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DEC 23 2011

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CDD-A 11-443352

December 3, 2011

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

RECEIVED
11 DEC -9 P2:01
OFC. OF ENVIRONMENTAL
QUALITY CONTROL

Dear Mr. Hooser

Subject: Draft Environmental Assessment (DEA)
Highway Improvements, Roadway Repair
Vicinity of 3798 Tantalus Drive, Honolulu, Hawaii

The Department of Design and Construction, City and County of Honolulu, has reviewed the Draft Environmental Assessment (DEA) for the subject project, and anticipates a Finding of No Significant Impact (FONSI) determination. Please publish notice of availability in the next available OEQC Environmental Notice.

We have enclosed a completed OEQC Publication Form, two hardcopies of the DEA, and a pdf version on CD-ROM.

Should you have any questions, please contact Michael Yamasaki of the Civil Division, Department of Design and Construction, at 768-8824, or our consultant, Nancy Nishikawa with Kimura International Inc. (nnishikawa@kimurainternational.com), at 944-8848. Your early attention to this matter will be appreciated.

Very truly yours,


Collins D. Lam, P.E.
Director

MY:MKHY:lal

Enclosures

OEQC Publication Form The Environmental Notice

Instructions to Applicant or Agency:

1. Fill out this Publication Form and email to: oeqc@doh.hawaii.gov
2. Send a pdf copy of the EA / EIS and 2 hardcopies to OEQC. Mahalo.

Name of Project: Highway Improvements, Roadway Repair, Vicinity of 3798 Tantalus Drive
Applicable Law: Ch, 343, HRS
Type of Document: DEA
Island: O'ahu
District: Honolulu (Kona)
TMK: 2-5-012: 004 and 014; 2-5-019: 005 and 009
Permits Required: DOH Noise Permit

Name of Applicant or Proposing Agency: City and County of Honolulu, Department of Design and Construction
Address: 650 South King Street, 11th Floor
City, State, Zip: Honolulu, HI 96813
Contact and Phone: Michael Yamasaki, Ph. 768-8824

Approving Agency: City and County of Honolulu, Department of Design and Construction
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Consultant: Kimura International, Inc.
Address: 1600 Kapiolani Boulevard, Suite 1610
City, State, Zip: Honolulu, HI 96814
Contact and Phone: Nancy Nishikawa, Ph. 944-8848

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

The Honolulu Department of Design and Construction (DDC) proposes to repair an existing crib wall and improve a portion of Tantalus Drive known as the Hogsback, in the vicinity of 3798 Tantalus Drive. Voids in the existing crib wall will be filled then encapsulated with mesh reinforced shotcrete. A 200-foot section of the road will be reconstructed using a reinforced concrete slab supported by a deep foundation system of drilled shafts. New reinforced concrete railings (barrier walls) will be integrated with the concrete slab. The project also includes drainage and erosion control improvements and ancillary roadway improvements.

The project is necessary to stabilize the road, maintain its long-term use, and improve public safety.

Tantalus-Round Top Drive is a historic road that is listed on the National and Hawaii Registers of Historic Places. In reconstructing the road segment, the project proposes to demolish and remove adjacent concrete rubble masonry walls, concrete curbs, and a spillway—contributing elements to the historic road. Design features to mitigate these changes include molding the concrete to match the textures of existing facilities, color conditioning to blend with the existing environment, and reusing salvaged construction material. Removal of tall trees and brush will improve views from the Hogsback, also part of the area's historic character.

Construction is estimated to take 12 months. Because of space constraints in the construction zone, and for safety reasons, approximately 850 feet of Tantalus Drive will be closed for about 5 months. A traffic control plan will be implemented. Construction-related noise and dust impacts will be mitigated through BMPs.



**Highway Improvements,
Roadway Repair
Vicinity of 3798 Tantalus Drive**
Honolulu, Oahu, Hawaii

Department of Design and Construction
City and County of Honolulu

December 2011

**Highway Improvements, Roadway Repair
Vicinity of 3798 Tantalus Drive
Honolulu, Hawai'i**

Prepared for

Department of Design and Construction
City and County of Honolulu
650 South King Street
Honolulu, HI 96813

Prepared by

Kimura International, Inc.
1600 Kapi'olani Boulevard, Suite 1610
Honolulu, HI 96814

December 2011

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- B. *Traffic Assessment: Closure of a Portion of Tantalus Drive, Vicinity of 3798 Tantalus Drive, Honolulu, Hawaii. Prepared by Julian Ng Inc., October 2011*

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Glossary of Acronyms and Hawaiian Terms*

AASHTO	American Association of State Highway Transportation Officials
AC	asphalt concrete
ADA	Americans with Disabilities Act
ADAAG	Americans with Disabilities Act Accessibility Guidelines
<i>ahupua'a</i>	a land division usually extending from the uplands to the sea
BMP	Best Management Practice
CRM	concrete masonry rubble
DDC	Department of Design and Construction
DEA	Draft Environmental Assessment
DOH	Department of Health, State of Hawaii
DP	Development Plan
EA	Environmental Assessment
FEA	Final Environmental Assessment
FONSI	Finding of No Significant Impact
HAR	Hawai'i Administrative Rules
HRS	Hawai'i Revised Statutes
<i>heiau</i>	Pre-Christian place of worship; shrine
<i>makai</i>	toward the ocean (seaward)
<i>mauka</i>	toward the mountains (landward)
MSL	mean sea level
NPDES	National Pollutant Discharge Elimination System
OEQC	Office of Environmental Quality Control
PUC	Primary Urban Center
SHPD	State Historic Preservation Division
SMA	Special Management Area
TMK	tax map key
TRM	turf reinforcement matting

* English definitions of Hawaiian terms from *Hawaiian Dictionary*, Revised and Enlarged Edition (Pukui and Elbert, 1986) and *Dictionary of Hawaiian Legal Land-Terms* (Lucas, 1995)

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1 INTRODUCTION

1.1 PROPOSING AGENCY AND ACTION

The City and County of Honolulu, Department of Design and Construction (DDC) proposes to repair an existing crib wall and make improvements to a portion of Tantalus Drive in the vicinity of 3798 Tantalus Drive.

The proposed improvements will repair the existing crib wall and fill all void spaces in the crib wall with fine gravel fill or other suitable material, then encapsulate the crib wall with metal mesh reinforced shotcrete.

The project also proposes to demolish and remove the existing asphalt concrete (AC) concrete roadway surface and adjacent concrete rubble masonry (CRM) walls. The new roadway will be constructed using a 200-foot reinforced concrete slab which will be supported by a deep foundation system consisting of drilled shafts. Integrated with the concrete slab will be new reinforced concrete railings (barrier walls) that are textured to a rock pattern and colored to match the existing CRM walls. A series of drainage slots at the bottom of the new concrete railing will discharge stormwater runoff from the roadway to land in the adjacent Pauoa Valley.

The project includes clearing and grubbing, new metal guardrails, signs, roadway striping, erosion control matting and grassing, landscaping, and ancillary roadway improvements.

1.2 PROJECT AREA

The project area is located in the Honolulu (Kona) District, island of O‘ahu, on portions of lands identified as TMKs: 2-5-012: 004 and 014, and 2-5-019: 005 and 009. The project area encompasses approximately 0.36 acre (or 15,700 square feet) of a southwest facing ridge. It extends from the northern end of the one-lane section known as the ‘Hogsback’ to the junction of Tantalus Drive and Telephone Road.

The project area is located at an elevation of approximately 1430 feet above mean sea level. Steep slopes drop down on the south side to Kānealole Stream in Makiki Valley, approximately 100-150 feet below the level of the road. On the north side, Pauoa Stream lies approximately 725 feet below the level of the road. The land around the project area is heavily vegetated and located in the Department of Land and Natural Resources’ Honolulu Watershed Forest Reserve.

Construction will affect approximately 450 linear feet of roadway, including the new concrete slab section, AC pavement approaches, and Hawaiian Telcom ductline work. Given the narrow, confined roadway in the Hogsback, an additional 400 feet of Tantalus Drive *makai* of the construction site will be used as a staging area for storing and maneuvering material and equipment. The one-lane section of the Hogsback will be used for staging, but is not within the

limits for active construction. The project area, therefore, covers a section of Tantalus Drive that is approximately 850 feet in length.

1.3 PROJECT PURPOSE AND NEED

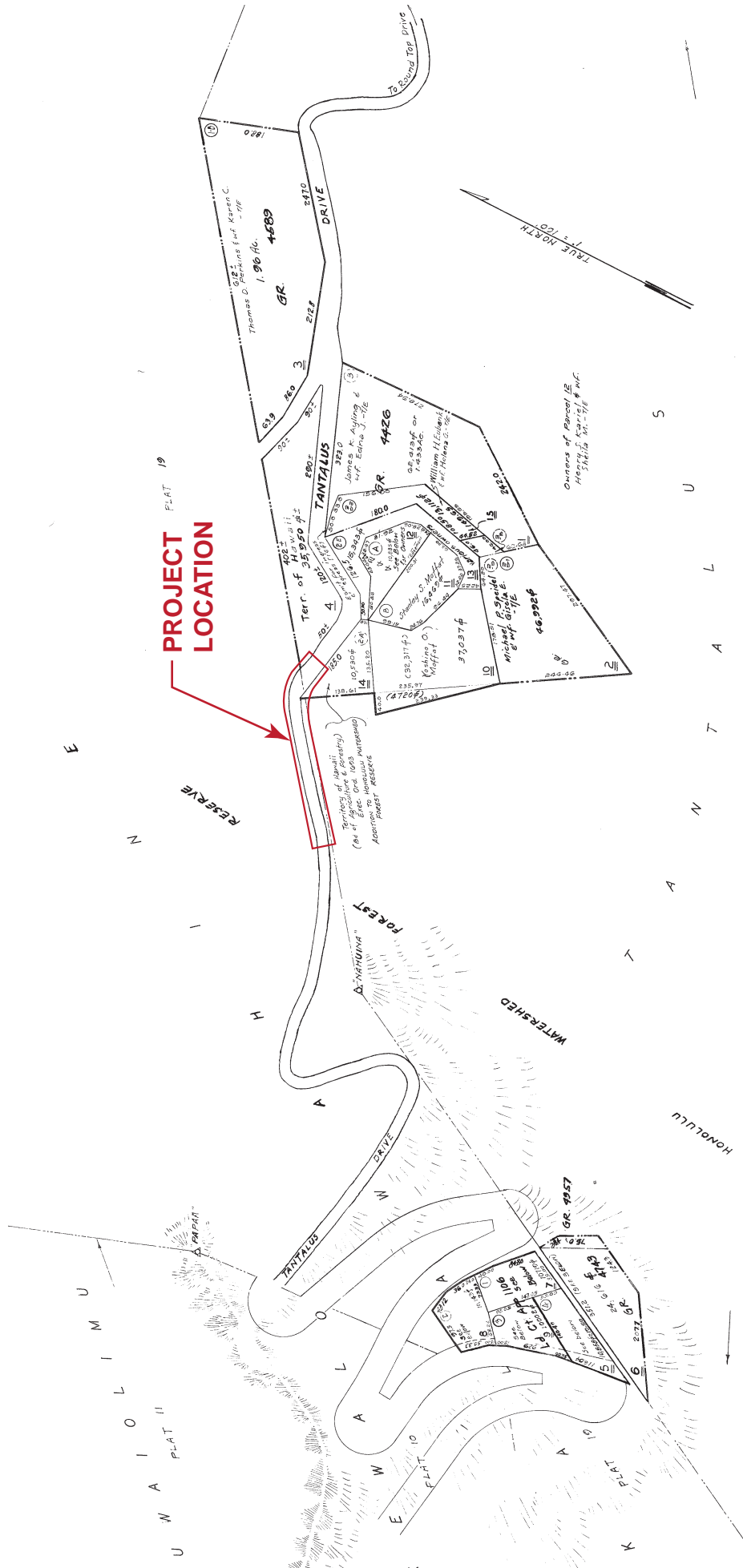
The City and County of Honolulu is responsible for maintaining the functional and structural integrity of Tantalus Drive. In 2005, a study of the crib wall was initiated when pavement cracks were observed near by and visual observations of crib wall deterioration raised concerns about its structural performance. The crib wall supports the inbound lane (*makai* direction) of traffic. One vertical cell of the crib wall structure was observed to be completely hollow and erosion had left adjacent cells only partially filled. Based on the study's findings, the City determined that a long-term solution was needed. The proposed action will slow further deterioration, and repair and reinforce the concrete members before the stability of the structure is compromised.

Additional engineering studies found that the structural integrity on the opposite side of the roadway—the outbound *mauka* lane—is also susceptible to subsidence. Therefore, the long-term solution to stabilize the roadway includes reconstruction on a deep foundation system. The new roadway has been designed to meet current safety standards adopted by the City and County of Honolulu, and will extend the operational life of the roadway.

1.4 PURPOSE OF THE DRAFT ENVIRONMENTAL ASSESSMENT

This Draft Environmental Assessment (DEA) was prepared for the proposed action pursuant to Chapter 343, Hawai'i Revised Statutes (HRS); and State Department of Health Title 11, Chapter 200, Administrative Rules. The specific triggers applicable to the proposed action are the following:

- Use of county lands or use of county funds
- Use within any historic site as designated in the National Register or Hawai'i Register, as provided for in the Historic Preservation Act of 1966, Public Law 89-665, or chapter 6E



**PROJECT
LOCATION**

Owners of Parcel 5:
Margaret Titcomb
8000 Kalia Rd.
Honolulu, HI 96816

Owners of Parcel 6:
Julius M. Vetter
6411 Kalia Rd.
Honolulu, HI 96816

Owners of Parcel 7:
Margaret G. Madson

FIRST DIVISION	2
ZONE	5
SEC.	12
PLAT	19
CONTAINING 6 PARCELS	
SCALE: 1 in = 100 FT.	

ADVANCE SHEET
SUBJECT TO CHANGE

FIGURE
2

TAX MAP

Note: Other project TMKs not shown
2-5-019-005 and 009

Highway Improvements,
Roadway Repair
Vicinity of 3798 Tantalus Drive
Environmental Assessment
December 2011

Not to Scale



FIGURE

3

AERIAL PHOTOGRAPH

Highway Improvements,
 Roadway Repair
 Vicinity of 3798 Tantalus Drive
 Environmental Assessment
 December 2011



1.5 STEPS IN THE ENVIRONMENTAL REVIEW AND IMPLEMENTATION PROCESS

Once completed, the DEA is submitted to the State Office of Environmental Quality Control (OEQC) for processing. The OEQC will notify the public that the DEA is available for review with an announcement in a bimonthly bulletin called the *OEQC Environmental Notice*. Publication in the *Notice* initiates a 30-day comment period during which government agencies and interested members of the public can review and comment on the EA findings. After the review period has ended, the DDC will review all comments and determine whether the EA warrants a Finding of No Significant Impact (FONSI).

1.6 PERMITS AND APPROVALS REQUIRED OR POTENTIALLY REQUIRED

The following government permits are required or potentially required to implement the proposed action:

- Construction Noise Permit, State Department of Health
- Construction Noise Variance, State Department of Health
- Grading Permit, City and County of Honolulu, Department of Planning and Permitting
- Street Use Permit, City and County of Honolulu, Department of Transportation Services

1.7 PROJECT SUMMARY

Project Name	Highway Improvements, Roadway Repair, Vicinity of 3798 Tantalus Drive
Proposing Agency	City and County of Honolulu, Department of Design and Construction
Approving Agency	City and County of Honolulu, Department of Design and Construction
Anticipated Determination	Finding of No Significant Impact (FONSI)
Tax Map Keys	[1] 2-5-012: 004 and 014 and [1] 2-5-019: 005 and 009
Existing Uses of the Site	Project is located within a roadway and largely surrounded by forest land. Six residences are located <i>mauka</i> of the project area on the hillside of Makiki Valley. .
Proposed Project	The project proposes clearing of vegetation and tree removal; demolition work; shotcrete lining to repair the existing crib wall; relocation of Hawaiian Telcom underground duct line facilities; construction of a 16-inch thick reinforced concrete slab supported on 2-foot diameter by 33-foot deep drilled shafts; construction of concrete railings (barrier walls), concrete rubble masonry (CRM) walls, metal guardrails, and concrete and asphalt concrete pavement restoration; drainage improvements and erosion control measures; landscaping; signing, striping, and pavement markings.
State Land Use	Conservation District
Primary Urban Center (PUC) Development Plan	The project area is located within an area designated for Preservation use in the PUC Development Plan, outside the Urban Community Boundary.
Zoning	The project area is zoned P-1 Restricted Preservation.
Special Management Area (SMA) Designation	The project area is not located within the SMA.

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2. PROJECT ALTERNATIVES

2.1 PROJECT BACKGROUND

In 2005, the DDC initiated a crib wall study when pavement cracks were observed in the vicinity and visual observations of deterioration in the crib wall raised concern about the stability of the structure. One vertical cell of the crib wall structure was observed to be completely hollow and erosion had left adjacent cells only partially filled.

Existing Facilities

The existing roadway is located along a ridge line that overlooks Pauoa Valley and Pacific Heights to the north and upper Makiki Valley to the south. The roadway is paved with asphalt concrete (AC) and supports two lanes of traffic (one lane in each direction). The width of the road varies from approximately 22 to 28 feet. The AC pavement structure varies in thickness from 8 to 12 inches. The roadway in the project area generally slopes toward Pauoa Valley. Although upper Tantalus Drive was repaved in April 2009, longitudinal cracks can be seen in the roadway pavement.

The roadway is delineated by concrete curb, concrete rubble masonry (CRM) wall, or guardrail on either side. The northern edge of the roadway is supported by the crib wall structure, measuring approximately 16-20 feet high and 120 feet long. The southern edge of the roadway is supported by a low CRM gravity retaining wall.

The site is heavily overgrown with steep slopes on both sides of the roadway. Vegetation and large trees grow from the material retained in the existing crib wall. Large roots can be seen protruding between the cribs and displacing or damaging the crib beams. In some areas, portions of the crib wall can be observed from the roadway in between the heavily vegetated hillside. The exposed face of the crib wall structure is intact; however, surfaces of the concrete members are weathered and worn. Minor spalls and signs of deterioration due to corrosion are visible.

The existing asphalt concrete curbs and low CRM walls located on both sides of the road contain the stormwater runoff within the roadway section. There is no opening in the existing asphalt concrete curb or CRM wall along the south (Makiki Valley) side of the roadway. Stormwater runoff crosses over to the north side, near the low point in the roadway and also discharges through the opening (spillway) in the CRM wall. The runoff then drops approximately 20 feet to the toe of the crib wall, where erosion has been observed. The runoff discharges to Pauoa Stream.

The existing drainage conditions have contributed to deterioration of the existing crib wall and roadway. Stormwater from the spillway has washed out fill material from within some of the crib wall cells. Continued exposure to stormwater runoff has also caused erosion of material from the cells.

There is an existing Hawaiian Telcom duct line under the roadway which contains telephone and cable television lines. There are no water or sewer facilities within the roadway in the project area. Overhead power lines, cables, and electric poles are present in the project area.

Photos of the Project Site

Photo 1. Tantalus Drive (looking *makai*, toward Makiki Heights Drive)

Photo 2. Tantalus Drive near junction with Telephone Road (looking *mauka*, toward Round Top Drive)

Photo 3. CRM wall slanting toward Makiki Valley, pavement cracks in roadway

Photo 4. Top of crib wall structure, adjacent to roadway

Photo 5. Crib wall structure supporting roadway

Photo 6. Close-up of crib wall shows erosion of fill material

Photo 7. Spillway directs stormwater flow toward Pauoa Valley



Photo 1. Tantalus Drive (looking *makai*, toward Makiki Heights Drive)



Photo 2. Tantalus Drive near junction with Telephone Road
(looking *mauka*, toward Round Top Drive)



Photo 3. CRM wall slanting toward Makiki Valley, pavement cracks in roadway



Photo 4. Top of crib wall structure, adjacent to roadway



Photo 5. Crib wall structure supporting roadway



Photo 6. Close-up of crib wall shows erosion of fill material



Photo 7. Spillway directs stormwater flow toward Pauoa Valley

2.2 PREFERRED ALTERNATIVE

Improvements to the roadway will maintain the existing alignment of Tantalus Drive. Roadway design has sought to balance historic features of the road and guidelines provided by the American Association of State Highway and Transportation Officials (AASHTO), Hawai'i Statewide Uniform Design Manual for Streets and Highways, and the Americans with Disabilities Act.

Major elements of the proposed improvements are described below.

Roadway Improvements (see Figures 4 and 5)

1. The roadway will consist of two 10-foot wide travel lanes (one lane in each direction) and 2-foot shoulder on either side. The roadway speed limit will remain at the level currently posted of 10 miles per hour.
2. Replace the existing AC pavement with a new 16-foot thick reinforced concrete slab supported on new 2-foot diameter drilled shafts. There will be a total of 78 drilled shafts extending approximately 33 feet deep. The concrete slab portion of the roadway will be approximately 200 feet long. The surface of the concrete roadway will be stained to match the color of AC pavement.
3. Construct new reinforced concrete railings along the length of the concrete slab roadway. The 42-inch high concrete railing is essentially a barrier wall that will be integrated with the concrete road slab, forming a consolidated structure. The railing will be constructed using textured form liners that create a rock-like texture. Concrete for the railings will be stained to match the existing rock walls.
4. Construct a short section of new CRM wall, partially consisting of rock material salvaged and cleaned following demolition of existing CRM walls.
5. Construct a short section of reinforced concrete wall that will be supported on four 2-foot diameter drilled shaft foundation.
6. Install new AC pavement at the approaches to the concrete slab portion of roadway.
7. Install hand-laid riprap north of Telephone Road at the trailhead of the Kalawahine Trail. This erosion-prone area lies under a large ficus tree where the lack of sunlight inhibits the growth of vegetative groundcover. Riprap material will consist of rock material salvaged and cleaned following demolition of existing CRM walls. A new concrete pad will be provided for a trash receptacle.
8. Reconstruct a portion of Telephone Road where it merges with Tantalus Drive.
9. Install metal guardrails, signs, striping, and pavement markings.

Crib Wall Repair (see Figure 6)

10. Fill voids in crib wall with fine gravel prior to applying shotcrete (sprayed concrete) to surface. Shotcrete surface will be reinforced with metal mesh and include a series of weepholes for drainage. The shotcrete lining on the surface of the crib wall will be color-conditioned or stained to match the color of existing soils. Pothos (*scindapsus aureus*) or other suitable vine or climbing species will be planted at the base of the crib wall to allow growth and screening of the shotcrete crib wall.
11. Construct new concrete planter on top of the crib wall. The planter will be used as a permanent Best Management Practice (BMP) to improve stormwater quality and disperse stormwater runoff over a greater area prior to discharging into Pauoa Valley for infiltration into the watershed.
12. Work on the crib wall is expected to be staged from Tantalus Drive. No temporary access road will be constructed into the valley.

Drainage Improvements

13. New concrete railing on the north (Pauoa Valley) side will have a series of drain slots on the bottom. The majority of the slots will discharge stormwater runoff into the planter for removal of sediment, debris, trash, nutrients, and other potential pollutants.
14. Install turf reinforcement matting (TRM) and landscaping on the slopes below railings and wall footings.

Underground Ductline

15. Relocate an existing Hawaiian Telcom ductline containing telecommunications cables and establish a new easement.

Tree Disposition Plan

16. Remove approximately 42 trees within the project limits and vicinity.
17. The landscaping plan calls for 14 new kukui (*aleurites moluccana*) to be planted below the base of the crib wall (north side) and adjacent to the roadway (south side). Groundcover will consist of pothos (*scindapsus aureus*) that will root through the TRM and further stabilize the ground by holding the TRM in place. Laua'e fern (*polypodium phymatodes*) has been selected for the planter and yellow ginger (*hedychium gardnerianum*) will be planted at the foot of the crib wall.

Other Project Activities

18. A portion of Tantalus Drive *makai* of the construction zone will be used as a staging area.

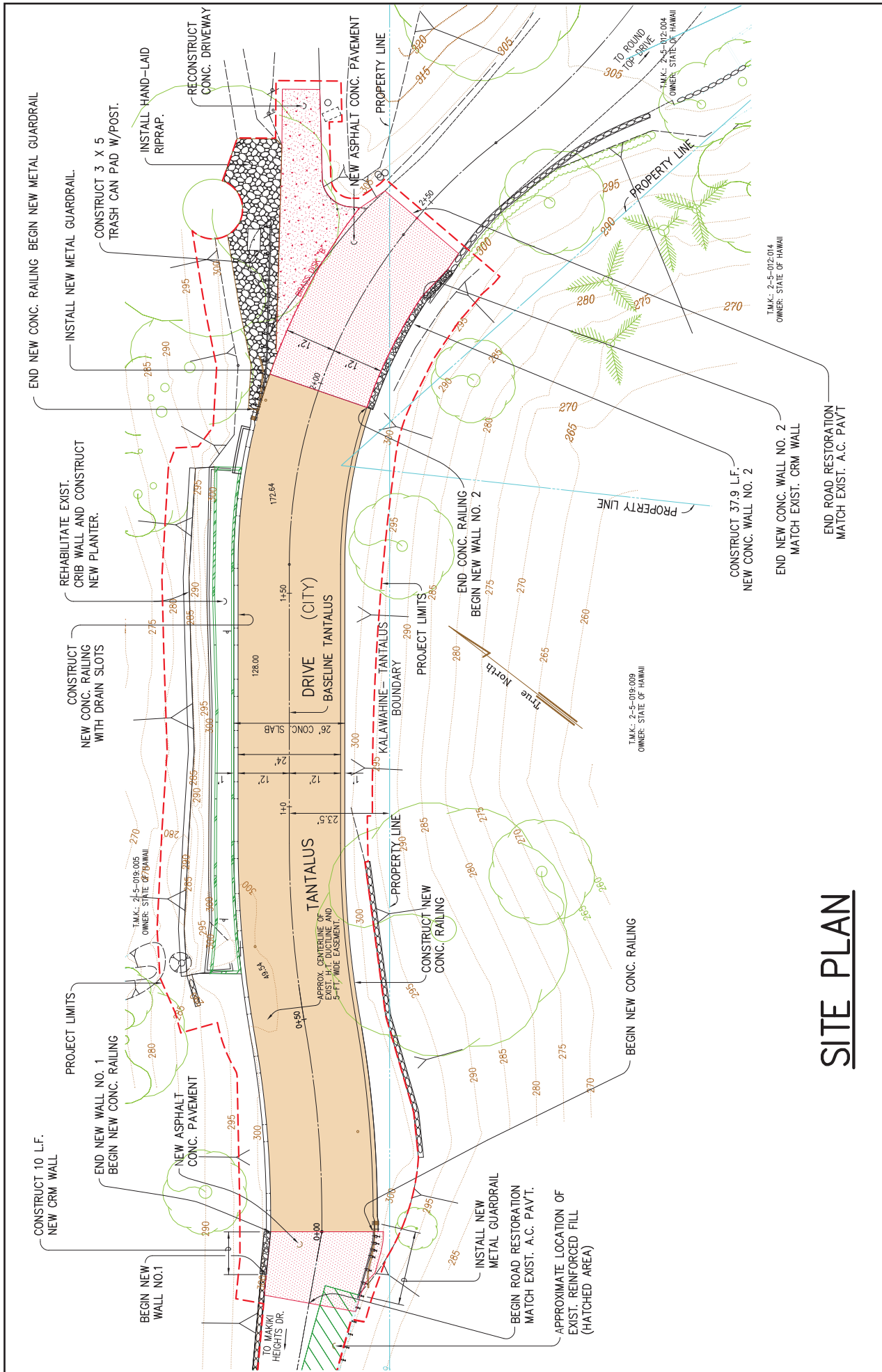
2.2.1 Construction Phasing and Traffic Control

The project will be implemented in phases in coordination with a traffic control plan (see Figure 7). Periodic road closures in the project area will be unavoidable because the facility extends across the entire ridge top with only a narrow space for construction workers and equipment. A tentative phasing plan has been developed to incrementalize the work and limit road closures to periods when required for the safety of both the construction crews and the public.

Table 1. Tentative Construction Phasing Plan and Traffic Control Plan

Phase	Description	Proposed Working Hrs	Road Operations
		Proposed Non-working Hrs	
1A	Drill and construct trial shaft	8:00 PM to 4:00 AM (next day)	Closed 8 hours
1B	No work	4:00 AM to 8:00 PM	Open
1C	Conduct and complete load tests	8:30 AM to 10:30 AM (next day)	Closed 26 hours
1D	Drill and construct drill shafts	8:00 PM to 4:00 AM (next day)	Closed 8 hours
2A	Install telecommunications conduits/ ducts and manholes (<i>makai</i> of Telephone Rd)	8:00 PM to 4:00 AM (next day)	Closed 8 hours
2B	No work	4:00 AM to 8:00 PM	Open
2C	Install telecommunications conduits/ ducts and manholes (Telephone Rd and vicinity)	8:30 AM to 3:30 PM	Open with contraflow*
3	Demolition, tree removal, crib wall repair, excavation and subgrade preparation, construction of concrete slab and railings, CRM wall, concrete planter, AC pavement restoration, installation of metal guardrails, signs, landscaping	8:30 AM to 6:30 PM	Closed 24 hours
4A	Demolition, tree removal, wall construction, AC pavement restoration, landscaping	8:30 AM to 3:30 PM	Open with contraflow*
4B	No work	3:30 PM to 8:30 AM (next day)	Open
5A	Demolition, excavation, construction of AC and concrete pavements, installation of metal guardrails, hand-laid riprap, landscaping—Tantalus Dr at Telephone Rd	8:30 AM to 3:30 PM	Open with contraflow*
5B	No work	3:30 PM to 8:30 AM (next day)	Open

* Contraflow refers to the use of one lane to circumvent construction area(s) with flagmen to control traffic flow.



SITE PLAN

FIGURE 4

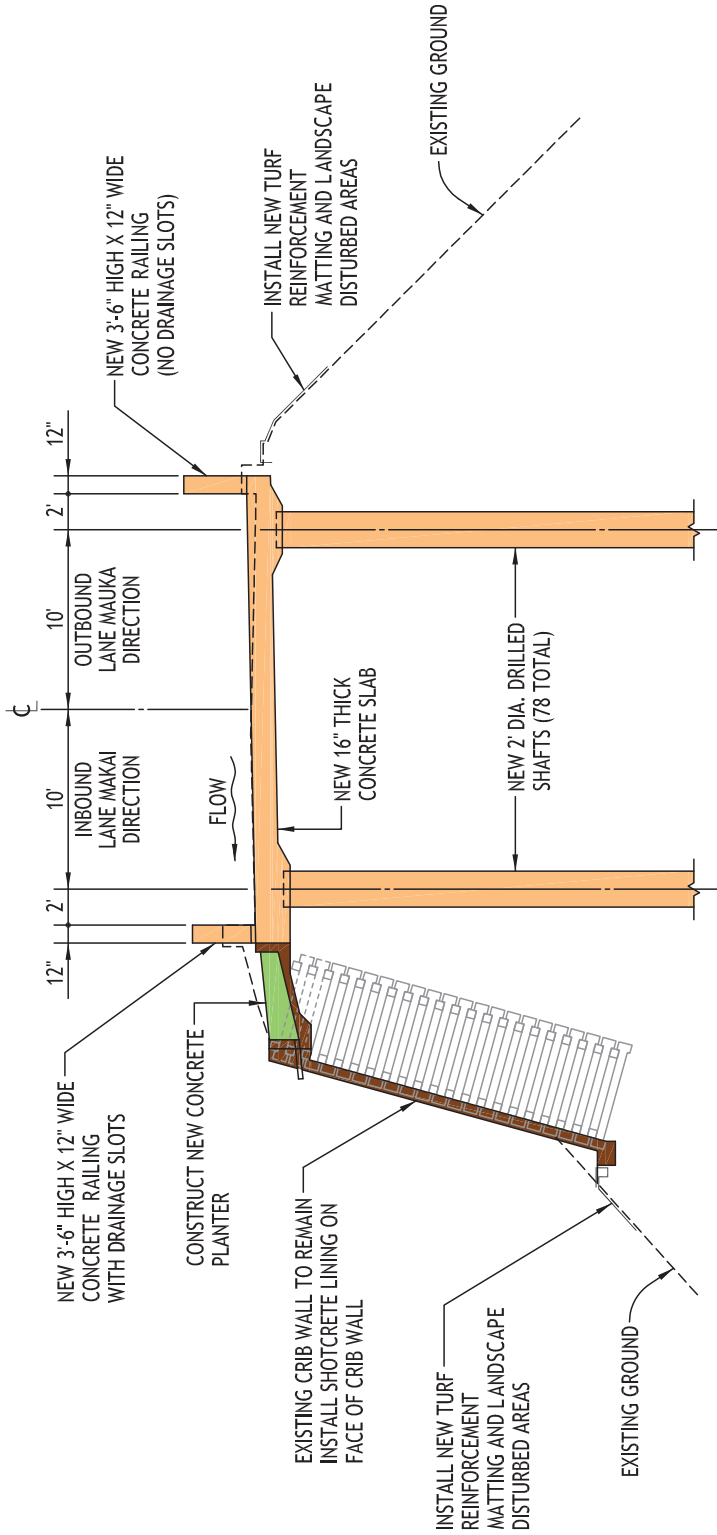
SITE PLAN

Highway Improvements,
Roadway Repair
Vicinity of 3798 Tantalus Drive
Environmental Assessment
December 2011

Not to Scale

NORTH
PAUOA VALLEY

SOUTH
MAKIKI VALLEY



SPECIAL DESIGN CONSIDERATIONS:

1. COLOR-CONDITIONED OR STAINED SHOTCRETE LINING FOR THE CRIB WALL. COLOR TO BE SIMILAR TO THE EXISTING SOILS.
2. POTHOS (SCINDAPUS AUREUS) OR OTHER APPROPRIATE CRAWLING PLANT IS BEING CONSIDERED TO BLEND THE SHOTCRETE FACE OF THE CRIB WALL INTO THE SURROUNDING ENVIRONMENT.
3. STAINED CONCRETE FOR THE FINISH ROADWAY SURFACE. COLOR TO MATCH THE ASPHALT CONCRETE PAVEMENT.
4. CUT STONE "BLUE ROCK" TEXTURING WITH STAINING OF THE NEW CONCRETE RAILINGS TO MATCH THE EXISTING CONCRETE RUBBLE MASONRY WALLS.
5. NEW PLANTER ALONG THE TOP OF THE EXISTING CRIB WALL TO BE USED FOR DRAINAGE AND STORMWATER QUALITY IMPROVEMENT PURPOSES.
 - DISTRIBUTE RUNOFF OVER A GREATER AREA TO MINIMIZE EROSION.
 - COLLECT DEBRIS, SEDIMENT AND TRASH.
 - REMOVE NUTRIENT AND OTHER POTENTIAL POLLUTANTS.
6. LAUAE FERN, UKI UKI OR OTHER APPROPRIATE NATIVE HAWAIIAN PLANT WILL BE USED FOR THE PLANTER. THE PLANT SHALL BE LOW MAINTENANCE AND SUITABLE FOR THE ENVIRONMENT.



Not to Scale

Highway Improvements,
Roadway Repair
Vicinity of 3798 Tantalus Drive
Environmental Assessment
December 2011

FIGURE
5

TYPICAL SECTION

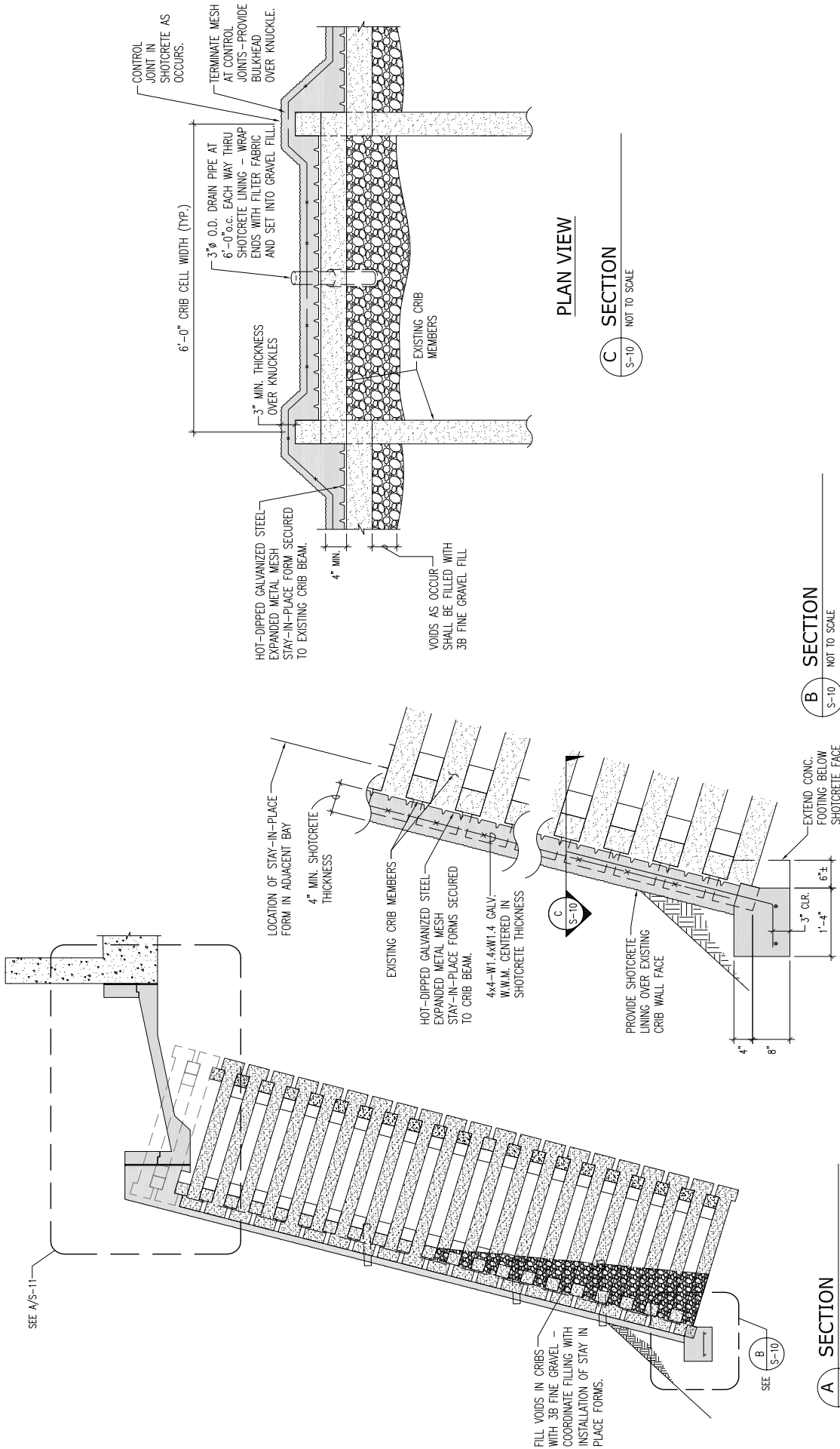


FIGURE 6

REHABILITATION OF CRIB WALL SECTION

Highway Improvements,
Roadway Repair
Vicinity of 3798 Tantalus Drive
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Not to Scale

2.2.2 Project Schedule

Construction is anticipated to start in September 2012 and take approximately 12 months to complete. Because of space constraints in the construction zone, and for the safety of the public and work crew, a section of Tantalus Drive will likely be closed to pedestrian, bicycle, and vehicular traffic for a minimum of 5 months. If construction begins in September 2012, road closure is projected to take place from April through August. Extended construction work hours and night work are being considered to shorten the road closure period.

2.2.3 Cost Estimate

Construction costs are estimated at \$3.7 million. Funds are being allocated through the City and County of Honolulu's capital improvement program for FY 2012-13.

2.3 ALTERNATIVES CONSIDERED, BUT NOT CARRIED FORWARD

A range of alternatives were considered in relation to the project purpose and need, including no action and alternative structural designs. These options are described below.

2.3.1 No Action

The no-action or no-build alternative would forego major structural improvements to the Hogsback section of Tantalus Drive and limit City action to routine maintenance, such as resurfacing. Environmental impacts would be avoided, construction costs spared, and there would be no need to obtain permits. However, without correcting structural deficiencies in the Hogsback, the potential for structural instability and road failure would not be addressed. The no action alternative would continue to pose a hazard to motorists and other users of the roadway and to adjacent property owners.

2.3.2 Conventional Concrete Retaining Wall

A conventional retaining wall would consist of a large rectangular reinforced concrete footing and a reinforced concrete stem wall. The footing would likely extend within the existing roadway and require total closure for the duration of the wall construction. Construction would require removal of the existing crib wall structure and excavation of most of the roadway for the installation of the footing. Temporary relocation and reinstallation of the existing utility duct line would be required. If founded on suitable material, the wall would be a permanent and stable structure.

Drainage improvements would be included in the project. Installation of catch basins, a drain inlet, a drain manhole and reinforced concrete pipes would be incorporated into the project to ensure adequate collection and discharge of stormwater through the retaining wall system.

This system would have several drawbacks. The most significant is that the foundation of the wall would have to be founded deep enough to preclude undermining at the base. Since the wall would be constructed on a relatively steep slope, the additional depth required to adequately embed the footing may be significant. A shallow retaining wall would be structurally unacceptable.

2.3.3 Segmental Retaining Wall

The segmental retaining wall option would consist of precast concrete or masonry modular face units with an engineered fill reinforced with a formed polypropylene grid structure. The polypropylene grid is also referred to as geogrid. The engineered fill would consist of a geogrid placed between low lifts of engineered fill material. The geogrid would be mechanically attached to the face units. Combined, the geogrid, engineered fill, and modular blocks would form a unit that functions like a gravity retaining wall. No special construction equipment would be required for this option and the modular face units could be constructed off site.

The proposed design for drainage improvements would include catch basins, a drain inlet, a drain manhole and reinforced concrete pipes. Catch basins would be located at the low point or sag on each side of the road. A grated drain inlet was proposed along the south side of the roadway, approximately 1,110 feet *mauka* of a new catch basin. The grated inlet would reduce the amount of runoff flowing to the new catch basins. The new catch basins and grated inlet would minimize the flow from spreading beyond a width of 8 feet.

Stormwater runoff collected in the drainage system would be allowed to drop within the new catch basin located on the north side of the road. This would reduce the flow velocity and dissipate the energy prior to being discharged onto the slope of Pauoa Valley. Gabions were proposed at the outlet of the drainage system and along a portion of the eroded slope of Pauoa Valley to minimize flow velocity and stabilize the eroded areas. CRM or dumped riprap could also be used as an erosion control measure at the outlet.

The new roadway surface would be crowned to drain surface runoff to both sides of the roadway. Draining the water to both sides would minimize the potential for erosion of the existing hillside. An internal drainage system consisting of catch basins, a grated intake structure, a drain manhole, and reinforced concrete drain pipes would be incorporated into the new wall structure to ensure that surface runoff is collected and discharged at specific locations at the base of the wall. Dumped riprap or gabions were proposed at the outlet of the drainage system for erosion control.

This option would require complete removal of the existing crib wall structure and remaining fill. Complete road closure for the duration of construction would be required since the excavation for the system will extend to the base of the existing wall.

Temporary relocation of the existing Hawaiian Telcom duct line would be required during construction of the segmental retaining wall. The telephone and communication lines could be temporarily relocated around the construction site or installed on wooden poles. The duct line

and telecommunication line would be reinstalled after the wall is constructed. Once completed, it may be difficult to excavate and install future utilities within the roadway because of the presence of the engineered fill and geogrids. Damage to the geogrids could affect the structural integrity of the wall system.

The 2005 crib wall study (Shigemura, Lau, Sakanashi, Higuchi & Associates, Inc.) recommended this option. This option focused corrective action on the north (Pauoa Valley) side of the roadway and did not address potential structural weaknesses on the south (Makiki Valley) side. When further engineering investigations determined that the entire roadway required stabilization, the preferred option was reevaluated and the option discussed in Section 2.2, above, was selected.

2.3.4 Drilled Shaft Retaining Wall

The drilled shaft retaining wall would consist of closely spaced cantilevered drilled shafts. The shafts would be reinforced concrete caissons approximately 48 inches in diameter and spaced approximately 5 feet apart. The total shaft length was estimated to be 50 feet. The drilled shafts would require special drilling equipment. The drilled shafts could be located on the roadside of the existing crib structure so that removal of the crib wall structure would not be necessary or required. While the crib wall would not be functional and its presence would not affect the performance of the drilled shaft retaining wall, the structure would continue to deteriorate and possibly become a safety problem so it was recommended that the crib structure be dismantled after placement of the drilled shafts was completed.

A drainage system similar to the description in Section 2.2.3, above, using grated inlets, drain manholes, and reinforced concrete pipes would be included with this option.

2.3.5 Soil-Nailed Wall

The soil-nailed wall option would consist of rebars or other bar sections installed in small diameter holes that are drilled into the face of the excavation face. The bars would be grouted in place with the exposed ends doweled into shotcrete walls that would line the exterior surface. This wall option could be constructed from the top and proceed to the base of the wall. The area taken up by the crib wall structure would be lost as the crib wall elements would be removed for the installation of the soil nails. The loss of area would require that the new roadway width be reduced slightly from the existing width. Special drilling equipment would be required to drill and grout the soil nails.

Similar to the Segmental Retaining Wall option, once completed, it may be difficult to excavate and install future utilities within the roadway because of the presence of soil nails under the road. Damage to the soil nails could affect the structural integrity of the wall system.

A drainage system similar to the description in Section 2.2.3, above, using grated inlets, drain manholes, and reinforced concrete pipes would be included with this option.

2.4 TEMPORARY PEDESTRIAN ROUTE

Based on a request from the Department of Land and Natural Resources, Division of Forestry and Wildlife, the DDC studied the possibility of providing a temporary walkway to allow pedestrians (and bicyclists) to traverse the construction zone. A conceptual plan for a cantilevered walkway along the south (Makiki) side of the roadway was prepared and estimated to cost more than \$0.5 million. Given the high cost of the facility and concerns about public access through a tight and hazardous construction area, the DDC determined that the temporary pedestrian route would not be feasible.

3 AFFECTED ENVIRONMENT, IMPACTS, AND MITIGATION

3.1 PHYSICAL RESOURCES

3.1.1 Geology and Soils

Existing Conditions

According to the *Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii* (U.S. Department of Agriculture Soil and Conservation Service), soils in the project area consists of Tantalus Silt Loam (TAF) soil with 40% to 70% slope. The Tantalus Soils Series are comprised of well-drained soils on uplands on the island of O‘ahu. These soils developed in volcanic ash and material weathered from cinders. The TAF soils are found on moderate to very steep slopes. According to the *Soil Survey*, a representative profile includes a surface layer, about 18 inches deep, that is very dark brown silt loam with a subangular, blocky structure. The subsoil, about 11 inches thick, is dark reddish brown, very fine sandy loam. The substratum is black, unweathered, gravel-size cinders. Permeability is moderately rapid. Runoff is medium to rapid, and the erosion hazard is severe. See area topography in Figure 8.

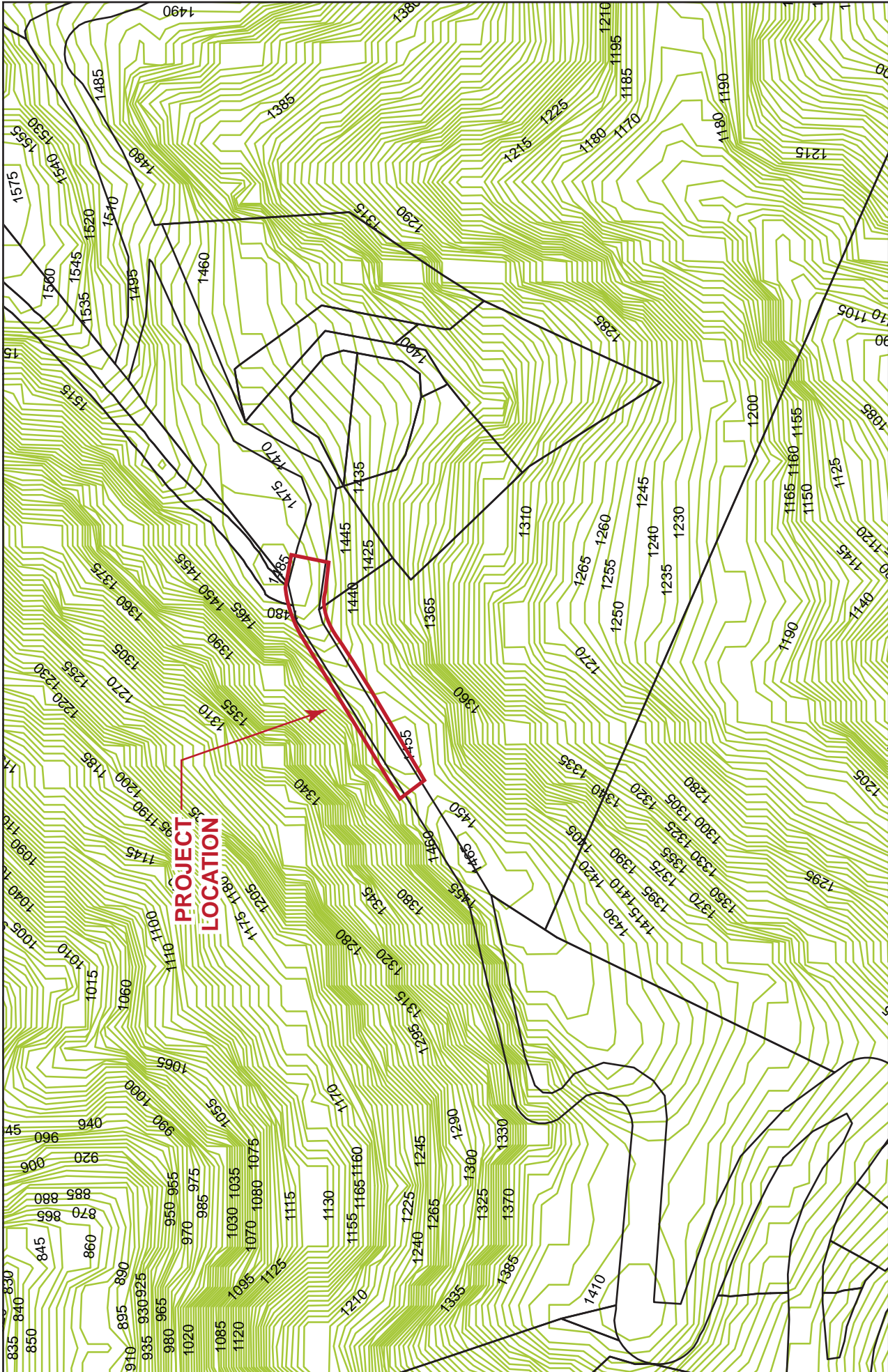
A geotechnical study was completed by Yogi Kwong Engineers (YKE), LLC in March 2010 to support preliminary engineering design. YKE drilled and sampled 5 borings to approximate depths of 60 to 61.5 feet below the existing ground surface. Based on the exploratory borings, the existing ground surface within the project area is covered by approximately 8- to 12-inch thick AC pavement. Below the AC pavement, a fill or volcanic cinder layer was encountered, ranging from 1 to 5 feet in thickness. It is probable that the volcanic cinders were excavated from nearby area as fill material during construction of the roadway. In general, the fill material was made up of medium dense to very dense, dark brown to brown and gray silty cinder sand with gravel or roots.

Potential Impacts and Mitigation Measures

The total quantity of material to be excavated within the project area is estimated at approximately 620 cubic yards. No slope embankment or fill is anticipated for construction.

The following measures will be implemented to reduce the potential for erosion control:

- Install temporary erosion control measures, including temporary compost sock, sediment control filter, and temporary crushed rock at ingress/egress sites.
- Moisten exposed dirt areas to prevent dust pollution and nuisance.
- Grass/mulch all exposed slopes for dust and erosion control.
- Inspect, maintain, and repair erosion control measures throughout the duration of construction.
- Monitor and maintain compost socks and sediment control filter during times of above normal rainfall events and periodically.





**PROJECT
LOCATION**

FIGURE 8

TOPOGRAPHY

Highway Improvements,
Roadway Repair
Vicinity of 3798 Tantalus Drive
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Source: Hawaii State GIS

Scale in Feet

The project area will be less than 1 acre and is not expected to require a National Pollutant Discharge Elimination System (NPDES) permit.

3.1.2 Climate and Air Quality

Existing Conditions

The Makiki Heights-Tantalus project area is located in the wet, Ko‘olau Mountain Range at an elevation of approximately 1430 feet above mean sea level. The area receives an average annual rainfall of approximately 120 inches. Seasonal variation in rainfall occurs with higher rainfall during the months of November through April. Temperatures are typically mild and uniform, with the monthly average ranging from 70°F in January to 78°F in August. Prevailing winds are northeasterly tradewinds which occur approximately 70 percent of the time. Tradewind frequency ranges from about 45 percent in January to more than 90 percent in July. High winds are most likely to occur during the winter months. Humidity in the area ranges between 70 to 80 percent with higher humidity levels occurring during the winter months and lower during the summer months.

The State Department of Health operates a network of air quality monitoring stations at various locations on O‘ahu. The air quality monitoring stations located closest to the project site are in Honolulu and Sand Island. In general, it can be assumed that air quality in the project area is good. The predominant source of air emissions is vehicular traffic that produces carbon monoxide (CO) and carbon dioxide (CO₂). Prevailing tradewinds contribute to favorable climatic conditions for air quality in this rural area, vehicular emissions are negligible given low traffic volumes, and there are no large, stationary industrial facilities in the vicinity.

Potential Impacts and Mitigation Measures

Construction activities will result in temporary and localized impacts on air quality in areas adjacent to the construction site. Equipment used during the construction phase will emit exhaust and airborne particulates, and construction work will produce dust. Due to the low background levels of pollutants in the area and favorable climatic conditions, increased vehicular emissions are not expected to be significant. Construction vehicles will arrive and depart at staggered times. The contractor will use vehicles that are properly maintained.

During demolition and construction, the contractor will sprinkle water, as necessary, to control dust. Transported or stored soils will be covered. Areas graded and cleared of vegetation will be revegetated as soon as possible to reduce dust.

Construction activities will employ fugitive dust emission control measures in compliance with provisions of the State Department of Health Rules and Regulations (Chapter 43, Section 10), and Hawai‘i Administrative Rules (HAR), Chapter 11-60.1, “Air Pollution Control,” Section 11-60.1-33 on Fugitive Dust.

In the long-term, the roadway improvements are not expected to produce changes in traffic volume or in the levels of vehicular air emissions.

3.1.3 Water Quality

Groundwater: Existing Conditions

Groundwater was not encountered in the exploratory borings during field exploration for the geotechnical study (Yogi Kwong Engineers LLC, March 2010). However, the study noted that subsurface seepage or groundwater may occur based on experience with similar subsurface conditions. The study further noted that higher groundwater levels should be anticipated during or after rainy periods.

Potential Impacts and Mitigation Measures

Construction methods anticipated for this project will not affect groundwater underlying the project site. Construction activities are not expected to introduce or release any materials into the soil that could adversely affect the groundwater.

Surface Water: Existing Conditions

Hawai'i experiences high rainfall, but most streams do not flow continuously throughout the year due to the high permeability of rocks and soils. Nevertheless, the steep slopes typical of watersheds in Hawai'i create conditions of high peak flows, making streams prone to flash flooding during storm events.

The project site is located approximately 1,500 feet northwest from Pauoa Stream and 1,000 feet southeast of Kānealole Stream. According to the *Hawaii Stream Assessment (1990)*, both streams are classified as tributaries of perennial streams. Pauoa Stream is a tributary of Nu'uānu Stream and Kānealole Stream is a tributary of Makiki Stream, which then flows into Ala Wai Stream.

Potential Impacts and Mitigation Measures

The proposed roadway improvements are not expected to have an adverse impact on water resources. Stormwater runoff naturally flows toward nearby streams in low-lying valleys. However, because the project site is surrounded by undeveloped land, runoff is more likely to infiltrate into the watershed.

In addition to temporary BMPs to be implemented during construction (see Section 3.1.1), the project will construct permanent BMPs, including:

- Installation of hand-laid riprap north of Telephone Road. This erosion-prone area lies under a large ficus tree where the lack of sunlight inhibits the growth of vegetative groundcover.

- Construction of a new concrete planter on top of the crib wall. The planter will collect sediment, debris, trash, nutrients, and other potential pollutants.
- Roadway will be graded to direct stormwater flow to the north (Pauoa Valley) side.
- The new concrete railing on the north side will have a series of drain slots on the bottom. The majority of the slots will discharge stormwater runoff into the planter before the stormwater runoff is dispersed over a greater area prior to discharging into Pauoa Valley.
- Turf reinforcement matting and landscaping will be installed on the slopes below railing and wall footings.

3.1.4 Natural Hazards

Flooding

According to the Federal Emergency Management Agency's Flood Insurance Rate Map (FIRM), lands at the project site are designated as Zone X, or areas of 100-year flooding with determined base flood elevations (see Figure 16).

The Flood Insurance Program does not have regulations for developments within Flood Zone X.

Seismic Activity

The island of O'ahu experiences earthquakes infrequently because the island is not situated in a high seismic area. The structural design for this project will be based on AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications (2010). Applicable structural elements will be designed based on the following seismic parameters:

Peak Ground Acceleration: $PGA = 0.17$
Importance Factor: Essential
Site Class: D
Spectral Accelerations: $S_s=0.40$, $S_1=0.11$
Seismic Zone: 2

3.1.5 Noise

Existing Conditions

Ambient noise levels at the project site are very low due to the predominance of open space and limited residential development. Traffic noise from Tantalus Drive is not a significant source of noise because of low traffic volumes.

Potential Impacts and Mitigation Measures

Construction-related Noise

Construction noise impacts are unavoidable, but will be temporary. The surrounding residential properties may be impacted by project construction noise due to their proximity. Actual noise levels produced during construction will be a function of the methods employed during each stage of construction. Pile drivers will not be needed because the shafts will be drilled into soil, and not rock. Shafts will be installed using truck-mounted drills that are outfitted with noise suppressors to mitigate construction noise. Other equipment likely to be used include crane, excavator, backhoe, grader, forklift, semi-trucks, dump trucks, concrete trucks, compactors, paving equipment, and compressors. Typical ranges of construction equipment noise vary between 70 and 95 dBA, which exceeds permissible levels. Earthmoving equipment, e.g., backhoes, front loaders, bulldozers, and diesel-powered trucks, will probably be the loudest equipment used during construction. The contractor will be required to maintain and properly muffle construction equipment and on-site vehicles that exhaust gas or air.

In cases where construction noise exceeds, or is expected to exceed the State's "maximum permissible" property line noise levels, a permit must be obtained from the State Department of Health (DOH) under Hawai'i Administrative Rules Chapter 11-46, Rules on Community Noise. In order for the DOH to issue a construction noise permit, the contractor must submit a noise permit application to the DOH which describes the construction activities for the project. Before issuing the permit, the DOH may require the contractor to incorporate noise mitigation into the construction plan. The DOH may also require the contractor to conduct a noise monitoring or community meeting inviting the neighboring residences and businesses to discuss construction noise.

The contractor should use reasonable and standard practices to mitigate noise, such as using mufflers on machines with diesel and gasoline engines, using property tuned and balanced machines, and so forth. The DOH may require additional noise mitigation treatments, such as a temporary barrier around a generator.

Specific permit restrictions required for construction projects by the DOH are:

- No permit shall allow construction activities creating excessive noise before 7:00 am and after 6:00 pm of the same day

- No permit shall allow construction activities which emit noise in excess of 95 dBA except between 9:00 am and 5:30 pm of the same day
- No permit shall allow construction activities which exceed the allowable noise levels on Sundays and on certain holidays. Pile driving and other activities exceeding 95 dBA will be prohibited on Saturdays.

The DOH noise permit does not limit the noise level generated at the construction site, but rather the times at which noisy construction can take place. Therefore, noise mitigation for construction activities will be addressed using project management to ensure compliance with time constraints.

In addition to the noise permit, a noise variance may be requested from the DOH for the specific occasions when work hours need to be extended into the evenings and/or on weekends to implement the overall construction schedule.

Long-term Noise Impacts

The proposed action will not change traffic counts or operational conditions (i.e., the posted speed limit). Therefore, after project completion, noise levels are expected to return to pre-construction levels.

3.2 BIOLOGICAL RESOURCES

3.2.1 Flora

Existing Conditions

Vegetation is a mix of native (*koa*, *māmaki*, *kukui*) and introduced (eucalyptus, acacia, lantana, and guava) trees, but this forested area is mainly the result of a reforestation program begun in 1910. A historic preservation literature review by Cultural Resources Hawai‘i (Hazlett et al. 2011) found that the Makiki-Tantalus forest underwent two periods of severe deforestation due to its proximity to Honolulu Harbor. From 1815 to 1826, timber was cut for the sandalwood trade with China. From 1833 to 1860, wood was harvested to provide fuel for the whaling trade. In addition, fires, farming, grazing by livestock and feral animals and harvesting for building materials contributed to the loss of the Makiki-Tantalus forest and its replacement by grasses. During the reforestation project begun in 1910, the ridge tops were planted with Norfolk Pines and ironwoods. Other common exotic trees include Java plum, avocado, and octopus tree. Introduced grasses, ginger, ki (or ti) plants, and other shrubs are the main understory plants. *Koa haole* is the dominant plant on the lower slopes.



Photo 8. Vegetation on north (Pauoa Valley) side of Tantalus Drive

Potential Impacts and Mitigation Measures

A tree disposition plan was prepared with the assistance of certified arborist Steve Nimz of Steve Nimz & Associates, LLC. This plan will remove approximately 42 trees and shrubs from the crib wall structure where invasive roots have contributed to the deterioration of the structure, and adjacent to the roadway where the site must be cleared and grubbed before construction can begin. Species to be removed include ficus, brassiaia, avocado, java plum, mock orange, fiddlewood, *hau*, *kukui*, and panax.

The project will not have any adverse effect on any endemic ecosystem or on any endangered or threatened plant species in the area.

3.2.2 Terrestrial and Avian Fauna

Existing Conditions

An environmental assessment was prepared for the Hawai‘i Public Radio (HPR) Facility (Analytical Planning Consultants Inc. and Land Planning Consultants LLC, February 2005), located atop Tantalus at an elevation of 1930 feet above mean sea level or approximately 500 feet higher than the Tantalus Drive project area that is the subject of this DEA. The two sites are connected by a utility access road known as Telephone Road. Because of the proximity of the two sites and shared environmental settings, faunal resources are expected to be similar. The HPR Facility EA described existing fauna as follows:

In September 2004, the Department of Land and Natural Resources, Division of Forestry and Wildlife was consulted regarding native and introduced bird species that may be found in the vicinity of the project site. According to a DLNR biologist, native birds that may be found in the area include ‘Apanepane (*Himatione sanguinea*), ‘Amakihi (*Hemignathus virens*), and, more rarely, Pueo (*Asio flammeus*). In addition, the Oahu Creeper (*paroreomyza Montana*), Elepaio (*Chasiempis sanvichensis ibidis*), and Iiwi (*Vestiaria coccininea*) were likely once common but are now no longer present. Hawaiian Hoary Bat (*Lasiurus cinereus semotus*) and Newell’s Shearwaters (Threatened) may fly over the area, but no reports exist due to the cryptic habits of these species. Several species of seabirds may also fly over the site such as Tropic birds and White terns. Introduced passerine birds include House Finch, Nutmeg Mannikin, Red-billed Leiothrix, Hwamei, Japanese White-eye, Common Myna, Common waxbill, and Northern Cardinal. The introduced Barn Owl is likely common in the area as well. Rats, mice, and feral cats may reside in some areas of the project site or the general area.

Potential Impacts and Mitigation Measures

The segment of roadway within the project limits is not lighted, and there is no proposal to add street lights.

The HPR Facility EA mentions the possibility that the *pueo* or Hawaiian endemic sub-species of the Short-eared Owl (*Asio flammeus sandwichensis*) forages within the larger Tantalus forest land. The O‘ahu population of this species is listed as endangered under State of Hawai‘i endangered species statutes, but it is not listed under the Federal Endangered Species Act. Because the habitat in the project area is highly disturbed due to man-made alterations, the site likely does not contain suitable nesting habitat for this species. There are larger areas of better foraging and nesting habitat within the forest reserve. If construction activity temporarily disturbs foraging *pueo*, such activity is unlikely to result in adverse impact to this species.

The project will not have any adverse effect on any endemic ecosystem or on any endangered or threatened animal species in the area.

3.3 CULTURAL RESOURCES

3.3.1 Archaeological and Historic Resources

The information in this section is based on a Literature Review and Field Investigation conducted by Cultural Surveys Hawai‘i (Hazlett et al. 2011) and reproduced in Appendix A.

Archaeological Background

Residents utilized Makiki Valley for the cultivation of taro and sweet potato during both pre-Contact and historic times. Pu‘u ‘Ualaka‘a (Round Top) was famous for having been the sweet

potato plantation of Kamehameha I. During the Mahele (1848-1852), large-scale crop cultivation land use was transformed into small-scale residential agriculture with associated habitation dwellings. Land Commission Award (LCA) documentation provides evidence of dry and wet agriculture of taro and sweet potato cultivation in the valleys. No *kuleana* LCAs were awarded in the vicinity of the project area.

Very little archaeological research has been conducted in the upland portions of Pauoa and Makiki *ahupua'a*. A pedestrian field investigation of the project site identified no potential archaeological sites or subsurface features. While burials have been identified in Makiki, they have all been located at the base of Round Top, more than a mile south of the project area.

Based on the cultural, archaeological, and historic documentation, the only historic site related to the project area would be related to transportation, specifically to State Inventory of Historic Places (SIHP) Site No. 50-8014-9019, Tantalus-Round Top Road.

Historical Background

Few persons lived in the uplands of Makiki prior to 1890. One resident was a Hawaiian man named Alakea who built a hale on the Kalawahine Trail, north of the project area. E. B. Scott's book *The Saga of the Sandwich Islands* features an 1899 picture of two carriages at a grassy turn-around on Pu'u 'Ōhi'a and claims "a winding path led further up the singularly bleak mountainside to a scrub covered two-thousand-foot summit, passing a native grass shack and twin-doored privy on the 'ewa shoulder of the mountain" (Scott 1968: 580).

Pu'u 'Ōhi'a gained the name of Mount Tantalus in the 19th century after a hiking excursion by a Punahou School hiking club found they were unable to broach the thick undergrowth, and were forced to give up their ascent. The students named the peak "Tantalus" for being unattainable.

In 1890, a number of citizens petitioned the Legislature for the construction of a carriage road to the top of Tantalus, to be paid for by the sale of government lots for residential use. The resident lots were surveyed and laid out in 1891, and construction began in 1892.

The road to the foot of Tantalus was completed by 1902, but wealthy citizens made extensions to reach their residences further east, first to the house of Senator Schmidt, and then to the Waterhouse Estate.

Construction of Round Top Drive (which connected the Tantalus Road back down into Makiki) did not begin until 1913, and was not completed until 1917.

In 1936, Tantalus-Round Top Road was paved as part of a series of road improvement undertaken by the Works Progress Administration (WPA). Further road work was curtailed during World War II, but the road was resurfaced in 1947. In 1953, low retaining walls and drainage culverts were added where needed. Only minor alterations have been made to the road since 1954; resurfacing and the installation of metal guardrails, number signs, speed limit signs,

reflectors, traffic signs, and short wooden and metal posts to define the edges of lookout parking (Liverman et al. 2009: 15).

Historic Tantalus-Round Top Road

Tantalus Drive was listed in the State Inventory of Historic Places on March 3, 2007 (Site No. 50-80-14-9019) and listed on the National Register of Historic Places on August 14, 2009. The site's boundary begins at Mile Marker 1.5 on Tantalus Drive and ends at Mile Marker 8 on Round Top Drive—a boundary justified by the area's infrastructure (private water catchment system), historic integrity, and rural character. Contributing elements to the historic site include the road, lookouts, culverts, retaining walls and curbs along the shoulder, and encompass the entire public road right-of-way. The period of significance is from the start of construction efforts in 1890, until approximately 1954 when the present roadside drainage improvements were completed.

Specific historic engineering features cited in the site's nomination include lava rock guard walls (some of which date to the earliest construction, and some that date to the improvements in the 1950s) and basalt and concrete culverts (which date to improvements in the 1950s).

Both types of features are visible in the project area. The northern (Pauoa Valley) edge of the roadway is bounded by a low basalt and cement guard wall from the southern end of the project area to the junction with Telephone Road. This wall is a continuation of the guard wall that marks the western edge of the Hogsback section. The southern (Makiki Valley) edge of the roadway, in contrast, is bounded by a low basalt and concrete curb. This curb was "signed" during construction, near the southern end of the project area. Inscribed in the smooth top surface are the words "John MOMONA AL KAM July 9, 1953."

Historic Preservation Review, Chapter 6E, HRS

The project was originally reviewed and approved by the State Historic Preservation Division (SHPD) on December 14, 2006 (LOG NO: 2006.4209/DOC NO: 10611AJ07) with a determination that "no historic properties will be affected." On March 3, 2007, Tantalus Drive was added to the Hawai'i Register of Historic Places, and listed on the National Register of Historic Places on August 14, 2009. The project was subsequently revised and resubmitted to SHPD for review on October 9, 2009; the revised proposal was reviewed on October 15, 2009 (LOG NO: 2009.3979/DOC NO: 0910RS10) with the determination that "the project will affect historic properties."

Discussions have continued between SHPD and the City and County of Honolulu Department of Decision and Construction regarding the project's proposed roadway safety improvements. In an SHPD letter dated May 15, 2011 (LOG NO: 2011.1257/DOC NO: 1105RS11), the agency's determination for the proposed work was "effect, with proposed mitigation."

Potential Impacts and Mitigation Measures

Archaeological Resources

The project area includes all of the flat portion of the ridge top, which falls off precipitously to either side (there is no place for any other surface sites in the project area, as seen by the route of the Nahuina Trail, which is forced to follow the road through the project area). The project area itself has been modified repeatedly by road construction and repair. Based on the field inspection results, no archaeological properties are likely to be affected by the proposed work. In the event that significant subsurface properties are encountered during project construction, work in the immediate area should halt and the State Historic Preservation Division (Ph. 692-9015) should be notified immediately.

Historic Resources

The project proposes to remove existing CRM walls and concrete curbs from a 200-foot section of the roadway that are contributing elements to the historic road, as described in the nomination for listing on the National Register of Historic Places. While other changes are proposed, the demolition of these elements will likely be the most noticeable changes. In place of the lower CRM wall or curb, the project will construct 42-inch concrete railings or barrier walls. The railings will be part of a concrete slab road deck that will be anchored into the ridge top for long-term stability of the structure. The railing's height of 42 inches is based on the current design standard for this class of road and the potential safety risks associated with the environmental setting.

The project has incorporated the following design features to mitigate the diminishment of the roadway's historic qualities:

- Rock texturing and staining of the new concrete railings to match the existing rock walls. The reinforced concrete will be given a rock-like texture using form liners. Project engineers also evaluated the use of rock veneers; however, this option was eliminated because the increased weight would compromise the load bearing capacity of the structure.
- Where new sections of CRM walls are to be constructed, rock material salvaged and cleaned from the demolished walls will be reused. Salvaged rock material will also be used for hand-laid riprap at the Kalawahine Trailhead, providing a transition from the trail to the paved road.
- Application of stain to the top of the new concrete road surface to match the color of AC pavement.
- Retention and repair of the existing crib wall. As discussed in Chapter 2, the crib wall would have been demolished and replaced with a segmental retaining wall in an earlier project design. Repair of the crib wall includes encapsulating the crib wall with shotcrete and this material will be color conditioned or stained to match existing soils.

3.3.2 Cultural Impact Assessment

The following analysis considers the Cultural Setting of the project area, *wahi pana* (storied places), gathering practices, hunting practices, archaeological sites, burials, and trails

Cultural Setting

The project area lies at a relatively high elevation (1430 feet) well above the elevation of identified Land Commission Awards (LCAs) and the understood areas of intense agricultural and permanent habitation in the pre-Contact and early post-Contact periods. Habitation and agriculture in the general vicinity was concentrated in the valley areas along Kānealole and Moleka Streams and well away from the present project area. No historic properties (other than Tantalus-Round Top Road) have been documented in close proximity to the project area.

Wahi Pana (Storied Places)

No *heiau* (pre-Christian place of worship), *hōlua* (sled courses) or other major pre-Contact Hawaiian sites are reported from the immediate vicinity of the proposed Tantalus Drive roadway improvements project area. The nearest places of note were Pu‘u ‘Ōhi‘a (Tantalus; elevation 2013 feet) to the northeast, Makiki Springs (at the headwaters of Kānealole Stream) to the southeast and Kahuawai Spring and Booth Spring along Pauoa Stream to the west. The literal meaning of Pu‘u ‘Ōhi‘a is “the ‘ōhi‘a tree hill.” On the top of Pu‘u ‘Ōhi‘a was a *heiau* called Pepeiaohikiau or Pepeiao o Hikiea, one of the *heiau* associated with human sacrifices at Pūowaina or Punchbowl. Pu‘u ‘Ōhi‘a is at some distance from the present project area. The springs are all in valleys at some distance from the project area.

Gathering Practices

Plant species believed to be present in the immediate vicinity with known cultural uses are summarized below in Table 2.

Table 2. Plant Species within the Project Area with Known Cultural Use

Family	Species	Common Name	Use
Ferns	<i>Diplazium esculentum</i>	<i>Hō‘i‘o</i> Fern	Indigenous, young fronds are eaten raw
CONVOLVULACEAE (Morning glory Family)	<i>Ipomea indica</i>	<i>Koali ‘awa, Koali lā‘au</i>	Indigenous, roots & leaves used in plasters and poultices for wounds, sores, & treating broken bones, a cathartic
EUPHORBIACEAE (Spurge Family)	<i>Aleurites moluccana</i>	<i>Kukui</i> , candlenut, Indian walnut	Polynesian introduction, light, dye, medicine, condiment, lei, etc.
FABACEAE (Pea Family)	<i>Acacia koa</i>	<i>Koa</i>	Endemic, wood used for a variety of purposes, for canoes & wood working generally

Family	Species	Common Name	Use
FABACEAE (Pea Family)	<i>Leucaena leucocephala</i>	<i>Koa haole, ekoa, haole koa</i>	Exotic, cattle feed
LAURACEAE (Laurel Family)	<i>Persea americana</i>	Avocado, alligator pear	Exotic, edible fruit
MYRTACEAE (Myrtle Family)	<i>Psidium guajava</i>	Common guava, <i>kuawa</i>	Exotic, edible fruit, a medicinal tea is made from leaf buds
MYRTACEAE (Myrtle Family)	<i>Syzygium malaccense</i>	' <i>ōhi'a 'ai</i> , Mountain apple	Polynesian introduction, edible fruit, infusion of the bark used for sore throats, wood used for posts, rafter & images
URTACACEAE (Nettle family)	<i>Pipturus albidus</i>	<i>Māmaki</i>	Fibers used for cordage & <i>kapa</i> , bark, fruit & young leaves used medicinally
AGAVACEAE (Agave Family)	<i>Cordyline fruticosa</i>	Ti, <i>Kī</i>	Polynesian introduction, Thatch for houses, food wrappers, hula skirts, sandals, roots for food & alcohol
ARACEAE (Philodendron Family)	<i>Alocasia macrorrhiza</i>	' <i>Ape</i>	Polynesian introduction, famine food
MUSACEAE (Banana Family)	<i>Musa paradisiaca</i>	Banana, <i>Maia</i>	Polynesian introduction, edible fruit, offerings, lining <i>imu</i> , poultice for sprains & broken bones, sap as a dye, fibers for lei, etc.
POACEAE (Grass Family)	<i>Panicum maximum</i>	Guinea grass	Exotic, cultivated as an important forage grass
POACEAE (Grass Family)	<i>Bambusa sp.</i>	Bamboo, ' <i>Ohe</i>	Polynesian introduction, bamboo used for a variety of purposes: musical instruments, poles, etc.
ZINGIBERACEAE (Ginger Family)	<i>Hedychium coronarium</i>	White ginger, ' <i>Awapuhi ke'oke'o</i>	Exotic, Flowers and roots used for "foetid nostrils", lei plant
ZINGIBERACEAE (Ginger Family)	<i>Hedychium flavsscens</i>	Yellow ginger, ' <i>Awapuhi melemele</i>	Exotic, Flowers and roots used for "foetid nostrils", lei plant

Thus quite a number of traditionally used plant species are to be found within the project vicinity including plants valued for construction material (*koa*, '*ōhi'a*, '*ohe*), for food (*hō'i'o* fern, avocado, banana, guava, '*ōhi'a 'ai*), for medicine (*koali 'awa*), and for their fragrance ('*awapuhi ke'oke'o*, '*awapuhi melemele*). Many of these (*kukui*, *koa*, *kī*, '*ōhi'a 'ai*, *māmaki*, *maia*, '*ohe*) are known to be plants that were quite commonly gathered in the uplands and that are known to be ubiquitous.

The majority of the vegetation is composed of introduced or alien species and the native species which occur in the project area can be found in similar habitats throughout the islands. Two

additional points relate to likely patterns of traditional gathering. First, the project area is exceedingly steep, effectively at an angle of repose, and it would seem likely that gathering would typically focus on areas less potentially hazardous and more accessible. The developed trail system in the immediate area allows much easier access to similar or identical resources. Second, access to these steep slopes will continue to be possible from a paved pull-off area and formal trail network off the north side of Tantalus Drive just to the north.

Hunting

Signs of pigs (rootings, trails, spoor) are believed to be quite common within the project vicinity. Doubtlessly the pigs take advantage of the relatively good forage, including avocados, guavas, bananas and mountain apples in the vicinity at the head of Kānealole Stream. It is understood however that pig hunting in the area is prohibited by existing state fish and game laws. Regardless, the proposed road improvements would not be expected to have a significant impact on pig populations or hunting practices.

Archaeological Sites

The historic settlement pattern indicates minimal native Hawaiian land use in the upper slopes of Tantalus. The field survey (Hazlett et al. 2011) found the slopes in the project area too steep for traditional or early historic enterprise. Based on the field inspection, no archaeological sites or historic properties (other than the Tantalus Drive road itself) were observed in the project area. The project area includes all of the flat portion of the ridge top, which falls off precipitously to either side (there is no place for any other surface sites in the project area, as seen by the route of the Nahuina Trail, which is forced to follow the road through the project area).

Burials

No burials have been documented in the project area and vicinity in the (Hazlett et al 2011) archaeological study. While burials have been identified in Makiki they have all been located at the base of Round Top, more than a mile south of the project area.

Trails

The 1919 War Department Fire Control quad map shows trails extending just north of the present project area up to the summit of Pu‘u ‘Ōhi‘a (Tantalus) and also inland to the west of the Pu‘u ‘Ōhi‘a trail (the Mānoa Cliffs Trail 2 alignment). It is believed that the relatively large population of lowland Kona District, O‘ahu probably accessed the uplands in the vicinity of Pu‘u ‘Ōhi‘a for forest resources and recreation. This system of trails was probably always rather braided – much as the present network of trails in the vicinity maintained by the State Department of Land and Natural Resources. There would have been a logical pathway along the ridge traversed by the present project area prior to the construction of the Tantalus Road. That trail would have been obliterated by Tantalus Road construction. That pedestrian alignment is easily traversed on the margins of the existing road. The proposed road improvements would not affect pedestrian travel.

Potential Impacts and Mitigation Measures

There are no known *kuleana* or commoner land claims near the project area and no permanent habitation is believed to have occurred on the steep slopes of the project area in traditional Hawaiian times. It seems probable that there was traditionally gathering of a wide variety of forest resources in the greater Pu‘u ‘Ōhi‘a (Tantalus) area and that these included plants, such as *kukui*, *koa*, ‘*ōhi‘a`ai*, *māmaki*, *maia*, ‘*ohe*, etc. as may be found within the vicinity of the present project area. However, the sought after species present are found in similar habitats in the greater Pu‘u ‘Ōhi‘a area and throughout the islands. The exceedingly steep slopes of the project area would make any gathering difficult and it would seem likely that gathering would typically focus on areas of easier access. Access to these steep slopes will continue to be possible from a paved pull-off area and formal trail network off of Tantalus Drive. It appears that forest resources and access to forest resources will not be significantly impacted by the proposed project. No adverse impact to cultural resources or practices is anticipated.

3.4 SOCIO-ECONOMIC ENVIRONMENT

Demographic and Economic Characteristics

The Tantalus-Round Top community is represented by Census Tract 32. The 2010 U.S. Census counted 833 persons living in this census tract. In 2000, the Census enumerated 885 persons, therefore the census tract experienced a net decrease of 52 persons (-5.8%) over the decade. In comparison, the county as a whole experienced an overall population increase of 8.8%.

The 2010 Census reported 314 households in the census tract with an average size of 2.62 persons. Of the occupied housing units (also 314) 76.4% were owner-occupied units and 23.6% were renter-occupied units.

Potential Impacts and Mitigation Measures

Demographic Impacts. The proposed roadway improvements are not expected to affect the number or demographic characteristics of people who live in the area. The project will not disrupt the integrity of the existing neighborhood.

Economic Impacts. The proposed action is anticipated to have several types of economic impacts. One type is construction-related employment and income. With a preliminary estimated cost of several million dollars, the project is expected to support a number of engineers and construction workers for the duration of the project (approximately 12 months). Unless the economy expands significantly and existing firms are working at full capacity, this project is more likely to help sustain existing employment and income levels, rather than create new jobs. The wages paid to workers on this project (direct income), payments to suppliers (indirect income), and their subsequent expenditures (induced income) could have a significant cumulative impact as the monies circulate through the local economy.

It is unlikely that any long-term employment opportunities would be realized by this project.

Fiscal Impacts. Funds for this project will be allocated from the City's capital improvement budget. Additional local government funds will be needed to maintain the facility. In the long term, the new roadway design and modern materials is expected to result in reduced maintenance costs.

3.5 SCENIC AND VISUAL RESOURCES

Existing Conditions

Tantalus Drive is not identified as a scenic resource in the Primary Urban Center Development Plan, Map A.1: Significant Panoramic Views. Nevertheless, Tantalus-Round Top is a popular recreational drive because it offers outstanding vistas of the city during the day and at night. There are several scenic outlooks along the roadway, marked by pull-outs and trash receptacles. The Hogsback section is a notable highlight of the loop with excellent views of the coastal plain in both the Diamond Head (east) and 'Ewa (west) directions.

Potential Impacts and Mitigation Measures

One component of the project is to remove invasive trees and shrubs from the slopes adjacent to the roadway. During the early consultation period for this EA, one long-time resident commented that the tree growth which obscures views from the Hogsback is not consistent with the historic character of the area. By removing trees and vegetation that currently block panoramic vistas, the proposed action will enhance the scenic quality of the area.

During a briefing to the Upper Makiki/Lower Punchbowl/Tantalus Neighborhood Board, a community member asked about potential impacts on tourism. An Internet search, including general query and investigation of major bus touring companies, showed only one regularly scheduled activity: an optional trip up Mount Tantalus to see the city lights following the Navatek Sunset Dinner Cruise. In addition to organized trips, the drive is a longstanding sightseeing activity for visitors in personal rented vehicles, but their numbers are unknown. Temporary closure of Tantalus Drive will adversely affect individuals and groups that wish to drive the continuous loop. For some, it will mean that the trip is truncated, while others may choose to forgo the trip. In the long term, the proposed improvements will create safer driving conditions especially for motorists navigating an unfamiliar, unlit road.



Photo 9. View toward Diamond Head from the Hogsback

3.6 TRAFFIC AND CIRCULATION

3.6.1 Vehicular Traffic

The information in this section is based on a traffic assessment prepared by Julian Ng, Inc. and reproduced in Appendix B.

Existing Conditions

Tantalus Drive and Round Top Drive form a loop roadway between Makiki Heights and Makiki Valley, providing access to approximately 300 residences, Pu‘u ‘Ualaka‘a State Park, hiking trails, and a number of scenic lookouts. Traffic on Tantalus Drive can proceed onto Makiki Heights Drive and Mott-Smith Drive to Nehoa Street, or continue through the Papakōlea community to connect to Pūowaina Drive. Traffic on Round Top Drive would connect to Makiki Street, which intersects with Nehoa Street 0.4 miles east of the Mott-Smith Drive intersection. The total “distance” between these intersections via the Tantalus Drive and Round Top Drive loop is 9.7 miles.

Traffic Volumes

A manual traffic count was taken at the site during morning and afternoon peak traffic periods on a weekday with public schools in normal session. A total volume of 112 vehicles were counted in the five hours of the count (6:30 AM to 8:30 AM and 3:00 PM to 6:00 PM). Table 3 summarizes the count data.

Peak traffic volumes were recorded between 7:30 AM and 8:30 AM and between 4:45 PM and 5:45 PM.

A twenty-four hour traffic count taken in July 2008 on Mott-Smith Drive was used to estimate a daily traffic volume of 400 vehicles on this portion of Tantalus Drive.

**Table 3. Manual Traffic Counts
Wednesday, July 27, 2011**

	Vehicles on Tantalus Drive		
Peak hour shown in boldface	Eastbound	Westbound	Total
6:30 AM – 6:45 AM	1	2	3
6:45 AM – 7:00 AM	2	3	5
7:00 AM – 7:15 AM	0	2	2
7:15 AM – 7:30 AM	0	2	2
7:30 AM – 7:45 AM	0	4	4
7:45 AM – 8:00 AM	1	1	2
8:00 AM – 8:15 AM	3	6	9
8:15 AM – 8:30 AM	2	3	5
3:00 PM – 3:15 PM	2	3	5
3:15 PM – 3:30 PM	2	1	3
3:30 PM – 3:45 PM	4	2	6
3:45 PM – 4:00 PM	2	5	7
4:00 PM – 4:15 PM	4	1	5
4:15 PM – 4:30 PM	3	4	7
4:30 PM – 4:45 PM	3	1	4
4:45 PM – 5:00 PM	6	3	9
5:00 PM – 5:15 PM	6	1	7
5:15 PM – 5:30 PM	5	2	7
5:30 PM – 5:45 PM	6	6	12
5:45 PM – 6:00 PM	3	5	8
Total Counted	55	57	112

Travel Patterns

A site and map review of the area indicates that the “break-even point” in the choice of using Tantalus Drive or Round Top Drive is the intersection of Round Top Drive and Forest Ridge Way. Residents *makai* of this intersection would likely use Round Top Drive to Nehoa Street, rather than Tantalus Drive. Residents *mauka* of this intersection would have a shorter distance and travel time by using Tantalus Drive to Nehoa Street. Depending on the destination, there may be slight variations. The alternate routes would be equal for residents of Forest Ridge Way.

Potential Impacts and Mitigation Measures

The segment of roadway to be repaired is located on a narrow ridge near the *mauka* end of Tantalus Drive and a complete closure of the roadway will allow for the project to proceed safely and efficiently, minimizing the duration of construction. Roadway closure could be 24 hours a day for up to five months to allow for construction of a new concrete slab road on drilled shaft foundation and other improvements. The road closure will occur 3.1 miles *mauka* of the intersection of Tantalus Drive and Makiki Heights Drive and 5.5 miles *mauka* of the intersection of Makiki Street and Makiki Heights Drive.

Up to 50 residences could be affected by the proposed closure of Tantalus Drive if all of the residences of Forest Ridge Drive opted for using Tantalus Drive instead of Round Top Drive. For an estimated one-half of the residences served by Forest Ridge Way normally using Tantalus Drive, the traffic generated by 32 residences would be affected. The peak hour traffic volumes generated by 32 detached residential dwellings were estimated by applying the widely accepted trip rates from *Trip Generation, 8th Edition*, published by the Institute of Transportation Engineers. A daily volume of 310 vehicles was computed using the applicable weekday rate. The peak hour estimates are slightly lower than the field counts (Table 4).

Table 4. Comparison of Traffic Estimates and Count Data

	Vehicles on Tantalus Drive		
	Eastbound	Westbound	Total
Counted AM Peak Hour	6	14	20
Counted PM Peak Hour	23	12	35
AM Peak Hour based on traffic generated rates*	6	18	24
PM Peak Hour based on traffic generated rates*	20	12	32
* Based on 32 dwelling units			

The maximum impact of the road closure would occur during the PM Peak Hour and is estimated to be a two-way volume of 35 vehicles per hour. This volume would be added volume on Round Top Drive and Makiki Street. Beyond Nehoa Street, the traffic impact would be distributed onto

Nehoa Street and Makiki Street, and will be less than 35 vehicles per hour at any location. This traffic impact, which would be temporary, lasting only during the time the roadway is closed for construction, compares to a volume of 100 vehicles per hour that is usually considered the threshold for significant traffic impacts.

Measures that will be implemented to minimize traffic impacts:

- Access to private residences and telecommunications facilities will be maintained at all times.
- Construction plans for the project will include requirements to post warning signs to advise drivers of the road closure.
- The signs will be placed at the approaches to the intersections of Tantalus Drive and Makiki Heights Drive, and Makiki Street and Makiki Heights Drive, where drivers will have the opportunity to divert to an alternate route.
- Public notices will be published.
- Affected residents and emergency responders will be informed of the construction schedule.
- Temporary fencing or other appropriate barriers, as necessary, to deter the public from unauthorized entry into restricted or hazardous construction zones during working and non-working hours.

3.6.2 Pedestrian and Bicycle Facilities

There are no dedicated facilities for pedestrians and bicyclists in the project area. Shared use of the roadway is appropriate given the low traffic volumes and slow speeds of vehicular travel.

Potential Impacts and Mitigation Measures

The new reinforced concrete railings have been designed to a height of 42 inches as prescribed in the *Guide for the Development of Bicycle Facilities (1999)* issued by the American Association of State Highways and Transportation Officials (AASHTO). Although higher than the current CRM walls and concrete curbs, raising the barrier height will improve the safety of bicycle riding in the steeply sloped section of Tantalus Drive.

The project area will be closed to pedestrian and bicycle traffic for a portion of the construction period. Passage through the project area will be prohibited when hazardous conditions ensue from ongoing construction activities.

A temporary walkway through the construction zone was studied in response to a suggestion by Aaron Lowe, Na Ala Hele Trails Program, Division of Forestry and Wildlife. The intent of this temporary facility was to extend the time when pedestrians and bicyclists would be able to transit the project area during construction. Based on the study, the DDC determined that a temporary facility would not be cost effective nor able to assure public safety during certain phases of construction.

Although a temporary walkway is not feasible, a phasing plan has been developed to maximize the periods when the roadway would be open to pedestrian and bicycle travel. During some phases, transit through the project area may be allowed during non-working hours by laying down temporary steel plates. This measure will depend, in part, on the contractor's ability to obtain noise permits to perform outside of normal working hours. No through traffic will be allowed, however, during the phase(s) of construction when the travel surface itself is under construction—currently estimated to last 5 months. Signs and notices will warn roadway users of any closure.

3.6.3 Bus Transit

There is no public bus service through the project area. Route 15—Pacific Heights to Alapai Street, services the lower portion of Tantalus Drive through Papakōlea. The bus travels *mauka* on Tantalus Drive only to Makiki Heights Drive.

Potential Impacts and Mitigation Measures

The proposed project will not affect bus service on an established route. However, the O'ahu Transit Service also operates the Handi-van, a demand-based paratransit service. Because Handi-vans provide curb to curb service, the O'ahu Transit Service will be informed of road closure to minimize any adverse effect on the dispatching of rider pick ups.

3.7 PARKS AND RECREATIONAL FACILITIES

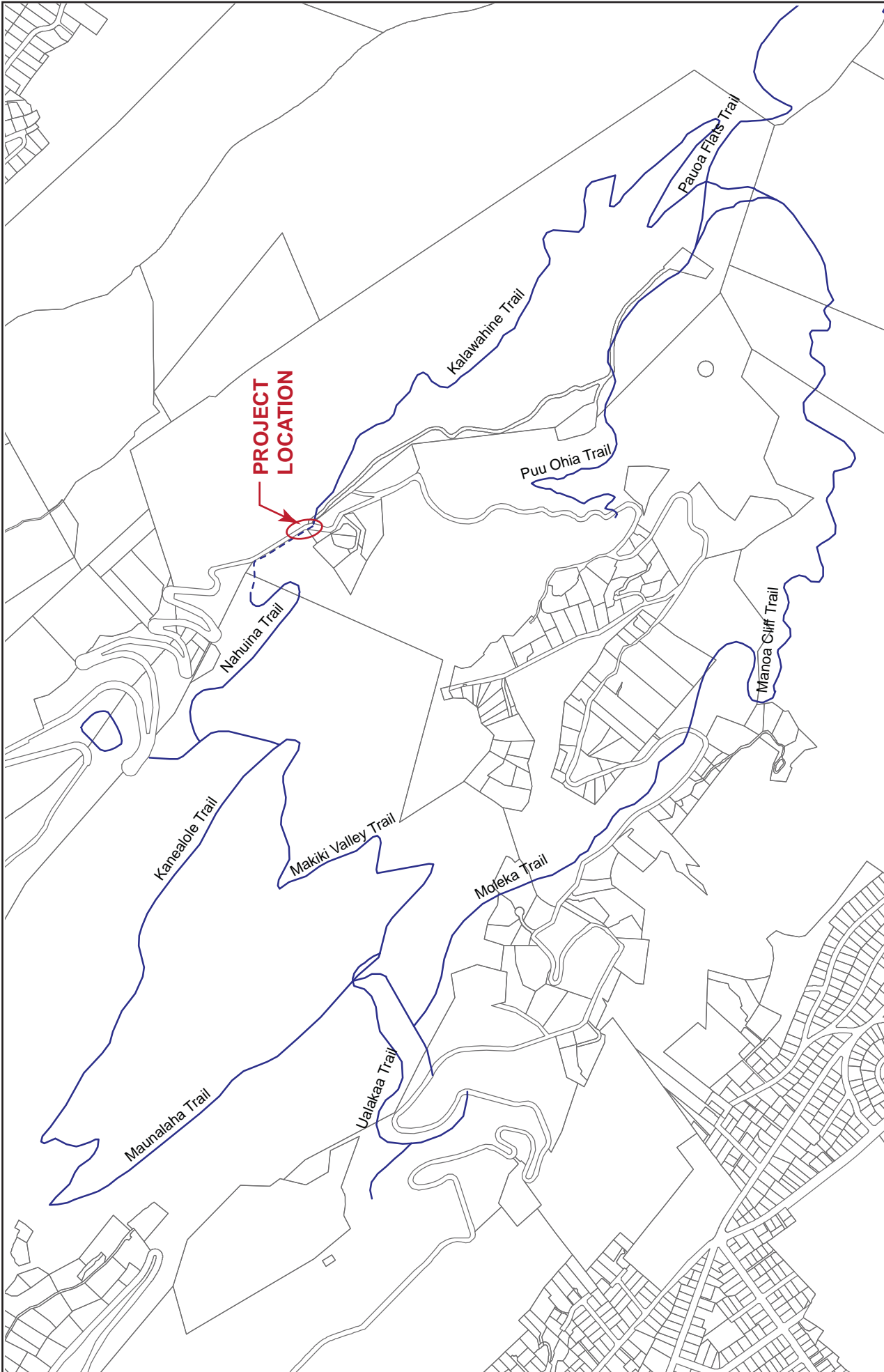
Existing Conditions

The Honolulu Mauka Trail System, managed by the Na Ala Hele Trails Program, Division of Forestry and Wildlife, Department of Land and Natural Resources is an extensive network of off-road trails through the Honolulu Forest Reserve (Figure 9). The slopes and valleys around Mt. Tantalus contain approximately 15.5 miles of trails. This system is open to hiking and other pedestrian use of the trail, but not off-road bicycling or hunting. Two of these trails are in the immediate vicinity of the project area.

Kalawahine Trail is a 1.5-mile trail with a trailhead located adjacent to the junction of Telephone Road and Tantalus Drive. This trail traverses the east side of Pauoa Valley. It connects to Pauoa Flats Trail and Manoa Cliff Trail.

Nahuina Trail is a 0.75-mile trail with a trailhead located *makai* of the project area, at the southern end of the Hogsback. The trail traverses the west side of Makiki Valley and intersects with Makiki Valley Trail.

The two trails are connected by the Hogsback section of Tantalus Drive—a “crossover.” Except for the roadway, the ridge top is too steeply sloped to support a viable off-road foot trail.



FIGURE

9

HONOLULU MAUKA TRAIL SYSTEM

Highway Improvements,
Roadway Repair
Vicinity of 3798 Tantalus Drive
Environmental Assessment
December 2011

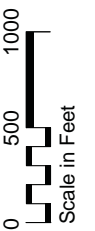




Photo 10. Kalawahine Trailhead; Telephone Road seen on right



Photo 11. Hikers off the Kalawahine Trail (later picked up by a commercial eco-tour company)

Potential Impacts and Mitigation Measures

Temporary Loss of Trail Connectivity

With its proximity to urban Honolulu, the Mauka Trail System is a popular recreational resource for residents and visitors. All trails will remain open for the duration of construction, including the Kalawahine and Nahuina trails. However, when the road is closed 24 hours a day, it will not be possible for trail users to travel directly between these two trails. To mitigate this adverse impact, construction has been phased to shorten the duration of the extended 24-hour road closure period to approximately 5 months. When possible, some construction activities will be scheduled at night or during extended workdays so that the roadway is open for use during daytime peak periods.

Road closure will also have a temporary adverse affect on recreationalists who use the road itself for walking, running, and bicycling, and who wish to travel the continuous Tantalus-Round Top loop.

There are several organized sporting events that take place annually and use the trail system with the Hogsback “crossover” or Tantalus Drive itself. Among these are the following with date of latest event or usual timeframe, if known.

Sponsor	Event Name	Facility Used	Date
Hawaii Ultra Running Team (HURT)	100 Miler	Primarily trails with crossovers on Tantalus Drive	President’s Day weekend
Hawaii Ultra Running Team (HURT)	Tantalus Triple Trek (50K)	Primarily trails with crossovers on Tantalus Drive	Labor Day weekend
Mid Pacific Road Runners Club	10-mile loop	Tantalus-Round Top Drive	October 9, 2011
Bicycling organization (unknown)	Tantalus Time Trial (4.5 mi.)	Tantalus Drive (Makiki Hts Dr to Round Top Drive)	April 3, 2011

These events can attract participation from off-island with entrants making travel plans well in advance. Therefore, to reduce adverse impacts and to the extent possible, the project will coordinate with event organizers and keep them informed of the likely timetable for road closures.

Temporary Loss of Trailhead Parking

Another temporary adverse impact to trail users is the short-term loss of nearby parking areas. Small pull-out areas near the Kalawahine and Nahuina trails will be needed for vehicular turnarounds when the road is closed and will be unavailable for parking by trail users. Other parking areas may experience greater demand as trail users reorient their start/end points. Existing pull-out areas will be restored to their former condition when the project is completed.

To mitigate inconvenience to trail users, information about conditions, such as temporary closures, would be disseminated through the Na Ala Hele website and signs posted at the trailheads. Electronic road signs, posted as part of the traffic control plan, would also be part of the informational outreach.

3.8 PUBLIC HEALTH AND SAFETY

3.8.1 Police Protection Services

The Tantalus area falls within District 1, Central Honolulu, for police service. District 1 personnel are located at the department's Alapai headquarters located at 801 South Beretania Street.

3.8.2 Fire Protection Services

Central Honolulu is under the jurisdiction of Battalion 1 of the Honolulu Fire Department. Engine 3, housed at the Makiki Fire Station is located at 1202 Wilder Avenue.

3.8.3 Emergency Medical Services (EMS)

The City and County of Honolulu has 19 EMS advanced life support ambulance units and 2 rapid response paramedic units. The island of O'ahu is divided into two districts, directed by a unit supervisor. District 1 encompasses West O'ahu, while District 2 encompasses East O'ahu. The Tantalus area is served by EMS units based at several locations, including Queens Medical Center, Hawai'i Medical Center East, and 1426 Young Street.

Potential Impacts and Mitigation Measures

During construction phases involving road closure, first responders—police, fire, and EMS—may need to alter the route taken to respond to service calls. Because the project area is located relatively close to the “break-even point” in the choice of using Tantalus Drive or Round Top Drive (estimated to be the intersection of Round Top Drive and Forest Ridge Way), the routing change is not expected to have a significant adverse effect on response time. Necessary measures to assure public health and safety will be provided throughout all phases of construction. The contractor will provide, install, and maintain all necessary signs, lights, barricades, markers, cones, and other safety facilities. These safety precautions will conform with the current Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) published by the U.S. Federal Highway Administration. When the construction schedule requires road closure, the contractor will notify first responders of changes in road access.

By letter dated August 9, 2011, the Police Department noted the potential for increased calls for police service to the area due to construction-related dust, noise, traffic, and odors. In the long term, there should be no impact on police facilities or operations.

The road improvements have been designed to support the maximum weight (55,000 lbs) of fully loaded fire apparatus.

3.9 PUBLIC INFRASTRUCTURE AND FACILITIES

3.9.1 Water and Wastewater Systems

By letter dated August 3, 2011, the Honolulu Board of Water Supply confirmed that no water lines are present within the project area. Available records indicate that no other underground utilities (i.e., sewer lines, drainage, etc.) are present.

Potential Impacts and Mitigation Measures

No project-related impacts will occur to potable water lines or the sewer system.

3.9.2 Solid Waste Management

Single-family solid waste collection service is provided by the City and County of Honolulu, Department of Environmental Services, including trash collection once a week, and green waste and recyclables collection once a week on alternating weeks.

Potential Impacts and Mitigation Measures

Residential Refuse Collection

During periods of 24-hour road closure, residential refuse collection may be modified. When Tantalus Drive and Round Top Drive cannot be traveled as a continuous loop, routes for refuse trucks may need to be reconfigured. The pickup schedule is not expected to change, but there is a possibility that residences located close to the project limits may need to temporarily change where refuse bins are placed. The contractor will be required to notify the Department of Environmental Services and affected residences of project-related scheduling that may affect refuse collection services.

Construction Waste

Waste and debris material will be generated by the project during the demolition and new construction work.

Prior to construction, an acceptable solid waste management plan will be prepared for the disposal of waste from the demolition work and debris during the new construction work. The contractor will remove and dispose of all waste and debris off-site, at a State-licensed landfill operation or licensed waste disposal facility.

3.9.3 Electrical and Telecommunications Systems

The project area contains overhead electric, telephone, and CATV lines, and underground telephone and CATV lines.

Potential Impacts and Mitigation Measures

All existing utilities in the project area will need to be protected from damage during construction and to remain functional through the construction period. Relocation of the underground Hawaiian Telcom ductline is a component of the project description. Additionally, the project has been phased to enable 24 hours a day, 7 days a week access via Telephone Road for Hawaiian Telcom and Hawai'i Public Radio to reach their telecommunications facilities. To mitigate the potential for adverse impacts, project engineers are coordinating with affected utility companies on an ongoing basis.

4 LAND USE PLANS, POLICIES, AND CONTROLS

4.1 HAWAI‘I STATE PLAN AND FUNCTIONAL PLANS

The Hawai‘i State Plan, Chapter 226, HRS, is the umbrella document in the statewide planning system. It serves as a written guide for the long-range development of the State by describing a desired future for the residents of Hawai‘i and providing a set of goals, objectives, and policies that are intended to shape the general direction of public and private development.

Transportation Functional Plan

The State functional plans, such as the Transportation Plan (1991) provide more detail to the State Plan, guiding State and County actions in specific areas of governance.

Although this project involves City-funded repairs to a City roadway, the project is consistent with statewide transportation strategies, notably to “construct facility and infrastructure improvements in support of Hawai’s thriving economy and growing population base.” Tantalus Drive is notable for its multiple functions—providing vehicular access to local residents, as well as scenic motoring opportunities and access to off-road hiking trails to a larger base of residents and visitors.

4.2 STATE LAND USE CLASSIFICATION

The State Land Use Commission, pursuant to Chapter 205 and 205A, HRS and Chapter 15-15, Hawai‘i Administrative Rules, is empowered to classify all lands in the State into one of four land use districts: Urban, Rural, Agricultural, and Conservation. The project site and surrounding properties are located within the Conservation District. No change in State land use classification is required for this project.

In a letter dated July 22, 2005 [Ref: OCCL: TM; OA 05-256], Samuel J. Lemmo, Administrator of the Office of Conservation and Coastal Lands (OCCL), Department of Land and Natural Resources stated that the existing crib wall appears to lie within the Resource subzone of the Conservation District and may be a nonconforming structure. Pursuant to HAR §13-5-37, Nonconforming uses shall not prohibit the continuance of, or repair of nonconforming uses. OCCL determined that the crib wall is part of the road structure and the road has not been destroyed to an extent of more than 50% of its replacement cost at the time of destruction. Furthermore, pursuant to HAR §13-5-37, P-10, the drainage and erosion control improvements appear to be accessory structures to an existing facility as identified in the exempt classes established in § 11-200-8. Therefore, the rehabilitation/ replacement of the crib wall and the accessory drainage and erosion control improvements will not require the filing of a Conservation District Use Application.

4.3 CITY AND COUNTY OF HONOLULU LAND USE REGULATIONS

4.3.1 O'ahu General Plan

The O'ahu General Plan establishes the City and County of Honolulu's long-range objectives and represents its commitment to a desirable and attainable future of the Island of O'ahu. The following objectives and policies are relevant to this project:

Objective A: To create a transportation system which will enable people and goods to move safely, efficiently, and at a reasonable cost; serve all people, including the poor, the elderly, and the physically handicapped; and offer a variety of attractive and convenient modes of travel.

Policy 1: Develop and maintain an integrated ground-transportation system consisting of the following elements and their primary purposes:

- b. Roads and highways—for commercial traffic and travel in nonurban areas

Discussion: Tantalus Drive provides essential access for the Tantalus-Round Top community. This project will stabilize the roadway and correct deficiencies in the drainage system so that the facility can be maintained and operated safely and cost-effectively over the long term.

4.3.2 Primary Urban Center Development Plan

Pursuant to Chapter 226, HRS, each County is required to implement the Hawai'i State Plan through the adoption and implementation of a County General Plan. In the case of the City and County of Honolulu, regional plans (either Development Plans or Sustainable Communities Plans) have been established as a policy "bridge" between the City's General Plan and its zoning powers. The City and County is divided into eight regions. The project area is located in the Primary Urban Center (PUC), a region that extends from the historic core of downtown Honolulu to Pearl City in the west and Waialae-Kahala in the east.

The Primary Urban Center Development Plan, adopted in 2002, reflects an underlying intent to improve the livability of a mature urban center. A supporting theme is protecting and enhancing the city's natural, cultural, and scenic resources.

Discussion: Given the congestion and high-density development of the PUC, the verdant slopes of Tantalus provide valuable open space within relative proximity to thousands of Honolulu residents. The proposed action is consistent with PUC Development Plan by improving the safety and reliability of the roadway network that provides access to these recreational and scenic opportunities.

4.3.3 Zoning

County zoning provides the most detailed set of regulations affecting land development prior to actual construction. Zoning is typically limited to lands classified in the Urban District under the State land use system. The project area is zoned P-1, restricted preservation. This classification is consistent with Sec. 21-3.40 of the Land Use Ordinance that all lands within a state-designated conservation district be zoned within the P-1 restricted preservation district. The purpose of preservation districts is to preserve and manage major open space and recreation lands and lands of scenic and other natural resource value. Within the P-1 district, all uses, structures and development standards are to be governed by the appropriate state agency. See Section 5.2, above.

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5 OTHER ENVIRONMENTAL CONSIDERATIONS

5.1 Unavoidable Adverse Effects

All potential environmental impacts discussed in Chapter 3 either can be avoided or mitigated to an extent that they would not be significant. Short-term impacts associated with construction activities will be offset by Best Management Practices and other proposed mitigation measures.

5.2 Energy Requirements and the Conservation Potential of Various Alternatives and Mitigation Measures

In comparison to engineering alternatives that were studied for this project, the proposed action offers relatively greater energy and material conservation potential. By retaining and repairing the existing crib wall, the preferred alternative salvages the concrete structure and avoids the need for new materials to construct a replacement wall. During the construction period, and particularly when part of Tantalus Drive is closed, some motorists may be required to reroute their trips, thereby driving farther and using more fuel. However, without preventive stabilization, road failure is a possibility, in which case, the time needed to complete repairs would be longer and cause greater disruption to travel patterns.

5.3 Relationship of Short-term Uses and Long-Term Productivity

In the short term, the project will have temporary construction-related impacts, such as noise, dust, and traffic and recreational inconveniences due to temporary road closure. The improvements will require a commitment of public construction funds. However, in the long term, the improvements will extend the safe and useful life of the roadway for many years.

5.4 Irretrievable and Irreversible Resource Commitments

Resources that are committed irreversibly or irretrievably are those that cannot be recovered if the project is implemented. The proposed project will involve the commitment of capital, labor, fuels, and equipment. The site has been committed to transportation use since early in the city's history. Using the narrow, ridge top corridor for the purpose of a travel way continues to serve the public interest as no alternative travel route is available.

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6 FINDINGS AND REASONS SUPPORTING THE ANTICIPATED DETERMINATION

This Environmental Assessment, prepared in accordance with Chapter 343, HRS, as amended, has found that potential impacts associated with the proposed action will not be significant. Environmental impacts will be temporary and are not expected to adversely impact the long-term environmental quality of the area.

The potential short-term, long-term, and cumulative effects of the proposed project were evaluated based on the significance criteria in Section 11-200-12 (Hawai‘i Administrative Rules, revised in 1996). The following summarizes the potential effects of the action.

SIGNIFICANCE CRITERIA

1. Irrevocable commitment to loss or destruction of natural or cultural resources.

Tantalus Drive, together with Round Top Drive, is an historic road listed on the National and Hawai‘i Registers of Historic Places. To stabilize the road and maintain its long-term use and to enhance public safety, the proposed action cannot avoid modifying contributing elements to the historic road that are located within a 200-foot section of Tantalus Drive. However, to mitigate visual changes to the roadway, the project incorporates design features, such as molding concrete to match the textures of existing facilities, color conditioning to blend with the existing natural and man-made environment, and reusing salvaged construction material.

Proposed construction will occur within the existing roadway and adjoining areas. These areas have been disturbed through previous iterations of road construction and repair; therefore, the proposed action is not expected to disturb possible archaeological subsurface deposits. However, should any archaeological resources be encountered during construction, all work in the immediate vicinity will cease and the State Historic Preservation Division shall be contacted immediately in compliance with Chapter 6E, HRS.

There will be no destruction or loss of threatened or endangered plant or animal species.

2. Curtailment of the range of beneficial uses of the environment.

The project area serves both transportation and drainage functions. These functions will be improved by repairing the crib wall, stabilizing the roadway, and modifying the storm water drainage pattern without significantly curtailing or altering other beneficial uses of the environment.

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

The proposed action complies with State and City environmental policies, plans, and guidelines. In particular, the project is consistent with the policies in Chapter 344, HRS, related to improving the transportation infrastructure in a manner consistent with the local lifestyle and environment.

4. Substantially affects the economic or social welfare of the community or state.

The proposed action is intended to meet level of service and safety standards for a local road that is used by area residents, businesses, and visitors. This project will positively affect the welfare of the community by reducing adverse flows of storm water runoff at the project site.

5. Substantially affects public health.

Public health—as mediated by water quality, air quality, and noise levels—will be minimally affected or unaffected by the construction and operation of the reconstructed roadway. The project contractor will be required to follow appropriate Best Management Practices to mitigate short-term, construction impacts.

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

The proposed action will not increase road capacity and, in and of itself, is not expected to generate population growth in the Tantalus-Round Top community. Population growth in the Conservation District is strictly regulated through State land use policies.

7. Involves substantial degradation of environmental quality.

The assessment of air and water quality, noise levels, and traffic impacts has determined that proposed crib wall and road repairs will not substantially degrade environmental quality. Appropriate mitigation measures will be employed during construction to reduce potential adverse impacts.

8. Is individually limited but cumulatively has considerable effect on the environment, or involves a commitment for large actions.

The proposed replacement project is part of the City’s overall commitment to maintain safe and efficient transportation facilities, but does not involve a commitment for larger actions.

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

The proposed roadway improvements are not expected to have significant adverse effect on rare, threatened or endangered species, or their habitat. Areas adjacent to the project area are currently overgrown with mostly introduced species that will be removed because of deleterious effects where embedded in the crib wall, to clear the area for construction, and/or restore the historic character of the area with open vistas from the Hogsback. Given the scale and location of the road reconstruction, no habitats or natural environments are anticipated to be adversely affected by the proposed project.

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

Short-term impacts on air quality and noise levels are unavoidable during the construction period. Appropriate mitigation measures will be implemented to minimize construction-related impacts. Because the proposed action will not increase capacity or change the alignment or speed limit, significant worsening of air quality, water quality, and ambient noise levels is not expected.

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

The project site is located in an area of steep slopes. Modifications to the roadway are intended to implement a long-term solution to the potential problem of road instability.

12. Substantially affects scenic vistas and view planes identified in county or state plans or studies.

Removal of tall trees and overgrown vegetation in the project area will have a beneficial effect on scenic vistas from the Hogsback section of Tantalus Drive.

13. Requires substantial energy consumption.

Fuel will be consumed by construction vehicles and equipment, but this use is not expected to be extraordinary. In the long-term, the project is not anticipated to create additional demands for energy consumption.

CONCLUSION

In accordance with the provisions set forth in Chapter 343, HRS, and the significance criteria in Section 11-200-12 of Title 11, Chapter 200, Hawai'i Administrative Rules, this assessment has determined that the project will not have significant adverse impacts to water quality, air quality, noise levels, social welfare, archaeological sites, or wildlife habitat. Anticipated impacts are primarily temporary and related to construction activities. These impacts have been mitigated through planning and design, and will be further mitigated by implementing best management practices (BMPs) during construction. Changes to a short section of the historic roadway are necessary for safety reasons and will be mitigated through design features intended to harmonize the improvements with existing man-made and natural elements.

Because the assessment has determined that the project will not adversely impact environmental quality in the project area and vicinity, the City and County of Honolulu, Department of Design and Construction anticipates filing a Finding of No Significant Impact (FONSI) with the State Office of Environmental Quality Control.

7 ANTICIPATED DETERMINATION

Based on the information presented and examined in this document, the proposed project is not expected to result in significant social, economic, cultural, or environmental impacts. Consequently, a finding of no significant impact is anticipated, pursuant to the provisions of Subchapter 6 of Chapter 200, Title 11, Hawai'i Administrative Rules of the Department of Health.

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8 REFERENCES

- American Association of State Highway and Transportation Officials. 1999. *Guide for the Development of Bicycle Facilities*.
- Analytical Planning Consultants, Inc. and Land Planning Consultants LLC. February 2005. *Final Environmental Assessment, Proposed Hawaii public Radio Facility, Tantalus, Honolulu, Oahu, Hawaii*.
- City and County of Honolulu, Department of Planning and Permitting. May 2002. *Primary Urban Center Development Plan*.
- Hazlett, Alexander, David Shideler, and Hallett H. Hammatt. October 2011. *Historic Preservation Literature Review and Field Inspection for Highway Improvements and Roadway Repair, Vicinity of 3798 Tantalus Drive (Tantalus Crib Wall Repair) Project, Pauoa and Makiki Ahupuaa, Kona District, Oahu Island, TMK: (1) 2-5-012:014 and (1) 2-5-019:005*.
- Institute of Transportation Engineers. 2008. *Trip Generation, 8th Edition*.
- Julian Ng Inc. October 2011. *Traffic Assessment: Closure of a Portion of Tantalus Drive, Vicinity of 3798 Tantalus Drive, Honolulu, Hawaii*.
- Juvik, Sonia P. 1998. *Atlas of Hawaii, 3rd Ed.* Honolulu, HI: University of Hawaii Press.
- Liverman, Astrid, Ming-Yi Wong, and Barbara Shideler. May 2009. National Register of Historic Places Nomination Packet for Tantalus-Round Top Road.
- ParEn, Inc. dba Park Engineering. October 2011. *Pre-Final Drainage Calculations for Highway Improvements, Road Repair, Vicinity of 3798 Tantalus Drive*.
- Scott, E. B. 1968. *The Saga of the Sandwich Islands. Vol. 2, 4th Edition*. Sierra-Tahoe Publishing Co., Crystal Bay Lake, NV.
- Shigemura, Lau, Sakanashi, Higuchi & Associates, Inc. July 2005. *Tantalus Crib Wall Rehabilitation Study*.
- State of Hawai‘i, Department of Land and Natural Resources, Commission on Water Resource Management and the U.S. National Park Service. December 1990. *Hawaii Stream Assessment*.
- U.S. Census Bureau, <http://factfinder2.census.gov>. Accessed October 2011.

U.S. Department of Agriculture, Soil Conservation Service, In Cooperation with the University of Hawai'i Agriculture Experiment Station. August 1972. *Soil Survey of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii.*

YKE Yogi Kwong Engineers, LLC. March 2010. *Geotechnical Report: Highway Improvements, Proposed Roadway Repair vicinity of 3798 Tantalus Drive, Honolulu, Oahu, Hawaii.*

9 CONSULTATION AND COORDINATION

9.1 ORGANIZATIONS CONSULTED DURING PRELIMINARY ENGINEERING DESIGN

The following organizations were consulted during the preliminary engineering and design phase of the project.

Agency	Document	Comments
Federal Government		
U.S. Army Corps of Engineers, Regulatory Branch	Letter from George P. Young, Chief to Wayne Higuchi, Shigemura, Lau, Sakanishi, Higuchi & Associates, Inc. (structural engineer), dated July 1, 2005	Determination that project will occur in uplands above and away from the waters of Pauoa Stream, Kanaha Stream, and Kanealole Stream. Proposed ground disturbing activities will not require the discharge of fill material into those streams. A Department of the Army permit is not required.
State Government		
SHPD	Memo from Angie Westfall, Architecture Branch Chief to Collins Lam, DDC, dated May 5, 2011 [LOG: 2011.1257; DOC: 105RS11]	Tantalus Drive is listed on the National Register of Historic Places (No. 80-14-9019, dated March 3, 2007). Not currently listed on the National Register of Historic Places. Historic because constructed in early 19 th century to access country mountain retreats. SHPD's position that railings on top of the retaining wall are inappropriate for the historic roadway. Prefer a lower barrier to preserve the view. If necessary for barrier to be 42 inches, recommend that entire height be made of the aesthetic rock treatment offered by the DDC. Determination that the project will have effect, with proposed mitigation
SHPD	Memo from Pua Aiu, Administrator to Russell Arakaki, Park Engineering dated June 14, 2010	Restatement of mitigation agreements to date: New drainage system to follow the design of the original (minus curbing). Plan to remove the existing CRM spillway and replace it with a series of drainage slots through the concrete barrier wall on the north side of the roadway would disperse runoff and lessen both erosion and subsequent instability in the road without changing the look of the immediate roadway is satisfactory.

Agency	Document	Comments
		<p>Proposal to eliminate the two-inch thick asphalt concrete pavement on top of the new reinforced concrete slab due to concerns about maintenance. Alternate proposal to place a similar color component to the existing asphalt in the concrete mix for the new road surface would result in better road traction while retaining the look of the original road is satisfactory</p> <p>Agreement to use of shotcrete to prevent renewed erosion within the cement matrix on the side of the road. Shotcrete would be treated to match the soil color and ground cover similar to what already exists in the area would be planted on the slope and in the flatter area immediately behind the wall.</p> <p>In response to proposal that walls be strengthened by use of a concrete core, SHPD suggested that a rock finish be used on the walls to match the historic rock type rather than moss rock. Agreement, then, that the walls be covered with a finish to match the cut stone, nearly flush blue rock look of the existing CRM walls.</p> <p>Issue of the height of roadside walls continues to be a concern as the three-foot height requirement in the current code would spoil the road design continuity, detract from the view, create a drainage ditch appearance, become a magnet for graffiti, and make it difficult for pedestrians to get out of the path of an automobile in an emergency.</p> <p>SHPD notes that at Diamond Head Road, a similar historic rock wall is two feet high and protects pedestrians and automobiles from the Cliffside. SHPD is willing to accept a two-foot wall (similar to Diamond Head), and (because) the speed limit of the Tantalus road segment is only 20 miles per hour, SHPD feels that safety issues would be satisfactorily addressed.</p> <p>No pedestrian fence exists along the length of Tantalus-Round Top Roads; historic precedent should preclude erection of such a facility.</p>
SHPD	Letter from Pua Aiu, Administrator to Russell Arakaki, Park Engineering dated	Since an earlier determination that the project would have no effect on historic properties, the scope of proposed work has changed. The road is now listed on the Hawaii Register of Historic

Agency	Document	Comments
	<p>October 15, 2009 [LOG: 2009.3979; DOC: 0910RS10]</p>	<p>Places and the evaluation criteria for the project have changed.</p> <p>SHPD finds that the project will affect historic properties.</p> <p>Recommended mitigation measures:</p> <p>(1) Rock veneer used on walls match the historic rock type rather than moss rock</p> <p>(2) Replacement walls be built of CRM or concrete rather than reconstructing low rise walls and topping them with guardrails</p> <p>(3) New drainage systems follow the design of the originals (minus curbing, etc.) to maintain continuity of the road layout</p>
SHPD	<p>Letter from Melanie Chinen, Administrator to Wayne Higuchi, Shigemura, Lau, Sakanishi, Higuchi & Associates, Inc. (structural engineer), dated December 14, 2006 [LOG: 2006.4209; DOC: 0611AJ07]</p>	<p>Determine that no historic properties will be affected by this undertaking because (1) intensive cultivation has altered the land, (2) previous grubbing/grading has altered the land, and (3) other—a review of available documents indicates there are no known historic properties in the vicinity of the current project. Also, when commenting on a CDUA to construct Hawaii Public Radio facilities on the subject parcel [LOG: 2006.3659; DOC: 0412EJ15] dated December 22, 2004, found that the then proposed undertaking would have no effect on historic properties.</p>
Division of Forestry and Wildlife	<p>Letter from Paul Conry, Administrator to Wayne Higuchi, Shigemura, Lau, Sakanishi, Higuchi & Associates, Inc. (structural engineer), letter undated; received November 29, 2006</p>	<p>In general, project is acceptable, as proposed in plans submitted November 1, 2006; do not have major concerns</p> <p>Any new turf reinforcing matting with hydroseed should be submitted to DOFAW for review and approval prior to installation. Note: seed samples (in unopened, sealed container properly labeled) to be sent to State Dept of Agriculture for inspection, analysis, and reporting. Seed analysis report, confirming compliance HRS §150 related to noxious weeds, to be submitted to DOFAW officer-in-charge at least 2 weeks prior to hydroseeding.</p> <p>For Tantalus Drive, there are no existing documents distinguishing actual ownership. City owns and maintains Tantalus Drive along with appurtenances. On most maps and/or drawings,</p>

Agency	Document	Comments
		<p>typical rights-of-way are shown to be approximately 50 or 60 feet wide. Recommend the establishment of a permanent easement approximately 15 feet beyond the proposed 50-foot ROW or to transfer fee title of this area to the City for the proper ownership, operation, and maintenance of the proposed improvements.</p> <p>Because land dispositions take a long time, and if the project must proceed before all land dispositions are completed, DOFAW is open to discussing options for conditional approvals that would allow the project to move forward.</p> <p>Note: Staff report to BLNR recommending approval of (1) Use and Occupancy Agreement for Retaining Wall Purposes and (2) Construction and Management Right-of-Entry. PSF No. 060D-230 dated March 23, 2007</p>
Commission on Water Resource Management	Letter from Dean A. Nakano, Acting Deputy Director to Wayne Higuchi, Shigemura, Lau, Sakanishi, Higuchi & Associates, Inc. (structural engineer), dated July 1, 2005	The project will not alter the bed or banks of streams, therefore a stream channel alteration permit will not be required.
Office of Conservation and Coastal Lands	Memorandum from (signature illegible) dated December 21, 2010	No objections. Comments dated July 22, 2005 still apply.
Office of Conservation and Coastal Lands	Letter from Samuel J. Lemmo, Administrator to Wayne Higuchi, Shigemura, Lau, Sakanishi, Higuchi & Associates, Inc. (structural engineer), dated July 22, 2005 [Ref: OCCL: TM; OA 05-256]	<p>Existing crib wall appears to lie within the Resource subzone of the Conservation District and may be a nonconforming structure.</p> <p>Pursuant to HAR §13-5-37, Non-conforming uses shall not prohibit the continuance of, or repair of nonconforming uses.</p> <p>OCCL believes that the crib wall is part of the road structure and the road has not been destroyed to an extent of more than 50% of its replacement cost at the time of destruction.</p> <p>Pursuant to HAR §13-5-37, P-10, the drainage and erosion control improvements appear to be accessory structures to an existing facility as identified in the exempt classes established in §</p>

Agency	Document	Comments
		11-200-8. Therefore, the rehabilitation/ replacement of the crib wall and the accessory drainage and erosion control improvements will not require the filing of a Conservation District Use Application.
Land Division-Oahu District	Memorandum from T. Chee dated December 13, 2010	Any improvements including the erosion control matting and grass made to State land requires a disposition from the Land Board
Division of State Parks	Memorandum from Dan Quinn dated December 15, 2010	No comments
Engineering Division	Memorandum from Carty S. Change, Chief Engineer dated December 16, 2010	According to the FIRM, the project site is located in Flood Zone X. The Flood Insurance Program does not have any regulations for developments within Flood Zone X.
Disability and Communication Access Board (DCAB)	Document Review Memo by Gary L. Batcheller, Facility Access Specialist II dated December 20, 2010	No construction requiring the application of the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and other applicable design standards required by HRS 103-50.
DCAB	Document Review Memo by David K. Poe, Facility Access Specialist dated September 26, 2006 [DCAB Job # 2006-499; Project # 21-06]	No construction requiring the application of the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and other applicable design standards required by HRS 103-50.
City and County Government		
Department of Planning and Permitting	Letter from Henry Eng, Director to Wayne Higuchi, Shigemura, Lau, Sakanishi, Higuchi & Associates, Inc. (structural engineer), dated July 13, 2005	Project is not within the Special Management Area
Other		
Hawaiian Telcom	Meeting on November 30, 2010	Concerns by HT and Hawaii Public Radio (HPR) re vehicle access to antenna/transmitter facilities

Agency	Document	Comments
		<p>HPR is installing a new transmitter during summer 2011</p> <p>Installation of a temporary overhead is not necessary, but underground ductline should be installed 5 feet below finished grade of the structural concrete slab; also installation of three new manholes</p> <p>HT has a 5-foot wide easement that may need to be adjusted</p>

9.2 ORGANIZATIONS CONSULTED DURING PREPARATION OF THE DEA

As part of the early consultation process, agencies and organizations not previously contacted were sent a pre-assessment letter requesting comments to assist in the DEA preparation.

A copy of the letter requesting pre-assessment comments is reproduced after the listing.

Federal

- Department of Interior, Fish & Wildlife Services

State of Hawai'i

- Department of Accounting and General Services
- Department of Business, Economic Development & Tourism
- Department of Hawaiian Home Lands
- Department of Health, Environmental Planning Office
- Department of Transportation
- Na Ala Hele Trails and Access Program, Department of Land and Natural Resources
- Office of Planning
- Office of Hawaiian Affairs
- Senator Carol Fukunaga
- Representative Della Au Belatti

City and County of Honolulu

- Department of Planning and Permitting
- Department of Environmental Services
- Department of Parks and Recreation
- Department of Environmental Services
- Department of Facility Maintenance
- Department of Transportation Services

- Honolulu Fire Department
- Honolulu Police Department
- Board of Water Supply
- Councilmember Tulsi Gabbard
- Makiki/Lower Punchbowl/Tantalus Neighborhood Board No. 10

Utilities

- Oceanic Time Warner Cable

Organizations

- Tantalus Community Association

Individuals

- Owner/Resident 3803 Tantalus Drive
- Owner/Resident 3809 C Tantalus Drive
- Owner/Resident 3811 Tantalus Drive
- Owner/Resident 3821 Tantalus Drive
- Owner/Resident 3825 Tantalus Drive
- Owner/Resident 3653 Tantalus Drive
- Owner/Resident 3655 Tantalus Drive
- Owner/Resident 3798 Tantalus Drive

Early Consultation Comment Letters

A total of 18 agencies, organizations, and individuals responded to the request for pre-assessment consultation. Comments are summarized below, and have been incorporated into relevant sections of the DEA. Letters are reproduced in full at the end of this chapter.

Respondent	Document	Comments	Relevant Section(s) in the DEA
Suzanne Case, Resident 3761 Round Top Drive	E-mail dated 7-23-11	Forty years ago, Hog's Back was fully open to view on both sides. In decades since, invasive trees and shrubs have grown and obscured the view. Project is opportunity to correct this condition by clearing high vegetation and restoring historic views.	Sec. 3.5, Scenic and Visual Resources
Gary Cabato, Director, Honolulu Department of Parks and Recreation	Letter dated 7-26-11	No comments. No program or facility that would be impacted by the project. Agency can be removed as a consulted party for balance of the environmental review process.	
Westley Chun, Director and Chief Engineer, Honolulu Department of Facility Maintenance	Letter dated 8-2-11	Support intent of project to repair the crib wall. No comments at present.	
Bruce A. Coppa, State Comptroller, Hawaii Department of Accounting and General Services	Letter dated 8-3-11	Proposal does not impact any DAGS project or facilities No comments at present.	
Glenn M. Okimoto, Director, Hawaii Department of Transportation	Letter dated 7-29-11	DOT does not anticipate any significant, adverse impacts to nearby State transportation facilities. DDC should coordinate need for a permit to transport any oversized or overweight equipment/loads used for the project on State highways.	
Aaron Lowe, Trails and Access Specialist, Division of Forestry and Wildlife, Hawaii Department of Land and	Meeting on 8-10-11	The Nahuina and Kalawahine Trails are connected by the Hog's Back section of Tantalus Drive. Closing the road for construction will prevent hikers from	Sec. 3.7, Parks and Recreational Facilities Sec. 2.4, Temporary Pedestrian Route

Respondent	Document	Comments	Relevant Section(s) in the DEA
Natural Resources		<p>completing a loop.</p> <p>Requested that a 36-inch walkway be considered through the job site, even for limited use during non-construction hours.</p> <p>Because 24-hour access must be maintained to the Hawaiian Telcom and Hawaii Public Radio antenna facilities, pedestrian access to Kalawahine Trail also will be maintained.</p> <p>Consider impacts on bicyclists and road runners.</p> <p>Proposed road closure is not expected to have a significant impact on parking by trail users.</p> <p>Concerns about the concentrated discharge of stormwater runoff into Pauoa Valley have been addressed through the current design which includes multiple drainage slots and proposed planter that will remove sediment, debris, and other pollutants prior to discharge.</p> <p>Information about changes in trail conditions can be disseminated through the Na Ala Hele website and signs posted at trailheads.</p>	<p>Sec. 2.2, Preferred Alternative</p> <p>Sec. 3.1.3, Water Quality</p>
Louis M. Kealoha, Chief, Honolulu Police Department	Letter dated 8-9-11	<p>Traffic control personnel recommended if there will be traffic control contra flow and to assist emergency vehicle access</p> <p>Drivers may experience difficulty turning around on narrow road</p> <p>Increase in traffic on Round Top Drive as alternate route</p>	<p>Sec. 2.2.1, Construction Phasing and Traffic Control</p> <p>Sec. 3.6, Traffic and Circulation</p> <p>Sec. 3.8.1, Police Protection Services</p>

Respondent	Document	Comments	Relevant Section(s) in the DEA
		<p>Increase in nuisance calls to police during construction</p> <p>No long term impacts on police facilities or operations</p>	
Paul S. Kikuchi, Chief Financial Officer, Customer Care Division, Honolulu Board of Water Supply	Letter dated 8-3-11	No water facilities in project area.	
Kenneth G. Silva, Chief, Honolulu Fire Department	Letter dated 8-12-11	Recommends that roadway surface be maintained to support 55,000 pounds which is the estimated weight of fully-loaded fire apparatus.	Sec. 3.8.2, Fire Protection Services
Albert "Alapaki" Nahalea, Chairman, Hawaii Department of Hawaiian Home Lands	Letter dated 8-4-11	No comments.	
Keola Lindsey, Compliance Monitoring Program, Office of Hawaiian Affairs	E-mail dated 8-16-11	No substantive comments at this time.	
Pamela Burns, Historic Road Committee, Tantalus Community Association	Letter dated 8-18-11	<p>Because original walls made of cut blue stone and this is an important feature of the historic road, should be utilized throughout the project rather than more contemporary metal guardrails and painted concrete.</p> <p>Construction area is described as a "narrow two lane section of the roadway," but it is historically and continues to be a one lane road and should remain that way.</p>	<p>Sec. 2.2, Preferred Alternative</p> <p>Sec. 3.3.1, Archaeological and Historic Resources</p> <p>Sec. 1.2, Project Area</p> <p>Sec. 2.2.1, Construction Phasing and Traffic Control</p>

Respondent	Document	Comments	Relevant Section(s) in the DEA
		<p>Request that construction plans be made available to the consulting parties and that they be reviewed by a historic architect or engineer prior to undertaking the work to ensure compliance.</p> <p>Project description states that this portion of :Tantalus Drive will be closed for approximately 5 months except for emergency vehicles and continuity of public services.” Request same access for Tantalus residents.</p> <p>Residents and other community members have invested a great deal of time and resources to gain State and National historic recognition and it is very important that historic characteristics of the road be maintained.</p>	
<p>Makiki-LowerPunchbowl-Tantalus Neighborhood Board</p>	<p>Presentation at regularly scheduled meeting on 8-18-11</p>	<p>How many residences will be affected?</p> <p>What is the cost of the project?</p> <p>Will there be a public hearing?</p> <p>The problem was identified in 2005, and is only now being fixed?</p> <p>Any study of tourism impacts?</p> <p>If planning night work, will this affect birds?</p> <p>Have you looked at impacts on endangered plants? If federal funds are being used, the U.S. Fish and Wildlife Service must be consulted.</p>	<p>Also see Sec. 9.3, Makiki/Lower Punchbowl/Tantalus Neighborhood Board</p> <p>Sec. 3.4, Socio-economic Environment</p> <p>Sec. 3.6, Traffic and Circulation</p> <p>Sec. 2.2.3, Cost Estimate</p> <p>Sec. 2.1, Project Background</p> <p>Sec. 3.7, Parks and Recreational Facilities</p> <p>Sec. 3.2, Biological Resources</p> <p>Sec. 2.2.1, Construction Phasing and Traffic Control</p>

Respondent	Document	Comments	Relevant Section(s) in the DEA
		<p>Can see that this project addresses a public safety issue—that the project is needed or the road might deteriorate further.</p> <p>Is it possible to have a bypass or do half the road at a time?</p> <p>Can the work be done in a less than 5 months (the anticipated road closure period)?</p> <p>Is there any way to guarantee how long construction will take and how much—so this doesn't become another Round Top?</p>	<p>Sec. 2.2.2, Project Schedule</p>
<p>Wayne Y. Yoshioka, Director, Honolulu Department of Transportation Services</p>	<p>Letter dated 8-17-11</p>	<p>Apprise area neighborhood board, residents, and businesses of the project and impacts on network of adjoining streets.</p> <p>Street usage permit from DTS is required for right-of-way and roadway improvements.</p> <p>Contractor shall provide appropriate traffic control devices and flaggers/police officers for safe passage through construction site.</p> <p>Construction should be performed during off-peak hours of traffic (9 am to 3 pm; 8 pm to 4 am)</p>	<p>Sec. 3.6, Traffic and Circulation</p> <p>Sec. 2.2.1, Construction Phasing and Traffic Control</p> <p>Sec. 1.6, Permits and Approvals Required or Potentially Required</p>
<p>Laura Moffat-Cintron and Charles Moffat, Residents 3803 Tantalus Drive, TMK 2-5-02: 010 and 3809 Tantalus Drive TMK 2-5-012: 011</p>	<p>E-mail dated 8-20-11</p>	<p>Properties are located just below the Hog's Back on the Makiki side; accessible from private driveway where hikers park for the Manoa Cliffs Trail. Four homes on this private driveway.</p> <p>Happy with improvements since the new concrete barrier wall will help minimize water flowing into properties and prevent cars</p>	<p>Sec. 2.2, Preferred Alternative</p>

Respondent	Document	Comments	Relevant Section(s) in the DEA
		<p>from going off the cliff.</p> <p>Want to be sure road slopes toward Pauoa Valley and water drains in that direction.</p> <p>Would like new CRM Wall No. 2 be extended to the parking area because existing wall is deteriorated with a missing section that allows water to drain onto their properties.</p> <p>Requested that a berm be installed along the Makiki side edge of Tantalus Drive to further reduce water drainage onto their properties. Runoff has worsened over time, possibly due to regrading and resurfacing of the roadway.</p>	
<p>Tantalus Community Association (TCA)— Verne Takagi (President), Pamela Burns, Carolyn Carley, Irv Jenkins, Abby Eaton</p>	<p>Meeting and field visit on 8-20-11</p>	<p>Concerned about 3’-6” concrete barrier walls along both sides of road and requested new walls be lowered to match the existing walls.</p> <p>Requested barrier walls be made of real rock, instead of proposed rock veneer or colored, rock textured concrete.</p> <p>Question if emergency vehicles will be allowed to pass through the construction zone.</p>	<p>Also see, Sec. 9.4, Tantalus Community Association</p>
<p>Gisela Speidel, Resident</p>	<p>E-mail dated 8-14-11</p>	<p>Concerned that plan will not fix the major problem of runoff from Tantalus Drive above the Hog’s Back. Recommends a large drainage about ¼ mile from Hog’s Back on right (<i>presumably Pauoa Valley</i>) side. Existing drain is too flat and clogs quickly.</p> <p>Concerned about impaired access if road is</p>	<p>Sec. 2.2, Preferred Alternative</p> <p>Sec. 2.2.1, Construction Phasing and Traffic Control</p> <p>Sec. 3.6, Traffic and Circulation</p>

Respondent	Document	Comments	Relevant Section(s) in the DEA
		<p>closed for construction.</p> <p>Concerned that road closure will last too long—should be days, rather than months.</p>	
<p>Alec Wong, Chief, Clean Water Branch, Hawaii Department of Health</p>	<p>Letter dated 8-25-11</p>	<p>Any project and its potential impacts to State waters must meet criteria of (a) antidegradation policy, (b) designated uses according to classification of receiving State waters, and (c) water quality criteria.</p> <p>Project may require NPDES permit. All discharges related to construction activity must comply with State water quality standards.</p>	<p>Sec. 3.1.3, Water Quality</p> <p>Sec. 3.1.1, Geology and Soils</p>

9.3 MAKIKI/LOWER PUNCHBOWL/TANTALUS NEIGHBORHOOD BOARD

The Makiki/Lower Punchbowl/Tantalus Neighborhood Board was given a project briefing at its regularly scheduled meeting on Wednesday, August 17, 2011. Comments and concerns expressed by Board members and community residents included the following:

How many residences will be affected?

Do not know off hand how many houses will be affected. The EA will include traffic counts and impacts on roadway users.

What is the cost of the project?

Ballpark estimate is \$4-4.5 million.

Will there be a public hearing?

No public hearing is planned. However, a meeting with the Tantalus Community Association is scheduled for August 20, 2011 at 8:20 a.m.

The problem was identified in 2005, and is only now being fixed?

The study was completed in 2005.

Any study of tourism impacts?

These will be examined in the EA

Lower Round Top Drive was closed for repairs for 1.5 years.

If planning night work, will this affect birds? Have you looked at impacts on endangered plants?

If federal funds are being used, you'll need to check with the U.S. Fish and Wildlife Service.

A tree specialist is involved with the project. No Federal funds will be used.

Can see that this project addresses a public safety issue—that the project is needed or the road might deteriorate further.

This project is intended to prevent road failure.

Is it possible to have a bypass or do half the road at a time?

There's no alternative road along the Hogsback. We are looking into the possibility of doing the drill shaft work at night and covering with a plate during the day (for through traffic). But after the drill shaft work is completed, we'll need to dig down about two feet to put in the concrete slab. Traffic will not be allowed during this phase.

Can the work be done in a shorter period than 5 months (the anticipated road closure period)?

We're looking at extending the work day from 8 to 12 hours, and working on Saturdays.

Is there any way to guarantee how long construction will take and how much—so this doesn't become another Round Top?

We're only doing the design. The City and County will manage construction.

9.4 TANTALUS COMMUNITY ASSOCIATION (TCA)

The project planning team met with members of the Tantalus Community Association at the project site on Saturday, August 20, 2011. The following comments and concerns were expressed during the meeting.

1. TCA members expressed concern about the 3'-6" high concrete barrier walls that are proposed along each side of the roadway. The TCA members requested that a lower wall be constructed to match the height of the existing walls.

The City is required to meet current standards and a 42-inch high barrier wall is required for the safety of the bicyclists. The City and design consultants have discussed this issue with the State Department of Land and Natural Resources, Historic Preservation Division (SHPD) staff.

2. TCA members requested that the barrier walls be constructed of "real rock" instead of the proposed rock veneer or colored, rock textured concrete.
3. A TCA member asked if emergency vehicles will be allowed to pass through the project site during construction.

No vehicles will be allowed to drive through the project site after a certain point during construction. The roadway will be excavated about 2-feet deep to install the reinforced concrete slab. Rebars will be exposed and extend for the full width of the roadway. All vehicles will be required to use Round Top Drive.

9.5 AGENCIES, ORGANIZATIONS, AND INDIVIDUALS TO BE CONTACTED DURING THE DEA REVIEW PERIOD

The following agencies and individuals will be contacted during the DEA public review and comment period.

Federal

U.S. Department of Interior, Fish and Wildlife Service

State of Hawaii

Department of Health

Department of Land and Natural Resources (DLNR)

DLNR, Division of Forestry and Wildlife

DLNR, Division of Forestry and Wildlife, Na Ala Hele Trails Program

DLNR, Office of Conservation and Coastal Lands

DLNR, State Historic Preservation Division

Office of Hawaiian Affairs

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

State Representative, District No. 25

State Senator, District No. 11

City and County of Honolulu

Department of Environmental Services
Department of Facility Maintenance
Department of Planning & Permitting
Department of Transportation Services
Honolulu Fire Department
Honolulu Police Department
Councilmember, District No. 6

Utility

Hawaiian Electric Co.
Hawaiian Telcom
Oceanic Time Warner Cable

Community Groups and Organizations

Maikik/Lower Punchbowl/Tantalus Neighborhood Board No. 10
Tantalus Community Association
Hawaii Public Radio
Hawaii Bicycling League
Hawaii Ultra Racing Team
Mid Pac Road Runners Club
Navatek Cruise
Oahu Nature Tours

Individuals

- Owner/Resident 3803 Tantalus Drive
- Owner/Resident 3809 C Tantalus Drive
- Owner/Resident 3811 Tantalus Drive
- Owner/Resident 3821 Tantalus Drive
- Owner/Resident 3825 Tantalus Drive
- Owner/Resident 3653 Tantalus Drive
- Owner/Resident 3655 Tantalus Drive
- Owner/Resident 3798 Tantalus Drive

Media

Honolulu Star Advertiser

Pre-assessment Comment Letters



KIMURA INTERNATIONAL INC.

July 20, 2011

(name, address)

Dear (salutation):

**Subject: Highway Improvements, Roadway Repair
Vicinity of 3798 Tantalus Drive
Honolulu, Oahu, Hawaii
TMK: [1] 2-5-012: 014 and [1] 2-5-019: 005
Pre-Assessment Consultation**

Kimura International, Inc. is preparing a Draft Environmental Assessment (EA) for the City and County of Honolulu, Department of Design and Construction (DDC) that will examine the impacts of a project to repair the existing concrete crib wall and roadway in the vicinity of 3798 Tantalus Drive on the island of O'ahu.

We are requesting comments and input regarding environmental concerns in all resource areas, and information that might assist in evaluating the project.

Project Location

The project is located in the vicinity of 3798 Tantalus Drive, a section that is referred to by residents as the "hogs back" because the road is located along the top of a narrow ridge with Pauoa Valley and Pacific Heights to the north and upper Makiki Valley to the south. The project is also identified by its location between the Nahuina Trail and the Manoa Cliffs Trail (see location map, attached).

Project Purpose

In 2005, the DDC completed a study of the existing crib wall structure which is approximately 16 to 20 feet high and 120 feet long. The crib wall supports the inbound lane of traffic for a narrow two-lane section of the roadway. The study was initiated when pavement cracks were observed and visual observations of the crib wall raised concerns for the stability of the structure. The study found the crib structure to be intact, but fill material had eroded from some of the cells. Deterioration of the header and stretcher units was observed in the form of cracks, spalls,

1600 Kapiolani Blvd., Suite 1610
Honolulu, HI 96814
Tel: 808 944-8848 • Fax: 808 941-8999

and general weathering of exposed members. Based on these conditions, and because the majority of the structure is buried and cannot be assessed, replacement of the structure was initially recommended.

Project Description

In general, the project will include the following components (see preliminary site plan).

- Clearing of vegetation and tree removal
- Repair of an existing crib wall
- Demolition of a portion of the asphalt concrete roadway and concrete rubble masonry (CRM) walls
- Relocation of Hawaiian Telcom ductlines
- Construction of an 18-inch thick reinforced concrete slab supported on 24-inch diameter drilled shafts
- Construct CRM walls, concrete barrier walls, metal guardrails, concrete and asphalt concrete pavement restoration
- Drainage improvements and erosion control measures, including construction of drainage slots within the north concrete barrier wall to discharge storm water runoff from the roadway to the adjacent land and installation of turf reinforcement matting and grass planting
- Signing, striping, and pavement markings

Construction is expected to begin in September 2012 and take approximately 12 months. Because of space constraints in the construction zone, and for the safety of the public and work crew, a section of Tantalus Drive will be closed for approximately 5 months. During this time, a traffic control plan will be implemented, including provision for access by emergency vehicles and continuity of public services, such as trash pickup and mail delivery.

Pre-Assessment Consultation

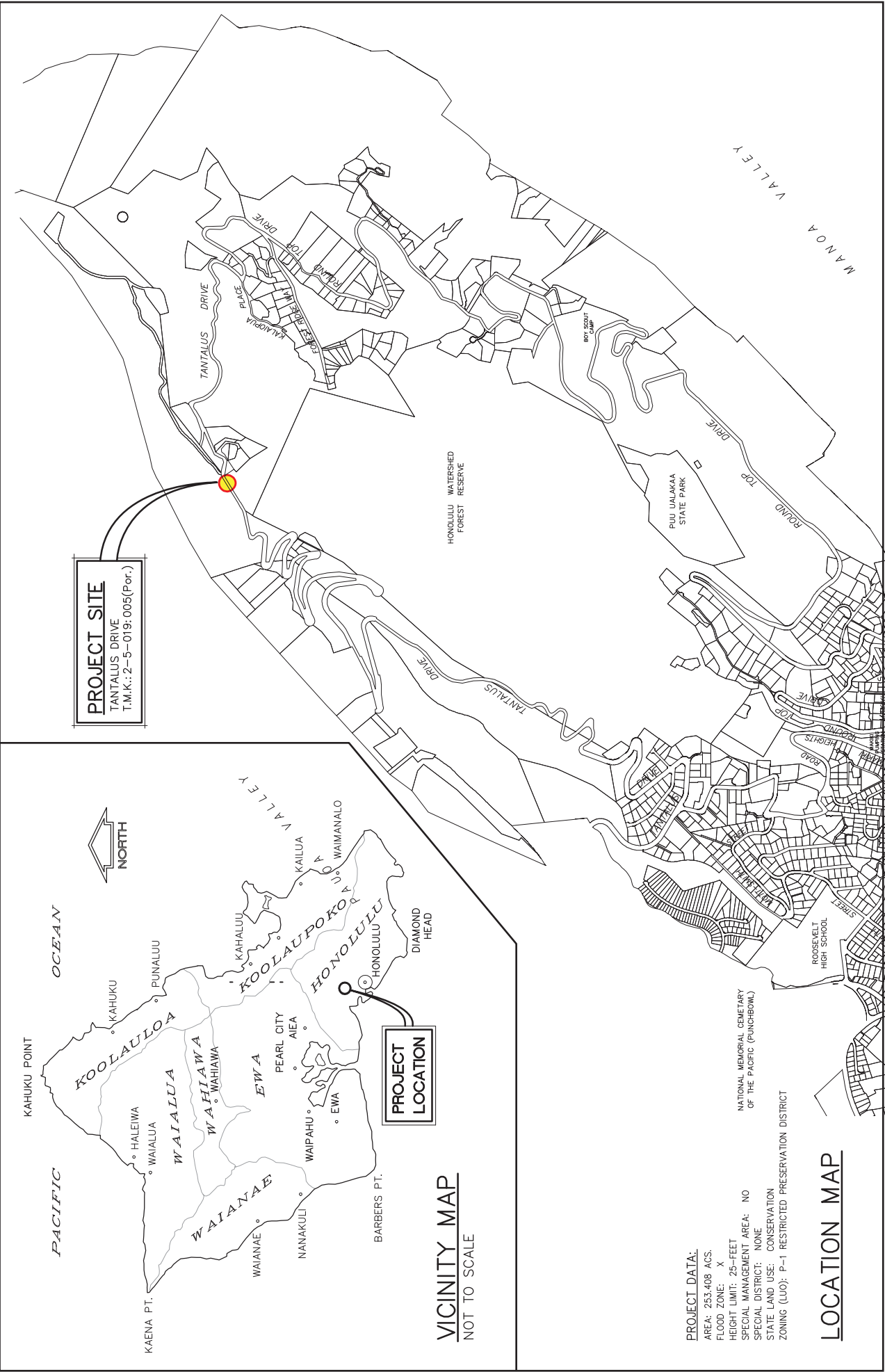
The Draft EA for this project is being prepared in accordance with Chapter 343, Hawai'i Revised Statutes. A copy of the draft document will be available for public review, and you will also have an opportunity to provide comments at that time.

Please send preliminary comments to Kimura International, Inc. by Monday, August 22, 2011. If you have questions, please feel free to e-mail or call me or my associate, Nancy Nishikawa (nnishikawa@kimurainternational.com), at Ph. 944-8848. Mahalo.

Sincerely,
KIMURA INTERNATIONAL, INC.



Glenn T. Kimura
President



PROJECT SITE
 TANTALUS DRIVE
 T.M.K.: 2-5-019: 005(Par.)

PROJECT LOCATION

VICINITY MAP
 NOT TO SCALE

LOCATION MAP

PROJECT DATA:
 AREA: 253.408 ACS.
 FLOOD ZONE: X
 HEIGHT LIMIT: 25-FEET
 SPECIAL MANAGEMENT AREA: NO
 SPECIAL DISTRICT: NONE
 STATE LAND USE: CONSERVATION
 ZONING (LUO): P-1 RESTRICTED PRESERVATION DISTRICT



Not to Scale

Tantalus Drive
 Roadway Improvements,
 Environmental Assessment
 July 2011

FIGURE



LOCATION MAP

Nancy Nishikawa

From: SCaselnHI@aol.com
Sent: Saturday, July 23, 2011 10:09 AM
To: nnishikawa@kimurainternational.com
Cc: glassr@hawaiihome.cc; pburns@hawaiianhumane.org; Suzicase@aol.com; Jameshcase@aol.com; gigiabel@gmail.com; elisabethcase@hawaii.rr.com; EJFINNEY@aol.com; mcarlsmith9@gmail.com
Subject: Tantalus Hog's Back Project

Thank you for your request for comments on the Tantalus Hog's Back Project. I have been a resident of Round Top Drive for the past ten years and also from approximately 1965 to 1977.

I would just note that forty years ago the Hog's Back was fully open to view on both sides. It was a beautiful landmark feature of the Tantalus Drive/Round Top Drive loop road, now officially designated an historic road, and featured stunning sweeping views of Honolulu from both sides. In the ensuing decades many invasive trees and shrubs have grown up to obscure the view, and may have contributed to potential instability of the structure. This is a great opportunity to correct that.

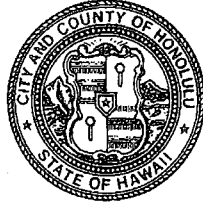
I would urge that the project completion leave both sides of the Hog's Back cleared of high vegetation and open once again to the landmark, historic view on both sides.

Suzanne Case
3761 Round Top Drive

DEPARTMENT OF PARKS & RECREATION
CITY AND COUNTY OF HONOLULU

1000 Uluohia Street, Suite 309, Kapolei, Hawaii 96707
Phone: (808) 768-3003 • Fax: (808) 768-3053
Website: www.honolulu.gov

PETER B. CARLISLE
MAYOR



GARY B. CABATO
DIRECTOR

ALBERT TUFONO
DEPUTY DIRECTOR

RECEIVED JUL 29 2011

July 26, 2011

Mr. Glenn T. Kimura, President
Kimura International, Inc.
1600 Kapiolani Blvd., Suite 1610
Honolulu, Hawaii 96814

Dear Mr. Kimura:

Subject: Pre-Consultation for Draft Environmental Assessment
Highway Improvements, Roadway Repair
Vicinity of 3798 Tantalus Drive
Honolulu, Hawaii - TMK: [1] 2-5-012: 014 and [1] 2-5-019: 005

Thank you for the opportunity to review and comment at the pre-consultation stage of the subject Highway Improvements, Roadway Repair Project.

The Department of Parks and Recreation has no comment, as the proposed project will not impact any program or facility of the department. You may remove us as a consulted party to the balance of the EIS process.

Should you have any questions, please contact Mr. John Reid, Planner, at 768-3017.

Sincerely,

A handwritten signature in black ink, appearing to read "Gary B. Cabato".

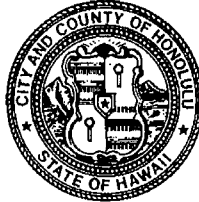
GARY B. CABATO
Director

GBC:jr
(426161)

DEPARTMENT OF FACILITY MAINTENANCE
CITY AND COUNTY OF HONOLULU

1000 Uluohia Street, Suite 215, Kapolei, Hawaii 96707
Phone: (808) 768-3343 • Fax: (808) 768-3381
Website: www.honolulu.gov

PETER B. CARLISLE
MAYOR



WESTLEY K.C. CHUN, Ph.D., P.E., BCEE
DIRECTOR AND CHIEF ENGINEER

GEORGE "KEOKI" MIYAMOTO
DEPUTY DIRECTOR

IN REPLY REFER TO:
DRM 11-612

August 2, 2011

RECEIVED AUG 03 2011

Mr. Glenn Kimura
Kimura International, Inc.
1600 Kapiolani Blvd., Suite 1610
Honolulu, Hawaii 96814

Dear Mr. Kimura:

Subject: Highway Improvements, Roadway Repair
Vicinity of 3798 Tantalus Drive
Honolulu, Hawaii
TMK: (1) 2-5-012:014 AND (1) 2-5-019:005
Pre-Assessment Consultation

Thank you for the opportunity to comment on the environmental concerns in all resource areas or your proposed project in reference to your letter dated July 20, 2011

We support the intent of the project to repair the crib wall and have no comments at the present time.

Should you have any questions, please call Lan Yoneda, Assistant Chief of the Division of Road Maintenance, at 768-3600.

Sincerely,

A handwritten signature in black ink, appearing to read "Westley K.C. Chun", is written over a circular stamp that partially overlaps the signature.

Westley K.C. Chun, Ph.D., P.E., BCEE
Director and Chief Engineer

NEIL ABERCROMBIE
GOVERNOR



BRUCE A. COPPA
COMPTROLLER

JAN S. GOUVEIA
DEPUTY COMPTROLLER

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES

P.O. BOX 119, HONOLULU, HAWAII 96810-0119

(P)1160.1

RECEIVED AUG 04 2011

AUG - 3 2011

Mr. Glenn T. Kimura, President
Kimura International, Inc.
1600 Kapiolani Blvd., Suite 1610
Honolulu, Hawai'i 96814


Dear Mr. Kimura:

Subject: Highway Improvements, Road Repair Vicinity of
3798 Tantalus Drive
Honolulu, Oahu, Hawaii
TMK: (1) 2-5-012: 014 and (1) 2-5-019: 005
Pre-Assessment Consultation

This is in response to your letter dated July 20, 2011 regarding the subject project. The proposed project does not impact any of the Department of Accounting and General Services' projects or existing facilities, and we have no comments to offer at this time.

If you have any questions, please call me at 586-0400 or have your staff call Mr. David DePonte of the Public Works division at 586-0492.

Sincerely,



BRUCE A. COPPA
State Comptroller

NEIL ABERCROMBIE
GOVERNOR



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

GLENN M. OKIMOTO
DIRECTOR

Deputy Directors
JADE T. BUTAY
FORD N. FUCHIGAMI
RANDY GRUNE
JADINE URASAKI

IN REPLY REFER TO:
DIR 0943
STP 8.0497

July 29, 2011

RECEIVED AUG 05 2011

Mr. Glenn T. Kimura
President
Kimura International, Inc.
1600 Kapiolani Boulevard, Suite 1610
Honolulu, Hawaii 96814

Dear Mr. Kimura:

Subject: Tantalus Drive Roadway Repairs
Pre-Assessment Consultation for Draft Environmental Assessment (DEA)

Thank you for requesting the State Department of Transportation's (DOT) review of the subject project. DOT understands City and County of Honolulu, Department of Design and Construction (DDC) propose the subject roadway repair project in the vicinity of 3798 Tantalus Drive.

Given the project's location, DOT does not anticipate any significant, adverse impacts to the nearby State transportation facilities. However, the DDC should coordinate the need for a permit to transport any oversized or overweight equipment/loads used for the project on State highway facilities with DOT Highways Division, Oahu District Office.

DOT appreciates the opportunity to provide comment. If there are any questions or the need to meet with DOT staff, please contact Mr. David Shimokawa of the DOT Statewide Transportation Planning Office at telephone number (808) 831-7976.

Very truly yours,

A handwritten signature in black ink, appearing to read "Glenn M. Okimoto".

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

Notes of Meeting with DLNR, Na Ala Hele Trails

Wednesday, August 10, 2011, 10:00 a.m.

Aaron Lowe, DLNR
Mike Yamasaki, DDC
Russell Arakaki, Park Engineering
Glenn Kimura, Kimura International
Nancy Nishikawa, Kimura International

Purpose of the Meeting: to provide preliminary project information to Aaron Lowe, Oahu Trails and Access Specialist, and to identify areas of potential impacts and concerns.

Trail Facilities in the Project Area

The project site affects the trailheads for the Nahuina Trail and Kalawahine Trail. Aaron estimates that 100 people per day use the Makiki Loop, which takes approximately 2.5 hours. There is an extended loop that includes the Nahuina, Kalawahine, Manoa Cliff, and Moleka Trails. The Nahuina and Kalawahine Trails are connected by the Hogs Back section of Tantalus Drive. The cliff face in this area is too steep for off-road trail development. Aaron also noted that Tantalus Drive is used by contingents of bicyclists and road runners (an annual race takes place in January).

Impacts and Potential Mitigation

Trail Access. Aaron asked that a 36-inch treadway be considered through the job site, possibly made available off-hours when construction workers are not on site. Even with legally defensible warning signs, he noted that people are “going to try to get through.” Nancy asked whether it’s possible to do work on one side of the road first, then the other. Russell explained that the roadway will be stabilized with a 16-inch thick concrete slab supported on (78) 24-inch diameter drilled shafts running the length of the roadway. Additionally, Russell said there may be periods when it’s unsafe for the public to traverse the workzone because of pits or exposed rebars. Aaron acknowledged these conditions, but suggested it might still be possible to provide limited access to (pro-actively) mitigate the expected five-month road closure. Russell said that he would examine options for a treadway (of approx. 300 feet) and consult with the City regarding feasibility.

Russell showed the limits of the construction area affecting approximately one-third of the Hogs Back section on the mauka side. The remaining makai two-thirds, while not a construction zone, may be needed for staging. Road closure locations took into account vehicle turnaround.

On the mauka end of the construction site, Hawaiian Telcom and Hawaii Public Radio require 24-hour access to the utility road; therefore, pedestrian access to Kalawahine Trail will be maintained.

Glenn asked about the possibility of temporarily establishing a “bypass” loop. Aaron said that it’s possible, but would involve walking at least 0.5 mile on the hot blacktop.

Water Drainage. Aaron said that District Forester Ryan Peralta had raised concerns about the concentrated discharge of stormwater runoff. Russell explained that the current design includes 14 drainage slots at the bottom of the north concrete barrier wall. The majority of these drainage slots will discharge stormwater runoff into the proposed planter for the removal of sediment, debris, trash, nutrients, and other potential pollutants. The planter will be used as a permanent best management practice (BMP). Runoff in the planter will then disperse over a greater area prior to discharging into Pauoa Valley for infiltration into the watershed.

Parking. There was a discussion about potential loss of parking by trail users. While a small number of roadside spaces may be temporarily unavailable, the road closure points will avoid the larger designated parking locations.

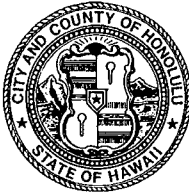
Traffic Circulation. Aaron observed that the construction area is located near the midpoint of Tantalus/Round Top, thereby minimizing detours for their maintenance vehicles, as well as resident motorists.

Trail User Information

Aaron said that information about trail conditions, such as temporary closures, would be disseminated through their website and signs posted at the trailheads.

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU

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



PETER B. CARLISLE
MAYOR

LOUIS M. KEALOHA
CHIEF

DAVE M. KAJIHIRO
MARIE A. McCAULEY
DEPUTY CHIEFS

OUR REFERENCE **DAT-LS**

August 9, 2011

RECEIVED AUG 11 2011

Mr. Glenn T. Kimura, President
Kimura International Inc.
1600 Kapiolani Boulevard, Suite 1610
Honolulu, Hawaii 96814-3806

Dear Mr. Kimura:

This is in response to your letter dated July 20, 2011, requesting comments on the Pre-Assessment Consultation, Draft Environmental Assessment, for the Highway Improvements/Roadway Repair project in the vicinity of 3798 Tantalus Drive.

Traffic control personnel are recommended, especially if there will be any type of traffic contra flow and to assist with emergency vehicle accessibility during the road work.


Use of Tantalus Drive will be limited in the area of the project during construction. Drivers may experience difficulty turning around at or near the project site due to the narrow roadway. The residents and visitors of the area will need to use Round Top Drive as an alternate, thereby increasing traffic to Round Top Drive.

During the construction phase, this project will have a negative impact on the services provided by the Honolulu Police Department. In spite of mitigation measures, construction-related dust, noise, traffic, and odors would likely cause an increase in calls for police service to the area. However, once completed, there should be no impact on the facilities or operations of the Honolulu Police Department.

Should you have any questions, please call Captain William Axt of District 1 (Central Honolulu) at 529-3386.

Sincerely,

LOUIS M. KEALOHA
Chief of Police

By 
DEBORA A. TANDAL
Assistant Chief of Police
Support Services Bureau

BOARD OF WATER SUPPLY

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



August 3, 2011

PETER B. CARLISLE, MAYOR

RANDALL Y. S. CHUNG, Chairman
DENISE M. C. DE COSTA
ANTHONY R. GUERRERO, JR.
THERESIA C. McMURDO
ADAM C. WONG

WESTLEY K.C. CHUN, Ex-Officio
GLENN M. OKIMOTO, Ex-Officio

DEAN A. NAKANO
Acting Manager

Mr. Glenn T. Kimura, President
Kimura International, Incorporated
1600 Kapiolani Boulevard, Suite 1610
Honolulu, Hawaii 96814

RECEIVED AUG 11 2011

Dear Mr. Kimura:

Subject: Your Letter Dated July 20, 2011 Requesting Comments on the Draft
Environmental Assessment Pre-Assessment Consultation for Highway
Improvements, Roadway Repair Vicinity of 3798 Tantalus Drive,
TMK: 2-5-12: 14, 2-5-19: 5

Thank you for the opportunity to comment on the proposed project.

We do not have any water facilities in the area of the proposed project.

If you have any questions, please contact Robert Chun at 748-5443.

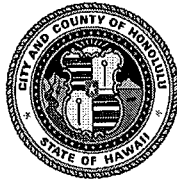
Very truly yours,

PAUL S. KIKUCHI
Chief Financial Officer
Customer Care Division

HONOLULU FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU

636 South Street
Honolulu, Hawaii 96813-5007
Phone: 808-723-7139 Fax: 808-723-7111 Internet: www.honolulu.gov/hfd

PETER B. CARLISLE
MAYOR



KENNETH G. SILVA
FIRE CHIEF

EMMIT A. KANE
DEPUTY FIRE CHIEF

August 12, 2011

RECEIVED AUG 13 2011

Mr. Glenn Kimura, President
Kimura International, Inc.
1600 Kapiolani Boulevard, Suite 1610
Honolulu, Hawaii 96814

Dear Mr. Kimura:

Subject: Preassessment Consultation
Highway Improvements, Roadway Repair
Vicinity of 3798 Tantalus Drive
Honolulu, Oahu, Hawaii
Tax Map Keys: 2-5-012: 014 and 2-5-019: 005

In response to your letter of July 20, 2011, regarding the above-mentioned subject, the Honolulu Fire Department reviewed the material provided and recommends that the roadway surface be maintained to support 55,000 pounds, which is the estimated weight of a fully-loaded fire apparatus.

Should you have any questions, please call Acting Battalion Chief Gary Lum of our Fire Prevention Bureau at 723-7152.

Sincerely,

A handwritten signature in black ink, appearing to read "Kenneth G. Silva".

KENNETH G. SILVA
Fire Chief

KGS/GL:bh

NEIL ABERCROMBIE
GOVERNOR
STATE OF HAWAII



ALBERT "ALAPAKI" NAHALE-A
CHAIRMAN
HAWAIIAN HOMES COMMISSION

MICHELLE K. KAUHANE
DEPUTY TO THE CHAIRMAN

M. WAIALEALE SARSONA
EXECUTIVE ASSISTANT

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS

P. O. BOX 1879
HONOLULU, HAWAII 96805

RECEIVED AUG 13 2011

August 4, 2011

Glenn T. Kimura
President
Kimura International Inc.
1600 Kapiolani Blvd., Suite 160
Honolulu, Hawaii 96814

Aloha Mr. Glenn Kimura

Subject: HIGHWAY IMPROVEMENTS, ROADWAY REPAIR
VICINITY OF TANTALUS DRIVE
HONOLULU, OAHU, HAWAII
TMK: [1] 2-5-012: 014 and [1] 2-5-019: 005
PRE-ASSESSMENT CONSULTATION

Mahalo for the opportunity to provide comments regarding the subject proposal.

The Department of Hawaiian Home Lands has no comments to offer. Should you want to discuss this matter further, please call the Planning Office at (808) 620-9480.

Me Ke aloha,

fu

Albert "Alapaki" Nahale-a
Chairman

Department of Hawaiian Home Lands

Nancy Nishikawa

From: Keola Lindsey
Sent: Tuesday, August 16, 2011 2:29 PM
To: nnishikawa@kimurainternational.com
Subject: Tantalus Drive Improvements Project

Aloha Nancy Nishikawa- The Office of Hawaiian Affairs is in receipt of your July 20, 2011 letter seeking comments ahead of a draft environmental assessment (DEA) which will be prepared to support the Tantalus Drive Improvements Project proposed by the City and County of Honolulu-Department of Design and Construction in the vicinity of 3798 Tantalus Drive.

OHA has no substantive comments at this time. We do request that one electronic copy of the DEA be sent to OHA attn: Compliance Monitoring Program when it becomes available so that we can review and possibly provide comments at that time.

Please feel free to contact me with any questions.

Thanks, Keola

*Keola Lindsey
Office of Hawaiian Affairs
Compliance Monitoring Program
711 Kapiolani Boulevard
Honolulu, Hawaii 96813
keolal@oha.org (email)
(808) 594-0244 (office)*

Pamela Burns
125 Kalaiohua Place
Honolulu, Hawaii 96822
808-356-2202

August 18, 2011

Glenn Kimura, President
Kimura International
1600 Kapiolani Blvd., Suite 1610
Honolulu, Hawaii 96814

Dear Mr. Kimura,

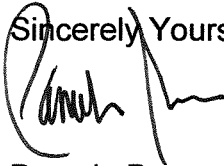
Thank you for your letter of July 20, 2011 regarding proposed work on Hog's Back located on Tantalus. I have reviewed the proposed project description and would like to offer the following comments:

- The plans indicate that "metal guard rails" and "concrete barrier walls" imitating cut blue stone are to be used. This road and its associated features are listed on The National Register of Historic Places and all work must be "in conformance with the Secretary of the Interior's Standards and Guidelines for the Treatment of Historic Properties". Since the original walls were of cut blue stone and are an important feature throughout this historic road, we would like to ask that this be utilized throughout the project rather than the more contemporary metal guardrails and painted concrete.
- In the description of the construction area it is described as a "narrow two lane section of the roadway". This is historically and continues to be a one lane road and it should remain a one lane road. The naturally narrow road also serves as a traffic calming feature and deterrent for speeding.
- I'd like to request that the construction plans be made available to the consulting parties and that they be reviewed by a historic architect or engineer prior to undertaking the work to ensure compliance.
- The project description states that this portion of "Tantalus Drive will be closed for approximately 5 months except for emergency vehicles and continuity of public services". We ask that the same access also be extended to residents of Tantalus.

The residents of Tantalus and other community members privately invested a great deal of time and resources to gain the State and National historic recognition of this beautiful road. It's very important that the historic characteristics of this road be maintained.

Thank you for addressing these issues.

Sincerely Yours,

A handwritten signature in black ink, appearing to read 'Pamela Burns', written over the typed name.

Pamela Burns
Historic Road Committee

CC: ✓ Vern Takagi, President Tantalus Community Association
✓ Jim Shon, President Friends of Tantalus
Wayne Yoshioka, C & C Dept of Transportation
Councilmember Tulsi Gabbard
Senator Carol Fukunaga
Representative Della Au Belatti
Angie Westfall, State Historic Preservation

Notes of Presentation to the Makiki/Lower Punchbowl/Tantalus Neighborhood Board
Wednesday, August 17, 2011, 7:00 p.m.

Purpose of the Presentation: to provide preliminary project information to Board and community members, respond to questions about the project, and obtain public feedback.

Russell Arakaki gave a brief project description aided by presentation boards. The following are questions and comments raised during the meeting. Responses in italics.

How many residences will be affected?

Do not know off hand how many houses will be affected. The EA will include traffic counts and impacts on roadway users.

Chair Steelquist mentioned 400 homes.

What is the cost of the project?

Ballpark estimate is \$4-4.5 million.

Will there be a public hearing?

No public hearing is planned. However, we will be meeting with the Tantalus Community Association on Saturday, August 20, 2011 at 8:20 a.m.

The problem was identified in 2005, and is only now being fixed?

The study was finished in 2005.

Any study of tourism impacts?

These will be examined in the EA

Lower Round Top Drive was closed for repairs for 1.5 years.

If planning night work, will this affect birds?

Have you looked at impacts on endangered plants?

If federal funds are being used, you'll need to check with the U.S. Fish and Wildlife Service.

A tree specialist is involved with the project. No use of Federal funds.

Discussion about additional consultation with DOFAW personnel.

Can see that this project addresses a public safety issue—that the project is needed or the road might deteriorate further.

This project is intended to prevent road failure.

Is it possible to have a bypass or do half the road at a time?

There's no alternative road along the hog's back. We are looking into the possibility of doing the drill shaft work at night and covering with a plate during the day (for through traffic). But after the drill shaft work is completed, we'll need to dig down about two feet to put in the concrete slab. Traffic will not be allowed during this phase.

Can the work be done in a shorter period than 5 months (the anticipated road closure period)?
We're looking at extending the work day from 8 to 12 hours, and working on Saturdays.

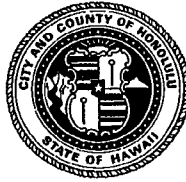
Is there any way to guarantee how long construction will take and how much—so this doesn't become another Round Top?

We're only doing the design. The City and County will manage construction.

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU

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

PETER B. CARLISLE
MAYOR



WAYNE Y. YOSHIOKA
DIRECTOR

KAI NANI KRAUT, P.E.
DEPUTY DIRECTOR

TP7/11-426190R

August 17, 2011

RECEIVED AUG 19 2011

Mr. Glenn T. Kimura, President
Kimura International, Inc.
1600 Kapiolani Boulevard, Suite 1610
Honolulu, Hawaii 96814

Dear Mr. Kimura:

Subject: Draft Environmental Assessment (DEA) Highway Improvements;
Roadway Repair Vicinity of 3798 Tantalus Drive; Honolulu, Oahu,
Hawaii; Tax Map Key (TMK): (1) 2-5-012: 014 and (1) 2-5-019: 005;
Pre-Assessment Consultation

This responds to your letter dated July 20, 2011, requesting our comments concerning this proposed project.

Our Traffic Engineering Division (TED) has the following comments:

- The Neighborhood Board, as well as the area residents, businesses, etc., should be kept apprised of the details for the proposed project and the impacts the project may have on the adjoining local street network area.
- A City and County of Honolulu Street Usage permit from the Department of Transportation Services (DTS) will be required for the right-of-way and roadway improvements.
- When the road's traffic flow is impeded during construction, the contractor shall provide appropriate temporary traffic control devices and flaggers/police officers for safe traverse through the construction site according to the Manual on Uniform Traffic Control Devices (MUTCD).

Mr. Glenn T. Kimura
Page 2
August 17, 2011

- Construction should be performed during off-peak hours of traffic (i.e., 9 a.m. to 3 p.m. and 8 p.m. to 4 a.m.).

We reserve further comment pending submission of the DEA.

Thank you for the opportunity to review this matter. Should you have any further questions, please contact Michael Murphy of my staff at 768-8359.

Very truly yours,

A handwritten signature in black ink, appearing to read "Wayne Y. Yoshioka". The signature is fluid and cursive, with the first name "Wayne" being the most prominent.

WAYNE Y. YOSHIOKA
Director

Nancy Nishikawa

From: Laura Moffat-Cintron
Sent: Saturday, August 20, 2011 4:42 PM
To: nnishikawa@kimurainternational.com
Cc: cgmoffat2003@yahoo.com
Subject: Fwd: Input to Tantalus Hogs Back Project
Attachments: Hogs_Back_Input.pdf

Mr. Kimura,

I own 3803 Tantalus Drive TMK 1-2-5-012-010 and my brother Charles Moffat owns 3809 Tantalus Drive TMK 1-2-5-012-011. We reviewed your "Site Plan." Our properties are located just below the Hogs Back on the Makiki side. They are accessible from a private driveway located where hikers usually park for the Manoa Cliffs Trail. Please see attached "Site Plan." There are 4 homes down this private driveway 3803, 3809, 3809C and 3811 Tantalus Drive.

We are happy that improvements will be made. Since our properties are just below the site, the "260 L.F. of new concrete barrier wall" will help minimize the flow of water onto our properties as well as prevent cars from going off the cliff. The existing wall is too short and has holes in it that allow water to flow onto our properties. There is a tremendous amount of water flow coming down Tantalus Drive from the Round Top side which has caused landslides on our two properties. See Permit #598519. Soil engineer Larry Shinsato, structural engineer Glenn Miyasato and contractor Structural Systems, Inc. were the professionals involved in fixing this very expensive and damaging landslide caused by water flow.

We want to make sure that the road will be sloped or graded towards the Pauoa Valley side to send the tremendous flow of water to the "drain slots" on the "new concrete barrier wall" on the Pauoa side.

We would like the "14 L.F. new CRM Wall No. 2" to be extended to the end by the parking area because the existing wall is deteriorated and there is a gap or missing section. The deterioration and gap allow water to overflow onto our lower properties. Please see our notes on attached "Site Plan."

We would also ask that a berm be installed along the Makiki side edge of Tantalus Drive starting up the hill east for about 50' past 3825 Tantalus Drive's 2 mailboxes and to connect or end up at the start of the concrete blocks near the top of our private driveway. This would help stop the excessive water drainage onto our properties. We grew up there in the 1950's and there never used to be this runoff problem. We believe the grading of the road has changed with re asphaltting resulting in this very damaging water flow. A berm would be a much cheaper solution than re grading that part of Tantalus Drive.

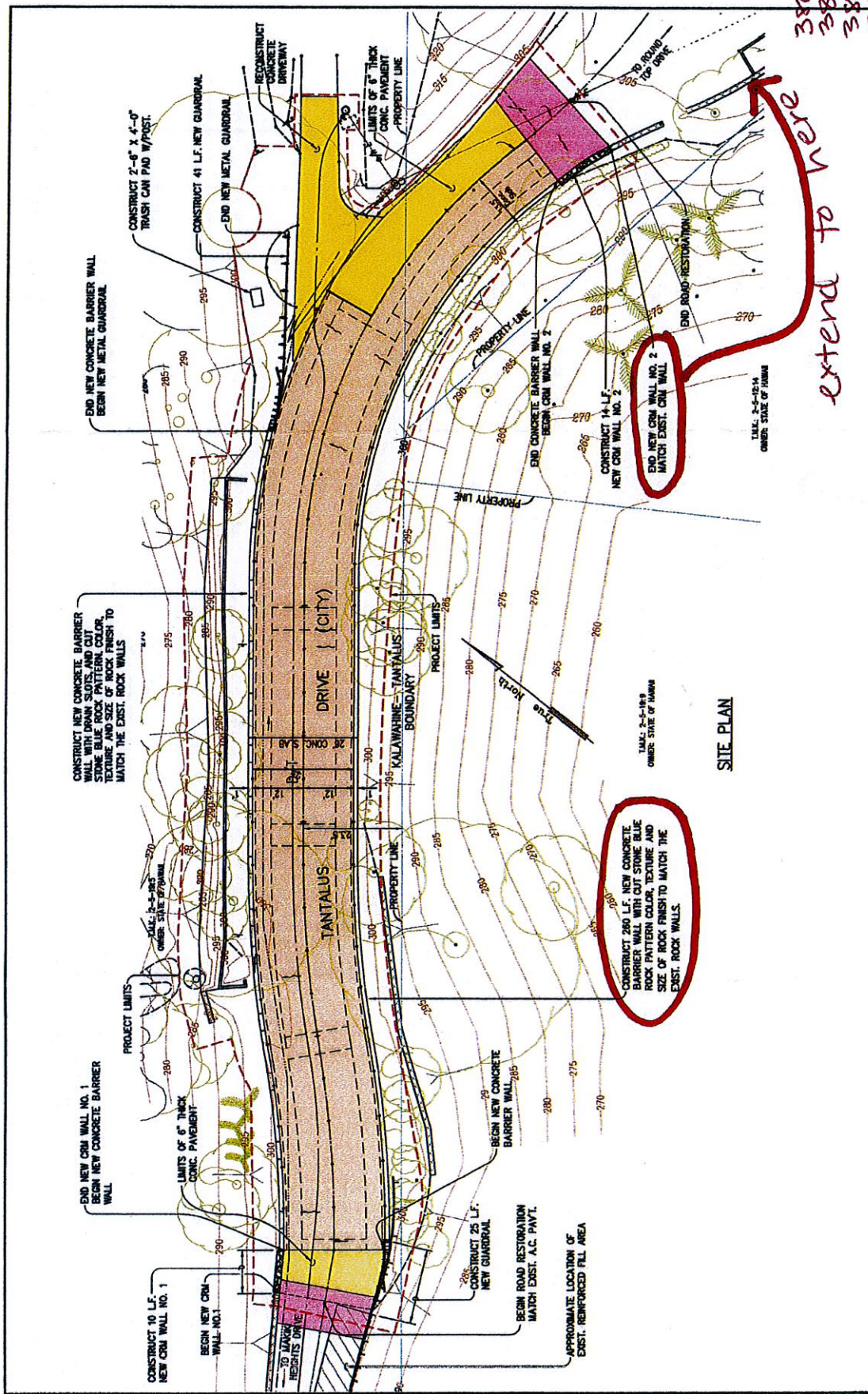
We would be happy to meet on site or discuss this matter further. Thank you for your consideration.

Laura Moffat-Cintron, Esq., R.
LauraMoffat@aol.com (808) 554-3031

Charles Moffat
CGMoffat2003@yahoo.com (808) 398-7908

This message may contain confidential and/or proprietary information, and is intended for the person/entity to whom it was originally addressed. Any use by others is strictly prohibited.

8/22/2011



3803,
3804,
3809C,
3811
Private
driveway

extend to where

CONSTRUCT NEW CONCRETE BARRIER WALL WITH DRAIN SLOTS, AND CUT ROCK PATTERN COLOR, TEXTURE AND SIZE OF ROCK FINISH TO MATCH THE EXIST. ROCK WALLS

CONSTRUCT 10 L.F. NEW CRM WALL NO. 1

CONSTRUCT 25 L.F. NEW GUARDRAIL

LIMITS OF 6" THICK CONC. PAVEMENT

CONSTRUCT 25 L.F. NEW GUARDRAIL

CONSTRUCT 10 L.F. NEW CRM WALL NO. 1

END NEW CRM WALL NO. 1

BEGIN NEW CRM WALL NO. 1

CONSTRUCT 10 L.F. NEW CRM WALL NO. 1

END NEW METAL GUARDRAIL

BEGIN NEW METAL GUARDRAIL

CONSTRUCT 10 L.F. NEW CRM WALL NO. 1

RECONSTRUCT CONCRETE DRIVEWAY

BEGIN ROAD RESTORATION MATCH EXIST. A.C. PAVT.

CONSTRUCT 10 L.F. NEW CRM WALL NO. 1

END NEW METAL GUARDRAIL

BEGIN ROAD RESTORATION MATCH EXIST. A.C. PAVT.

CONSTRUCT 10 L.F. NEW CRM WALL NO. 1

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CONSTRUCT 10 L.F. NEW CRM WALL NO. 1

END NEW METAL GUARDRAIL

BEGIN ROAD RESTORATION MATCH EXIST. A.C. PAVT.

CONSTRUCT 10 L.F. NEW CRM WALL NO. 1

SITE PLAN

CONSTRUCT 280 L.F. NEW CONCRETE BARRIER WALL WITH CUT STONE BLUE ROCK PATTERN COLOR, TEXTURE AND SIZE OF ROCK FINISH TO MATCH THE EXIST. ROCK WALLS.

CONSTRUCT 14 L.F. NEW CRM WALL NO. 2 MATCH EXIST. CON WALL

THIS IS A PLAN UNDER STATE OF ILLINOIS

THIS IS A PLAN UNDER STATE OF ILLINOIS



Suite 1500, Pacific Park Plaza ☐ 711 Kapiolani Boulevard; Honolulu, Hawaii 96813 ☐ Telephone (808) 593-1676 ☐ Facsimile (808) 593-1607

ParEn, Inc. ☐ dba **park engineering**

MEETING NOTES

Subject: Highway Improvements, Roadway Repair
Vicinity of 3798 Tantalus Drive

Date: Saturday, August 20, 2011

Time: 8:20 AM

Place: Project Site (along the hogs back)

Participants: Verne Takagi, President of Tantalus Community Association (TCA)
Pamela Burns, Resident
Carolyn Carley, Resident
Irv Jenkins, Resident
Abby Eaton, Resident
Michael Yamasaki, DDC, Civil Division
Russell Arakaki, ParEn, Inc.

See attached sign-up sheet.

The purpose of the meeting was to provide preliminary project information to members of the Tantalus Community Association (TCA). The following is a summary of our discussion.

1. The objective of the project is to stabilize the roadway.
2. R. Arakaki provided a brief description of the project, including:
 - a. The *mauka* and *makai* project limits,
 - b. Clearing of vegetation and tree removal,
 - c. Demolition work,
 - d. Colored shotcrete lining on the existing crib wall,
 - e. New landscape planter on top of the existing crib wall,
 - f. 16-inches thick reinforced concrete slab supported on 24-inch diameter drilled shafts,
 - g. 3'-6" high rock textured and stained concrete barrier walls with drainage slots along north wall,
 - h. Rock walls, and
 - i. Metal guardrails.

3. The TCA members expressed concern about the 3'-6" high concrete barrier walls that are proposed along each side of the roadway. The TCA members requested that a lower wall be constructed to match the height of the existing walls.

R. Arakaki explained that the City is required to meet current standards and a 42-inch high barrier wall is required for the safety of the bicyclists. R. Arakaki mentioned that the City and design consultants have discussed this issue with the State Department of Land and Natural Resources, Historic Preservation Division (SHPD) staff.

4. The TCA members requested that the barrier walls be constructed of "real rock" instead of the proposed rock veneer or colored, rock textured concrete.

M. Yamasaki cited two (2) examples of the use of rock veneer, including

- a. Wall at the corner of University Avenue and Maile Way, and
- b. 2355 Round Top Drive.

5. A TCA member asked if emergency vehicles will be allowed to pass through the project site during construction.

R. Arakaki explained that all vehicles will not be allowed to drive through the project site after a certain point during construction. The roadway will be excavated about 2-feet deep to install the reinforced concrete slab. Rebars will be exposed and extend for the full width of the roadway. All vehicles will be required to use Round Top Drive.

6. P. Burns will provide documentation that shows Tantalus Drive is listed on the National Register of Historic Places.
7. V. Takagi provided a copy of an email from Gisela Speidel, dated August 14, 2011 with comments on the project. See attached.

Meeting concluded at about 9:00 A.M.

Verne Takagi

From: Gisela [gsl.speidel@gmail.com]
Sent: Sunday, August 14, 2011 9:19 PM
To: vtakagi@hawaii.rr.com
Subject: Hogsback construction

Hi Verne,

About the planned repairs at the hogsback , a few points:

1. Was not Kimura International the company that worked on Kalaiopua and had very expensive equipment just standing around for a long time? Made residence wait forever to finish and in the end had a problem with runoff. Do we have to go with this company?
2. The plans will not fix the major problem, which is a huge run off during downpours along Tantalus Dr. from quite a bit above the hogsback. There should be a large drainage about ¼ mile up from the hogsback on the right hand side, a system that is built as elsewhere on Tantalus further down. There is a drain, but it is flat and gets clogged quickly so that all the run off up to the next sharp curve goes on to the hogsback.
3. We should insist that Tantalus residents are allowed to pass through during construction. Besides, what will happen if a tree blocks the road on Round Top and we have to go to work, have medical emergencies, air planes to catch, etc?
4. Any full blockage of Tantalus at hogsback should be a matter of a few days, not months as is their plan.

Could you please pass this along to Kimura? Thanks ever,

Gisela

APPENDICES

- A Historic Preservation Literature Review and Field Inspection for Highway Improvements and Roadway Repair, Vicinity of 3798 Tantalus Drive (Tantalus Crib Wall Repair) Project, Pauoa and Makiki Ahupua'a, Kona District, O'ahu Island, TMK: (1) 2-5-012:014 and (1) 2-5-019:005. Prepared by Alexander Hazlett, David Shideler, and Hallett H. Hammatt (Cultural Surveys Hawai'i, Inc.), October 2011

- B. Traffic Assessment: Closure of a Portion of Tantalus Drive, Vicinity of 3798 Tantalus Drive, Honolulu, Hawaii. Prepared by Julian Ng, Inc., October 2011

APPENDIX A

Historic Preservation Literature Review and Field Inspection for Highway Improvements and Roadway Repair, Vicinity of 3798 Tantalus Drive (Tantalus Crib Wall Repair) Project, Pauoa and Makiki Ahupua'a, Kona District, O'ahu Island, TMK: (1) 2-5-012:014 and (1) 2-5-019:005. Prepared by Alexander Hazlett, David Shideler, and Hallett H. Hammatt (Cultural Surveys Hawai'i, Inc.), October 2011

DRAFT

**Historic Preservation Literature Review and Field
Inspection for Highway Improvements and Roadway Repair
Vicinity of 3798 Tantalus Drive (Tantalus Crib Wall Repair)
Project,
Pauoa and Makiki Ahupua‘a, Kona District, O‘ahu Island
TMK: (1) 2-5-012:014 and (1) 2-5-019:005**

**Prepared for
Kimura international, Inc.**

**Prepared by
Alexander Hazlett Ph.D.,
David Shideler, M.A.,
and
Hallett H. Hammatt Ph.D.
Cultural Surveys Hawai‘i, Inc.
Kailua, Hawai‘i
(Job Code: PAUOA 5)**

October 2011

**O‘ahu Office
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Ph.: (808) 262-9972
Fax: (808) 262-4950**

www.culturalsurveys.com

**Maui Office
1860 Main St.
Wailuku, Hawai‘i 96793
Ph: (808) 242-9882
Fax: (808) 244-1994**

Management Summary

Reference	Historic Preservation Literature Review and Field Inspection for the Highway Improvements and Roadway Repair Vicinity of 3798 Tantalus Drive (Tantalus Crib Wall Repair) Project, Pauoa and Makiki Ahupua'a, Kona District, O'ahu Island TMK: (1) 2-5-012:014 and (1) 2-5-019:005 (Hazlett, Shideler and Hammatt 2011)
Date	October 2011
Project Number (s)	Cultural Surveys Hawai'i, Inc. (CSH) Job Code: PAUOA 5
Investigation Permit Number	CSH completed the fieldwork component of this study under Hawai'i State Historic Preservation Division/Department of Land and Natural Resources (SHPD/DLNR) permit No. 11-17, issued per Hawai'i Administrative Rules (HAR) Chapter 13-13-282.
Project Location	The project area is located on a southwest facing ridge near the junction of Tantalus Drive and Telephone Road at an elevation of approximately 1430 ft. (436 m.), in Honolulu (Kona) District, in east O'ahu. The project area is depicted on the 1999 U.S. Geological Survey 7.5-minute series topographic map, Honolulu Quadrangle.
Land Jurisdiction	City and County of Honolulu
Agencies	SHPD/DLNR
Project Description and Project Related Ground Disturbance	The proposed development includes removal and replacement of guardrails and rock walls; erection of a fence on the north side; demolition of the existing asphalt concrete roadway surface and construction of a concrete road surface supported by a deep foundation system using micropiles and drilled shafts; demolishing a spillway; removal of trees and vegetation from a crib wall; and encapsulating the crib wall with shotcrete.
Project Acreage	Approximately 0.3 acres (approximately 13,068 square feet)
Area of Potential Effect (APE)	The Area of Potential Effect (APE) includes the entire 0.3-acre project area.
Historic Preservation Regulatory Context	This document was prepared to support the proposed project's historic preservation review under Hawai'i Revised Statutes (HRS) Chapter 6E-42 and HAR Chapter 13-13-284.
Fieldwork Effort	A field inspection was conducted on September 12, 2011 by Alex Hazlett, Ph.D. The fieldwork required approximately 4 hours to complete.
Number of Historic Properties Identified	Tantalus Drive is listed on the Hawai'i Register of Historic Places (SIHP No.50-80-14-9019, dated March 3, 2007). It is not currently listed on the National Register of Historic Places.

<p>Historic Properties Recommended Eligible to the Hawai'i Register* of Historic Places</p>	<p>SIHP No. 50-80-14-9019 was recommended eligible to the Hawai'i Register* under criterion A (associated with events that have made an important contribution to history).</p>
<p>Project Effect Recommendation</p>	<p>Based on the field inspection, no additional archaeological sites or historic properties were observed in the project area. The project area includes all of the flat portion of the ridge top, which falls off precipitously to either side .</p> <p>Several contributing elements that had been designated to define SIHP No. 50-80-14-9019 (Tantalus Round Top Road) were identified in the project area. These included the low basalt and concrete guard wall on the western edge of the project area, the basalt and concrete culvert that drains into Pauoa Valley at the southern end of the project area, and the low basalt and concrete curb on the eastern edge of the project area. The inscription on the eastern curb, at the southern end of the project area, suggests that this curb was built or repaired in 1953, at the same time the culvert was added. The treatment of these contributing elements of Site No. 50-80-14-9019 is being addressed by discussion between the design proponents and SHPD.</p> <p>The project area has been modified repeatedly by road construction and repair. Based on these field inspection results, CSH recommends that no historic properties (other than Site 50-80-14-9019) are likely to be affected by the proposed project. Therefore, CSH's project specific effect recommendation is "no further [archaeological] work".</p>

* To be considered eligible for listing on the Hawai'i Register a cultural resource must possess integrity of location, design, setting, materials, workmanship, feeling, and association, and meet one or more of the following broad cultural/historic significance criteria: "A" associated with events that have made an important contribution to the broad patterns of our history; "B" associated with the lives of persons important in our past; "C" embodies the distinctive characteristics of a type, period, or method of construction, represents the work of a master, or possesses high artistic value; "D" have yielded, or is likely to yield information important for research on prehistory or history; and, "E" 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 history accounts – these associations being important to the group's history

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Section 1 Introduction

1.1 Project Background

At the request of Kimura International, Cultural Surveys Hawai'i, Inc. (CSH) has completed an archaeological literature review and field inspection for the Tantalus Crib Wall Repair Project, Kalāwahine and Makiki Ahupua'a, Honolulu (Kona) District, O'ahu Island, TMK: (1) 2-5-012:014 and (1) 2-5-019:005. The project area encompasses approximately 0.3 acres (approximately 13,068 square feet) of a southwest facing ridge near the junction of Tantalus Drive and Telephone Road (Figure 1, Figure 2, Figure 3) at an elevation of approximately 1430 ft. (436 m) a.m.s.l. Steep slopes drop down on the southeast side to Kānealole Stream, approximately 100-150 ft. (30-45 m) below the level of the road, and on the northwest side to Pauoa stream, approximately 725 ft. (221 m) below the level of the road. The land around the project area is heavily vegetated and is located in the State Department of Land and Natural Resources' Honolulu Watershed Forest Reserve. Tantalus Drive is a portion of the Tantalus-Round Top Road which was nominated to the National Register of Historic Places. It was listed on the State of Hawai'i Inventory of Historic Properties (SIHP) on March 3, 2007 as SIHP No. 50-80-14-9019.

The proposed improvements include removal and replacement of guardrails and rock walls; erection of a fence on the north side; construction of a concrete road surface; demolishing a spillway; removal of trees and vegetation from a crib wall; and encapsulating the crib wall with shotcrete. Soil nailing and micropiles are also being considered to stabilize the crib wall. The plan also envisions demolition of the existing asphalt concrete roadway surface and adjacent concrete rubble masonry walls (CRM). A new roadway of reinforced concrete slab would be supported by a deep foundation system using micropiles and drilled shafts. The existing CRM walls would be replaced with reinforced concrete walls covered with a moss rock veneer. Also involved would be clearing and grubbing, new metal guardrails, chain link fencing, signs, striping, erosion control matting, grassing, and other ancillary roadway improvements. The area of potential effect would be the roadway and its immediate environs. This document was prepared to support the proposed project's historic preservation review under Hawai'i Revised Statutes (HRS) Chapter 6E-42 and HAR Chapter 13-13-284.

The project was originally reviewed and approved by the State Historic Preservation Division (SHPD) on 14 December 2006 (LOG NO. 2006.4209 / DOC NO: 10611AJ07) with a determination that "no historic properties will be affected." On 3 March 2007, Tantalus Drive was added to the Hawai'i Register of Historic Places. The project was subsequently revised and was resubmitted to SHPD for review on 9 October 2009; the revised proposal was reviewed on 15 October 2009 (LOG NO. 2009.3979 / DOC NO: 0910RS10) with the determination that "the project will affect historic properties." Discussion has continued between SHPD and the City and County of Honolulu Department of Design and Construction regarding the project's proposed roadway safety improvements. An SHPD letter dated 15 May 2011 (LOG NO. 2011.1257 / DOC NO. 1105RS11) determination for the proposed work was "effect, with proposed mitigation."

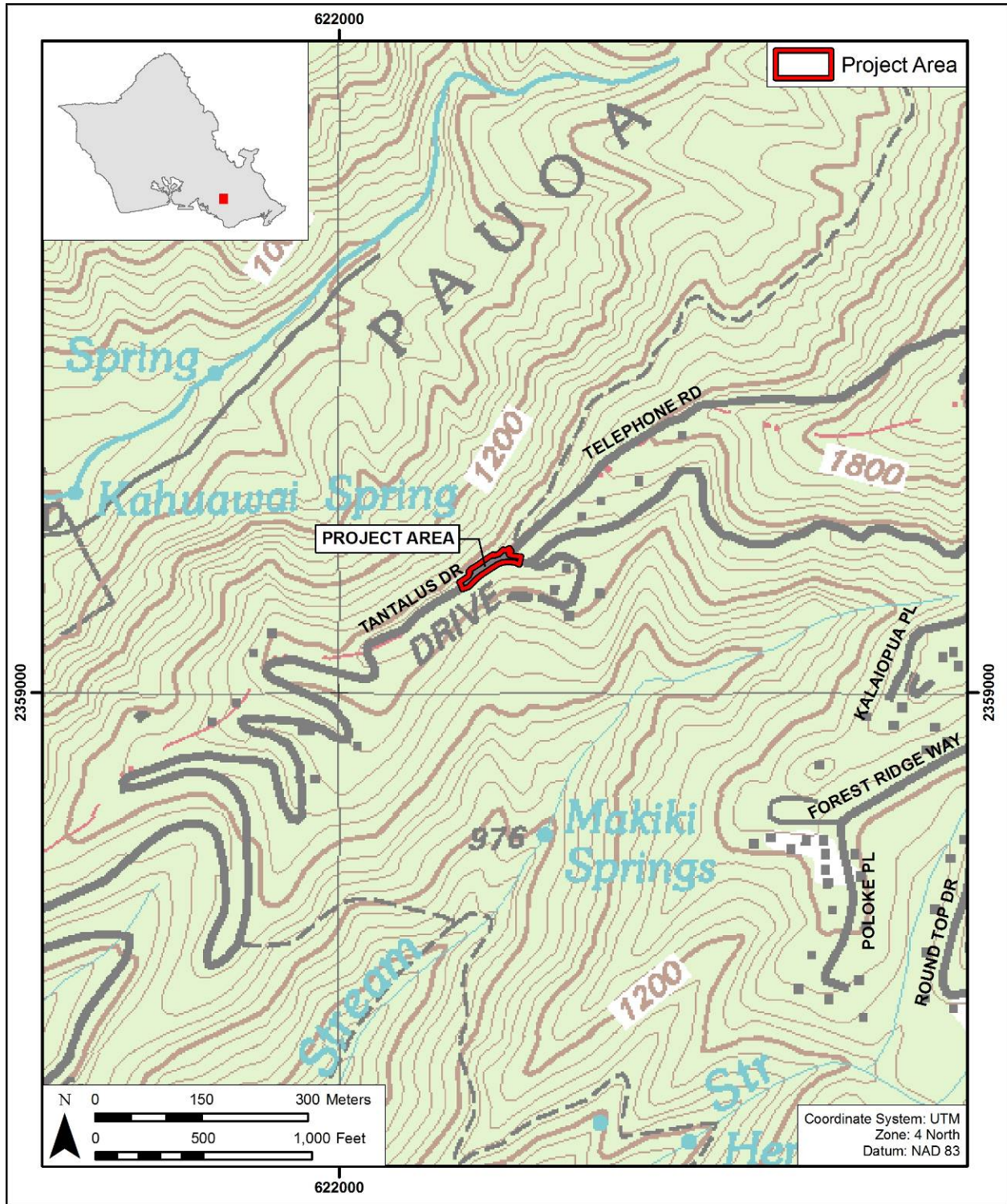


Figure 1. Portion of a 1999 Honolulu U.S. Geological Survey 7.5-Minute Topographic Quadrangle Map, showing the location of the project area

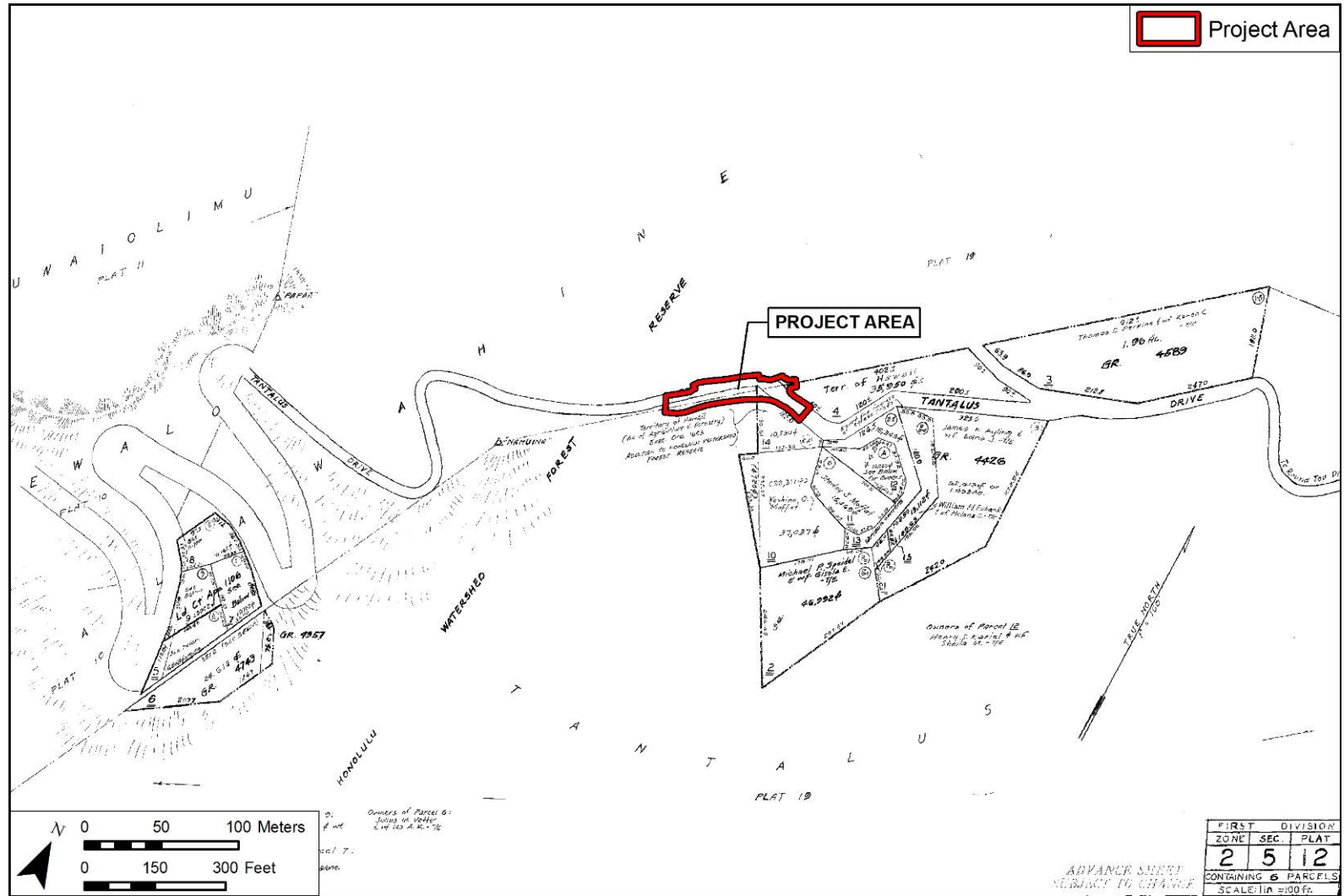


Figure 2. Tax Map Key (TMK) plat map [1] 2-5-012 showing the location of the project area

Historic Preservation Literature Review and Field Inspection for the Highway Improvements and Roadway Repair, Vicinity of 3798 Tantalus Drive (Tantalus Crib Wall Repair) Project, Pauoa and Makiki Ahupua'a, O'ahu

TMK: (1) 2-5-012:014 and (1) 2-5-019:005



Figure 3. Aerial photograph (source: 2005 U.S. Geological Survey Orthoimagery), showing the location of the project area

1.2 Scope of Work

This archaeological literature review and field inspection study was designed to be a useful resource for planning stages of the proposed project. The scope of work was designed to address potential archaeological site types and locations, and allow for future work recommendations.

- 1) Limited historical research to include study of archival sources, historic maps, Land Commission Awards and previous archaeological reports to construct a history of land use and to determine if archaeological sites have been recorded on or near this property and specifically to consider and summarize such specific contributing elements as have been designated to define State Register site 50-80-14-9019 (Tantalus Round Top Road).
- 2) Limited field inspection of the project area to identify any surface archaeological features and to investigate and assess the potential for impact to such sites and subsurface deposits. The focus of the fieldwork will be documentation of such specific contributing elements to the State Register site.
- 3) Preparation of a report to include the results of the historical research and the limited fieldwork with an assessment of archaeological potential based on that research, with recommendations for further archaeological work, if appropriate and including documentation of such specific contributing elements to the State Register site. A major focus of the report will be to provide mitigation recommendations to address historic preservation concerns.
- 4) A free standing, brief assessment of cultural impacts also will be provided to the client.

This scope of work includes full coordination with the SHPD/DLNR and county relating to archaeological matters. This coordination takes place after consent of the owner or representatives.

1.3 Environmental Setting

1.3.1 Natural Environment

The Makiki Heights-Tantalus project area is located in the wet, Ko'olau Mountain Range at an elevation of approximately 1430 ft. (436 m) a.m.s.l. and receives an average annual rainfall of approximately 3000 mm (120 in.).

Soils in the project area are listed as Tantalus Silt Loam, 40 to 70% Slopes (Foote et al. 1972; Figure 4). A representative profile of these soils is reported as: “[surface layer] is very dark brown silt loam... [subsoil] is dark reddish brown, massive very sandy loam...[substratum] is black, unweathered, gravel-size cinders” (Foote et al. 1972: 121). Tantalus Silt Loam is also characterized as having moderately rapid permeability, medium to rapid runoff, and severe erosion hazard (Foote et al. 1972).

Vegetation is a mix of native (*koa*, *māmaki*, *kukui*) and introduced (eucalyptus, acacia, lantana, and guava) trees, but this forested area is mainly the result of a reforestation program begun in 1910. Before this, the slopes were denuded of trees due to “...heavy timber cutting in

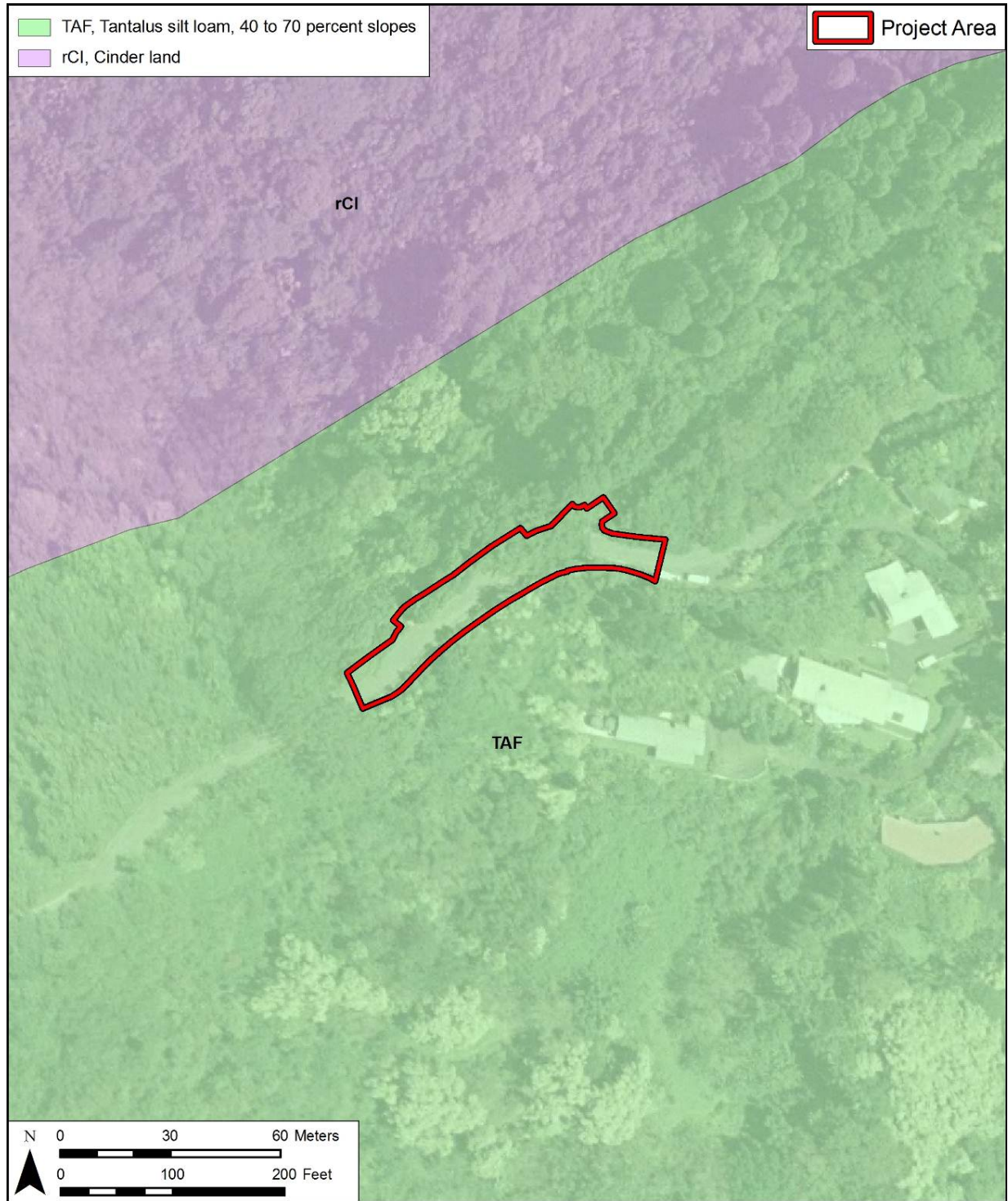


Figure 4. Overlay of Soil Survey of the State of Hawai'i (Foote et al. 1972), indicating sediment types within and surrounding the current project area (source: soils Survey Geographic Database [SSUGRO] 2001, U.S. Department of Agriculture)

the latter half of the 1800s for the sandalwood trade and to supply firewood for the Honolulu area” (Yent and Ota 1980:12). Overgrazing by cattle also contributed to this loss of forest (Fitzpatrick 1989:22). During the reforestation project begun in 1910, the ridge tops were planted with Norfolk Pines and ironwoods. Other common exotic trees include Java plum, octopus tree, and eucalyptus. Introduced grasses, ginger, *kī* (or ti) plants, and other shrubs are the main understory plants. *Koa haole* is the dominant plant on the lower slopes (Carpenter and Yent 1994:7).

1.3.2 Built Environment

The project is located within the existing roadway in the vicinity of 7798 Tantalus Drive. All of the project area is located within the boundaries of the Tantalus - Round Top Road, a National and Hawai'i Register of Historic Places-listed historic site (Hawai'i State Inventory of Historic Properties [SIHP] No. 50-80-14-9019, refer to Appendix A, which is the National Register nomination form for the district [Liverman et al. 2009]).

1.4 Document Review

Background research included: a review of previous archaeological studies on file at the SHPD/DLNR library; review of historical documents at Hamilton Library of the University of Hawai'i at Mānoa, the Hawai'i State Archives, the Mission Houses Museum Library, the Hawai'i Public Library, and the Archives of the Bishop Museum; study of historic photographs at the Hawai'i State Archives and the Archives of the Bishop Museum; study of historic maps at the Hawai'i State Land Survey Division; and study of historic maps and photographs at the CSH library.

This research provided the environmental, cultural, historic, and archaeological background for the project area. The sources studied were used to formulate a predictive model regarding the expected types and locations of historic properties in the project area.

Section 2 Background Research

2.1 Traditional and Historical Background

2.1.1 Traditional Accounts of Makiki Ahupua'a

Although most accounts describe people and places in the valleys and lowlands of Makiki ahupua'a, there are accounts which address the three cinder cones Pu'u 'Ōhi'a (Tantalus); Pu'u Kākea (Sugarloaf); and Pu'u 'Ualaka'a (Round Top) that are found above the valley.

2.1.1.1 Pu'u 'Ōhi'a (Tantalus)

The literal meaning of Pu'u 'Ōhi'a (Figure 5) is “the 'ōhi'a tree hill” (Pukui et al. 1974:203). On the top of Pu'u 'Ōhi'a was a *heiau* called Pepeiaohikiau or Pepeiao o Hikiea, one of the *heiau* associated with human sacrifices at Pūowaina or Punchbowl (Boundary Commissioners' Record Book, Makiki Boundary Certificate, p. 60-62, cited in Fitzpatrick 1989:22, 46).

2.1.1.2 Pu'u Kākea (Sugarloaf)

Pu'u Kākea is named for a storm wind associated with Mānoa (Pukui et al. 1974:197). It is also associated with the saying “*He Kākea ka makani kulakula'i kauhale o Mānoa,*” which means “the Kākea wind that pushes over the houses of Mānoa,” said of one who is excessively aggressive (Pukui and Elbert 1986:119).

2.1.1.3 Pu'u 'Ualaka'a (Round Top)

The literal meaning of Pu'u 'Ualaka'a is “rolling sweet potato hill,” and it is named for the story of a rat that bit a sweet potato, causing it to roll downhill and sprout. The name may also have originated when Kamehameha I planted many sweet potatoes in this area (Fornander 1919b, Vol. V:692), which on being dug out, rolled downhill (Pukui et al. 1974:214).

Ma hope iho o ka pau ana o ka mai ahulau. (Okuu) o ka mahi ai ka hana nui loa. Mahi ai o ia ma Waikiki, Honolulu, Kapalama a me na wahi ae o Kona, a nui ka ai, a laila, haawi i ka ai i na alii a me na kanaka. Hele no o Kamehameha i ka lawaia, a nui ka ia, haawi no i na alii a me na kanaka, no laila, ua maopopo loa kona malama i na alii a me na kanaka.

I ka wa o Kamehameha e noho ana ma Oahu, he nui loa na moku haole i ku mai ma ke awa o Honolulu; o na moku kalepa, na moku imi 'āina a me na moku manua. O ka pu ka mea i makemake nui ia e na alii a me na kanaka, no laila, ua kuai nui aku na alii i ka pu a me ka pauda. O na hale waiho pu o Kamehameha, aole o kana mai a ka nui launa ole.

Ua lako loa o Kamehameha i na mea kaua haole, a pela no hoi i na alii a pau. Aohe makemake nui ia o ke dala a me ka lolo. A ike o Kamehameha, o ka uala ka ai i makemake nui ia e ka haole, a o ka uhi kahi, no laila, mahi ihola o Kamehameha i ka uala a nui, o ia hoi o Ualakaaa ma Manoa a ma Makiki. A

mahi ihola i ka uhi ma Kaakopua, a ma Honolulu, o ia hoi o Kapauhi, a kuai akula me na haole. (Kamakau, Ka Nūpepa Kū'oka'a, July 27, 1867)

Translation:

After the pestilence had subsided the chiefs again took up farming, and Kamehameha cultivated land at Waikiki, Honolulu, and Kapalama, and fed the people. He fished, made huge hauls, and gave food to the chiefs and people. Thus he cared for both chiefs and commoners. In those days ships were coming into the harbor at Honolulu--merchant vessels, war ships and ships out to discover new lands. Of these the chiefs and people bought arms and gunpowder. Kamehameha had several storehouses well stocked with foreign arms, but nobody wanted money or clothing. On the part of the foreigners potatoes and yams were in great demand. The chief accordingly went into the cultivation of these foods, and grew potatoes on the hill of 'Ualaka'a between Manoa and Makiki, and yams at Ka'akopua, and sold them to the foreigners. (Kamakau 1992:190)

There are several alternate legends of the origin of the place name Pu'u 'Ualaka'a. In "A Story of Ualaka'a" (Fornander 1919b), there were two potato fields planted on the slope of 'Ualaka'a in Mānoa:

Ua kanu ia keia uala ma Manoa, Oahu, aia ma ka pali komohana akau e pili la ia Manoa. He elua nae mala uala, na Kupihe kekahi, a na Kapanaiia kekahi. O ka Kupihe mala uala, ua kanu ia mahuna o ka pali, o ka Kapanaiia hoi, ua kanu ia mahuna o kahi honua palahalaha, i ko laua wa i mahiai ai, hookahi no uala i loaia ka Kapanaiia mala, ua hoomaka oia e puepue a hoomaka nohoi ua uala nei e nui a ahuwale aku mawahoo ka pue i kanu ia ai, o ka mala hoi a kela kanaka, aohe uala iki iloko o kana mala.

Translation:

This potato was planted at Manoa, Oahu, on the northwestern slope of Manoa. There were two potato fields, one for Kupihe and the other for Kapanaiia. Kupihe planted his potato on the side hill while Kapanaiia planted his on the flat. When they were cultivating only one potato was found in Kapanaiia's field, so he hilled it up. But the potato grew large and became exposed from the hill in which it was planted; the field of the other man, however did not contain any potato.

One day Kapanaiia went to check on his potato, but it was gone. He went up to Kupihe's field and noticed a potato causing a lump in his field. He asked "Whose potato is this?" The other answered: "It is mine, for it is growing in my potato-hill." The two quarreled, and then returned to their home. That night the potato rolled down hill and made a deep hole where it struck; it then bounced and reattached itself to its parent vine. (Fornander 1919b:Vol. V:532-533)

Fornander (1919b, Vol. V:532-533) also records two other versions of this story:

Ua olelo ia ma keia moolelo a'u i lohe ai, ua oki maoli ia no ke anakiu o ua uala nei e ka iole, a hoomaka mai ua uala nei e kaa a paa i ka mala a Kapanaiia, a

malaila kahi i waiho ai a ulu haupuupu, oai ka mea e ulu haupuupu nei ka uala a kakou e ike nei. Oia ka mea i kapa ia ai kela puu mauka o Makiki o Ualakaa, no ka kaa ana o ua uala la. A kekahi inoa a'u i lohe ai o Iolekaa. O kekahi hoi, na Kaauhelemao i kiko ke anakii o ua uala la, a haule i ka mala a Kapanaiia, no ke alualu ia ana mai e Pupuulima.

Translation:

That is one version of the story. But in the story which I heard, it is stated that the stem of this potato was bitten by a rat and the potato rolled down until it landed in Kapanaiia's field, and it was left there until new sprouts commenced to grow from it. That is why new sprouts come from potatoes as we see them now. That was why this potato at Makiki was called Ualakaa, because it rolled [down hill]. Another name which I heard [applied to it] was Iolekaa (rolling rat). Another has it that Kaauhelemao pecked at the stem of this potato and it rolled to Kapanaiia's field, because Pupuulima chased after it.

A fourth explanation for the name of this hill was given by George P. Mossman (1934) in an article in the *Honolulu Star-Bulletin*:

In the district of Ualakaa were grown some of the finest sweet potatoes in the islands. One day a famous bow and arrow expert, resting on Punchbowl, a mile or so away from the potato field, looked over that way and spied a mouse eating one of the potatoes. He shot his arrow, and the mouse fell dead. But the potato which it had been eating rolled down the hill. In commemoration of the feat, the Hawaiians gave the name of "rolling potato" to the district.

These legends form the basis of the saying *Aia i luna o 'Ualaka'a*, meaning "He is up on 'Ualaka'a," said of one who, like a rolling potato, has nothing to hold fast to (Pukui 1983:8).

Pu'u 'Ualaka'a may also have been the location of a *hōlua* slide. According to an 1869 Makiki Boundary Certificate, the Makiki/Mānoa boundary began at King Street, went past Punahou School, then past John 'Ī'ī's land called Anapuni, which was the beginning of the *hōlua* slide on the slopes of 'Ualaka'a. Fitzgerald (1989:45) believes that this slide must have been on the side of the hill above Punahou School.

2.1.2 Early Visitor's Description of Makiki Valley

A visitor to the islands in the early nineteenth century was the first to describe Makiki Valley. In 1831, the Prussian explorer vessel, *Prinzess Louis*, anchored in the harbor of Honolulu. On board was Dr. Franz Julius Ferdinand Meyen, a 27-year-old botanist, who during the next six days toured the southern coast of O'ahu from Diamond Head to Pearl Harbor, collecting plant and animal species and making notes on the scenes of Hawaiian life that he observed. Early maps show the densely populated areas of Honolulu, Mānoa Valley, and Waikīkī, in contrast to the sparse, barren nature of the slopes of Pūowaina (Punchbowl) past Pu'u Kākea (Sugarloaf) to Pu'u 'Ōhi'a (Tantalus).

After making a successful trek up Nu'uānu Valley, Meyen next planned an expedition to Pu'u Kākea. Meyen observed:

The excursion which we had planned for today, July 27th, took us by the foot of the extinct volcano which lies on the eastern end of the city and is called Puwaina [Pūowaina]. This old cone rises to a height of 400 feet and is completely round. . . Since the mountain has at present been converted into a fortification, not everyone has access to it but it is not supposed to be difficult to obtain permission. . . The fortifications consist almost solely of ten or twelve cannons of high but unequal caliber which range over the harbor but cannot be aimed. Every time the current ruler leaves the island of Oahu and again when he returns, he is saluted with these cannons. (Pultz 1981:39)

Meyen observed the barren and arid nature of the area along the plain and lower slopes of Punchbowl:

The flat valley of Honolulu through which we hiked on the excursion as well as the entire slope of Puowaina and the ridge which we had just climbed were completely barren up to an elevation of 600 to 700 feet-covered only by low herbage scorched by the sun. . . .

On our way we also saw a little piece of land which was covered with dry taro. It was a damp place. Nearby we came across a spring. They had formed the earth around the root of each plant into a little hollow so that moisture could collect there.

. . .

The top of Mount Kakea, [now known as Sugarloaf], which we reached right after noon time, is bare of all arboraceous vegetation. Bushes six to seven feet in height and connected by an extremely dense grown of *Dracaena* and *Convolvulus* cover the whole area. The last stretch of the way to the summit was so densely covered with plants that we first had to cut a path through them. (Pultz 1981:39-43)

After resting and breaking for lunch, the excursion party decided to return to Honolulu by a different route, traveling on the west side of the ridge that they had followed to Pu'u Kākea. The slopes of this ridge were thickly forested, as described by Meyen:

Nowhere again, neither on Oahu nor in Brazil nor in Manila, did we see such a charming picture of nature. We saw here the greatest profusion of the gayest tropical vegetation complemented by the picturesque forms of the mountains. Numerous *Musaceae*, some casually planted, other wild, covered the slope of the mountain. Among them were the fragrant and aromatic *Scitamineae* which were already mentioned above, and also the short, shrub-like ferns intertwined and covered with vines which had blossoms of the most wonderful colors. Beneath that were the various greens of the *Cyperaceae*, which cover the lowest parts of the transversal valley, as well as the loveliest arrangement of the individual clusters of shrub-like and arboraceous vegetation on the slope of the mountain ridge and on the top of the mountain close by. All this taken together made such a glorious and friendly impression that we were often not capable of going on. Had it only been possible to have a view of this region - even if only a small portion of it - copied by a talented artist! (Pultz 1981:44)

Meyen saw the natives gathering the stone called *makiki*, used to make the stone portion of an octopus lure. The name of the *ahupua'a* comes from this special type of stone:

As soon as the valley became wider the beautiful vegetation disappeared. The slopes of the mountains were covered only with low grasses, the huts of the Indians became more numerous and here and there large boulders appeared again. The end of a low ridge which runs through the center of this transversal valley had been artificially cleared of vegetation and of the cover of humus. The rock which came to light here is a very attractively colored basalt conglomerate. The Indians were just then busy chipping flat pieces from this rock which they wanted to use to hunt octopus. The rock on the sides of the valley, however, is the usually porous basalt which is found all around Honolulu. Here and there one can find caves in this rock, some of which are inhabited. (Pultz 1981:46)

Meyen also noted that many formerly forested areas were turning into pastures, either by intentionally clearing by man or due to the depredations of roaming cattle. Meyen reported:

In the course of our excursion we saw the mountains everywhere covered with grazing horses and horned cattle. . . . The island of Oahu has more than 2000 head of horned cattle of which 1000 head belong to the Spaniard Don Francisco Marin. . . . There is also a great number of horses on these islands and already every reasonably well-to-do person, man or woman, keeps a riding horse. Yet, as welcome as the increase in this most useful domestic animal is, the joy in it will soon disappear when it is realized that this increase, as well as the expanded cultivation of meadows, is in exact proportion to the decrease in true agriculture.

Everywhere one hears the complaint that in former times a far greater quantity of field-produce was cultivated than now. . . . Many and very extensive fields through which we have just wandered and which are presently being used as pasture land were formerly covered with sweet potatoes. Today one can still see the remaining traces of their cultivation. They say that in the days of Kamehameha a great part of the Honolulu Valley was used for the cultivation of field-produce. Now there are meadows there and the valley is far less productive than in former times. (Pultz 1981:46-47)

2.1.3 Agriculture in the uplands of Makiki Ahupua'a

Although irrigated taro cultivation was practiced in the swampy lands of Makiki south of King Street, the inland areas, especially along the slopes of Punchbowl Crater and Round Top, were known for the growing of sweet potatoes. Pu'u 'Ualaka'a (Round Top) was "famous in the annals of Hawaiian agriculture because here Kamehameha I established his own plantation [of sweet potatoes] on the steep slopes above Mānoa" (Handy 1940).

Due to its proximity to Honolulu Harbor, the Makiki-Tantalus forest underwent two periods of severe deforestation. From 1815 to 1826, timber was cut for the sandalwood trade with China. From 1833 to 1860, wood was harvested to provide fuel for the whaling trade. In addition, fires, farming, grazing by livestock and feral animals, and harvesting for building materials contributed to the loss of the Makiki-Tantalus forest and its replacement by grasses.

During the Māhele, 21 Land Commission Awards (LCA) were awarded along Makiki Stream and its tributaries. The awarded land was used for habitation, the cultivation of sweet potatoes and dryland taro, and for cattle pasture. No *kuleana* LCAs were awarded in the vicinity of the current project area.

In the early historic period (1864-1876), H. W. Schmidt, attempted to grow coffee trees on a large land grant in the back of Makiki Valley, but was unsuccessful (Carpenter and Yent 1994:17). Another attempt at coffee cultivation was made by J. M. Herring, who purchased several acres (portions of Royal Patents 3216, 3830, 3863, 4519, and 7410) along Kānealole and Moleka Streams between 1864 and 1876. Mr. Herring built a house in the lower valley on the Maunalaha side of Moleka Stream, and a carriage road to his house, and modified some of the original Hawaiian agricultural terraces for his planting areas. The U.S. Geological Survey still labels this feature as Herring Spring on their topographic maps (O'Hare et al. 2010:55).

In 1846, King Kamehameha III passed a law declaring forests to be government property. In 1876, the Kingdom passed the "Act for the Protection and Preservation of Woods and Forests" including watershed preservation. In 1880, legislation was drafted to protect watershed areas that contributed domestic water supplies in the Makiki, Tantalus, Round Top and Pauoa area. This was modified in the 1890s to allow citizens to acquire residential property on Tantalus.

In 1901, the U.S. Congress passed an appropriation to establish an agricultural station on O'ahu for the study of agricultural produce (excluding sugar cane). Congress originally chose a plot in the tract called Kewalo uka (inland Kewalo), but they instead used this land for a Marine Hospital. The next tract chosen was 154 acres on the eastern slope of Punchbowl to the southern slopes of Tantalus. Sixty-two acres were reserved for a stone quarry and a public park. This park later became Makiki Cemetery.

In 1903, the Bureau of Agriculture and Forestry became the Territorial Board of Agriculture and Forestry. In 1904, the Division of Forestry acquired upper Makiki Valley for their reforestation program. They built a concrete dam midway along Kānealole Stream, which created a small reservoir; they constructed a plant nursery at the *mauka* end of the access road. Makiki reforestation efforts began in 1910; these included the planting of a variety of non-native species in the Forest Reserve including eucalyptus, guava, and acacia trees. The Civilian conservation corps planted additional trees in the mid 1930s (O'Hare et al. 2010:59).

Hawai'i's first commercial macadamia nut plantation was established in 1922 along the west side of Pu'u 'Ualaka'a. Ernest Shelton Van Tassel formed the Hawaiian Nut Company Limited on a twenty two-acre parcel leased from the Territory of Hawai'i. Cultivation started in 1925 and continued until 1967, and macadamia nut trees from the original orchard remain today (Carpenter and Yent 1994:18).

2.1.4 Development of Tantalus-Round Top Road

Few persons lived in the uplands of Makiki prior to 1890, one resident was a Hawaiian man named Alakea who built a *hale* on the Kalāwahine trail (north of the current project area. E. B. Scott's book *The Saga of the Sandwich Islands* features an 1889 picture of two carriages at a grassy turn-around on Pu'u 'Ō'hia (Figure 5) and claims "a winding path led further up the

singularly bleak mountainside to a scrub covered two-thousand-foot summit, passing a native grass shack and twin-doored privy on the 'ewa shoulder of the mountain" (Scott 1968:580).

Pu'u 'Ō'hia gained the nickname of Mount Tantalus in the 19th Century after a hiking excursion by a Punahou School student hiking club found they were unable to broach to the thick undergrowth, and were forced to give up their ascent. The students named the peak "Tantalus" for its unattainability.



Figure 5. Portion of an 1889 photograph of the carriage road summit on Pu'u 'Ō'hia (Mount Tantalus) made by members of an excursion party and cameraman Joaquin Augusto Gonsalves (Original photograph in Hawai'i State Archives; reprinted in Scott 1968:580)..

In 1890, a number of citizens petitioned the Legislature for the construction of a carriage road to the top of Tantalus, to be paid for by the sale of government lots for residential use. The residential lots were surveyed and laid out in 1891, and construction began in 1892. The *Biennial Report of the Minister of the Interior* for 1892 described the road:

[it] begins at the Punchbowl Road, forming a junction with the same at the rear of the hill, at an elevation of about 285 feet, and follows a 5% grade up the ridge known as the forest ridge, to the narrow ridge, dividing Makiki from Pauoa Valley, at an elevation of about 1450 feet; then around the South Slope of Tantalus and head of the ravines leading into Makiki, to a point by the Pond just above "Sugar Loaf" (Minister of the Interior 1892).

The road to the foot of Tantalus was completed by 1902, but wealthy citizens made extensions to reach their residences further east, first to the house of Senator Schmidt, and then to the Waterhouse Estate.

Construction of Round Top Drive (which connected the Tantalus Road back down into Makiki) did not begin until 1913, and wasn't completed until 1917.

In 1936 Tantalus-Round Top Road was finally paved as part of a series of road improvements undertaken by the Works Progress Administration (WPA). Further road work was curtailed during World War II, but the road was resurfaced in 1947. In 1953 low retaining walls and drainage culverts were added where needed. Only minor alterations have been made to the road since 1954; resurfacing and the installation of metal guardrails, number signs, speed limit signs, reflectors, traffic signs, and short wooden and metal posts to define the edges of lookout parking (Liverman et al. 2009:15).

For more detail see the National Register of Historic Places nomination form for Tantalus – Round Top Road (Liverman et al. 2009), which is included as Appendix A of this report.

2.2 Previous Archaeological Research

Very little archaeological research has been conducted in the upland portions of Pauoa and Makiki Ahupua'a. Most of the previous archaeology in Pauoa has been concentrated to the west and the southwest of the current project area, in the lower portion of Pauoa valley, on the slopes of Pacific Heights and in the flats north of Punchbowl crater. Most of the previous archaeological research in the Makiki Valley-Tantalus area has been concentrated in the valley areas along Kānealole and Moleka Streams, south of the current project area.

2.2.1 Pauoa Ahupua'a

Sinoto and Pantaleo (1992) conducted an archaeological inventory survey of a parcel in the middle/upper portion of Pauoa Valley, approximately 750 meters west of the present project area. They identified 22 features, subsumed under one site number (SIHP No. 50-80-14-4490). This site contained a mix of Pre-and Post-Contact features including pondfields, terraces, cleared areas, retaining walls, and a platform. Makiki Ahupua'a

Martha Yent and Jason Ota (1980) conducted an archaeological survey in the Makiki Valley area, along Kānealole and Moleka Streams, identifying a variety of pre-Contact and historic sites including agricultural terraces, rock walls, rock shelters, a walled enclosure, a historic house site and carriage road, and retaining walls. Twenty-seven features were identified during this survey, all subsumed under one site number (SIHP No. 50-80-14-3985).

Martha Yent (1982) carried out an archaeological inspection of a short nature trail along Kānealole Stream for the Makiki Environmental Education Center, noting an old carriage road, an associated retaining wall, a ca. 1950s pig pen, and a historic series of terraces and planting holes associated with a former residence.

Carol Kawachi (1988) investigated terrace facings/retaining walls in a hairpin turn of Round Top Drive, concluding they were primarily modern modifications.

Alan Carpenter and Martha Yent (1994) carried out an informal survey on Pu'u 'Ualaka'a and Makiki Valley. In Makiki Valley, they recorded a rock shelter (50-80-14-4668) above an agricultural field system near Moleka Stream and a series of at least nine terraces (Site 50-80-14-4866). No sites were found on Pu'u 'Ualaka'a.

Kolb et al. (1993) conducted an archaeological inventory survey of Kalāwahine 'Ili on the lower slopes of Tantalus Ridge, between Tantalus Drive and Kalāwahine Place. This pedestrian survey of the 12-acre Kalāwahine parcel led to the identification of five sites comprised of 38 features. Site 50-80-14-4434 is a terrace cluster with multiple features. Site -4443 is a double-faced terrace and -4444 is a nearby paved oval area. Site -4445 is a modern dump area with an historic terrace, designated Site -4446.

Alan Carpenter and Martha Yent (1994) carried out an archaeological survey of ca. 90 acres of Pu'u 'Ualaka'a State Wayside and a discrete 3,000-foot long strip of Makiki Valley State Recreation Area. The only sites observed in the Pu'u 'Ualaka'a State Wayside transects were an old carriage road and remnants of a flume used to transport harvested macadamia nuts.

Paul Cleghorn (1999) discovered a cave near Kalāwahine Stream, which contained recent historic material. He suggested that there could be buried cultural deposits in the cave. No site number was assigned to the cave, which was then sealed.

Ian Masterson and Hallett H. Hammatt (1999) conducted an archaeological inventory survey of the Kalāwahine reservoir site on the hillside east of the dry streambed known as Kahawai o ka Po'opo'o. They recorded one site: 50-80-14-5732 is a retaining wall of twentieth century construction, used for historic agriculture and erosion control.

Ralston Nagata (1999) conducted a field investigation of a cart road remnant in the Forest Reserve near the Makiki Valley State Recreation Area down near Kānealole Stream. The cart road and associated features were attributed to J. M. Herring, who purchased several parcels in the vicinity between 1864 and 1876 and established a coffee plantation.

Rohrer, Shideler, and Hammatt (2003) conducted a pedestrian inspection of the entire slope area extending below Pūowaina Drive on the northeast slope of Punchbowl. They recorded a single site (50-80-14-6529), consisting of an historic roadbed and associated retaining wall segments as well as the remains of the foundation of an early twentieth century residence.

Cordy and Hammatt (2006) conducted archaeological monitoring during the Punchbowl Water System Improvements Project in 2004. No cultural subsurface features or deposits were noted. Most of the soil excavated for the sewer improvements consisted of fill material.

Loynaz, Borthwick, and Hammatt (2009) found only a small amount of historic trash (mostly modern) during monitoring of water system improvements along Round Top Road and Maunalaha Drive.

A number of burials have been inadvertently found in Makiki Valley, including skeletons in burial caves (McCoy 1971), and at least seven burials found under roads and houses on the west side of Round Top (Bath and Smith 1988; Bath 1989; Kawachi 1991, 1992; Pietruszewsky 1992a, b), and two from Makiki Park (Sinoto 1979).

2.2.2 Previous Archaeology in the Vicinity of the Project Area

Aki Sinoto and Jeffrey Pantaleo (1992) conducted an archaeological inventory survey of the proposed Laniolu Senior Housing and Care Facility project parcel on the floor of Pauoa Valley, west of the current project area (see Figure 6). Two sites were identified; 50-80-14-4491 included a complex of features discovered by Bishop Museum personnel during an initial surface assessment, and 50-80-14-5732, a complex of twenty-two discrete features and two modified areas. Five of the features appeared to be remnants of pre-Contact structures related to agricultural production, the remaining fifteen features exhibited signs of later historic modifications or construction, including a historic roadway, terraces and pondfields used for the cultivation of truck crops, flowers, and watercress, and a platform foundation to support a water tank or shed.

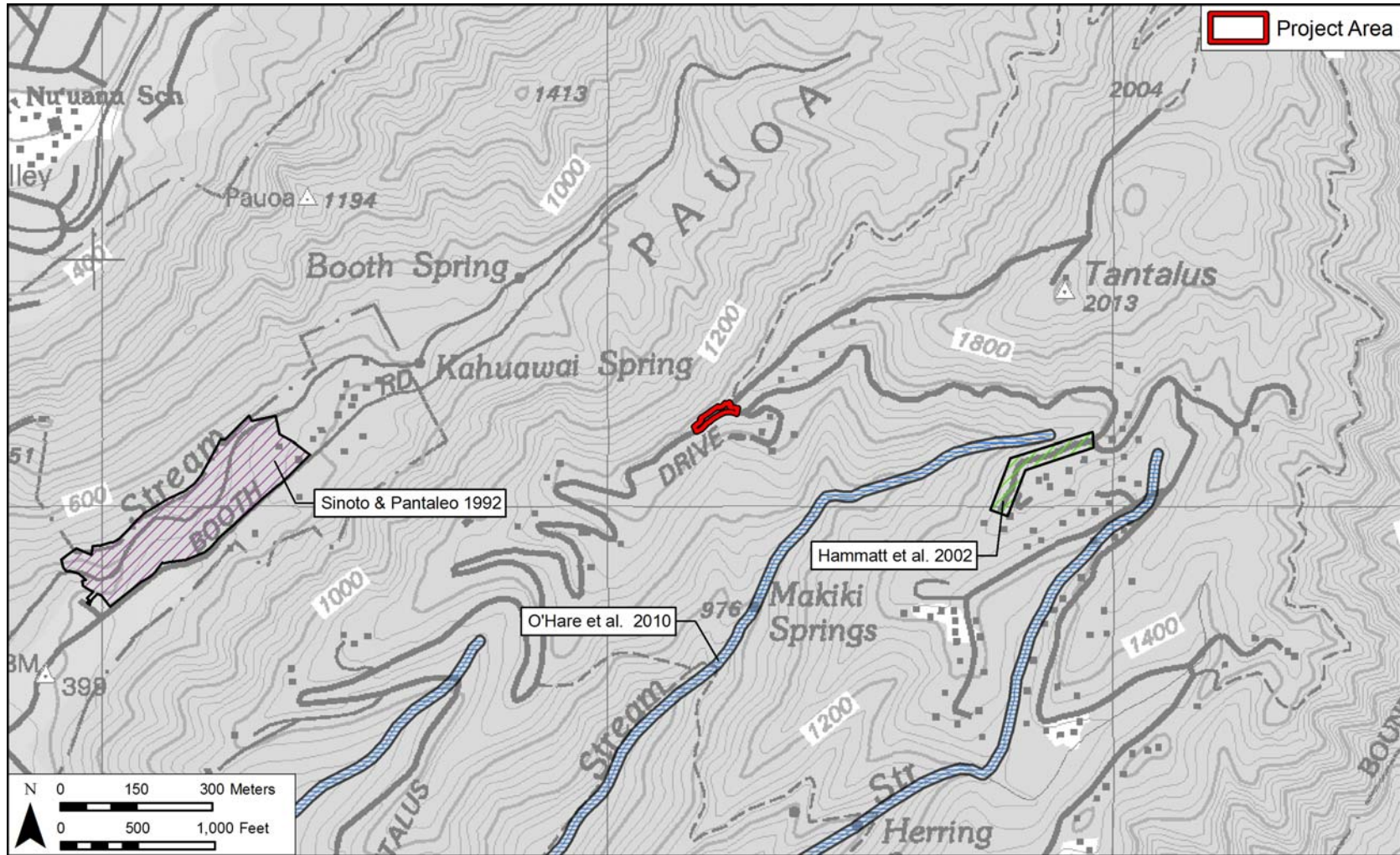


Figure 6. U.S. Geological Survey topographic map (Honolulu Quad 1998), showing previous archaeological studies in the vicinity of the current project area.

Hammatt, Shideler and Tulchin (2002) conducted a field investigation of Kala'i'ōpua Place located on the north-facing slope of Makiki Valley near the junction of Tantalus Drive and Round Top Road, east of the current project area. No significant artifacts, features, or sites were observed.

O'Hare et al. (2010) prepared a Cultural Resource Assessment that focused on cultural resources and archeological sites in the Ala Wai Watershed Project Area that included sites along Kanahā, Kānealole, Moleka, and Maunalaha streams, the headwaters that eventually merge into Makiki Stream. This included a field reconnaissance survey of the entire Makiki Watershed (approximately 2,020 acres of land and 7.3 miles of stream) on foot, from the heads of the tributary streams to the termination of Makiki Stream at the Ala Wai Canal with the extent of the survey along and directly adjacent to the streams (including 10 m to either side).

Thirty-one features/feature complexes were identified; a total of 16 features/feature complexes were assigned SIHP numbers. Agricultural features included one terrace on the east bank of Kanahā Stream (Site 50-80-14-6711), one terrace on the east bank of Makiki Stream (Site 50-80-14-6712), terraces on both the east and west banks of Kānealole Stream (Sites 50-80-14-6713, -6714, -6715, -6717, -6718, -6720), a terrace on the west bank of Moleka Stream (Site 50-80-14-6721), and three terraces on the east bank of Maunalaha Stream (Sites 50-80-14-6724 and -6725). Habitation features were also recorded including a cave shelter on Kānealole Stream (Site 50-80-14-6713), a traditional Hawaiian temporary activity area on the east bank of Kānealole Stream (Site 50-80-14-6718), a temporary habitation C-shape (Site 50-80-14-6719) on the west bank of Kānealole Stream, a permanent historic (with a possible traditional Hawaiian component) house site on the east bank of Maunalaha Stream (Site 50-80-14-6725), and two historic houses sites (Sites 50-80-14-6722 and -6723). A concrete dam structure on Kānealole Stream (Site 50-80-14-6716) and a ca. 1930s bottle dump on Maunalaha Stream were also recorded (Site 50-80-14-6726).

2.3 Background Summary and Predictive Model

In summary, residents utilized Makiki Valley for the cultivation of taro and sweet potato during both pre-Contact and historic times. Pu'u 'Ualaka'a (Round Top) was famous for having been the sweet potato plantation of Kamehameha I. During the Māhele (1848-1852), large-scale crop cultivation land use was transformed into small-scale residential agriculture with associated habitation dwellings. Land Commission Award (LCA) documentation provides evidence of dry and wet agriculture of taro and sweet potato cultivation in the valleys.

From previous archaeological studies, historic documents, and cultural documentation, it is apparent that land use in the vicinity of the current project area is long and varied, extending from pre-contact times into the modern era. Legendary accounts and early histories have emphasized the importance of Pūowaina and other peaks for fortification and ceremonial functions, such as human sacrifice at the *heiau* of the *ali'i*. On the top of Pu'u 'Ōhi'a was a *heiau* called Pepeiaohikiau or Pepeiao o Hikiea, one of the *heiau* associated with human sacrifices at Pūowaina. Several other legends emphasize the agricultural use of the Makiki uplands, particularly the sweet potato cultivation at 'Ualaka'a (Round Top); in fact, the name of the hill

itself means “rolling sweet potato.” Pu‘u ‘Ualaka‘a (Round Top) was famous for having been the sweet potato plantation of Kamehameha I.

During the Māhele (1848-1852) large-scale crop cultivation land use was transformed into small-scale residential agriculture with associated habitation dwellings. Land Commission Award (LCA) documentation provides evidence of dry and wet agriculture of taro and sweet potato cultivation in the area, with associated house lots. In 1940, E. Craighill Handy noted that taro cultivation the inland areas were known for the growing of sweet potatoes.

Much of the upper valley later became part of a park and forest preserve, which may have preserved many of the pre-Contact and post-Contact agricultural features. The Tantalus road was constructed in the late 19th century to allow development of the uplands; while it has been repaired and improved it has not been substantially modified since the early 1950s.

Very little archaeological research has been conducted in the upland portions of Pauoa and Makiki Ahupua‘a. Most of the previous archaeology in Pauoa has been concentrated in the lower portion of Pauoa valley, on the slopes of Pacific Heights and in the flats north of Punchbowl crater. Most of the previous archaeological research in the Makiki Valley-Tantalus area has been concentrated in the valley areas along Kānealole and Moleka Streams, south of the current project area. Only one investigation (Hammatt et al. 2002) has been conducted in the uplands of Makiki; no sites or features were identified during this field investigation. While burials have been identified in Makiki they have all been located at the base of Round Top, more than a mile south of the project area.

Based on the cultural, archaeological, and historical documentation, the most likely sites in the project area would be related to transportation (specifically, to the old Tantalus road and to SIHP Site No. 50-80-14-9019, Tantalus – Round Top Road).

Section 3 Results of Field Inspection

The fieldwork component of the archaeological literature review and field inspection was conducted on September 12th, 2011. CSH archaeologist Alex Hazlett, Ph.D., under the general supervision of Hallett H. Hammatt, Ph.D. (principal investigator), carefully inspected the project area to assess the potential of locating significant archaeological sites in this area. The fieldwork required approximately 5 hours to complete.

The project area consists of a 0.3-acre (approximately 13,068 square feet) portion of Tantalus Drive from the northern end of the one-lane 'Hogsback' section to the junction of Tantalus Drive and Telephone Road (Figure 7 and Figure 8). The area of potential effect (APE) to be disturbed by proposed project construction includes the entire 0.3-acre project area.

The field check indicated a low level of historic preservation concern. No archaeological sites (other than Tantalus Drive itself) were encountered. Although a historic photograph (see Figure 5) shows that a historic carriage trail predated the Tantalus road, the current roadway covers the top of the ridge from side to side at this point, which strongly suggests that the previous construction of the modern Tantalus Road eradicated all trace of any original trail in the project area. This is supported by the route of the Nahuina Trail, which emerge onto Tantalus Drive at the southern end of the 'Hogsback' and follows Tantalus Drive across the project area to connect to the Kalāwahine Trail at the northern end of the project area – at this point there is not even space for a foot trail on the ridge top except in the roadway. A retaining wall constructed of concrete cribwork is visible on the slope along the western edge of the project area.



Figure 7. Photograph of the project area from Telephone Road, view to southwest. The center stripe ends just before the south end of the project area, at the 'Hogsback.'

Tantalus Drive was nominated for eligibility to the National Register of Historic Places and was listed in the State Inventory of Historic Places on March 3, 2007 (Site No. 50-80-14-9019). The site includes the road, lookouts, culverts, retaining walls and curbs along the shoulder and encompasses the entire public road right of way. The period of significance is from the start of construction efforts in 1890, until approximately 1954 when the present roadside drainage improvements were completed.

Specific historic engineering features cited in the site's nomination include lava-rock guard walls (some of which date to the earliest construction, and some that date to the improvements of the 1950s) and basalt-and concrete culverts (which date to the 1950s improvements).

Both types of features are visible in the project area. The northwestern (Pauoa Valley) edge of the roadway is bounded by a low basalt and cement guard wall from the southern end of the project area all the way to the junction with Telephone Road (Figure 9, Figure 10, Figure 11). This wall is a continuation of the guard wall that marks the western edge of the 'Hogsback' section.(see Figure 16) The southeastern (Makiki valley) edge of the roadway, in contrast, is bounded only by a low (ten centimeters or less) basalt and concrete curb (Figure 12, Figure 13, Figure 14). This curb was 'signed' during construction, near the southern end of the project area. Inscribed in the smooth top surface of the curb are the words "John MOMONA AL KAM July 9, 1953" (Figure 15). A basalt-and-concrete culvert is visible on the Pauoa Valley side of the roadway, at the southern end of the project area (Figure 16, Figure 17, Figure 18, and Figure 19).



Figure 9. Photograph showing the low basalt and concrete guard wall along the northwestern (Pauoa Valley) side of Tantalus Drive, view to southwest



Figure 10. Photograph of the guard wall showing its construction of basalt and concrete, with a smooth concrete top, view to west.



Figure 11. Photograph of a damaged portion of the guard wall showing its internal construction of basalt stones and concrete.



Figure 12. Photograph showing the low curb on the southeastern (Makiki Valley) side of Tantalus Drive at the north end of the project area, view to west



Figure 13. Photograph showing the low curb along the southeastern (Makiki Valley) side of Tantalus Drive, view to south



Figure 14. Photograph showing the southern end of the low basalt and concrete curb along the southeastern (Makiki Valley) side of Tantalus Drive, view to southwest



Figure 15. Photograph showing the inscription (John MOMONA AL KAM July 9, 1953) on the top of the southern end of the low basalt and concrete curb along the southeastern (Makiki Valley) side of Tantalus Drive



Figure 16. Photograph showing the culvert at the southern end of the low basalt and concrete guard wall along the southwestern (Pauoa Valley) side of Tantalus Drive, view to west. Note that the guard wall continues south of the project area along the ‘Hogsback.’



Figure 17. Photograph of the culvert showing the basalt and concrete construction of the sidewalls and the concrete floor, view to southwest.



Figure 18. Photograph of the culvert showing the basalt and concrete construction of the sidewalls and the concrete floor, view to northwest



Figure 19. Photograph looking down from the culvert edge showing the concrete cribbing that retains the sediments on this side of the roadway

Section 4 Summary and Interpretation

At the request of Kimura International, Cultural Surveys Hawai'i, Inc. (CSH) has completed an archaeological literature review and field inspection for the Tantalus Crib Wall Repair Project, near the junction of Tantalus Drive and Telephone Road. Tantalus Drive is a portion of the Tantalus-Round Top Road which was nominated to the National Register of Historic Places 7; it that was listed as on the State of Hawaii Inventory of Historic Properties (SIHP) on March 3, 2007 as SIHP No. 50-80-14-9019. This document was prepared to support the proposed project's historic preservation review under Hawai'i Revised Statutes (HRS) Chapter 6E-42 and HAR Chapter 13-13-284.

The archaeological literature review and field inspection study was designed to be a useful resource for planning stages of the proposed project. The scope of work was designed to address potential archaeological site types and locations, and allow for future work recommendations.

Limited historical research, including study of archival sources, historic maps, Land Commission Awards and previous archaeological reports, was conducted to construct a history of land use and to determine if archaeological sites have been recorded on or near this property and specifically to consider and summarize such specific contributing elements as have been designated to define State register site 50-80-14-9019.

Background research and a review of previous archaeological studies in the vicinity of the project area indicate that although both Pauoa Ahupua'a and Makiki Ahupua'a contained areas utilized in pre- and post-contact times, no historic properties (other than Tantalus-Round Top Road) have been documented in close proximity to the project area. Several contributing elements that had been designated to define SIHP No. 50-80-14-9019 (Tantalus Round Top Road) were identified in the project area. These included the low basalt and concrete guard wall on the western edge of the project area, the basalt and concrete culvert that drains into Pauoa Valley at the southern end of the project area, and the low basalt and concrete curb on the eastern edge of the project area.

Fieldwork was conducted to identify any surface archaeological features and to investigate and assess the potential for impact to such sites and subsurface deposits, and to document specific contributing elements to the State Register site. Based on the field inspection, no additional archaeological sites or historic properties were observed in the project area. The project area includes all of the flat portion of the ridge top, which falls off precipitously to either side (there is no place for any other surface sites in the project area, as seen by the route of the Nahuina Trail, which is forced to follow the road through the project area).

Several contributing elements that had been designated to define SIHP No. 50-80-14-9019 (Tantalus Round Top Road) were identified in the project area. These included the low basalt and concrete guard wall on the western edge of the project area, the basalt and concrete culvert that drains into Pauoa Valley at the southern end of the project area, and the low basalt and concrete curb on the eastern edge of the project area. The inscription on the eastern curb, at the southern end of the project area, suggests that this curb was built or repaired in 1953, at the same time the culvert was added. We understand that the treatment of these contributing elements of

Site No. 50-80-14-9019 is being addressed by discussion between the design proponents and SHPD.

The project area has been modified repeatedly by road construction and repair. Based on these field inspection results, CSH recommends that no historic properties are likely to be affected by the proposed project. No further historic preservation work is recommended.

If in the unlikely event potentially significant historic properties are encountered during project construction, work in the immediate area should halt and the State Historic Preservation Division/Department of Land and Natural Resources (Tel. 692-9015) should be notified immediately.

Section 5 References Cited

Armstrong, R. Warwick

1973 *Atlas of Hawai'i*, Warwick R. Armstrong, Ed., University of Hawaii Press,

Bath, Joyce

1989 *Burial Call. M.E., #89-0776, Site #50-80-14-4134, 2030A Makiki Street, Honolulu, Hawai'i*. [Contains Report "Human Skeletal Remains from Makiki, Honolulu, O'ahu", by Maureen Bradley and Michael Pietrusewsky]. Department of Land and Natural Resources, State Historic Preservation Division, Kapolei, Hawai'i.

Bath, Joyce, and Marc Smith

1988 *Burial Removal at 2034 Round Top Terrace TMK: 2-5-07:43*. SHPD, State of Hawaii, Honolulu. [Contains Report "A Human Skeleton from Makiki, O'ahu, by Michael Pietrusewsky and Michele Toomay Douglas]. Department of Land and Natural Resources, State Historic Preservation Division, Kapolei, Hawai'i.

Beckwith, Martha

1970 *Hawaiian Mythology*. University of Hawai'i Press, Honolulu, Hawai'i.

Bishop [Bernice P.] Museum Archives

1915 Photographs of Kuapā Pond. Original photographs at Bernice P. Bishop Museum, 1525 Bernice Street, Honolulu, Hawai'i.

Carpenter, Alan and Martha Yent

1994 *Archaeological Survey of Proposed State Park Areas in Makiki Valley and Pu'u 'Ualaka'a, Makiki, Honolulu District, Island of O'ahu TMK: 2-5-19:3 (por.), 4, 8 (por.) & 2-5-20:4 (por.), 5, State of Hawai'i, Dept. Of Natural Resources, SHPD/DLNR, State of Hawai'i, Honolulu, HI.*

Chamberlain, Levi

1826 *Trip around Oahu by Levi Chamberlain in 1826. (June 21-July 11, 1826)*, Hawaiian Mission Children's Society, Honolulu, Hawai'i.

1828 *Tour Around Oahu, 1828, by Levi Chamberlain*. Hawaiian Mission Children's Society and Hawaiian Historical Society, Honolulu, Hawai'i.

1856 "Trip Around Oahu, 1818". Annual Report of the Hawaiian Historical Society for the Year 1956, Hawaiian Historical Society, Honolulu, Hawai'i.

Cleghorn, Paul

1999 *Report on Newly Discovered Cave at the Kalāwahine Streamside Project*. Pacific Legacy, Honolulu.

Cordy, Dominique Leu, and Hallett H. Hammatt

2006 *Archaeological Monitoring Report For the Board of Water Supply Punchbowl Water System Improvements Project*, Makiki Ahupua'a, Kona District, O'ahu Island. Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i.

Foote, Donald E., E.L. Hill, S. Nakamura and F. Stephens

1972 *Soil Survey of the Islands of Kaua'i, Oahu, Maui, Molokai and Lanai, State of Hawaii*, U.S. Dept. of Agriculture, U.S. Government Printing Office, Washington, D.C.

Fornander, Abraham

1916 *Fornander Collection of Hawaiian Antiquities and Folk-Lore*, with translations edited and illustrated with notes by Thomas G. Thrum, Volume 4, First series, 1916 - 1917 notes by Thomas G. Thrum. Bishop Museum Press, Honolulu, Hawai'i.

1969 *Index to "Polynesian Race", (Its Origin and Migrations and the Ancient History of the Hawaiian People to the Time of Kamehameha I, Volume II)*, compiled by John F. G. Stokes with a brief memoir of Judge Fornander, Tuttle & Co., Rutland, Vermont.

Hammatt, Hallett, H. David W. Shideler and Todd Tulchin

2002 *Archaeological Assessment and Cultural Impact Evaluation in Support of the Kala'i'opua Place Road Improvements Project* Cultural Surveys Hawai'i, Inc. Kailua, Hawai'i.

Handy, E.S. Craighill

1940 *The Hawaiian Planter*, Volume 1, Bishop Museum, Bulletin No. 161., Honolulu.

Handy, E.S. Craighill and Elizabeth G. Handy

1972 *Native Planters in Old Hawaii: Their Life, Lore, and Environment*, Bishop Museum Bulletin 233, Honolulu, Hawai'i.

Hawai'i TMK Service

Tax Map Keys: [1] 3-9-009. Hawai'i TMK Service, 222 Vineyard St., Suite 401, Honolulu, Hawai'i.

Īi, John Papa

1983 *Fragments of Hawaiian History*, Bishop Museum Press, Honolulu, Hawai'i.

Kamakau, Samuel M.

1961 *Ruling Chiefs of Hawai'i*. Kamehameha Schools Press, Honolulu, Hawai'i.

1968 *Ka Po'e Kahiko: The People of Old.*, The Bishop Museum, Special Publication No. 51, Bishop Museum Press, Honolulu, Hawai'i.

- 1976 *Na Hana a ka Po'e Kahiko: The Works of the People of Old.*, The Bishop Museum, Special Publication No. 61, Bishop Museum Press, Honolulu, Hawai'i.

Kawachi, Carol

- 1988 *Field Check at 2182 Round Top Drive, Honolulu, O'ahu (TMK 2-5-06:14)*. DLNR, Honolulu. Department of Land and Natural Resources, State Historic Preservation Division, Kapolei, Hawai'i.
- 1991 *Unmarked Burial Under House at 2123 Round Top Drive, Makiki, Kona, O'ahu. TMK: 2-5-07:39*. Department of Land and Natural Resources, State Historic Preservation Division, Kapolei, Hawai'i.
- 1992 *'Āina Lani Place Burial, Makiki, Honolulu*. Department of Land and Natural Resources, State Historic Preservation Division, Kapolei, Hawai'i.

Kolb, Michael J., C. Mitchell, P. Conte, and M. McFadden

- 1993 *Archaeological Inventory Survey in Kalāwahine 'Ili Honolulu Ahupua'a, Kona District Island of O'ahu*. Department of Land and Natural Resources, State Historic Preservation Division, Kapolei, Hawai'i.

Kirch, Patrick V.

- 1985 *Feathered Gods and Fishhooks*. University of Hawai'i, Honolulu, Hawai'i.

Liverman, Astrid, Ming-Yi Wong, and Barbara Shideler

- 2009 *National Register of Historic Places Registration Form for Tantalus – Round Top Road*. Mason Architects, Inc. Honolulu, Hawai'i.

Loynaz, Douglas Borthwick, and Hallett H. Hammatt

- 2009 *Archaeological Monitoring Report in Support of the Board of Water Supply Makiki Heights and Maunalaha Home Sites Water System Improvements Project, Makiki Ahupua'a, Kona District, O'ahu Island (TMK: 2-5-07, 20 & 24)*. Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i.

Macdonald, Gordon A., and Agatin T. Abbott

- 1974 *Volcanoes in the Sea, The Geology of Hawaii*, The University Press of Hawaii, Honolulu, Hawai'i.

Masterson, Ian A., and Hallett H. Hammatt

- 1999 *FINAL: Archaeological Inventory Survey of the Kalāwahine Reservoir Site*. Cultural Surveys Hawai'i, Kailua, Hawai'i.

McAllister, J. Gilbert

- 1933 *Archaeology of Oahu*, Bishop Museum Bulletin 104 Honolulu: B. P. Bishop Museum Press, Honolulu, Hawai'i.

McCoy, Patrick C.

- 1971 *Memo: Makiki Valley Burial Shelter*. Bernice P. Bishop Museum, Honolulu.

Minister of the Interior, Kingdom Of Hawaii

1892 *Biennial report of the Minister of the Interior to the Legislature*. Hawaiian Gazette Company, Honolulu, Hawai'i.

Nagata, Ralston, H.

1999 *Evaluation of Carriage Road Remnant within Honolulu Watershed Forest Reserve*, Makiki, Honolulu, Oahu. Department of Land and Natural Resources, State Parks Division, Honolulu.

O'Hare, Constance R., Kūhiō Vogeler, Chris Monahan, David W. Shideler, and Hallett H. Hammatt

2010 Cultural Resources and Ethnographic Study for the Ala Wai Watershed Project. Makiki, Mānoa and Pālolo Ahupua'a, Honolulu District, O'ahu Island TMK: [1] 2-3, 2-4, 2-5, 2-6, 2-7, 2-8, and 2-9; [1] 3-1, 3-2, 3-3 and 3-4. Cultural Surveys Hawai'i, Inc. Kailua, Hawai'i.

Paradise of the Pacific

1897 "A Trip to Mount Tantalus," June 1897

Pietrusewsky, Michael

1992a *Human Skeletal Remains from Round Top Ridge, Makiki, O'ahu*. Department of Land and Natural Resources, State Historic Preservation Division, Kapolei, Hawai'i.

1992b *A Human Skeleton from 2316 Maunalaha Road, Honolulu, O'ahu (SHPD 468)*. Department of Land and Natural Resources, State Historic Preservation Division, Kapolei, Hawai'i.

Portlock, Nathaniel

1968 *A Voyage Round the World*, New York: De Capo Press.

Pukui, Mary K., Samuel H. Elbert

1986 *Hawaiian Dictionary*, 2nd Edition. University of Hawaii Press, Honolulu, Hawai'i.

Pukui, Mary K., Samuel H. Elbert and Esther Mookini

1974 *Place Names of Hawaii*, University of Hawaii Press, Honolulu, Hawai'i.

Rohrer, Steven, David W. Shideler, and Hallett H. Hammatt

2003 *Archaeological Assessment in Support of the Makiki BWS Reservoir Project, Parcel E*, Makiki Ahupua'a, Kona District, O'ahu Island (TMK: 2-2-05:35). Cultural Surveys Hawai'i, Kailua, Hawai'i.

Scott, E. B.

1968 *The Saga of the Sandwich Islands*, Vol. 2 (4th Edition). Sierra-Tahoe Publishing Co., Crystal Bay Lake, Nevada.

Sinoto, Yoshihito

1979 *Letter: Makiki Hawaiian Sugar Planters Association Experiment Station Burials*. Bernice P. Bishop Museum, Honolulu.

Sinoto, Akihiko and Jeffrey Pantaleo

1992 *Archaeological Inventory Survey of the Proposed Lanialu Senior Housing and Care Facility Pauoa, Kona, O'ahu Island TMK 2-2-40:5*, Aki Sinoto Publishing, Honolulu, HI.

Sterling, Elspeth P. and Catherine C. Summers

1978 *Sites of O'ahu, compiled by Elspeth P. Sterling and Catherine C. Summers*, Bishop Museum Press, Honolulu, Hawai'i.

Summers, Catherine and Elspeth Sterling

1962 *Sites of Oahu*, Book 6, Vol. 1, Honolulu: Bishop Museum Press, Honolulu, Hawai'i.

Thrum, Thomas G.

1906 "Heiaus and Heiau Sites Throughout the Hawaiian Islands" *Hawaiian Almanac and Annual for 1907*, pp. 36-48, *Hawaiian Almanac and Annual*.

U.S. Army Mapping Service

1954 U.S. Army Mapping Service 7.5 minute topographic map of O'ahu, Koko Head Quadrangle, for the Installation of Floodlights for Nike Control Sites 17, 32 & 45, 63& 78& 84, Project Location Plan Nike Control Sites 32 & 45, Bellows Air Force Base, Waimanalo, Oahu, Hawaii. Available at USGS Information Services, Box 25286, Denver, Colorado.

U.S. Geological Survey

1927-28 U.S. Geological Survey 7.5 minute topographic map, KokoHead Quad. Available at U.S. Geological Survey Maps/ U.S. Department of War Maps. Available at USGS Information Services, Box 25286, Denver, Colorado.

1999 U.S. Geological Survey 7.5 minute topographic map, KokoHead Quad. Available at U.S. Geological Survey Maps/ U.S. Department of War Maps, USGS Information Services, Box 25286, Denver, Colorado.

Yent, Martha

1982 *Memo to Clyde Hosokawa re Archaeological Inspection of Short Nature Trail for the Makiki Environmental Education Center, Makiki-Tantalus State Park, Makiki Valley, Oahu*, Department of Land and Natural Resources State Parks Division

Yent, Martha and Jason Ota

1980 *Archaeological Field Survey of Makiki Valley, the Kanealole Stream and Moleka Stream Systems, Makiki, Kona, Oahu, memo to Gene Renard from Ralston Nagata*, Department of Land and Natural Resources State Parks Division

Appendix A National Register of Historic Places Nomination Packet for Tantalus – Round Top Road

NPS Form 10-900
(Rev. 10-90)

OMB No. 1024-0018

**United States Department of the Interior
National Park Service**

**NATIONAL REGISTER OF HISTORIC PLACES
REGISTRATION FORM**

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in How to Complete the National Register of Historic Places Registration Form (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name **TANTALUS – ROUND TOP ROAD**
other names/site number **Tantalus Drive; Round Top Drive**

2. Location

street & number **Tantalus Drive; Round Top Drive** not for publication **N/A**
city or town **Honolulu** vicinity **Makiki**
state **Hawai'i** code **HI** county **Honolulu** code **003** zip code **96822**

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1986, as amended, I hereby certify that this nomination request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property meets does not meet the National Register Criteria. I recommend that this property be considered significant nationally statewide locally. (See continuation sheet for additional comments.)

Signature of certifying official Date

State or Federal agency and bureau

In my opinion, the property meets does not meet the National Register criteria. (See continuation sheet for additional comments.)

Signature of commenting or other official Date

State or Federal agency and bureau

4. National Park Service Certification

I, hereby certify that this property is:

<input type="checkbox"/> entered in the National Register <input type="checkbox"/> See continuation sheet.	Signature of Keeper	Date of Action
<input type="checkbox"/> determined eligible for the National Register <input type="checkbox"/> See continuation sheet.	_____	_____
<input type="checkbox"/> determined not eligible for the National Register	_____	_____
<input type="checkbox"/> removed from the National Register	_____	_____
<input type="checkbox"/> other (explain): _____	_____	_____

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Tantalus-Round Top Road
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5. Classification

Ownership of Property

(Check as many boxes as apply)

- private
- public-local
- public-State
- public-Federal

Name of related multiple property listing

(Enter "N/A" if property is not part of a multiple property listing.)

N/A

Category of Property

(Check only one box)

- building(s)
- district
- site
- structure
- object

Number of Resources within Property

Contributing	Noncontributing	
0	0	buildings
0	0	sites
1	0	structures
0	0	objects
1	0	Total

Number of contributing resources previously listed in the National Register 0

6. Function or Use

Historic Functions (Enter categories from instructions)

Cat: Transportation

Sub: Road-related (vehicular)

Current Functions (Enter categories from instructions)

Cat: Transportation

Sub: Road-related (vehicular)

7. Description

Architectural Classification

(Enter categories from instructions)

OTHER/ Paved Roadway

Materials

(Enter categories from instructions)

foundation N/A
 roof N/A
 walls N/A
 other concrete; masonry (basalt); asphalt paving

Narrative Description (Describe the historic and current condition of the property on one or more continuation sheets.)

See continuation sheets.

8. Statement of Significance

Applicable National Register Criteria

(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing)

A Property is associated with events that have made a significant contribution to the broad patterns of our history.

B Property is associated with the lives of persons significant in our past.

C Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or

represents a significant and distinguishable entity whose components lack individual distinction.

D Property has yielded, or is likely to yield information important in prehistory or history.

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Criteria Considerations

(Mark "X" in all the boxes that apply.)

Property is:

A owned by a religious institution or used for religious purposes.

B removed from its original location.

C a birthplace or a grave.

D a cemetery.

E a reconstructed building, object, or structure.

F a commemorative property.

G less than 50 years of age or achieved significance within the past 50 years.

Areas of Significance (Enter categories from instructions)

ENGINEERING

TRANSPORTATION

SOCIAL HISTORY

Significant Person

(Complete if Criterion B is marked above)

Period of Significance

1892-1954

Cultural Affiliation

N/A

Significant Dates

1891 – 1902 Tantalus Road construction

1913 – 1917 Round Top road construction

1937 – Works Progress Administration paving

ca. 1953-54 - Repaving and roadside drainage

improvements

Architect/Builder

(designer/engineer) county engineers

(builder) county employees; private

contractors; and prison labor (trusties)

Narrative Statement of Significance (Explain the significance of the property on one or more continuation sheets.)

See continuation sheets

9. Major Bibliographical References

Bibliography (Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)

See continuation sheets.

Previous documentation on file (NPS)

preliminary determination of individual listing (36 CFR 67) has been requested.

previously listed in the National Register

previously determined eligible by the National Register

designated a National Historic Landmark

recorded by Historic American Buildings Survey # _____

recorded by Historic American Engineering Record # _____

Primary Location of Additional Data

State Historic Preservation Office

Other State agency

Federal agency

Local government

University

Other (Name of repository): Hawai'i State

Archives; Hawai'i State Library; Bishop Museum;

Hawai'i Nature Center; State Department of

Transportation

10. Geographical Data

Acreage of Property 19.7 acres

UTM References

(Place additional UTM references on a continuation sheet)

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Zone Easting Northing Zone Easting Northing
 1 _____ 3 _____
 2 _____ 4 _____

See continuation sheet.

Verbal Boundary Description

The nominated property is a linear resource approximated by the line segments identified by the UTM coordinates listed on the continuation sheet. The nomination includes the roadway and right-of-way proper, but neither the developed private parcels along the route nor landscaping or natural features outside the right-of-way, although they remain important characteristics of the setting. This parcel includes the road, lookouts, culverts, retaining walls and curbs within the public right-of-way, the varying width of which is noted in the narrative description. The boundaries of the nominated district begin at the 1.5 Mile Marker on Tantalus Drive and end at the 8.0 Mile Marker on Round Top Drive.

Boundary Justification

The boundary encompasses, but does not exceed, all of the property that has been historically associated with Tantalus and Round Top Drives. The beginning and end points of this district were determined by the demarcation of the Board of Water Supply system and the Tantalus community's private water catchment system. This section of road holds the greatest historic integrity and character and has been relatively unaltered since the road was completed in 1917. The boundary is further justified by the rural character of this portion of the road in comparison to the lower section closer to urban Honolulu.

11. Form Prepared By

name/title	Astrid Liverman, PhD, Ming-Yi Wong and Barbara Shideler, AIA		
organization	Mason Architects, Inc.	date	5/28/09
street & number	119 Merchant Street, Suite 501	telephone	(808) 536-0556
city or town	Honolulu state Hawai'i	zip code	96813

Additional Documentation

Submit the following items with the completed form:

Continuation Sheets

Maps

- A **USGS map** (7.5 or 15 minute series) indicating the property's location.
- A **sketch map** for historic districts and properties having large acreage or numerous resources.

Photographs

Representative **black and white photographs** of the property.

Additional items

(Check with the SHPO or FPO for any additional items)

Property Owner

(Complete this item at the request of the SHPO or FPO.)

name	City and County of Honolulu, Department of Transportation Services		
street & number	650 South King Street	telephone	(808) 527-6976
city or town	Honolulu	state	HI zip code 96813

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(8-86)

OMB No. 1024-0018

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section 7 Page 1 Tantalus – Round Top Road Honolulu, Hawai'i

Narrative Description

The Tantalus-Round Top road is a 10-mile drive that begins near the entrance to Pūowaina, also known as Punchbowl Crater and home to the “National Memorial Cemetery of the Pacific.” The roadway climbs Tantalus Drive along the Kalāwahine ridge between Pauoa and Makiki Valleys and then descends along Round Top Drive on the ridge linking Pu'u 'Ōhi'a (Mount Tantalus), Pu'u Kākea (Sugarloaf) and Pu'u 'Ualaka'a (Round Top); then past Maunalaha Valley Road to Makiki Street near the Archie Baker Mini Park. The boundaries for the proposed historic structure begin at the 1.5 Mile Marker on Tantalus Drive near the “Honolulu Watershed Forest Reserve” sign and the Board of Water Supply reservoir that marks the limit of the public water system. The structure ends at the 8.0 Mile Marker on Round Top Drive near the Mānoa Valley Overlook and the Board of Water Supply reservoir on the Pu'u 'Ualaka'a hillside.

The proposed historic structure includes the road, lookouts, culverts, retaining walls and curbs along the shoulder and encompasses the entire public road right of way. The period of significance is from 1890, when residents of Honolulu petitioned the Kingdom of Hawai'i for a carriage road to the top of Tantalus, until approximately 1954 when the present roadside drainage improvements were completed.

Tantalus-Round Top Drive retains its historic integrity and character in its location, alignment, design, setting and association. Physical construction of the road occurred between 1892 and 1917, and significant aspects of the roadway remain true to their original construction. Despite certain changes in materials and engineering of the surface itself, the curvilinear road dramatically demonstrates contemporary transportation engineering by incorporating rugged topography through the use of switchbacks, hairpins, and ridgeline routes. As such, the road represents not only an effective transportation link, but an aesthetic landscape in harmony with the natural environment. The road arguably took advantage of topography in such a manner as to create a unique recreational resource. Due to subsequent re-surfacing, specific paving is arguably less unique, while culverts, pull-offs, walls, and other features date prior to 1954 and are considered contributing features. No substantial changes have occurred since that date. The roadway varies from 14 feet to 30 feet wide, getting narrower as it reaches the forest reserve surrounding Pu'u 'Ōhi'a (Tantalus peak). The road has been widened and the shoulders improved in short stretches, but it remains winding and narrow along the majority of its length.

Amongst the specific historic engineering features that characterize this roadway are lava-rock guard walls, some dating to the road's earliest construction and extant in many locations, particularly in the “Hogsback” region near Mile Marker 4.0. Only a few steel w-beam rails have been installed more recently. Concrete and lava-rock (basalt) masonry culverts are contributing elements constructed in the 1950s along portions of the road to allow for storm water drainage. Consistent with its rural character, there are no paved sidewalks or light poles along the roadway. The telephone and electricity lines do not typically follow the route of the road but trace the shortest distance from the bottom of the ridge to the residential area at top. There are few side streets or roads off the main corridor. The majority of the residential and visitor traffic traverses the primary Tantalus-Round Top roadway. The speed limit is 25 miles per hour throughout, with certain sharp turns at 10 miles per hour. Mile and half mile markers are located on the road shoulder.

PHYSICAL DESCRIPTION

Mile Marker 1.5: Tantalus Drive gradually ascends the hillside as it enters the Honolulu Watershed. The vegetation consists mostly of a low mass of introduced grass and bushes with large trees beyond. The asphalt paving ends in a soft edge and concrete lined gutters (swales) are located on the downside of the road curves. There are a number of pipe culverts with masonry rock headwalls, constructed ca.1953-54. This lower road measures approximately 30 feet wide.

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Section 7 Page 2 Tantalus – Round Top Road Honolulu, Hawai'i

The city of Honolulu is visible as the road travels through the lower forest area over a series of small turns. There are several lookouts along a series of hairpin turns on Tantalus Drive, with views of Diamond Head and the Wai'anāe Range. These lookouts are mostly paved with rolled asphalt curbs, while others have waist-high timber posts or concrete I-shape upright markers defining the edge. At the side of the road in several locations are elongated I-beams, made out of coarse aggregate concrete (roughly 6'-0" long, 7" square), dating from the mid-1950s period. These I-beams are placed crisscross on their ends, two levels high, and held together with metal spikes, often along a full stretch of the road. These I-beams were placed at their current location by the Tantalus Community Association in 2005 to prevent off-roading; they were brought in from a storage site on the Round Top Drive hillside.

Mile Marker 2.0: After the first series of turns, the road narrows to approximately 23 feet, and the character of the vegetation changes. The plantings are denser, with taller trees. The eucalyptus forests begin at this point and there is an earthen embankment on both sides of the road with overhanging branches creating a forest tunnel. The first residence on Tantalus Drive, the historic Castle Estate, appears just before the next series of sharp turns. Often, these large estates are not visible from the road, due to the steepness of the hillside and the size of the property. Long and steep driveways are a particular characteristic of this mountain development. A few of the lowest houses are on city water, however the majority of the homes are on catchment and many have corrugated metal roofs that direct the rainwater into their individual water storage tanks.

Mile Marker 2.5 and 3.0: The next mile and a half of road features sharp hairpin turns. Lava rock walls, holding back the gradual slope, are common in this stretch of the road. The Halfway House, now demolished, is believed to have been just above Mile Marker 3.0. This small wooden shack located halfway up the carriage route provided ice and a few grocery items to visitors and residents. A cabin built for the foresters involved in the early reforestation effort of the mountain was located just below this area. The first of many hiking trails, typically narrow cleared paths into the forest, starts along this section of the road. These trails are identified by a State sign at the trailhead with a pullover for parking nearby.

Mile Marker 3.5: The verdant bamboo forest starts along this portion of the road and non-historic metal guardrails have been installed in stretches. The road measures approximately 20 feet wide.

Mile Marker 4.0: The forest canopy opens up as the road nears the base of Pu'u 'Ōhi'a. A sign warning of one-lane traffic marks a 14-foot wide stretch of road called the 'Hogsback.' A contributing historic lava rock wall lines the east (Makiki Valley) side and metal guardrail braces the west (Pauoa Valley) side. The lava rock wall is settling in areas, and the coloring and cut of the stone indicate that it was constructed in two periods. The first course is irregularly cut and may date to the road's earliest construction in the 1890s; the second course is made of "sugar stone," a sharply square cut basalt that was most likely added by the Works Progress Administration during its repaving project in 1937. Hogsback is considered the "best vantage point"¹ on this side of the mountain; the extent of Makiki Valley and Round Top Ridge is visible from this point, as well as views of Diamond Head and 'Ewa. After Hogsback, the first side road, Telephone Road, leads north from Tantalus Drive providing access to one residence and the telephone company installation.

¹ Townsend Griffiss, *When you go to Hawai'i, You will need this Guide to the Islands*, (Cambridge: Riverside Press, 1930) 171.

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Section 7 Page 3 Tantalus – Round Top Road Honolulu, Hawai'i

Mile Marker 4.5, 5.0 and 5.5: Metal guardrails appear with more frequency and residences are more densely situated along this top stretch of road. Telephone poles line the road and reflectors are located at certain turns. Portions of the road are bordered by low basalt rock walls that may date from the 1890s. Another Forestry Cabin is believed to have been situated below the road near Mile Marker 4.5. A side street, Kala'i'opua Place, is located south-west of Tantalus Drive and provides access to several residences. Shortly after Kala'i'opua Place, Forest Ridge Way drops away from the main road, and leads into Poloke Valley, where many of the mountain residences are located. Forest Ridge historically marks the end of Tantalus Drive and the beginning of Round Top Drive. Today this transition takes place at Kala'i'opua Place. The character changes as the road begins its eastern descent. The road narrows and the tree canopy is lower and denser in comparison to Tantalus' taller forests. There are concrete jersey barriers placed at the side of the road and a few residences are built immediately adjacent to the roadway.

Mile Marker 6.0 and 6.5: Residences are sparsely located in this area. This was the last section of the road to be completed and the final link between Round Top and Tantalus Drives. There is dense foliage on both sides of the road, but overhead, the canopy of trees diminishes. The historic road measures only 18 feet wide. Camp Erhorn, the Boy Scout camp, is located between mile marker 6.5 and 7.0. This was the site of the trustees' encampment while they were building the road in the early 1900s.

Mile Marker 7.0 and 7.5: There are low concrete walls at the inside of the sharp turns; in between these hairpin turns are grassy landscaped areas. Stretches of stacked concrete I-beams are sited along the curve of the road. Prior to World War II, a garden of day lilies was maintained in this area for use at the Governor's Residence, "Washington Place" (formerly the private home of Queen Lili'uokalani).² A tree-lined road leads to Pu'u 'Ualaka'a State Wayside Park where the historic "Nutridge" farm and the Pu'u 'Ualaka'a Lookout are located. The road to the top of Pu'u 'Ualaka'a from Round Top was constructed in the late 1940s³ and the park added in the 1950s. After the park, the road passes by rows of plumeria trees, planted by the Outdoor Circle in the late-1940s. After Mile Marker 7.5, low concrete walls border the edge of the road and the sharp cliff overlooking Mānoa Valley.

Mile Marker 8: The 'Honolulu Watershed Forest Reserve' sign marks the south-east end of the proposed linear historic structure.

Designation of Tantalus Round-Top Drive as a Historic Road will help retain its rural nature by preserving its several unique characteristics. The most important of these is the preservation of the historic footprint of the road as determined by the 1936 federal WPA project. This footprint is evidenced in the width and layout of the present roadway.

² Lorin Gill, personal communication, July 10, 2006.

³ Jennie Peterson, "Brief history of Makiki-Tantalus," Accessed April 25, 2006; available from www.tantalus.ws/tantalus/history.html

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Section 7 Page 4 Tantalus – Round Top Road Honolulu, Hawai'i

Next in historic importance is the preservation of the hand-laid split-rock retaining walls and culverts that were first constructed in the late-nineteenth and early-twentieth century and are found along the entire length of the road, particularly along the roadway fronting the Castle Estate and in the Hogsback region. Where new walls and culverts are needed, first consideration should be given to replicating this type of wall. Where guardrails are absolutely necessary, nationally approved steel-backed wood guardrails should be used.

A third significant feature of the drive is the limited use of official highway signs and road markings as the modest 25 mph speed limit precludes the need for them.

The fourth unique, and most dramatic, characteristic of Tantalus-Round Top Drive is the long-established paved roadside pull-offs with spectacular panoramic and bird's-eye views of Honolulu and environs. These include: the Diamond Head Lookout; the Airport View; Punchbowl Lookout on Tantalus Drive between mile markers 1.5 and 3.0; the views from the Hogsback area; and those from the Mānoa Valley Overlook on Round Top Drive. This Historic Road designation will encourage the State Department of Land and Natural Resources to develop a long-term landscape maintenance plan to preserve and enhance these significant view planes.

ENVIRONMENTAL SETTING

Tantalus is located in the Ko'olau mountain range in the Kona district of the island of O'ahu. The ridges that carry Tantalus Drive and Round Top Drive surround Makiki Valley. Within this valley, three streams--Kānealole, Moleka, and Maunalaha--eventually drain into Māmala Bay off of the Honolulu Plain. To the south of Makiki Valley lies Pūowaina. Northeast of Makiki is Pauoa Valley and southeast is Mānoa Valley. There are three cinder cones in the Tantalus range: Pu'u 'Ōhi'a (Mount Tantalus, 2013 feet); Pu'u Kākea (Sugarloaf, 1408 feet); and Pu'u 'Ualaka'a (Round Top, 1052 feet). The mean annual rainfall of Tantalus is 120-130 inches.⁴ By comparison, nearby Waikiki's annual rainfall is 20 inches.

Early Hawaiians grew taro near the mouth of Makiki Valley where runoff from the three tributaries created ideal agricultural conditions.⁵ Archeologists speculate that by the 1600s the lowland forests had been extensively harvested and that approximately eighty percent of the land below 2,000 feet elevation was altered.⁶ *Mo'olelo* (Hawaiian stories) indicate that Pu'u 'Ualaka'a was a favored locality for sweet potato cultivation and King Kamehameha I established his personal sweet potato plantation here.⁷ *Pu'u* translates as "hill" and *ualaka'a* means "rolling sweet potato", so named for the steepness of the terrain. Within the valley is a quarry where the basalt outcrop was chipped into pieces to make octopus lures. That is believed to be the origin of the word

⁴ Martha Yent and Jason Ota, State of Hawai'i, Department of Land and Natural Resources, "Archaeological Field Survey of Makiki Valley, the Kanealole Stream and Moleka Stream Systems, Makiki, Kona, O'ahu" (Honolulu, 1990) 9.

⁵ Peterson.

⁶ Peterson.

⁷ Yent and Ota, 15

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NATIONAL REGISTER OF HISTORIC PLACES
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Section 7 Page 5 Tantalus – Round Top Road Honolulu, Hawai'i

'*makiki*' – a type of stone used for weights in octopus lures.⁸ Numerous pre-contact agricultural sites were noted during a 1980 archaeological survey of Makiki Valley, Kānealole Stream and Moleka Stream systems.⁹

Historical attempts at cultivation in the Makiki-Tantalus area included a coffee plantation by J. M. Herring along Moleka Stream in the late 1800s (valley conditions proved too wet for coffee beans to flourish) and Hawai'i's first commercial macadamia nut plantation along the west side of Pu'u 'Ualaka'a. Ernest Shelton Van Tassel formed the Hawaiian Nut Company Limited in 1922 (or 1921) on a twenty two-acre parcel leased from the Territory of Hawai'i. Cultivation started in 1925 and continued until 1967. Rows of macadamia nuts trees from the original orchard remain today.¹⁰ Van Tassel's house "Nutridge" was designed by noted Honolulu architect, Hart Wood, and is listed on the National Register of Historic Places.

Recreational activities on Tantalus were popular with nineteenth-century Honolulu residents and included hiking Pu'u 'Ōhi'a, collecting endemic land snail shells in the forest and duck hunting in the ponds behind Pu'u Kākea. The name "Tantalus" originated during a hiking excursion by the Punahou¹¹ student hiking club, the Clan Alpine. The students began their hike at Pu'u 'Ualaka'a. As night approached, they found themselves at the edge of the ridge overlooking Poloke Valley. Unable to continue due to the thick undergrowth, the boys were forced to give up their ascent. Versed in Greek mythology, the students named the mountain "Tantalus."¹² (The mythological Tantalus was condemned to an afterlife of insatiable hunger and thirst due to unreachable pools of water and overhanging fruit.) "Round Top" and "Sugar Loaf" were also named by early Punahou students; these names appear on an 1873 'Map of Makiki Valley' surveyed by William De Witt Alexander (see Fig. 3).

Due to the close proximity to Honolulu Harbor, the Makiki-Tantalus forest underwent severe deforestation in two periods. In the first period, heavy timber was cut for the sandalwood trade with China from 1815 to 1826. In the second period, 1833 to 1860, wood was primarily harvested as fuel for the whaling trade to render whale blubber into oil. One of the old *lualā'au*, or wood-pits, dug to hold a horse cart-load of firewood, can still be seen today some two miles up Kalāwahine Trail off Tantalus Drive.¹³ In addition, fires, land clearing for farming, livestock grazing, feral animals, and harvesting for building materials contributed to the loss of the Makiki-Tantalus forest and its replacement by grasses. The spread of introduced plant species have crowded out the remaining native plant species. The dense foliage that now covers the mountain areas was once so open that residents called those areas "meadows."¹⁴

⁸ Peterson.

⁹ Yent and Ota.

¹⁰ Yent and Carpenter, State of Hawai'i, Department of Land and Natural Resources, "Archaeological Survey of Proposed State Park Areas in Makiki Valley and Pu'u 'Ualaka'a," (Honolulu: 1994), 7.

¹¹ Punahou School is a private school created in 1841 for the children of Missionaries. Punahou School is located southwest of the mouth of Makiki Valley.

¹² Griffiss, 170.

¹³ Gill.

¹⁴ Margaret Young, "Tantalus History," Notes for talk to Tantalus Community Association, Honolulu, March 31, 1990. Available on file with author.

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As early as 1846, the Kingdom of Hawai'i was facing development pressure from the public regarding the Makiki-Tantalus watershed. The barren hillsides were heavily eroded and the quantity and quality of fresh water in the streams was compromised.¹⁵ That same year, King Kamehameha III passed a law declaring forests to be government property. In 1876, the Kingdom passed the "Act for the Protection and Preservation of Woods and Forests" including watershed preservation. In 1880, further legislation was enacted to protect all watershed areas that contributed domestic water supplies in the Makiki, Tantalus, Round Top and Pauoa area. Despite the establishment of the protected area, 1890s legislation allowed citizens to acquire residential property on Tantalus. The Bureau of Agriculture and Forestry was created by the 1893 Legislature to combat the problem of erosion on the mountain.¹⁶ In 1903, this became the Territorial Board of Agriculture and Forestry. Makiki Valley was designated as a Forest Reserve in 1904 and reforestation began in 1910. Efforts by the first territorial forester, Ralph S. Hosmer, resulted in the intensive growth of non-native species in the valley. Hosmer created Hawai'i's first tree nursery with species introduced from Australia, Asia and other parts of the world.¹⁷ Accounts of day trips published during that time mention eucalyptus, guava, lantana, *kukui* and acacia trees, as well as a forester's cabin along the carriage road on the Tantalus side.¹⁸ A later reforestation program by the Civilian Conservation Corps in the years between 1934 and 1941 planted an average of two million trees per year in Hawai'i's forest reserves.¹⁹

The current vegetation of Makiki Valley reflects the reforestation program and private landscaping efforts. Although most of the plants have been introduced, there are still thriving stands of original *koa*, *māmaki*, *kukui* and a few other rare native species. While the native *Kahuli* snails disappeared with the original forest, wild pigs and the ubiquitous rat remain, along with the introduced mongoose. The native owl, *pueo*, now shares the forest with a growing diversity of introduced birds, among them cardinals, Indian mynas, sparrows, *mejiros* and doves, java finch, bulbuls and shama thrushes.²⁰

HISTORICAL DEVELOPMENT OF THE ROAD

In the Great Māhele of 1848, the land was privatized and awarded to individuals by the monarchy. The Māhele claims for Makiki were mostly small parcels of land containing a house lot and relatively few had taro *lo'i* (wetland agriculture) or *kula* (dryland agriculture) fields. This suggests that the traditional agriculture subsistence economy was being abandoned in the Makiki area more quickly than other areas of Honolulu.²¹ Three Hawaiians

¹⁵ Peterson.

¹⁶ Thomas Cox, "The Birth of Hawaiian Forestry: The Web of Influences," Presented at the XVII Pacific Science Congress, May 27-June 2, 1991.

¹⁷ Peterson.

¹⁸ "A Trip to Mount Tantalus," *Paradise of the Pacific*, June 1897; "An Ascent of Mount Tantalus, O'ahu," *Paradise of the Pacific*, September 1890.

¹⁹ "Some History of Hawai'i Agriculture," May 10, 2006, <http://www.Hawai'iag.org/history.htm>.

²⁰ Irving Jenkins, personal communication, July 6, 2006.

²¹ Yent and Carpenter, 15.

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received large land awards.²² John Papa 'Ī'i, high chief and member of the House of Nobles under Kamehameha III, received the largest award of 250 acres at the western edge of upper Makiki valley and two large parcels in lower valley. The effects of the Great Māhele on land ownership overrode any traditional land divisions and use over the years.²³ By 1872, King Kamehameha V had added further land grants to his inherited crown lands, totaling his ownership to roughly 500 acres in Makiki.

Prior to 1890, the only persons living on Tantalus included a Hawaiian man named Alakea and a Hawaiian family living near Pu'u 'Ualaka'a (on the present site of "Nutridge"). Alakea built a *hale* on the Kalāwahine trail after being banished to the mountain for an altercation on the Honolulu waterfront.²⁴ E. B. Scott's book The Saga of the Sandwich Islands features an 1889 picture of two carriages at a grassy turn-around along the Tantalus road and claims "a winding path led further up the singularly bleak mountainside to a scrub covered two-thousand-foot summit, passing a native grass shack and twin-doored privy on the 'ewa shoulder of the mountain."

In April 1891, H.W. Schmidt, a Senator in the Kingdom's legislature, received a Royal Patent (Grant 3535) for land on Tantalus from Queen Lili'uokalani. He paid \$285 for twenty-one acres located in Poloke, between Pu'u Kākea and Pu'u 'Ōhi'a, and built the first summer home called "Maluhia." His deed contained a forty-foot right of way provision for a public road. In July 1901, Schmidt's thirteen-year old son, Paul, wrote an article for the Pacific Commercial Advertiser about his experience living on Tantalus and mentions development of the road. "The building material had to be carried up on the backs of Portuguese (sic), because there was no road, they made their own path up Makiki, then up to the top of the [Tantalus] ridge and through the forest, now in the same place where the path was, is a fine carriage road, made by the government, and connected with Honolulu."²⁵ Personal interviews with local residents indicate that until 1898 the Tantalus Road ended at the end of Forest Ridge Way.²⁶ Another early horse trail came through Maunalaha Valley, a Hawaiian settlement to the south east, past the Nutridge farm road, and beyond Pu'u 'Ualaka'a on the right and Pu'u Kākea on the left to reach the Schmidt residence. Lorrin A. Thurston, Minister of Interior under King Kalākaua and a pioneer Tantalus resident, was credited with conceiving and promoting the Tantalus Road project.²⁷ In 1891, Thurston authorized the construction of a carriage road "6'-0" wide with an easy grade of 7%".

Construction of the Tantalus road began in 1892, in part an effort by the Kingdom of Hawai'i to provide access to several hundred acres of land for settlement "at an elevation sufficient to enjoy an atmosphere as cool and bracing as is desirable for a summer outing (...) the site [Tantalus] selected is one of the best that can be found in any near vicinity of Honolulu, within easy reach and having the beautiful advantage of overlooking the harbor, city and

²² Martha Yent and Alan Carpenter, 15.

²³ Yent and Carpenter, 10.

²⁴ Lorin Gill, interview by Barbara Shideler, March 17, 2006, Honolulu, Hawai'i.

²⁵ Paul Schmidt, "A Schoolboy's Essay on a Forest Home at Tantalus," Pacific Commercial Advertiser, July 1, 1901, 11.

²⁶ Gill.

²⁷ "Tantalus Drive: Honolulu's Scenic Wonderland," Paradise of the Pacific, (December 1926): 115.

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surrounding country.”²⁸ Two years prior, sixty prominent citizens petitioned the Legislature for \$17,500 for the construction of a carriage road to the top of Tantalus.²⁹ The petition guaranteed that monies received from the subsequent sale of government lots for residential use would be adequate to repay the Treasury. The residential lots on Tantalus were surveyed and laid out in 1891.³⁰

The Biennial Report of the Minister of the Interior to the Legislative Assembly of 1892 states that the Tantalus carriage road:

(...) from this on to the end of grade in the vicinity of ‘Sugar Loaf’ pond, a distance of say 4- ²/₁₀ miles, a wide and good trail has been opened on the road line, but which has yet to be completed as a substantial carriage road.³²

Further accounts specify that the road:

(...) begins at the Punchbowl Road, forming a junction with the same at the rear of the hill, at an elevation of about 285 feet, and follows a 5% grade up the ridge known as the forest ridge, to the narrow ridge, dividing Makiki from Pauoa Valley, at an elevation of about 1450 feet; then around the South Slope of Tantalus and head of the ravines leading into Makiki, to a point by the Pond just above “Sugar Loaf.”³¹

The project suffered a setback in 1892, when the Hawaiian Gazette reported that \$4,500 for the completion of Tantalus road was struck out of a bill by the Minister of Finance. The editors spoke in favor of continuing the work, emphasizing that several lots were already sold but that there were still very desirable government lots higher up that would have access once the road is completed - “to stop now is to destroy prospect of adequate financial return.”³³ They further stressed that the Tantalus “suburb” was incomparable to any neighborhood in Honolulu as far as climate and scenery is concerned.

The elder Schmidt wrote to James A. King, the Minister of the Interior in 1894, just after construction on the carriage road began, requesting that the “top of Tantalus be retained as a Public reservation and not be sold to private parties. It is one of those landmarks always visited by strangers and residents.”³⁴ The government agreed to reserve sections so that the “characteristic features of this delightful drive will not lose its natural charm.”³⁵ The scenic importance of the roadway was thus early and firmly established.

²⁸ “The Tantalus Road,” Pacific Commercial Advertiser, April 21, 1891.

²⁹ *Ibid.*

³⁰ Evelyn Frey, “National Register of Historic Places Multiple Property Nomination Form for Tantalus Residences,” April, 1988.

³¹ Doris Moana Rowland of Nā Ala Hele. Letter to Curt Cottrell of Nā Ala Hele. (Honolulu: September 16, 1997).

³² Biennial Report of the Minister of the Interior to the Legislative Assembly of 1892.

³³ “The Tantalus Road,” Hawaiian Gazette, (December 27, 1892).

³⁴ Margaret Young, “Makiki Tantalus State Recreation Area” notes, Honolulu, February 21, 1990. Available on file with author.

³⁵ Thos G. Thrum, pub., “A Handbook of Info on matters relating to the Hawaiian Islands, Original & selected of value to merchants, tourists and others” Hawaiian Almanac & Annual for 1895, (Honolulu: Honolulu Press, 1895), 47.

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Tantalus was earning a reputation as an idyllic and favored locale for the summer residences of prominent Honolulu families.³⁶ In 1897, J.G. Rothwell obtained a land patent (Grant 4425) from Sanford B. Dole, President of the Republic of Hawai'i, for 1 ½ acres west of the Schmidt holdings. William R. Castle, founder of Castle & Cooke, also obtained title to land on Tantalus, including a large tract in Kewalo and several lots in Poloke. The latter he subsequently subdivided and sold between 1891 and 1902.³⁷ Notable Honolulu families, including the Waterhouses, Castles, Dickeys, Hackfields, Alexanders, Dillinghams, Gills and the Thurstons, began to build summer cottages on Tantalus. These early families planted ironwood trees as windbreaks since the mountain was devoid of mature trees. Newspaper articles noted the significant improvement to the "delightful resort"³⁸ with the well-kept lawns of estates, bungalows, and cottages appearing on the mountainside. And not only did the road provide access to this scenic mountain ridge but the winding road itself, "when looked down on from above, present(s) a most intricate maze which adds to the charm of the place."³⁹

The continuing development of the carriage road was reported in the June 1898 issue of the Paradise of the Pacific, "Myth of Mountain Tantalus":

(...) the road leaves the road junction at rear of Punchbowl, rising with many long zigzags for over six miles then skirting along the base of the cone, and for a mile or two further winding on a level, in and out among the hills, to nearly over Mānoa Valley. The middle portion of the road traverses a beautiful new forest of eucalyptus, wattle and other foreign trees. A little higher are wonderful interior views of the deep canyons and ridges. At every turn are new sections of the glorious and ever expanding panorama of ocean and sky; of mountain, town and plain, including large portions of the island. But the richest part of the road above where it cuts through the upper wildwood of *koa* and *kukui*, intermingled with luxuriant fern and wild ginger--all overhanging the deep canyons. One is here in another world – cool, green, moist...it is a long and tedious climb to Tantalus, but once there, the lingering visitor will never regret or forget its romance and the melancholy cadence of its winds.⁴⁰

The road to the foot of Mount Tantalus was completed in 1901-1902 with a six-foot wide bridle path continuing beyond to Pu'u Kākea.⁴¹ The project cost \$17,705.33. Schmidt extended the main carriage road to his own residence. The road was further extended from the Schmidt's to the Waterhouse Estate by Samuel T. Alexander as

³⁶ Early landowners were J.G. Rothwell, James Finney, Andrew Brown, Judge W.L. Wilcox, Judge Charles F. Peterson, J.F. Hackfield, C. Duroi & J.F. Humburg, F. Harrison, A.V. Gear, Dr. C.B. Cooper, Judge A. W. Carter, Mary Forster, A.S. Lovekin, L.A. Thurston, Judge (later Governor) W.F. Frear, Charles H. Dickey, Martha and John Waterhouse, and W.M. Giffard. Evelyn Frey, "National Register of Historic Places Multiple Property Nomination Form for Tantalus Residences," April 1988. Available on file with author.

³⁷ Young, "Tantalus History."

³⁸ Jas W. Girvin, "Breaking New Trails," Pacific Commercial Advertiser, September 3, 1906.

³⁹ *Ibid.*

⁴⁰ Janet Jennings, "Myth of Mountain Tantalus," Paradise of Pacific, June 1898, 83.

⁴¹ A.N. Campbell, "Tantalus Drive: Honolulu Scenic Wonderland," Paradise of the Pacific, December 1926, 115.

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part of a wedding present for his daughter, Martha Alexander and John Waterhouse. Their home, "Olindita" was built in 1902 and was the first residence on the hill to have a telephone.

Tantalus road is mentioned in the letters and diary entries of Una Hunt Drage, a young girl from the East Coast, during her 1901 trip to Hawai'i. She described the German Club "built on a knee of Tantalus...with cement tennis court jutting out in front like a prow of a ship."⁴² Drage noted that "if a ball went 'out' it would land in the ocean or in the heart of the city (...) it seems a queer extravagance when the Club House is extremely primitive, for they say it cost a fortune to haul the tons of cement on a donkey's back over the zigzag trail."⁴³

In 1906, the Civic Federation of Honolulu brought Charles Mulford Robinson, a well-known civic adviser from Rochester, New York to survey streets, parks and public works in Honolulu. He recommended securing the top of Tantalus for "the one great park for Honolulu that cities now are learning to secure and save for the people, that they may get close to nature, forgetting the fences and survey lines which civilization has thrown like a network of prison walls upon the world."⁴⁴

By 1911, a Territory of Hawai'i Survey map (Fig. 4) shows the road continuing beyond the top curve toward the Round Top side and ending at the Waterhouse Estate. The map shows the path of the original Round Top carriage route (by dashed line, labeled "Tantalus Auto Road") connecting to the terminus of Tantalus Drive. Lorin Gill, who grew up on Tantalus, recalls: "In 1904 my father brought lumber up this trail by pack horses to build the Wilder's house. It was fairly wide, like a wagon trail." Drawn in solid lines of narrow width, the new Round Top Drive follows the general contour of the original route but with more turns, perhaps to achieve an easier grade. The map also reveals another (dashed) route at the bottom of the ridge that continues into Maunalaha Valley (this route was eventually discontinued). The map also illustrates the property plots of the early landowners.

Historic photos in the early 1900s from the top of Punchbowl show the development of Makiki-Tantalus. In the lower valley area, large fishponds are visible and there are relatively few buildings.⁴⁵ Upper Tantalus was divided into large residential lots with sizable houses within fenced cleared areas. These residences were located in the Honolulu Watershed Forest Reserve, which was established in 1913 to protect Honolulu's water supply. This reserve supplies some of the purest water in the world and is considered a "vitaly important source of the city's artesian water supply."⁴⁶

In 1907, The Honolulu Advertiser reported: "Bids for the construction of what is to be known as Makiki slopes (now Makiki Heights) road have been received."⁴⁷ However construction of the Makiki-Round Top road did not begin until 1913 during the administration of Territorial Governor Walter Frear (1907-1913). Frear, a Civil

⁴² Drage, 29.

⁴³ *Ibid.*

⁴⁴ Young, "Makiki Tantalus State Recreation Area."

⁴⁵ Yent and Carpenter, 18.

⁴⁶ A.N. Campbell, "Tantalus Drive: Honolulu Scenic Wonderland," Paradise of the Pacific, December 1926, 115.

⁴⁷ "History from our Files," The Honolulu Advertiser, September 12, 1947.

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Engineer by training, had a personal stake in the project since he held property at the top of Tantalus. Round Top Drive was completed in 1917 during Territorial Governor Lucius E. Pinkham's administration (1913-1918). The Superintendent of Public Works Annual Reports (SPW) from 1913, 1914-1915 and 1915-1916 reveal the progression of "Makiki Slopes" road construction with money initially expended on survey and inspection, plans, specifications, storm drains and wagons. In 1914, portions of the road were opened to automobiles at a cost of some \$4,000 to the City.

Honolulu was fast emerging as a center of transport and commerce and the *Pacific Commercial Advertiser*, stated on April 10, 1914, that "every beauty spot of the islands" should be offered to visitors of Hawai'i and "it would be an injustice as well as a loss to the advertising of the islands to allow them to depart without experiencing the grandeur of Tantalus."⁴⁸ The importance of tourism to the Territory's economy was highlighted by the development of scenic roadways.

The 1915 SPW report went into more depth about the road construction of "Makiki Round Top," revealing that portable quarters for prisoner-workers were greatly improving the construction speed of the road since the time spent bringing the prisoners back and forth from the prison was eliminated. All work on this road was performed by prison labor – trusties – "a scheme that was proving to be satisfactory because it was of minimal expense by the government as well increasing the value of the government land of which the road passes through."⁴⁹ The 1916 SPW report noted that the Round Top Road was being constructed "as speedily as possible, such a road [to connect with Tantalus Road] being greatly needed by the residents of the city."⁵⁰ The road is described as twenty feet wide with a grade of 7% and constructed out of cinder rock of volcanic formation, eight-inches thick, that was widely available on the mountain ridge. The rock, a good substitute for water-bound macadam, "is proving to be cheap as well as satisfactory."⁵¹ It was reported that the surface would be maintained by Territorial prisoners and constantly resurfaced with black volcanic sand readily available along the road.⁵² The project cost the Territory around \$12,000, a comparatively low cost, with the city contributing the use of some of its road-building machinery.

With the completion of Tantalus and Round Top Drives in 1917, the road was well established as the most beautiful scenic drive in Honolulu and a great tourist attraction. Magazine and newspaper articles touted the escape to Tantalus-Round Top as a place of meditation and "elegant seclusion reached by a picturesque winding road with breathtaking curves but a perfectly safe highway."⁵³ The summer homes on the mountain ridge were considered among the most desirable residential areas on the island for their proximity to Honolulu, favorable climate and gardens, and panoramic views of the southern shore of O'ahu. Tantalus quickly became an alluring locale for artists. Madge Tennent, Jules Tavernier, Howard Hitchcock, Alexander Scott, Charles Barlett, Huc Luquiens and Shirley Russell are among the many artists that have depicted scenes of or from Tantalus in their work.⁵⁴

⁴⁸ "Supervisors in favor of opening Tantalus Road," *Pacific Commercial Advertiser*, April 10, 1914.

⁴⁹ *Ibid.*

⁵⁰ Superintendent of Public Works, "Makiki Round Top Road" Report for 1916, 9.

⁵¹ *Ibid.*

⁵² Campbell.

⁵³ Francesca Carleton Hawes, "Tantalus," *Paradise of the Pacific*, January 1937, 15.

⁵⁴ Artist List. Honolulu Academy of Arts. June 2006.

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For all of the roads' popularity among visitors and residents, the drive was somewhat of an off-road adventure, which added to its allure. Drivers had to leave paved city streets for an unmarked gravel drive with spectacular views and all the potential washouts and potholes that an annual 130 inches of rain can cause. However, paving the eight-mile road with few residents was not economically feasible for the city, no matter how popular a drive and it remained a gravel road for 18 years.

The final step in the full development of Tantalus Round-Top Drive would be macadamized paving to tie in with the rest of the streets of Honolulu. Surprisingly, this expensive undertaking began at the least promising of times, in the midst of a severe economic depression that began in the United States in 1929. To combat the lingering economic downturn, President Franklin Delano Roosevelt established some thirty-five federal agencies to help states recover. The Territory of Hawai'i was included in that national effort.

The agency that was responsible for paving Tantalus Round-Top Drive was the Works Progress Administration (WPA), which opened an office in Honolulu in 1936. It closed it in 1941 after having sponsored more than \$10,000,000 in projects throughout the islands.

Tantalus Round-Top Drive was among the first projects undertaken by the WPA in Honolulu. Planning for improvements to the road began in 1934, when Honolulu Mayor Fred Wright proposed that work begin on "a continuation of the Tantalus Road up and around Makiki Valley, down Round-Top to Manoa Valley, to connect [sic] with the head of Makiki St."⁵⁵ The project was to be jointly funded by the City and County of Honolulu and the Federal Emergency Relief Administration, forerunner of the WPA. However, it was not until the establishment of the WPA in Honolulu in 1936 under administrator Fred Locey that plans gathered momentum. In July of that year, The Honolulu Advertiser reported that among the first WPA projects being considered was "widening of portions of the Tantalus-Makiki Round Top Road."⁵⁶ A month later, in August, the paper reported under the title "LOCEY NAMES WPA PROJECTS", that the project had expanded to include "widening and general improvement of the Tantalus-Makiki Round-Top Road."⁵⁷

On September 27, 1936, The Honolulu Star-Bulletin announced that the drive had not only been widened and improved, but paved; "the Tantalus Road improvement project, one of the largest of its kind to be undertaken here in recent years, will be completed in about 10 days. It extends from Papakolea in the Punchbowl district to what is known as Hogsback at the summit. The entire area included in the improvement has been macadamized. Work has already been started in improvement of the highway at the other side, and Mr. Locey (WPA administrator) said today that he hopes eventually to widen and pave the entire remaining section."⁵⁸

⁵⁵ "A Continuation", The Honolulu Star-Bulletin, Dec. 28, 1934, p.3.

⁵⁶ "Widening of Portions" The Honolulu Advertiser, July 28, 1936, p.2.

⁵⁷ "Locey Names" The Honolulu Advertiser, 1936, Aug. 14, 1936, p.1

⁵⁸ *Ibid.*

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The cost was the then enormous sum of \$337,000, all of it paid by the federal government. With this final step Tantalus Round-Top Drive became an integral and seamless part of Honolulu's highway system, turning the eight mile paved road into a beautiful suburban recreational drive instead of an exotic off-road adventure. Tantalus-Round Top Drive had finally arrived, courtesy of the United States Government.

On the morning of December 7, 1941, Japan bombed the United States Naval facilities at Pearl Harbor on O'ahu. Charles Black, a lifelong Tantalus resident, vividly remembered as a six-year-old boy having a panoramic view of the attack from Hogsback Ridge, which looks down on all of Pearl Harbor. Japanese planes returning from bombing and strafing runs seemed to fly straight at them as the Zeros flew in formation "just 100 feet" over Tantalus while anti-aircraft shells burst high overhead.

Governor James B. Poindexter (1934-1943) immediately proclaimed the islands under martial law and requested General Walter D. Short to take over all normal powers of the Governor. Throughout the duration of the Second World War all resources went to the war effort, and as a result improvements and maintenance of the Tantalus-Round Top road came to a complete stand-still. However, even during the war, Tantalus remained a popular drive as the *Honolulu Advertiser* noted: "During the war the Drive was a Mecca for serviceman and towns people alike who had a gallon of gasoline and could, in 20 minutes, look out through silvery kukuis, crescent koa leaves, tree ferns and gnarled hau branches at an astounding panorama from Koko Head to Waianae with the Koolau Range behind them in an island-long sweep." Gas rationing strengthened the social bond among the small Tantalus community by forcing residents to carpool up and down the mountain, and driving at night under black-out conditions required a detailed memory of the winding road.

During the war years young Charles Black, who had witnessed the attack on Pearl Harbor from Tantalus, ran a "little roadside stand" in front of his home selling candy bars and orange soda to Tantalus visitors driving the road during the war. He remembers early in the war Admiral Chester Nimitz, commander of the Pacific Fleet holding staff meetings walking the 10 mile Tantalus loop, taking advantage of the exercise and privacy afforded by the mountain. Nimitz would always stop and buy refreshments not only for his staff of four or five, but for Charles and his brother as well.

Just a little over a year after Japan surrendered in September 1945, repairs began on the neglected drive. In April 1947, the *Honolulu Advertiser* wrote:

Tantalus Drive, O'ahu's "skyline boulevard" with its breath-taking panoramic vistas which was devoid of maintenance during the latter years of the war, is now receiving the cooperative attention of the Board of Agriculture and Forestry, the City and County of Honolulu and the Outdoor Circle.

Half of Circle Drive, from Makiki Round Top to the Hogsback, needs complete resurfacing. Bad holes appear after every rain and the crew is now patching the potholes. The City and County Road Department restored a five man maintenance crew to the drive last October and great

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improvement has been noted in clearing brush, widening and intermittent patching. A few months ago they couldn't even look out because neglected roadside growth had shut out all the views.

The [Outdoor] Circle planning committee has developed a plan to increase the natural beauty of the entire drive. The four approaches, through Papakolea, up Mott-Smith Drive past Roosevelt High School, up Makiki Heights Drive, and up Makiki Round Top from the fork at Makiki Reservoir, are to become a mass of plumeria in all its lustrous white and hybrid colors. Above the plumeria on Round Top Drive the Cup of Gold and Night-blooming Cereus plantings will be stressed. Honey Suckle and other low ground coverings of a semi-wild nature will be used in the turn areas.⁵⁹

During the war, the summit of Round Top was used as by the military as a cinder quarry and the Board of Agriculture and Forestry now proposed that the three-acre area be turned into a park: "A low barrier around the edge, a grass surface, some shade trees and windbreak planting, and the residents of and visitors to Honolulu could, in 10 minutes, be nearly a thousand feet above the City in an ideal picnic and recreational spot unequaled on the Leeward side of O'ahu for its panoramic view of ocean, city, and mountains (...)."⁶⁰ Ten years later, in 1957, this became Pu'u 'Ualaka'a State Park, part of the Makiki –Tantalus Recreation Area.

During the 1950s, with the aid of federal funding, O'ahu saw an increase in new road construction with the widening, straightening and even elimination of old roads and the building of Hawai'i's first freeways and new multi-lane highways. Tantalus-Round Top Drive benefited from benign neglect during this period, very probably due to the few residents living along the drive. The only substantial improvement to the drive was in 1953-54, when low curbside retaining walls and roadside drainage culverts made from quarried basalt were built, where needed, along the length of the road. These were the last substantial additions or alterations to this historic drive.

CURRENT STATUS

Tantalus and Round Top Drives were built on public lands between 1892 and 1917 by the Kingdom, Provisional, Republic and Territorial governments of Hawai'i. The ownership of the road remained with the Territory of Hawai'i, and subsequently with the State of Hawai'i until 1993. The passage of Resolution 93-287 and Act 228 H.B. No. 1055 in 1993 transferred title to the City and County of Honolulu in name and tax map, since a metes and bounds survey does not exist. There was no actual exchange of deeds.

Under Act 234, passed in 1957, the Tantalus–Round Top area was zoned as a Conservation District with conditional residential use in the State's land use classification system. The zoning regulations were designed to prevent water pollution to the watershed area, thereby restricting further residential, commercial, or agricultural development. The 2,000-acre Makiki State Recreation Area was established in 1957 as part of the State park

⁵⁹ "Tantalus Scenic Drive Improvement Scheduled," *Honolulu Advertiser*, April 28, 1947.

⁶⁰ "History from our Files," *Honolulu Advertiser*, September 12, 1947.

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system. This recreational area consists of a wayside park along Makiki Heights Drive, an upper valley area from wayside park to Pu'u 'Ōhi'a, and the Pu'u 'Ualaka'a State Park

Tantalus is home to around 900 residents with approximately 200 homes that are not serviced by the municipal wastewater system; there is no long-term plan to extend service to that area.⁶¹ The 2000 Census reports that the neighborhood is an older one with 1957 as the median year for home construction. Most of the homes are higher than 1,300 feet above sea level. Property parcels have been relatively unchanged since they were placed on the market in late 1800s and early 1900s.

The drive provides access to a network of approximately fifteen trails that run throughout Makiki Valley and the Tantalus–Round Top mountain range. These trails, such as the Manoa Cliff Trail, Pu'u 'Ōhi'a Trail, Judd Trail, 'Aihualama Trail, and Nu'uuanu Trail, offer the hiker respite from nearby urban Honolulu and an opportunity to explore the verdant Tantalus forest, as well as some panoramic views of Diamond Head and the Wai'anae range. Many of the existing hiking trails are thought to originate with old horse trails from both the deforestation and reforestation days. Of historical note, the lower portion of Maunalaha Trail and a path that runs along the Maunalaha (east) side of Moleka Stream traces the path of the old carriage road built by G.M. Herring that begins at the Forestry Baseyard near the convergence of Kānealole and Moleka Streams.

The road is popular with cyclists, hikers, runners, birdwatchers, and motorcycle clubs (identified on one website as one of the best scenic routes for a motorcycle drive).⁶² The Tantalus Community Association has been very active in the clearing of the invasive and non-native vegetation and engaging in quarterly roadside cleanups and "workdays." Vehicular speeding is a problem, as the hairpin curves and the length of this mountain road present a challenge irresistible to recreational drivers. Heavy rainfall and strong winds often cause falling trees, forcing road closures. There have been efforts by the City to put up warning signs and re-stripe roads, all toward making the road safe for drivers.

ALTERATIONS

There have been relatively few minor alterations to Tantalus-Round Top Drive outside the period of significance (1890 – 1954). Masonry and concrete swales and rolled asphalt curbs were installed in the mid 1950s on the downside of turns and alongside the edge of lookouts. A few short segments of metal guardrail were installed over the past few decades. Small numbers signs (with displays such as 252+00) were positioned by the City in 2005 to help identify stretches of the road for maintenance crews. Contemporary speed limit signs, reflectors, and traffic signs are found at intervals on the road. The mile and half-mile marker posts were installed by the Tantalus Community Association in 2000. At certain lookouts, short wooden or metal posts are placed to define the limit of the lot – some, particularly the metal poles at the large Pu'u 'Ōhi'a Trailhead parking were installed to deter night-time parking and impede trash dumping.

⁶¹ 4M Inventory Phase Report Executive Summary, Chapter 2.

⁶² www.motorcycleroads.us/roads/hi_rtd.html. Accessed May 11, 2006.

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Narrative Statement of Significance

Tantalus-Round Top Drive fulfills Criteria A and C for listing on the National Register of Historic Places. The road represents a significant and distinguishable entity in the historical development of the city of Honolulu. The road retains historic integrity in its original road alignment, narrow lanes, undeveloped shoulders, and spectacular setting above the city. Minimal alterations over the past ninety years have not only preserved the historic character of the road, but have also helped maintain the natural and scenic qualities of the rural Tantalus community.

Criterion A: The development of Tantalus-Round Top Drive spanned the five successive governments of Hawai'i. The roadway served the sale and development of residential lots along the route, and provided vehicular access for a well-used scenic drive enjoyed by tourists and residents alike.⁶³ In fact, irrespective of associated residential development, the roadway represents an important civic amenity in its function to provide a scenic drive to tourists and residents alike. By providing an overview of the city, construction of the road contributed to the emergence of civic pride in the citizenry of Honolulu during the late-nineteenth and early-twentieth centuries. Its historic use as a recreational destination ensured its continued status as a cherished natural landscape.

At the turn of the eighteenth century, O'ahu was becoming the new center of commerce and trade in the islands. The discovery of the only navigable harbor in all of the islands on the south shore of O'ahu in 1793 led to the subsequent growth of Honolulu as an economic, political, and social powerhouse.⁶⁴ From the harvesting of the native forests on Tantalus in the early nineteenth century to the subsequent reforestation initiated by the Kingdom and later the Territory's Forestry Programs, to the opening of the mountain for recreational and residential use, the development of the mountain road parallels the gradual modernization of Hawai'i. The development and use of the road extended through the Kingdom of Hawai'i (1810-1893), the Provincial Government (1893 to 1894), the Republic of Hawai'i (1894 to 1900), the Territory of Hawai'i (1900 until 1959), and, finally, the State of Hawai'i, when the islands were admitted as the Fiftieth State of the United States of America in March 1959. Each government has deemed the mountain road significant enough to dedicate time and money to its maintenance and growth. Tantalus and Round Top Drives represent a pattern of road development that transformed old trails and carriageways into roads that could be easily negotiated by the automobiles introduced to the islands in the early twentieth century.⁶⁵

The macadamized paving of Tantalus Round-Top Drive was one of the earliest projects undertaken by the Work Progress Administration (WPA), one of the agencies established by United States President Franklin Delano Roosevelt to help the nation recover from the severe economic downturn caused by the New York stock exchange collapse in 1929. Between 1936 and 1941, the WPA spent \$10,000,000 in federal funds to aid the Territory of Hawaii. The footprint of the road remains largely as the WPA project left it, and the drive today is a reminder of the United States' investment in Hawai'i even prior to statehood in 1959.

The opening of the road in the 1900s allowed Honolulu's prominent families to purchase residential lots that were in close proximity to town, with a cool comfortable climate and stunning scenic appeal. The first summer homes built in this highly desired resort environment included the Waterhouse's "Olindita" (1902); Senator C.H. Dickey's "Kuahiwi" (1906); Mary Alexander's "Paliuli" (1907); the Wilder home "Mehemaua," designed by architect Tom Gill (1908); the

⁶³ "Tantalus Scenic Drive Improvement Scheduled," April 28, 1947.

⁶⁴ Gavan Daws, *Shoal of Time, A History of the Hawaiian Islands* (Honolulu: University of Hawai'i Press, 1968), 37.

⁶⁵ Ralph Kuykendall, *The Hawaiian Kingdom, 1854-1874, Vol. 2* (Honolulu: University of Hawai'i Press, 1953), 23.

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Campbell's "Kalaukoa" (1917); and David Little Withington's "The Camp" (1918). The Davies, Judd, Dillingham, Bishop, Castle, and Thurston families also had summer homes on Tantalus. Governor Walter Frear maintained a large estate on the mountain. In 1928, Thomas Gill constructed a home, called 'Wao'ala' on Tantalus and became one of the first year-round residents. Many of these historic grand residences are still intact along Tantalus and Round Top Drives and several current residents claim residency back to the Kingdom's Royal Patents. There are no other mountain ridge residential developments in Honolulu that compare to Tantalus-Round Top's scenic access by curvilinear road that follows the natural topography. Also notable are the depth to which the road reaches into the valley and the large size of many of the lots. Several homes are currently listed on the State Register of Historic Places as part of the Multiple Property designation for "Tantalus Residences." "Nutridge" in Pu'u 'Ualaka'a State Park is also individually listed on the National Register as the first macadamia nut farm in Hawai'i.

Tantalus-Round Top Drive has been since its inception a popular destination for both visitors and residents for its scenic vistas and the experience of driving through a lush forest landscape in close proximity to urban Honolulu. As early as 1820, O'ahu's landmarks were already well established; many historical accounts speak of the beaches of Waikiki and Diamond Head, the flat Honolulu plains, Barber's Point, and the mountains of Wai'anāe.⁶⁶ The proliferation of literature from the time the road was constructed reveals its significance as an early tourist attraction of Honolulu. Tantalus is described as one of "Hawai'i's best cards – miles of the loveliest scenery flanking an excellent driveway that winds through cool forests of *koa*, *kukui* and eucalyptus." The road provided access to the cool mountains and "makes available this veritable garden spot, with its striking panorama of Honolulu and environs."⁶⁷ The road was a testament to the civic pride evident in the citizenry of Honolulu at the beginning of the twentieth century: "From Tantalus it is that the Honolulan may really see his city; obtain an indelible impression of its great length sprawled out from Koko Head to Barber's Point; and of its breadth stretching from the verdure-clothed slopes to the blue ocean, south and west. One must view Honolulu from Tantalus to seriously appreciate its size, its orderliness, its wonderful coloring."⁶⁸

Additionally, it is important to note that the construction of the road is associated with several prominent Honolulu citizens, among them Lorrin A. Thurston, Henry Hackfield, Governor Walter Frear, and H.W. Schmidt. However, their contribution to the roadway project remains a minor aspect of their careers and accomplishments. As such, the property is not nominated under criterion B.

Lorrin Andrews Thurston (1858-1931), was the grandson of Asa and Lucy Thurston, members of the 1820 pioneer company of missionaries to Hawai'i. Born in Honolulu, he played an instrumental role in the transformation of Hawai'i from a sovereign constitutional monarchy into a territory of the United States. As owner and publisher of the *Honolulu Advertiser*, Thurston enthusiastically promoted Hawai'i as a tourist destination and was a firm proponent of public parks. He was instrumental in the establishment of Hawai'i Volcanoes National Park on the Island of Hawai'i and Haleakalā National Park on Maui.⁶⁹ Thurston was the driving force behind government road construction to the volcano on Hawai'i and to Tantalus on O'ahu.

⁶⁶ Meyen, viii.

⁶⁷ "Tantalus Drive: Honolulu's Scenic Wonderland" *Paradise of the Pacific*, December 1928.

⁶⁸ "Tantalus Drive: Honolulu's Scenic Wonderland" *Paradise of the Pacific*, December 1928.

⁶⁹ A. Grove Day, *History Makers of Hawai'i*, (Honolulu: Mutual Publishing, 1984) 121.

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Other pioneer Tantalus landowners were Henry Hackfield (1815-1887) of Hackfield and Co., Samuel Northrup Castle (1808-1894) of Castle and Cooke, and Samuel Thomas Alexander (1836-1904) of Alexander and Baldwin. Hackfield, Castle, and Alexander were founding members of three of the five sugarcane corporations known as the "Big Five" that effectively dominated island life economically, politically, and socially throughout the Territorial era and into the early years of Statehood.

Among these leaders, Hackfield in particular promoted Tantalus as a recreational destination by building a retreat for the German Club on his Kala'i'opua Place property. The German Club was a large social organization founded in 1854 during the reign of King Kamehameha III and made up of prominent members of the sizable and influential German community in Honolulu. Hackfield's managing director, H.W. Schmidt, built the first house on Tantalus, "Maluhia," in 1892. His granddaughter, Margaret Smith Young (1905-1993) was a long-time Tantalus resident and founder of the Hawai'i Nature Center at the Makiki State Recreation Area.

Many of these early Tantalus residents held various offices in the Hawaiian government. Schmidt was a Senator in the Hawaiian legislature. Hackfield served as consul in Hawai'i for Germany, Norway, and Sweden and was a charter member of the Honolulu Chamber of Commerce. During the monarchy, Lorrin A. Thurston served in the House of Representatives, House of Nobles, and was appointed Minister of the Interior.

Criterion C: The construction of the road between 1892 and 1916 is a transportation engineering achievement. County engineers, private contractors, and prison trustees improved and modernized the old trail into a carriage road and automobile system despite the challenging terrain. Tantalus-Round Top Drive is a rare extant example of a rural scenic roadway corridor winding through the forest reserve adjacent to Honolulu's primary urban core. Other examples, such as the Nu'uuanu-Pali Road, have been altered by urban development and the construction of modern highways along the original alignments. Features of the Tantalus-Round Top roadway, such as masonry walls and curbs, are significant for their use of vernacular materials, in this case basalt or "lava rock."

Tantalus-Round Top Drive is one of the last examples of a heavily forested landscape in the city of Honolulu. The integrity of the road has been sustained over the years. Historic photos, during and after construction, indicate that the rustic character of the road has undergone relatively few and minor changes. Current vegetation reveals layers of the historic use of Makiki Valley –deforestation, reforestation, and patterns of the establishment of native and non-native species. The lava rock walls along certain stretches of both Tantalus and Round Top date from the road's construction. Basalt rock culverts, concrete-lined gutters and rolled asphalt curbs are examples of typical road treatments in Hawai'i during the early twentieth century. With the exception of a few stretches of metal guardrail and limited traffic signs, the road's present-day appearance is physically and visually similar to its original appearance. Today a trip along the Tantalus-Round Top Drive provides an opportunity for a motorist to enjoy what excursionists would have seen in 1917. The road provides spectacular scenery, with views of Honolulu's natural beauty: verdant mountains and valleys, coastal stretches, and ocean vistas.

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Major Bibliographical References

- Alvarez, Patricia. Historic Bridge Inventory and Evaluation: Island of Hawai'i. Prepared for the State of Hawai'i, Department of Transportation, Highways Division in cooperation with the U.S. Department of Transportation, Federal Highways Administration, Honolulu, 1987b.
- Alexander, W.D. Hawaiian Government Survey. "Map of Makiki Valley." 1873.
- Alexander, W.D. "Map of the State of Kamehameha V in Pawaa, Waikiki." 1874.
- Black, Charles. Interview by Barbara Shideler of Mason Architects. March 20, 2006.
- Campbell, Marston. Hawai'i Territory Survey. "Makiki Valley Section." 1911.
- Cox, Thomas. "The Birth of Hawaiian Forestry: A Web of Influences," presented at XVII Pacific Science Congress, Honolulu, May 27-June 2, 1991.
- Daws, Gavan. Shoal of Time, A History of the Hawaiian Islands. Honolulu: University of Hawai'i Press, 1968.
- Day, A. Grove. History Makers of Hawai'i: a biographical dictionary. Honolulu: Mutual Publishing, 1984.
- Drage, Una Hunt. Hawai'i Deluxe, compiled from her own diary and letters in 1901. Honolulu: Honolulu Star Bulletin. 1952.
- Frey, Evelyn. A Collection of Tantalus Memories. Unpublished manuscript for the Tantalus Community Association, 1987.
- Gill, Lorin. Interview by Barbara Shideler of Mason Architects. March 17, 2006.
- Griffiss, Townsend. When you go to Hawai'i, You will need this Guide to the Islands, Cambridge: Riverside Press, 1930.
- Hawai'i (Territory). Biennial Report of the Minister of the Interior to the Legislative Assembly of 1892. 1892.
- Hawai'i (Territory). Superintendent of Public Works. Report for 1913, 1914, 1915 and 1916.
- Honolulu Advertiser, various dates.
- Hawaiian Gazette. December 27, 1892.
- Honolulu (City and County). Department of Planning and Permitting. 4M Inventory Phase Report Executive Summary. Honolulu: 2003.
- Honolulu (City and County). Real Property Tax Assessment Office. Property maps for section 2-5.

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(8-86)

OMB No. 1024-0018

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NATIONAL REGISTER OF HISTORIC PLACES
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Section 9 Page 2 Tantalus – Round Top Road Honolulu, Hawai'i

Honolulu Star-Bulletin, various dates.

Jenkins, Irving. Conversations with Barbara Shideler of Mason Architects, various dates.

Kuykendall, Ralph. Hawai'i: a History from Polynesian Kingdom to American State. Englewood Cliffs: Prentice Hall, 1961.

---. The Hawaiian Kingdom, 1854-1874. Vol. 2. Honolulu: University of Hawai'i Press, 1953.

Meyen, F.J.F. A Botanist's Visit to O'ahu in 1831. Kailua: Press Pacifica, 1981.

Pacific Commercial Advertiser. April 21, 1891; July 1, 1901; September 3, 1906; April 10, 1914.

Paradise of the Pacific. June 1898; December 1926; June 1898; January 1937.

Peterson, Jennie. Interview by Barbara Shideler of Mason Architects. March 22, 2006.

"Brief History of Makiki-Tantalus"; www.tantalus.ws/tantalus/history.html, accessed April 25, 2006.

Pukui, Mary Kawena and S.E. Elbert. Hawaiian Dictionary. Honolulu: University of Hawai'i Press, 1986.

--- and E.T. Mookini. Place Names of Hawai'i. Honolulu: University of Hawai'i Press, 1974.

Thrum, Thos G, pub. "A Handbook of Info on matters relating to the Hawaiian Islands, original and selected of value to merchants, tourists and others" Hawaiian Almanac & Annual 1895. Honolulu: Honolulu Press, 1895.

U.S. United States Geological Survey. Topographic Map of Honolulu, Makiki Valley, Hawai'i. Washington, D.C.: USGS 1998

Yent, Martha and Alan Carpenter. State of Hawai'i, Department of Land and Natural Resources. "Archaeological Survey of Proposed State Park Areas in Makiki Valley and Pu'u 'Ualaka'a." Honolulu: 1994.

---, and Jason Ota. State of Hawai'i, Department of Land and Natural Resources. "Archaeological Field Survey of Makiki Valley, the Kānealole Stream and Moleka Stream Systems, Makiki, Kona, O'ahu." Honolulu: 1990.

Young, Margaret. "Tantalus History," and "Tantalus State Recreation Area." Talks given to Tantalus Community Association. Honolulu: March 31, 1990.

NPS Form 10-900-a
(8-86)

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Geographical Data

UTM References The coordinates for Tantalus-Round Top Drive form a linear resource approximated by the

following line segments:

	Zone Easting Northing
1. Mile Marker 1.5	04-6212200-235777
2. Mile Marker 2.0	04-6214200-235812
3. Mile Marker 2.5	04-6216600-235858
4. Mile Marker 3.0	04-6217600-235878
5. Mile Marker 3.5	04-6218500-235890
6. Mile Marker 4.0	04-6220400-235910
7. Mile Marker 4.5	04-6225000-235925
8. Mile Marker 5.0	04-6230800-235920
9. Mile Marker 5.5	04-6230000-235865
10. Mile Marker 6.0	04-6227800-235825
11. Mile Marker 6.5	04-6227400-235795
12. Mile Marker 7.0	04-6227800-235777
13. Mile Marker 7.5	04-6225800-235755
14. Mile Marker 8.0	04-6223200-235730

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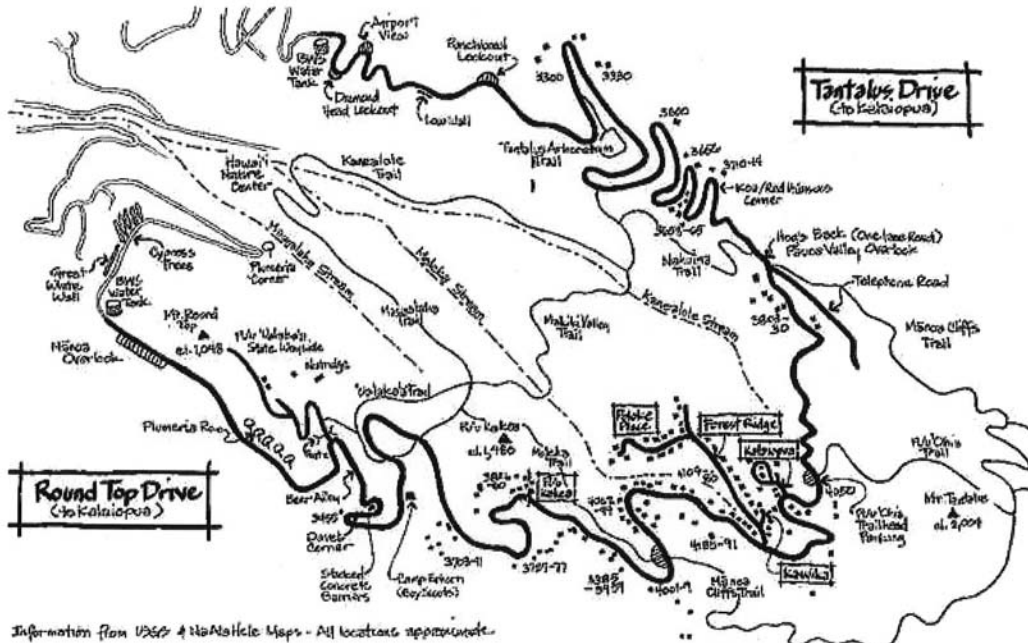
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Figure 1: Schematic map of Tantalus-Round Top Drive (Tantalus Community Association.).



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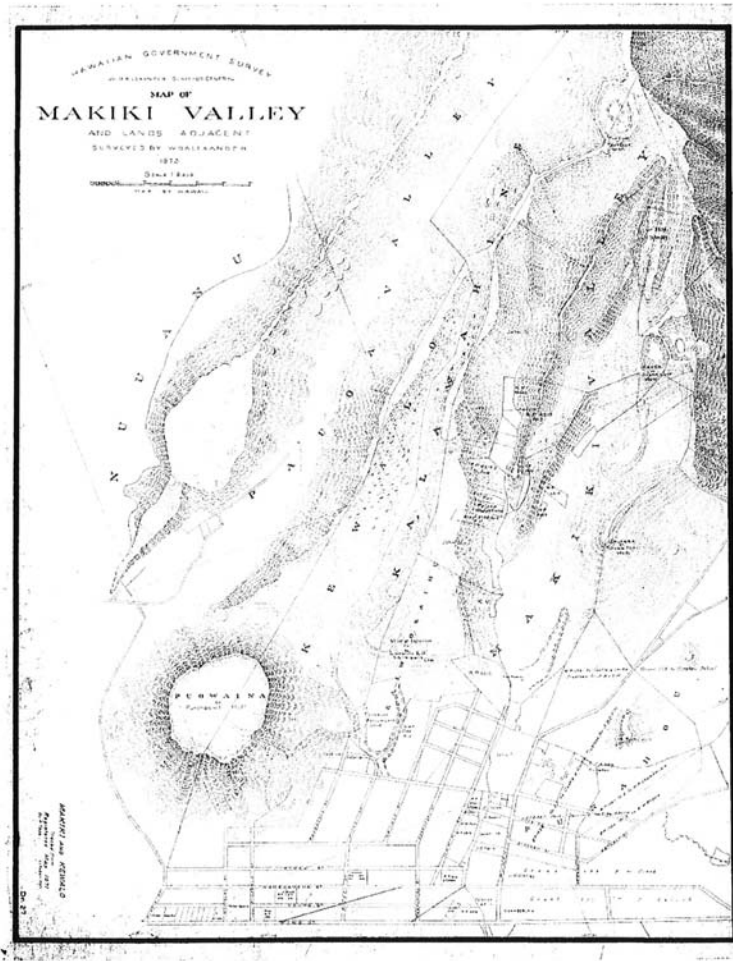
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Figure 3: 1873 Survey Map of Makiki Valley by W.D. Alexander (full size map attached).



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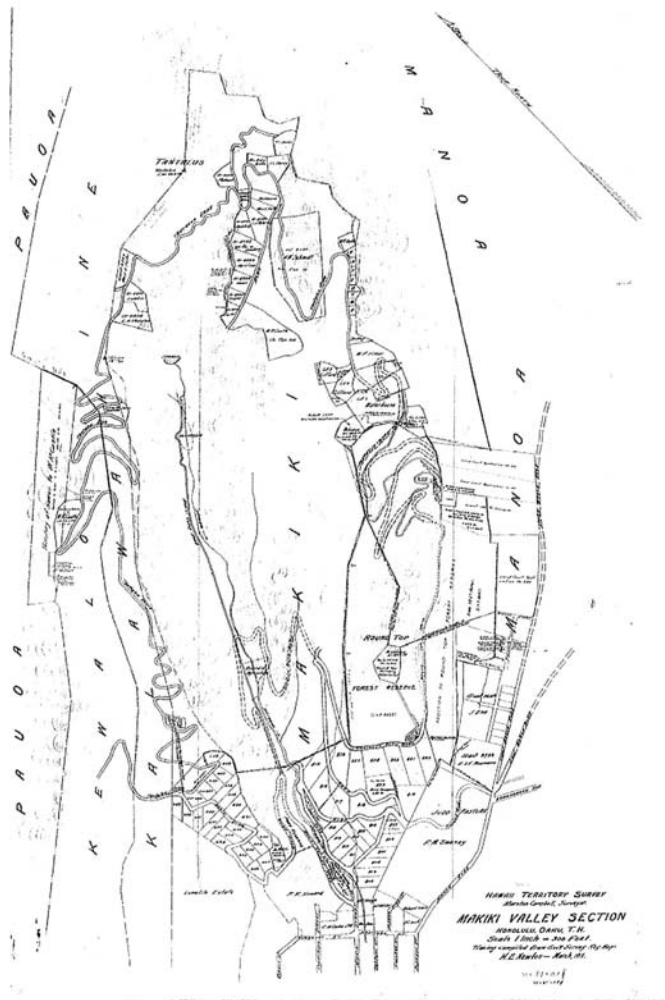
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Figure 4: 1911 Hawaii Territory Survey Map, Makiki Valley Section (full size map attached).



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Figures 5 and 6: Kukui trees along Tantalus Road, 1905 (*Alonzo Gartley, Bernice P. Bishop Museum*)
Tantalus Road, ca. 1907 (*T.S. Wilson, Bernice P. Bishop Museum*)



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Figures 7 and 8: Diamond Head from Tantalus, ca. 1900-1910 (*Alonzo Gartley, Bernice P. Bishop Museum*)
Diamond Head from Tantalus, 2006 (*Mason Architects, Inc*)



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Figures 9 and 10: Tantalus [view to 'Ewa], 1926 (*photographer unknown, Bernice P. Bishop Museum*)
Tantalus, view to 'Ewa, 2006 (*Mason Architects, Inc.*)



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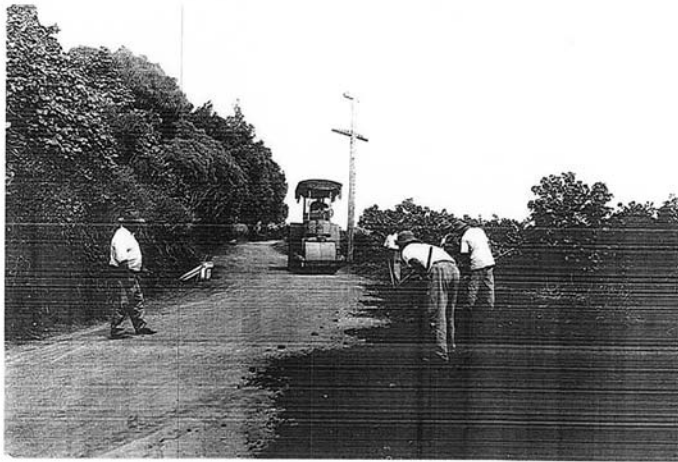
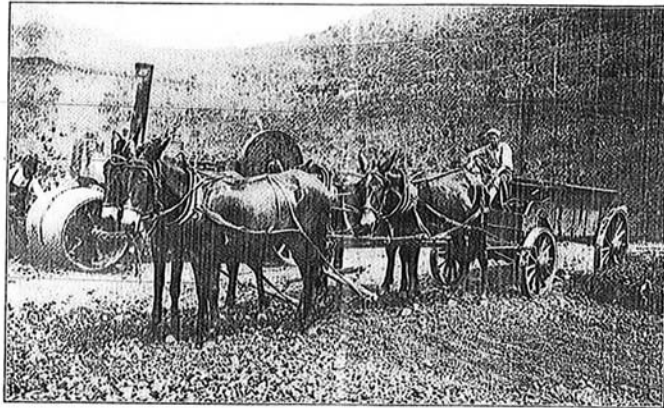
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Figures 11 and 12: Paving Round Top Road, ca. 1916 (*Hawaii State Archives*)
Paving Round Top Drive, ca. 1926 (*Williams Studios, Hawaii State Archives*)



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Figures 13 and 14: Tantalus, 1901 (*Una A. Clark, Private Collection*)
Picnic at Pu'u Kākea, 1918 (*Hedemann?, Bernice P. Bishop Museum*)



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Figures 15 and 16: Mile Marker 1.5
Honolulu Watershed Forest Reserve Sign



Figures 17 and 18: "Hogsback", near Mile Marker 4.0
Basalt (lava rock) retaining wall at Hogsback.



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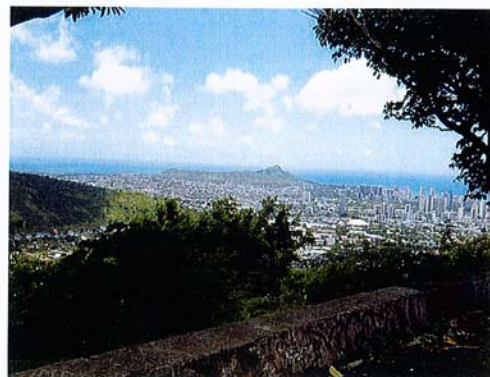
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Figures 19 and 20: Bamboo forest, near original Schmidt Estate, Mile Marker 5.0 – 5.5
Basalt curbing, near Mile Marker 5.0



Figures 21 and 22: Honolulu Watershed Forest Reserve, Mile Marker 8.0
View from Mānoa Valley overlook.



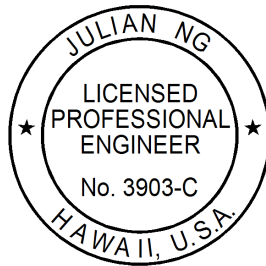
APPENDIX B

Traffic Assessment: Closure of a Portion of Tantalus Drive, Vicinity of 3798
Tantalus Drive, Honolulu, Hawaii. Prepared by Julian Ng, Inc., October 2011

Traffic Assessment
Closure of a Portion of Tantalus Drive
Vicinity of 3798 Tantalus Drive
Honolulu, Hawaii

Prepared for:

City and County of Honolulu
Department of Design and Construction



THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION


Signature

Expiration Date: 4/30/2012

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**Traffic Assessment
Closure of a Portion of Tantalus Drive
Vicinity of 3798 Tantalus Drive
Honolulu, Hawaii**

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Summary

This traffic assessment was prepared to identify the potential impacts of a construction project to repair a portion of Tantalus Drive in Honolulu, Hawaii, to prevent a possible future collapse of the roadway. Tantalus Drive and Round Top Drive form a loop roadway between Makiki Heights and Makiki Valley, providing access to approximately 300 residences, a state park, hiking trails, and a number of scenic lookouts.

Traffic on Tantalus Drive can proceed onto Makiki Heights Drive and Mott-Smith Drive to Nehoa Street, or continue through the Papakolea community to connect to Puowaina Drive. Traffic on Round Top Drive would connect to Makiki Street, which intersects with Nehoa Street 0.4 miles east of the Mott-Smith Drive intersection (the total “distance” between these intersections via the Tantalus Drive and Round Top Drive loop is 9.7 miles).

The segment of roadway to be repaired is located on a narrow ridge near the *mauka* end of Tantalus Drive and a complete closure of the roadway will allow for the project to proceed efficiently, minimizing the duration of construction. This traffic assessment has found that up to 50 residences could be affected during a road closure, and traffic that would normally use the closed portion of Tantalus Drive would be detoured to Round Top Drive, increasing one-way travel distance by up to 2 miles and travel times by up to 10 minutes (for approximately 15 residences). Other impacts during construction will include emergency access and the use of the roadway for recreational pursuits. However, as part of the construction requirements, any closure of the roadway would be preceded by public notices and signs will be placed in the lower portions of Tantalus Drive and Round Top Drive for traffic approaching these roadways, providing a good opportunity to divert to the alternate route.

Introduction

A project by the City and County of Honolulu Department of Design and Construction to repair a portion of Tantalus Drive in the vicinity of 3798 Tantalus Drive will require that a portion of the roadway be closed to traffic. Roadway closure would be 24 hours a day for up to six months to allow for the construction of new retaining walls and other improvements. The project is intended to reduce the chances of a failure of the roadway, which would result in a closure of a much longer duration.

A traffic assessment was prepared to identify the potential impacts of this road closure. The road closure will occur 3.1 miles *mauka* of the intersection of Tantalus Drive

and Makiki Heights Drive, and 5.5 miles *mauka* of the intersection of Makiki Street and Makiki Heights Drive. Figure 1 shows the roadways in the vicinity of the project site.



Figure 1 – Vicinity Map

Field Traffic Data

A manual traffic count was taken at the site during morning and afternoon peak traffic periods on a weekday with public schools in normal session. A total volume of 112 vehicles were counted in the five hours of the count (6:30 AM to 8:30 AM and 3:00 PM to 6:00 PM). Table 1 summarizes the count data.

Peak traffic volumes were recorded between 7:30 AM and 8:30 AM and between 4:45 PM and 5:45 PM (shown in bold in the table).

A twenty-four traffic count taken in July 2008 on Mott-Smith Drive was used to estimate a daily traffic volume of 400 vehicles on this portion of Tantalus Drive.

**Table 1 – Manual Traffic Counts
Wednesday, July 27, 2011**

	Vehicles on Tantalus Drive		
	Eastbound	Westbound	Total
6:30 AM – 6:45 AM	1	2	3
6:45 AM – 7:00 AM	2	3	5
7:00 AM – 7:15 AM	0	2	2
7:15 AM – 7:30 AM	0	2	2
7:30 AM – 7:45 AM	0	4	4
7:45 AM – 8:00 AM	1	1	2
8:00 AM – 8:15 AM	3	6	9
8:15 AM – 8:30 AM	2	3	5
3:00 PM – 3:15 PM	2	3	5
3:15 PM – 3:30 PM	2	1	3
3:30 PM – 3:45 PM	4	2	6
3:45 PM – 4:00 PM	2	5	7
4:00 PM – 4:15 PM	4	1	5
4:15 PM – 4:30 PM	3	4	7
4:30 PM – 4:45 PM	3	1	4
4:45 PM – 5:00 PM	6	3	9
5:00 PM – 5:15 PM	6	1	7
5:15 PM – 5:30 PM	5	2	7
5:30 PM – 5:45 PM	6	6	12
5:45 PM – 6:00 PM	3	5	8
Total counted	55	57	112

Analysis

A site and map review of the area indicates that the “break-even point” in the choice of using Tantalus Drive or Round Top Drive is the intersection of Round Top Drive and Forest Ridge Way. Residents *makai* of this intersection would likely use Round Top Drive to Nehoa Street, rather than Tantalus Drive. Residents *mauka* of this intersection would have a shorter distance and travel time by using Tantalus Drive to Nehoa Street (depending on the destination, there may be slight variations). The alternate paths would be equal for residents of Forest Ridge Way.

Based on this review, up to 50 residences could be affected by the proposed closure of Tantalus Drive if all of the residences of Forest Ridge Drive opted for using Tantalus Drive instead of Round Top Drive. For an estimated one-half of the residences served by Forest Ridge Way normally using Tantalus Drive, the traffic generated by 32 residences would be affected. The peak hour traffic volumes generated by 32 detached residential dwellings were estimated by applying the widely-accepted trip rates from *Trip Generation, 8th Edition*, published by the Institute of Transportation Engineers. A daily volume of 310 vehicles was computed using the applicable weekday rate. The peak hour estimates are slightly lower than the field counts (Table 2).

Table 2 – Comparison of Traffic Estimates and Count Data

	Vehicles on Tantalus Drive		
	Eastbound	Westbound	Total
Counted AM Peak Hour	6	14	20
Counted PM Peak Hour	23	12	35
AM Peak Hour based on traffic generation rates*	6	18	24
PM Peak Hour based on traffic generation rates*	20	12	32
* based on 32 dwelling units			

The maximum impact of the road closure would occur during the PM Peak Hour and is estimated to be a two-way volume of 35 vehicles per hour. This volume would be added volume on Round Top Drive and Makiki Street. Beyond Nehoa Street, the traffic impact would distribute onto Nehoa Street and Makiki Street and will be less than 35 vehicles per hour at any location. This traffic impact, which would be temporary, lasting only during the time the roadway is closed for construction, compares to a volume of 100 vehicles per hour that is usually considered the threshold for significant traffic impacts.¹

Conclusions

The road closure will affect the travel paths of 310 vehicle trips per weekday generated by the residential uses in the Tantalus area, as well as traffic generated by other users of Tantalus Drive and Round Top Drive. Traffic counts were used to estimate the total daily volume at 400 vehicles per weekday.

The construction plans for the project will include requirements to post warning signs to advise drivers of the road closure. The signs will be placed at the approaches to the intersections of Tantalus Drive and Makiki Heights Drive, and Makiki Street and Makiki Heights Drive, where drivers will have the opportunity to divert to an alternative path. In addition, public notices will be published. Affected residents and emergency responders will be informed of the construction schedule. These actions should minimize any adverse impacts of the road closure.

¹ Institute of Transportation Engineers, *Transportation Impact Analyses for Site Development*, Washington, D.C. 2005. p. 5.