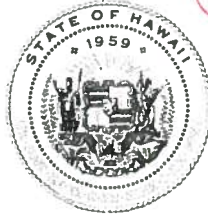


DAVID Y. IGE
GOVERNOR OF
HAWAII



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KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

**STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES**

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

September 7, 2016

Director
Office of Environmental Quality Control
Department of Health, State of Hawai'i
235 S. Beretania Street, Room 702
Honolulu, Hawai'i 96813

Dear Director:

With this letter, the Department of Land and Natural Resources hereby transmits the draft environmental assessment and anticipated finding of no significant impact (DEA-AFONSI) for the Waihe'e Ridge Trail – Trail Improvements situated at (2)3-1-006:001, in the Wailuku District on the island of Maui for publication in the next available edition of the Environmental Notice.

Enclosed is a completed OEQC Publication Form, two copies of the DEA-AFONSI, an Adobe Acrobat PDF file of the same, and an electronic copy of the publication form in MS Word.

Simultaneous with this letter, we have submitted the summary of the action in a text file by electronic mail to your office.

If there are any questions, please contact Torrie Nohara at (808) 873-3588 or Torrie.L.Nohara@hawaii.gov

Sincerely,
David G. Smith

Enclosures

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**AGENCY
PUBLICATION FORM**

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Project Name:	Waihe'e Ridge Trail Improvements
Project Short Name:	Waihe'e Ridge Trail Improvements DEA
HRS §343-5 Trigger(s):	Use of State and County Funds; Use of State Lands
Island(s):	Maui
Judicial District(s):	Wailuku
TMK(s):	(TMK (2) 3-1-006:001) and (TMK (2)3-1- 001:028 (Parcel 28))
Permit(s)/Approval(s):	The Waihe'e Ridge Trail is considered a permitted use under Chapter 205, HRS, as well as permitted under Maui County Code Chapter 19.30A, relating to the County's Conservation and Agricultural zoning districts, the trail is considered an existing permitted use. For this reason, the application for County Special Use Permit will be limited to and for the new observation platform (s), as well as all other structural improvements (i.e. railings) on the Waihe'e Ridge Trail, will be filed for review and consideration by the Maui Planning Commission. It is likely that the Maui Planning Commission will only require the filing of a building permit for the Waihe'e Ridge Trail structural components.
Proposing/Determining Agency:	State of Hawaii, Department of Land and Natural Resources
<i>Contact Name, Email, Telephone, Address</i>	Torrie Nohara 54 South High Street, Wailuku, Hawaii 96793 Phone No.: (808) 984-8100 torrie.l.nohara@hawaii.gov
Accepting Authority:	(for EIS submittals only)
<i>Contact Name, Email, Telephone, Address</i>	
Consultant:	WHALE Environmental Services LLC
<i>Contact Name, Email, Telephone, Address</i>	P.O. Box 455, Kahuku, HI 96731 Contact: Mark Howland markahowland@hawaii.rr.com Phone: (808) 294-9254

Status (select one) DEA-AFNSI**Submittal Requirements**

Submit 1) the proposing agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the DEA, and 4) a searchable PDF of the DEA; a 30-day comment period follows from the date of publication in the Notice.

 FEA-FONSI

Submit 1) the proposing agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEA, and 4) a searchable PDF of the FEA; no comment period follows from publication in the Notice.

 FEA-EISPN

Submit 1) the proposing agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEA, and 4) a searchable PDF of the FEA; a 30-day comment period follows from the date of publication in the Notice.

 Act 172-12 EISPN
("Direct to EIS")

Submit 1) the proposing agency notice of determination letter on agency letterhead and 2) this completed OEQC publication form as a Word file; no EA is required and a 30-day comment period follows from the date of publication in the Notice.

 DEIS

Submit 1) a transmittal letter to the OEQC and to the accepting authority, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the DEIS, 4) a searchable PDF of the DEIS, and 5) a searchable PDF of the distribution list; a 45-day comment period follows from the date of publication

in the Notice.

- ___ FEIS Submit 1) a transmittal letter to the OEQC and to the accepting authority, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEIS, 4) a searchable PDF of the FEIS, and 5) a searchable PDF of the distribution list; no comment period follows from publication in the Notice.
- ___ FEIS Acceptance The accepting authority simultaneously transmits to both the OEQC and the proposing agency a letter
___ Determination of its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS; no comment period ensues upon publication in the Notice.
- FEIS Statutory Timely statutory acceptance of the FEIS under Section 343-5(c), HRS, is not applicable to agency
 Acceptance actions.
- ___ Supplemental EIS The accepting authority simultaneously transmits its notice to both the proposing agency and the
___ Determination OEQC that it has reviewed (pursuant to Section 11-200-27, HAR) the previously accepted FEIS and
 determines that a supplemental EIS is or is not required; no EA is required and no comment period
 ensues upon publication in the Notice.
- ___ Withdrawal Identify the specific document(s) to withdraw and explain in the project summary section.
- ___ Other Contact the OEQC if your action is not one of the above items.

Project Summary

Proposed Action

The State of Hawaii – Department of Natural Resources (DLNR), Division of Forestry and Wildlife (DOFAW) is proposing to implement trail improvements and related structures on the Waihe'e Ridge Trail (TMK (2) 3-1-006:001) and (TMK (2)3-1- 001:028 (Parcel 28)) located at Kahakuloa, Maui, Hawaii. The property is owned by the DLNR.

Purpose and Need

These trail improvements are intended to update the trail to address public safety concerns as related to hikers and/or other trail users through surface improvements, drainage upgrades, and vegetative management.

Related improvements include upgrades to the viewing platforms from the trail, including the construction of two (2) new observation platforms, and associated support structures which are intended to enhance the existing trail system experience and bring the trail up to current trail improvement design standards.



WHALE Environmental Services LLC

P.O. Box 455, KAHUKU, HI 96731 808-294-9254

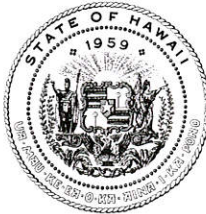
Waihe'e Ridge Trail Environmental Assessment

**DOFAW -
Division
of Forestry and
Wildlife**

August 2016



DAVID Y. IGE
GOVERNOR OF
HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

DIVISION OF FORESTRY AND WILDLIFE
1955 MAIN STREET, ROOM 301
WAILUKU, HAWAII 96793

SUZANNE D. CASE
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HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

Jessica Wooley, Director
Office of Environmental Quality Control
Department of Health, State of Hawaii
235 South Beretania Street, Room 702
Honolulu, Hawai'i 96813

13MD-132

SUBJECT: Draft Environmental Assessment, Waihee Ridge Trail Improvements
Kahakuloa, Maui, TMK (2) 3-1-001:001

Dear Ms. Wooley:

With this letter, the State of Hawaii, Department of Land and Natural Resources hereby transmits the Draft Environmental Assessment and Finding of No Significant Impact (FEA-AFONSI) for the Waihee Ridge Trail Improvements situated at TMK (2)3-1-001:001, in the Wailuku District (Kahakuloa) on the island of Maui for publication in the next available edition of the Environmental Notice.

Enclosed is a completed OEQC Publication Form, two copies of the FEA-AFONSI, an Adobe Acrobat PDF file of the same, and an electronic copy of the publication form in MS Word. Simultaneous with this letter, we have submitted the summary of the action in a text file by electronic mail to your office. If there are any questions, please contact Torrie Nohara, Trails and Access Specialist, at the Maui Division of Forestry and Wildlife Office at (808) 984-8100.

Sincerely,

A handwritten signature in blue ink that reads "Torrie Nohara".

Torrie Nohara
Trails and Access Specialist

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Draft Environment Assessment - Waihe'e Ridge Trail Improvement

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Appendix A. Flora and Fauna Study

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Appendix C. Best Management Practices Plan and Site Specific Pollution Prevention Procedures

Preface

This Chapter 343, Hawai'i Revised Statutes (HRS), Environmental Assessment (EA) has been prepared to address actions on lands owned by the State of Hawai'i, Department of Land and Natural Resources, Division of Forestry and Wildlife. These actions are triggers for the preparation of an EA, as follows:

1. DLNR- DOFAW proposes the improvement of trail components on the Waihe'e Ridge Trail (TMK (2) 3-1-006:001 and TMK (2)3-1- 001:028 (Parcel 28)), along with the installation of new observation structural platform improvements which lie within TMK (2) 3-1-006:001 and TMK (2)3-1- 001:028 (Parcel 28), as well as a portion of the adjacent State-owned parcel (TMK (2)3-1-001:001 (Parcel)). This action triggered the need to provide trail improvements using Federal funds, and State-owned lands will also be used for the implementation of these projects. Mechanized equipment will be used for these trail improvements, thus accordingly triggering a Chapter 343, HRS, EA (Environmental Assessment).

List of Acronyms

List of Acronyms

ADA	Americans with Disabilities Act
AIS	Archaeological Inventory Survey
ALISH	Agricultural Lands of Importance to State of Hawaii
AMSL	Above Mean Sea Level
BMP	Best Management Practice
BSA	Boy Scouts of America
CIA	Cultural Impact Assessment
CZM	Coastal Zone Management
DLNR	Department of Land and Natural Resources
DOE	Department of Education
DOFAW	Division of Forestry and Wildlife
DWS	Department of Water Supply
EA	Environmental Assessment
FONSI	Findings of No Significant Impact
GPD	Gallons Per Day
GPM	Gallons Per Minute
HAR	Hawaii Administrative Rules
HC&S	Hawaiian Commercial & Sugar Company
HDPE	High Density Polyethylene
HRS	Hawaii Revised Statutes
HwD	Honolua Silty Clay, 15 to 25 percent slopes
KAPWC	Kahakuloa Acres Private Water Company
LSB	Land Study Bureau
MCR	Maluhia County Ranches
MGD	Million Gallons per Day
MIP	Maui Island Plan
NPDES	National Pollutant Discharge Elimination System
rRK	Rock Land
SDR	Standard Dimension Ratio
SMA	Special Management Area
TMK	Tax Map Key
USDA	U.S. Department of Agriculture
WKWRF	Wailuku-Kahului Wastewater Reclamation Facility

Draft Environment Assessment - Waihe'e Ridge Trail Improvement

Other Acronyms

AAQS	Ambient Air Quality Standards
ac	acre(s)
CAA	Clean Air Act
CoM	County of Maui
CFR	Code of Federal Regulations
CZM	Coastal Zone Management Program
DLNR	State of Hawaii Department of Land and Natural Resources
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act
ft	feet/foot
ft ²	square feet/foot
ha	hectare(s)
HAR	Hawaii Administrative Rules
HDOH	State of Hawaii Department of Health
HRS	Hawaii Revised Statutes
IRBH	Indoor Radiological Health Board (DOH)
m	meter(s)
m ²	square meter(s)
mi	mile
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
OEQC	Office of Environmental Quality Control
SHPD	State Historic Preservation Division
SMA	Special Management Area
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service

Executive Summary

Project Name: Waihe'e Ridge Trail Improvements

Type of Document: Draft Environmental Assessment

Legal Authority: Chapter 343, Hawaii Revised Statutes

Determination: Finding of No Significant Impact (FONSI)

Applicable Environmental Assessment review "Trigger": Use of Mechanized Equipment

Location: Maui Island, Wailuku: (TMK (2) 3-1-006:001) and (TMK (2)3-1- 001:028 (Parcel 28))

Landowners: State of Hawaii, Department of Land and Natural Resources
54 South High Street, Wailuku, Hawaii 96793
Phone No.: (808) 984-8100

Applicants: State of Hawaii, Department of Land and Natural Resources
54 South High Street, Wailuku, HI 96793
Phone No.: (808) 984-8100

Approving Agency: State of Hawaii, Department of Land and Natural Resources
54 South High Street, Wailuku, Hawaii 96793
Phone No.: (808) 984-8100

Consultant: WHALE Environmental Services LLC
P.O. Box 455, Kahuku, HI 96731
Contact: Mark Howland
Phone: (808) 294-9254

Project Summary:

This Environmental Assessment (EA) analyzes the environmental consequences of the Proposed Action and reasonable alternatives in accordance with Hawaii Administrative Rules (HAR) and Chapter 343, Hawaii Revised Statutes (HRS). This EA demonstrates that construction and operation of the Proposed Action would not result in any significant effects to the environment. Pursuant to Chapter 343, HRS, should a Finding of No Significant Impact be determined, an Environmental Impact Statement would not be required.

Proposed Action

The State of Hawaii – Department of Natural Resources (DLNR), Division of Forestry and Wildlife (DOFAW) is proposing to implement trail improvements and related structures on the Waihe'e Ridge Trail (TMK (2) 3-1-006:001) and (TMK (2)3-1- 001:028 (Parcel 28)) located at Kahakuloa, Maui, Hawaii. The property is owned by the DLNR.

Draft Environment Assessment - Waihe'e Ridge Trail Improvement

Purpose and Need

These trail improvements are intended to update the trail to address public safety concerns as related to hikers and/or other trail users through surface improvements, drainage upgrades, and vegetative management.

Related improvements include upgrades to the viewing platforms from the trail, including the construction of two (2) new observation platforms, and associated support structures which are intended to enhance the existing trail system experience and bring the trail up to current trail improvement design standards.

The underlying land use designations for Parcel 28 are as follows:

- State Land Use Classification: Agricultural
- Wailuku-Kahului Community Agriculture Plan: Agricultural
- County Zoning: Agricultural

The Waihe'e Ridge Trail is considered a permitted use under Chapter 205, Hawaii Revised Statutes (HRS). As well, under Maui County Code (MCC) Chapter 19.30A relating to the County's Agricultural zoning district, the trail is deemed to be an existing nonconforming use. For this reason, an application for County Special Use Permit for the trail improvements and structures will be filed for review and approval by the Maui Planning Commission. The trail originates on Parcel 1, which is on the leased land of the Boy Scouts of America.

The underlying land use designations for Parcel 1 are as follows:

- State Land Use Classification: Conservation
- Wailuku-Kahului Community Plan: Conservation
- County Zoning: Conservation

The trail is considered a permitted use under Chapter 205, HRS as well as MCC 19.30A as open area recreation. Due to the foregoing project's use of State and County funds and use of State-owned lands, compliance with Chapter 343, HRS will be necessary. The approving agency for the Environmental Assessment will be the State Department of Land and Natural Resources.

The Proposed Action will have no significant impacts to any environmental resources areas. The implementation of standard Best Management Practices will ensure no significant impacts occur to geological and soil resources and water resources. The Proposed Action will not contribute to any significant cumulative impacts or reasonably

Draft Environment Assessment - Waihe'e Ridge Trail Improvement

foreseeable direct or indirect effects on any land use or resource use of the State's lands. WHALE Environmental Services LLC has included the Archaeological Literature Review and Field Inspection report for review by the State of Hawaii Preservation Division per the National Historic Preservation Act Section 106 as an appendix. The Proposed Action is not anticipated to adversely affect historic properties. Included also is the Biological Assessments in the appendixes as performed by DLNR/DOFAW.

Alternatives. The filing entertains the Proposed Action or a No Action Alternative to the Proposed Action:

1. Trail improvements to surface, vegetative and drainage of the trail, as well as related structural implementation of two (2) observation platforms.
2. The No-Action Alternative where the proposed project would not be constructed.

The alternate No-Action Alternative that is considered would be on the same 2.5 mile trail site. The environmental consequences of the No Action Alternative are evaluated as a baseline for comparison with the environmental consequences of the Proposed Action. Under this alternative, the Proposed Action would not be constructed. Therefore, DLNR would not benefit from the increase of safety factors for trail hikers and/or users, nor gain from the improvements to drainage and vegetative management. In addition, there would be a lost opportunity to assist the State in reaching the tourism goal of having the Waihe'e Ridge Trail a lead hiking trail in the state with improved hiking conditions and viewpoint observational improvements.

Environmental Consequences. The Proposed Action would have beneficial socio-economic impact. No significant adverse impacts are anticipated to biology, noise, air quality, geology and soils, land use, socioeconomics and traditional cultural practices, hazardous materials and waste, utilities and public services, and adherence to existing laws and regulations, water or archaeological resources. Moreover, this EA demonstrates that the Proposed Action will not have reasonably foreseeable direct or indirect effects on any land use or resource of the State's designated zones.

Based on the review of potential environmental resource impacts, the construction and operation of the Proposed Action would not result in any significant environmental impacts. The vast majority of potential impacts can and will be fully mitigated with the

Draft Environment Assessment - Waihe'e Ridge Trail Improvement

use of proper planning, construction mitigation, and compliance with the rules and regulatory policies. Best Management Practices (BMPs) will be in place to govern such impacts and to ensure protection of the natural and human environment. Thus, the Proposed Action will not contribute to any significant cumulative impacts or reasonably foreseeable direct or indirect effects on any land use or resource of the State's designated zones.

SECTION ONE

LOCATION, PURPOSE OF, AND NEED FOR ACTION

PROJECT OVERVIEW

Table DA-1 Summary of Potential Environmental Resource Impacts and Proposed Mitigation Measures

Table DA.1 Summary of Affected Environmental Resources and Impact And Mitigation		
Affected Environmental Resource	Level of Concern	Impact and Mitigation
Air Quality	No	Impact: Fugitive dust during construction Mitigation: Grading Permit to include Dust Control Plan
Noise	No	Impact: Additional noise during construction Mitigation: Noise negligible during operation and consistent with surrounding during construction
Infrastructure	Low	Impact: Additional traffic and utility connection Mitigation: Marginal increase in demand on transportation, storm water, and solid waste infrastructure
Climate	No	None
Visual Resources	No	There will be no change to scenic vistas or unique view planes
Hazardous Waste and Materials	Low	Impact: hazardous materials or wastes are discovered or released during construction or operations Mitigation: If discovered or released, they will be handled, removed, and disposed of in accordance with applicable state and federal laws, regulations, ordinances, and standards
Recreational Resources	No	None
Geology and Soil	Low	Impact: Soil erosion during construction Mitigation: Grading Permit to include Erosion Control Plan
Water Resources	Low	Impact: Potential stormwater runoff during construction Mitigation: NPDES construction permitting with best management practices
Biological Resources	Low	Impact: Area is previously disturbed with invasive vegetation Mitigation: Restore indigneous vegetation where possible
Cultural Resources	Low	Impact: Possible discovery during construction, but not likely due to location Mitigation: Stop construction in the event of a discovery
Land Use	No	None: no change
Socio-Economic	No	None
Cumulative Impacts	No	None

A. PROPERTY LOCATION, EXISTING USE, AND LAND OWNERSHIP

The DLNR - Division of Forestry and Wildlife (DOFAW) is proposing to implement trail improvements and related observation platform improvements at the Waihe'e Ridge Trail, (TMK (2) 3-1-006:001) and (TMK (2)3-1- 001:028 (Parcel 28)) located at Kahakuloa, Maui, Hawai'i. See **Figure 1**.

This project will implement trail improvements for the Waihe'e Ridge Trail. Situated on the northeastern slopes of the West Maui Mountains, the trail is located within hilly, densely vegetated land which provides scenic views of the Kahakuloa area and the Pacific Ocean.

Land Ownership is the State of Hawai'i Department of Land and Natural Resources (DLNR), Division of Forestry and Wildlife (DOFAW) and is utilized for outdoor wilderness hiking experiences.

There are no buildings on Parcel, although an existing water tank is located within this State-owned lot. A portion of the State-owned parcel is used for cattle grazing.

Existing use is for hikers utilizing the Waihe'e Ridge Trail (Trail) which originates on Parcel 1. Refer to **Figure 2**.



Figure 1

The Trail is an approximately 2.5 mile hike which climbs the windward slope of the West Maui Mountains and affords the hikers panoramic views of Wailuku and central Maui.

Draft Environment Assessment - Waihe'e Ridge Trail Improvement

WHALE Environmental Services LLC – August 2016



Figure 2 - Waihe'e Ridge Trail and maintenance locations

B. - PROJECT NEED

Waihe'e Ridge Trail Improvements

The trail parcel is owned and operated by State of Hawai'i Department of Land and Natural Resources (DLNR), Division of Forestry and Wildlife (DOF AW). The trail is operated as part of the state's Nā Ala Hele Trail & Access Program.



Description

Beginning at 1,000' elevation, trail climbs the windward slope of west Maui through a brushy guava thicket, a young stand of planted trees, and wet native scrub forest. Views of Waihe'e Gorge and Makamaka'ole Gulch can be seen along the way. On the peak, at 2,563' are panoramic views of Wailuku and central Maui, the Kahakuloa slopes, and Mount 'Eke. Weather at the summit varies from clear to overcast with showers. No drinking water is available along the trail. Camping is not permitted.

Special Conditions

The gate at the bottom of the access road is opened at 7:00 AM and closed at 7:00 PM. The gate at the bottom of the road may be closed at any time. If so, park in the gravel area by the gate and walk up the road (approximately 1 mile) to the trail head. The road is steep with poor lines of sight so be sure to keep to the side to avoid oncoming traffic. Do not use any trail or access road that is not delineated by name and color and that may also be displayed on these maps. The marked features are managed for public recreational use. Other trails or roads that branch off from the public features may be on private property, and are not managed for any public recreational use. Access is subject to adjacent landowner approval, and if used without authorization, you will be trespassing and possibly putting yourself at risk.

The trail is one of Maui's most popular hiking trails and has been serving the public as well as other community organizations since it's original development.

Currently, the trail has issues with trail stability due to wetness and other drainage related issues and also contains erosive potentials. Viewpoints are also in need of enhancements.



Map 1 – Waihe'e Ridge Trail

C. - SUMMARY OF PROPOSED ACTION

The proposed project is to conduct a series of trail improvements along the 2.5 mile trail as shown in Figure 3. The varieties of implementation actions include surface stabilization, drainage improvements, and vegetative management. As well two (2) proposed observation structures will be created.



Waihe'e Ridge Trail Improvements

The series of improvements to be implemented are shown in the following charts. The actions correspond with the symbols shown in figure 3. These improvements range from rolling dips (re-directs runoff to side of trail minimizing erosion), vegetation management (i.e. – dead tree removal), re-routing (to minimize hiking hazards) or to railing installs (safety enhancements).

Draft Environment Assessment - Waihe'e Ridge Trail Improvement

WHALE Environmental Services LLC – August 2016

TRAIL PRESCRIPTION					
Trail Name: Waihee Ridge Trail					
BEGIN STATION	END STATION	ACTIONS	TRAIL TYPE	SPECIAL FEATURES/COMMENTS	PHOTO ID / GPS COORDINATES
0+00	00+56	Top of trail, 40x30 Deck & BC fill		14" rise on platform for deck	
00+56	00+67	Water Control (WC)			
00+67	01+37	Rolling Dip (RD)			
01+37	02+19	Possible break rock			
02+19	02+44	Platform turn			
02+44	02+67	RD/WC			
02+67	02+74	Begin realignment			
02+74	03+46	End realignment			
03+46	04+00	RD			
04+00	04+35	Fill			
04+35	04+75	Possible reroute begin			
04+75	05+28	End reroute			
05+28	06+18	RD			
06+18	06+52	RD, Possible break rock			
06+52	06+88	Possible reroute begin			
06+88	07+23	RD			
07+23	07+85	WC/RD			
07+85	08+45	Possible reroute begin			
08+45	09+64	Possible reroute			
09+64	10+15	RD			
10+15	11+20	WC/RD			
11+20	11+57	PRR begin			
11+57	12+26	PRR end			
12+26	12+78	RD			
12+78	13+10	RD			
13+10	13+44	RD			
13+44	13+85	RD			
13+85	14+31	Climbing turn			
14+31	14+71	RD			
14+71	15+16	RD			
15+16	15+76	Climbing turn			
15+76	16+33	RD			

Chart 1 – Improvements List

Draft Environment Assessment - Waihe'e Ridge Trail Improvement

WHALE Environmental Services LLC – August 2016

TRAIL PRESCRIPTION					
Trail Name: Waihee Ridge Trail					
BEGIN STATION	END STATION	ACTIONS	TRAIL TYPE	SPECIAL FEATURES/COMMENTS	PHOTO ID / GPS COORDINATES
17+52	17+81	RD			
17+81	18+22	RD			
18+22	18+73	RD			
18+73	19+12	RD			
19+12	19+66	RD			
19+66	20+01	RD			
20+01	20+49	RD		Raise grade to 15%	
20+49	20+96	RD			
20+96	21+34	RD			
21+34	21+76	RD			
21+76	21+92	Climbing turn			
21+92	22+48	RD			
22+48	22+74	RD			
22+74	22+97	RD			
22+97	23+49	RD			
23+49	24+02	RD			
24+02	24+31	RD			
24+31	24+51	Possible reroute			
24+51	24+93	Possible reroute		80-100ft board walk?	
24+93	25+83	Begin boardwalk?			
25+83	26+28	End boardwalk?			
26+28	26+79	Begin boardwalk?			
26+79	26+98	End boardwalk?			
26+98	27+40	RD			
27+40	27+90	RD			
27+90	28+44	RD			
28+44	28+64	RD			
28+64	29+13	Cut roots			

Chart 2 – Improvements List

Draft Environment Assessment - Waihe'e Ridge Trail Improvement

WHALE Environmental Services LLC – August 2016

TRAIL PRESCRIPTION					
Trail Name: Waihee Ridge Trail					
BEGIN STATION	END STATION	ACTIONS	TRAIL TYPE	SPECIAL FEATURES/COMMENTS	PHOTO ID / GPS COORDINATES
34+88	36+18	Steps			
36+18	36+87	RD			
36+87	37+31	RD			
37+31	38+38	RD			
38+38	38+81	RD			
38+81	38+94	Climbing turn			
38+94	39+44	Climbing turn			
39+44	39+87	RD			
39+87	40+42	RD			
40+42	40+68	Break rock			
40+68	40+99	RD			
40+99	41+24	RD			
41+24	41+33	Break rock			
41+33	42+91	RD			
42+91	43+34	RD			
43+34	43+71	RD			
43+71	44+71	Retaining wall			
44+71	45+37	Retaining wall			
45+37	46+08	RD			
46+08	46+60	Break rock			
46+60	46+85	RD			
46+85	47+20	RD			
47+20	47+81	RD			
47+81	48+35	RD			
48+35	48+90	RD			
48+90	49+22	RD			
49+22	49+44	RD			
49+44	50+45	RD			

Chart 3 – Improvements List

Draft Environment Assessment - Waihe'e Ridge Trail Improvement

WHALE Environmental Services LLC – August 2016

TRAIL PRESCRIPTION					
Trail Name: Waihee Ridge Trail					
BEGIN STATION	END STATION	ACTIONS	TRAIL TYPE	SPECIAL FEATURES/COMMENTS	PHOTO ID / GPS COORDINATES
00+90	01+52	RD			
01+52	02+10	RD			
02+10	02+61	RD			
02+61	03+23	RD			
03+23	03+48	RD			
03+48	04+15	RD			
04+15	04+63	RD			
04+63	05+72	RD			
05+72	06+06	RD		Possible reroute	
06+06	06+51	RD			
06+51	07+45	RD			
07+45	07+90	RD			
07+90	08+86	RD			
08+86	09+78	RD		At tree	
09+78	10+50	Knick			
10+50	11+21	Base course 40 ft.			
11+21	11+87	RD			
11+87	12+83	RD			
12+83	13+92	Base course 40 ft.			
13+92	14+14	Possible reroute begin			
14+14	15+90	Possible reroute end			
15+90	18+65	Knick with BC fill			
18+65	19+71	Base course 40 ft.			
19+71	20+27	20x20 deck			
20+27	20+64	Base course 40 ft.			
20+64	21+15	RD			
21+15	21+62	RD			
21+62	22+78	Board walk		Sheet drain?	

Chart 4 – Improvements List

Draft Environment Assessment - Waihe'e Ridge Trail Improvement

WHALE Environmental Services LLC – August 2016

TRAIL PRESCRIPTION					
Trail Name: Waihee Ridge Trail					
BEGIN STATION	END STATION	ACTIONS	TRAIL TYPE	SPECIAL FEATURES/COMMENTS	PHOTO ID / GPS COORDINATES
28+35	29+08	RD			
29+08	29+45	RD			
29+45	30+07	Climbing turn		Retaining wall	
30+07	30+68	RD			
30+68	33+04	RD			
33+04	33+66	RD			
33+66	34+56	RD			
34+56	35+17	RD			
35+17	35+93	RD			
35+93	37+25	RD			
37+25	38+41	RD			
38+41	47+25	End of trail at gate			
00+00	00+50	RD		Road	
00+50	01+52	RD with BC 20 ft.			
01+52	03+09	RD			
03+09	04+95	RD			
04+95	05+88	RD			
05+88	06+70	End of road			

Chart 5 – Improvements List


Structural Components

As well, the project’s *Proposed Action* calls for the creation of new observation platforms at key viewpoints. These platforms are designed to enhance the trail experience and offer the hiker/trail user a venue for vista and view plane observations.

The design drawings for the observation platforms follow.


Draft Environment Assessment - Waihe'e Ridge Trail Improvement

WHALE Environmental Services LLC – August 2016



PROJECT LOCATION

TITLE SHEET



**STATE OF HAWAII - DEPARTMENT OF FORESTRY
NA ALA HELE TRAILS & ACCESS**

**VIEWING PLATFORM CONSTRUCTION PLANS FOR
WAIHEE RIDGE TRAIL**

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PROJECT LOCATION
N 20° 57.090'
W 156° 32.045'

DESIGNED BY: Cam Lockwood

DRAWN BY: Marcia A. O'Loughlin

Trails Unlimited, LLC
Cam Lockwood
1020 Lockdown Drive
Haw, CA 95021
Cell: 650-460-8345 Fax: 562-245-1172
trailsunlimited@proton.com

PROJECT NAME & LOCATION
**STATE OF HAWAII - DEPT OF FORESTRY
NA ALA HELE TRAILS & ACCESS**

ISSUED NAME
TITLE SHEET


ISSUED DATE
4 AUG 2016

NO SCALE

ISSUED NO.
SHEET
1 of 5

VICINITY MAP

PROJECT LOCATION
N 20° 57.090'
W 156° 32.045'



Waihe'e Ridge Trail

Waihe'e Coastal Dunes and Wetlands Refuge

Waihe'e-Waihe'e

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Cam Lockwood
1020 Lockdown Drive
Haw, CA 95021
Cell: 650-460-8345 Fax: 562-245-1172
trailsunlimited@proton.com

PROJECT NAME & LOCATION
**STATE OF HAWAII - DEPT OF FORESTRY
NA ALA HELE TRAILS & ACCESS**

ISSUED NAME
**VICINITY MAP
(MAUI COUNTY, HA)**

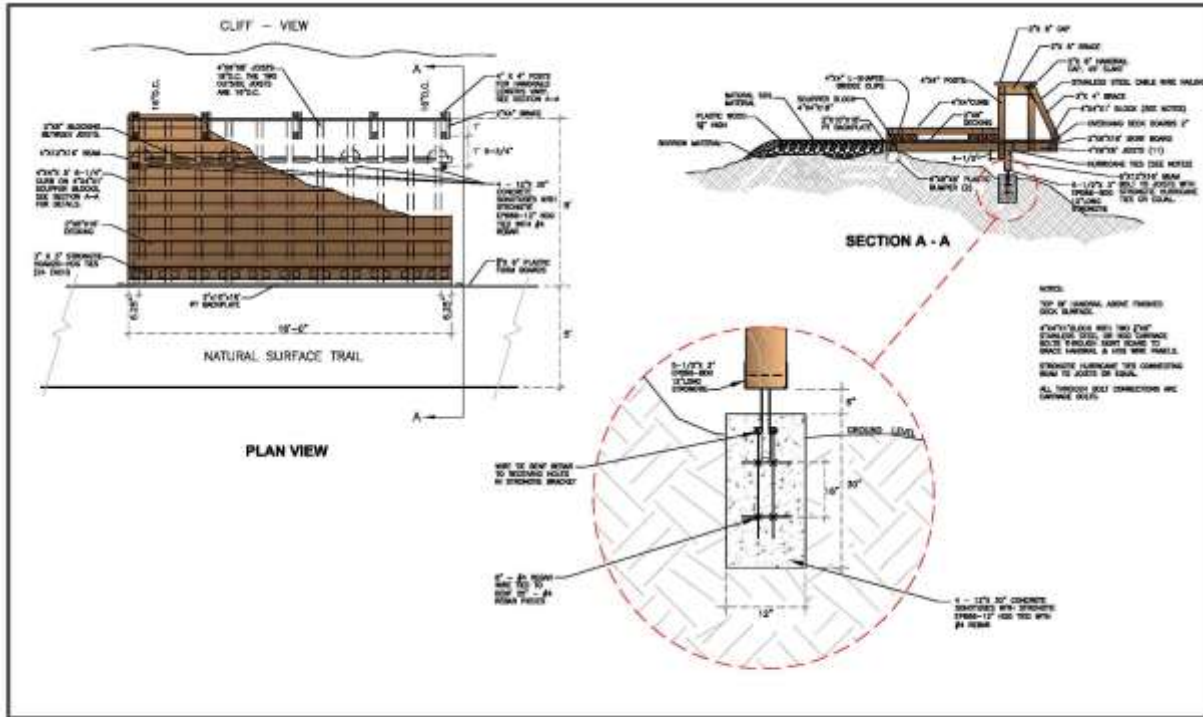
ISSUED DATE
4 AUG 2016

NO SCALE

ISSUED NO.
SHEET
2 of 5

Draft Environment Assessment - Waihe'e Ridge Trail Improvement

WHALE Environmental Services LLC – August 2016



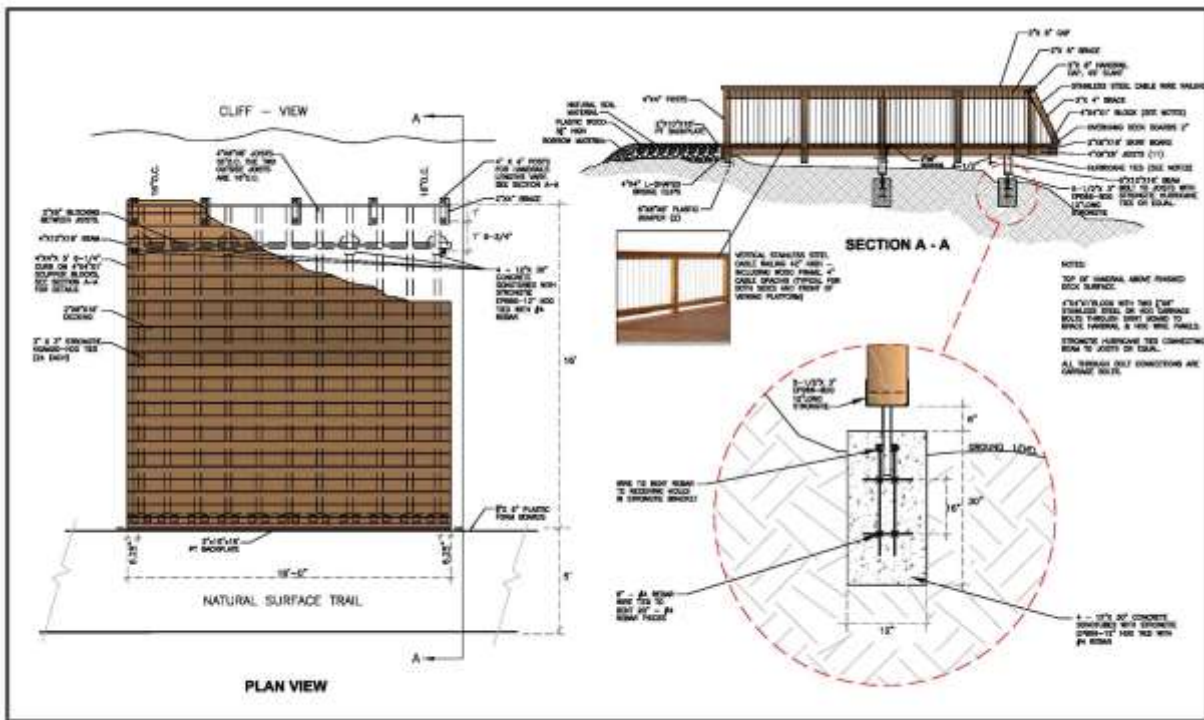
Trails Unlimited, LLC
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 trailsunlimited@rcn.com

PROJECT NAME & LOCATION
**STATE OF HAWAII - DEPT. OF FORESTRY
 NA ALA HELE TRAILS & ACCESS**

DRAWING NAME
WAIHEE TRAIL VIEWING PLATFORM

REVISION DATE
4 AUG 2016
 NO SCALE

DATE
3 OF 5



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PROJECT NAME & LOCATION
**STATE OF HAWAII - DEPT. OF FORESTRY
 NA ALA HELE TRAILS & ACCESS**

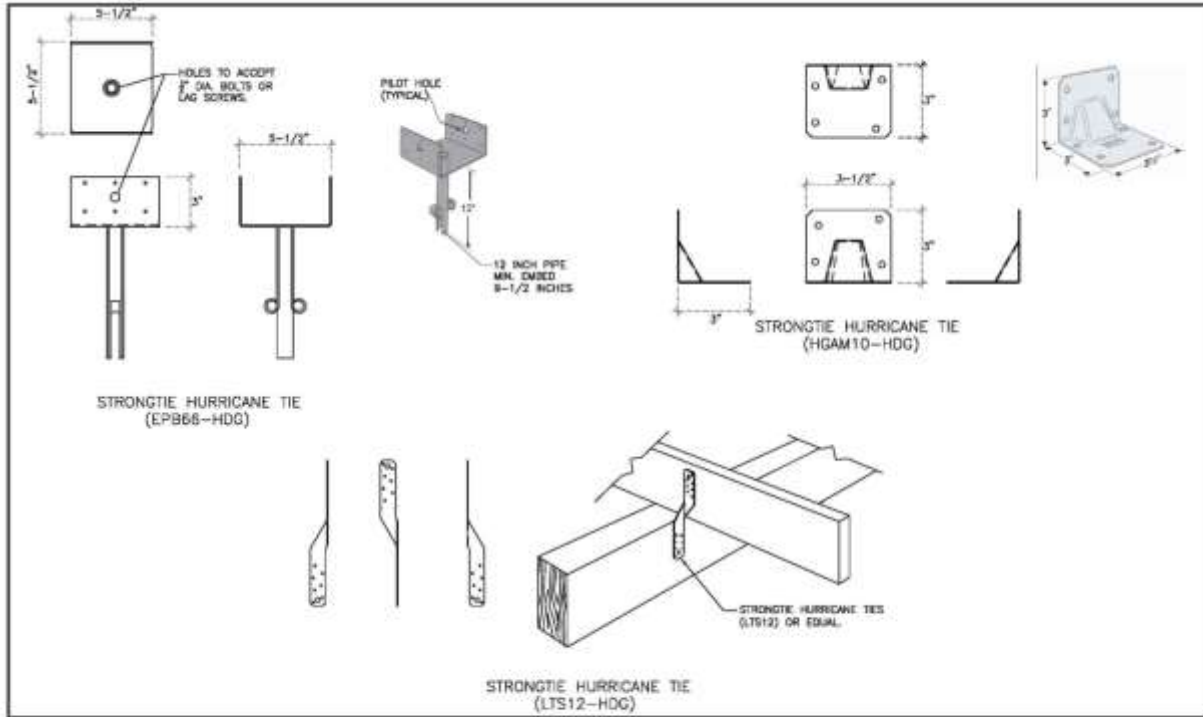
DRAWING NAME
**WAIHEE RIDGE TRAIL
 16FT X 16FT VIEWING PLATFORM**

REVISION DATE
4 AUG 2016
 NO SCALE

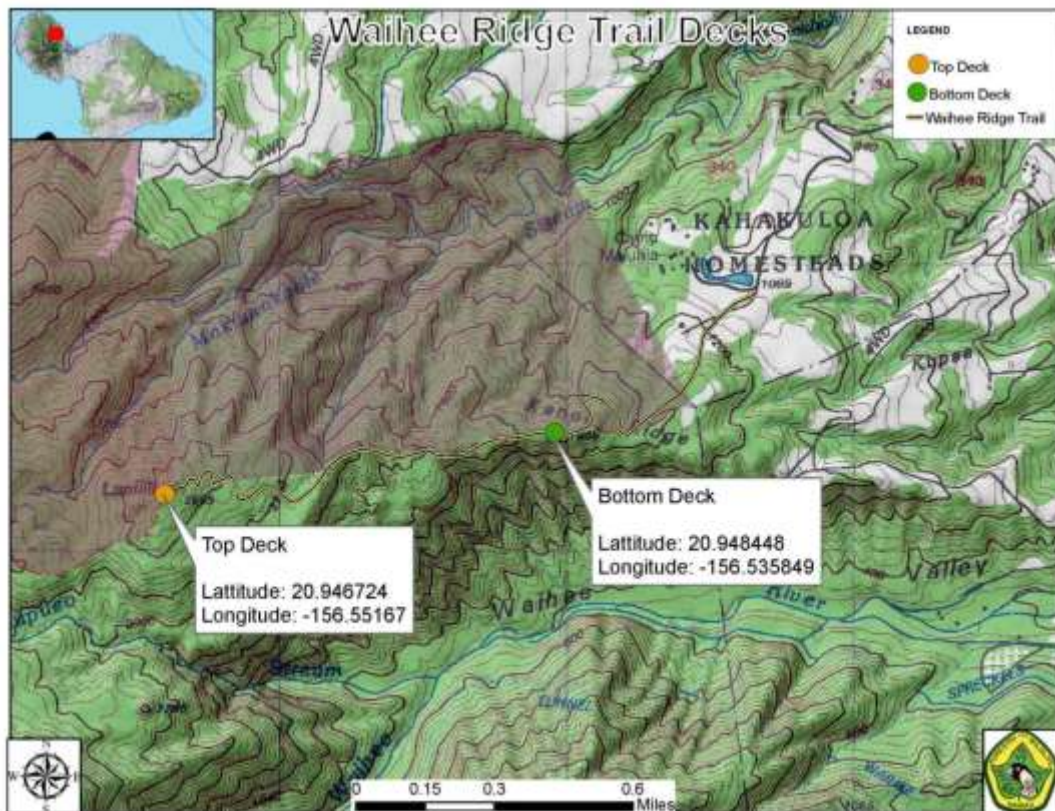
DATE
4 OF 5

Draft Environment Assessment - Waihe'e Ridge Trail Improvement

WHALE Environmental Services LLC – August 2016



<p>Trade Unlimited, LLC Cain Lockwood 1008 Lockman Drive Red, CA 92451 Call: 828-820-3345 Fax: 862-345-7172 tradeunlimited@comcast.com</p>	<p>PROJECT NAME & LOCATION STATE OF HAWAII - DEPT. OF FORESTRY NA ALA HELE TRAILS & ACCESS</p>	<p>DRAWING NAME WAIHEE TRAIL VIEWING PLATFORM SPECIAL DETAILS</p>	<p>ISSUE DATE 4 AUG 2016</p>	<p>SCALE NO SCALE</p>
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D. – APPLICABLE REGULATORY REQUIREMENTS OVERVIEW

The proposed trail improvements at the Waihe'e Ridge Trail will use State and County funds, as well as State lands. As such, compliance with Chapter 343, Hawai'i Revised Statutes (HRS) is triggered. Therefore, this Environmental Assessment (EA) has been prepared pursuant to Title 11, Chapter 200, Hawai'i Administrative Rules (HAR), Environmental Impact Statement Rules to evaluate the proposed action's technical characteristics, environmental and socio-economic impacts, and alternatives, as well as to advance findings relative to the significance of the project's potential impacts and proposed mitigation measures. The Approving Agency for the EA is the Department of Land and Natural Resources – Chairperson Office.

Land Designations of Project Area Parcels

It is noted that the underlying land use designations for one parcel (028) is:

- Land Use Designations Agricultural
- State Land Use Classification Agricultural
- Wailuku-Kahului Community Plan Agriculture
- County Zoning Agricultural

And furthermore noted that the underlying land use designations for the other parcel (006) are:

- Land Use Designations Conservation
- State Land Use Classification Conservation
- Wailuku-Kahului Community Plan Conservation
- County Zoning Conservation

The Waihe'e Ridge Trail is considered a permitted use under Chapter 205, HRS, as well as permitted under Maui County Code Chapter 19.30A, relating to the County's Conservation and Agricultural zoning districts, the trail is considered an existing permitted use. For this reason, the application for County Special Use Permit will be limited to and for the new observation platform (s), as well as all other structural improvements (i.e. railings) on the Waihe'e Ridge Trail, will be filed for review and consideration by the Maui Planning Commission. It is likely that the Maui Planning Commission will only require the filing of a building permit for the Waihe'e Ridge Trail structural components.

The Applicant will coordinate with the Maui Planning Commission to address applicable

regulatory requirements to ensure that Waihe'e Ridge Trail_improvements needs are appropriately addressed.

After reviewing the EA, the County of Maui, and the Department of Land and Natural Resources shall provide a notice of determination pursuant to Chapter 343, HRS. An action shall be determined to have a finding of no significant impact (FONSI) on the environment if it does not:

- (1) Involve an irrevocable commitment to loss or destruction of any natural or cultural resource;
 - (2) Curtail the range of beneficial uses of the environment;
 - (3) Conflict with the state's long term environmental policies or goals and guidelines as expressed in Chapter 343, HRS, and any revisions thereto, court decisions, or executive orders;
 - (4) Substantially affects the economic welfare, social welfare, and cultural practices of the community or State;
 - (5) Substantially affects public health;
 - (6) Involve substantial secondary impacts, such as population changes or affects public facilities;
 - (7) Involve a substantial degradation of environmental quality;
 - (8) Is individually limited by cumulatively considerable effect upon the environment or involves a commitment for larger actions;
 - (9) Substantially affects a rare, threatened, or endangered species, or its habitat;
 - (10) Detrimentally affects air or water quality or ambient noise levels;
 - (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, fresh water, or coastal waters;
 - (12) Substantially affects scenic vistas and view planes identified in county or state plans or studies
- OR
- (13) Require substantial energy consumption.

As this project does not trigger any of these conditions which would deny a FONSI, it is believed that the Waihe'e Ridge Trail improvements project would be issued a finding of no significant impact (FONSI).

SECTION TWO

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

AFFECTED ENVIRONMENT

This section describes the existing environmental setting and baseline conditions in the areas that would be affected by the Proposed Action and alternatives under consideration. The description of the affected environment serves as the basis of comparison for analysis of potential environmental effects of the Proposed Action.

Waihe'e Ridge Trail Improvements – Description of the Existing Environment, Potential Impacts, and Mitigation Measures

Physical Setting

1. Surrounding Land Uses

Definition of Resource

Land use includes the past, present, and planned land uses and government policies governing the preservation and development of land.

a. Existing Conditions

The project site is located 7.4 miles northwest of Wailuku Town, on the windward slopes of the West Maui Mountains in Kahakuloa, Maui, Hawai'i. (Refer to Figure 1). The area surrounding the trail and trailhead is characterized as agricultural and conservation lands. Lands have open vistas and view planes making this an ideal location for recreation amenities such as the trail. The surrounding agricultural grasslands are also used for cattle ranching purposes. Residential uses are non-existent in keeping with the area's agricultural and conservation land use context.

b. Potential Impacts and Mitigation Measures

The proposed trail improvements will be located throughout the entire 2.5 mile trail length; with the proposed observation platform improvements also will be located on the existing trail. These improvements are compatible with the existing uses of the properties and are not anticipated to create adverse impacts to the surrounding community.

2. Climate

Definition of Resource

Climate refers to meteorological conditions, such as the temperature range, precipitation levels, and wind conditions in a particular region, and is addressed under climate for purposes of this EA.

a. Existing Conditions

Like most areas in Hawai'i, the climate in the Wailuku region is relatively uniform year-round. Characteristic of the island's climate, the project site experiences mild and uniform temperatures, moderate humidity, and relatively consistent northeasterly trade winds. This climatic stability is due to Maui's tropical latitude, its location relative to the Pacific anticyclone and storm tracts, and the surrounding ocean currents. Variations in climate among the different regions in Maui are largely due to local terrain.

Historically, August is the warmest month with an average temperature in the high 80 degrees Fahrenheit (measured at the Kahului Airport), while the coolest month is February with an average in the low 60s. Rainfall in the region is seasonal, with the most precipitation occurring between October and March. Annual rainfall data for nearby Waihe'e Valley shows an average of 44.65 inches (Maui County Data Book, 2012).

b. Potential Impacts and Mitigation Measures

The proposed project is not anticipated to affect or be affected by climatic conditions in the area.

3. Agricultural Productivity Considerations

a. Existing Conditions

In 1977, the State of Hawai'i, Department of Agriculture developed a classification system to identify Agricultural Lands of Importance to the State of Hawai'i (ALISH), based primarily, though not exclusively, on soil characteristics of the underlying land. The three (3) classes of ALISH lands are "Prime", "Unique", and "Other Important" agricultural lands, with the remaining non-classified lands termed "Unclassified". When utilized with modern farming methods, "Prime" agricultural lands have soil quality, growing

season, and moisture supply needed to produce sustained crop yields economically; "Unique" agricultural lands contain a combination of soil quality, growing season, and moisture supply to produce sustained yields of a specific crop. "Other Important" agricultural lands include those important lands that have not been rated as "Prime" or "Unique".

The Waihe'e Ridge Trail, as reflected by the ALISH map, is located on lands designated as "Unclassified" and "Other" agricultural lands. Additionally, the trail also lies on lands zoned "conservation".

Additionally, the University of Hawai'i, Land Study Bureau (LSB) developed the Overall Productivity rating, which classified soils according to five (5) levels, with "A" representing the class of highest productivity soils and "E" representing the lowest. These letters are followed by numbers which further classify the soil types by conveying such information as texture, drainage, and stoniness.

The LSB classifications for the proposed project area are "D13" and "E96" with the majority of the trail in E96. The "D 13" classification (beginning of trail – parking) reflects an Overall Productivity Rating of D, the second lowest possible rating. The soils are characterized as non-stony. Soil depths are over 30 inches, with an average slope of 21 to 35 percent. The soil is of fine grain and well-drained. This land is typically found at an elevation of 0 to 1,000 feet, and experiences a mean annual rainfall of 30 to 50 inches. The soils are dark reddish brown in color. The "E96" classification reflects an Overall Productivity rating of E, the lowest possible rating. The soils are characterized as non-stony to rocky. Soil depths are variable, and with an average slope of 36 to 80 percent. The soil is of moderately fine to medium grain and well-drained.

The land is typically found at an elevation of 100 to 5,000 feet, and experiences a mean annual rainfall of 40 to 60 inches. The soils are dark brown to dark reddish-brown in color. Both D and E rated lands are suitable for grazing (University of Hawai'i, Land Study Bureau, 1967).

b. Potential Impacts and Mitigation Measures

While the site has relatively low productivity ratings, a portion of the State-owned parcel is used for cattle grazing purposes. The trail itself is used for outdoor recreational purposes. Adverse impacts to agricultural productivity are not anticipated as a result of the proposed action.

4. Topography/Geology and Soils Characteristics

Definition of Resource

Geology refers to the surface and subsurface materials of which a land area is composed, including soils and rocks. Important geologic characteristics of soils and underlying rocks include stability, slope, compatibility, shear strength, and productivity. Discussions of geology and soils typically identify existing conditions and determine how the Proposed Action and alternatives under consideration would likely affect, and be affected by, geology and soils.

a. Existing Conditions

Elevations at the project site range from approximately 1,050 feet above mean sea level (amsl) to 1,110 feet (amsl). The site generally slopes in a south to north direction, ranging from 6 to 50 percent.

The project site consists of soils within the Honolua-Olelo association, which is found on intermediate uplands and is characterized by deep, gently sloping to moderately steep, well-drained soils that have a fine textured subsoil (U.S. Department of Agriculture (USDA), 1972). Underlying the project site are both Honolua Silty Clay, 15 to 25 percent slopes (HwD), and Rock Land (rRK). See Figure 11. Honolua Silty Clay, 15 to 25 percent slopes (HwD) is a dark brown silty clay about 12 inches thick. Permeability is moderately rapid, runoff is medium, and the erosion hazard is slight to moderate. Rock Land (rRK) is made up of areas where exposed bedrock covers 25 to 90 percent of the surface. The

rock outcrops and very shallow soils are the main characteristics of this soil type. In many places, the soil material is very sticky and very plastic, and has high shrink-swell potential (USDA, 1972).

b. Potential Impacts and Mitigation Measures

The proposed project is not anticipated to affect or be affected by underlying soil or topographic conditions in the area. The slope at the site ranges from approximately 6 to 50 percent, and does not pose constraints on project constructability.

5. Flood and Tsunami Hazards

According to the Hawai'i - National Flood Insurance Program Flood Hazard Assessment Tool, the areas that would be affected by the Proposed Action and alternative under consideration are not designated 100 Year Floodplain Zones. (Hawai'i National Flood Insurance Program, 2011).

Additionally, the Proposed Action is not located within the tsunami hazard zone identified by the Maui Civil Defense Agency.

a. Existing Conditions

The project site is located on the windward slopes of the West Maui Mountains at an elevation of approximately 1,100 feet above mean sea level. As indicated by the Flood Insurance Rate Map for the County of Maui, the project site is located within Zone X. Zone X is the flood insurance rate zone that corresponds to areas of minimal flooding or areas determined to be outside the 0.2 percent annual chance flood plain.

Additionally, the project is located inland and outside the tsunami inundation zone.

b. Potential Impacts and Mitigation Measures

Given the location of the project site within Flood Zone X and outside of the tsunami inundation zone, there are no anticipated adverse effects to the proposed project from flooding or tsunami related events.

6. Streams and Wetlands

Definition of Resource

Water resources is a broad term that encompasses surface water, groundwater, near-shore water, wetlands, and other sources of water that support a variety of human activities, plant and wildlife species, habitats, and ecosystems. Surface water resources typically include stormwater, lakes, streams, and rivers, while water located beneath the ground surface within soil pore spaces or the fractures of rock formations is known as groundwater. Near-shore water is generally considered the area extending seaward from the shoreline beyond the surf zone. A wetland is an area of land that is saturated with water either permanently or seasonally. Water within wetlands can be saltwater, freshwater, or brackish. Examples of wetlands include marshes and swamps. Services performed by wetlands include water purification, shoreline stability, and habitat for plant and wildlife species.

a. Existing Conditions

There are two (2) streams on the State-owned parcel that are within the vicinity of the proposed project. The Makamaka'ole Stream is located approximately 1,500 feet to the north of the proposed trail improvement activities, and the Maluhia Stream is approximately 900 feet east of the site of the trail parking lot. Along the Waihe'e Ridge Trail, there is one intermittent flow crossing the trail at about the 2.0 mile point from the base.

b. Potential Impacts and Mitigation Measures

The project will utilize Best Management Practices (BMPs) to minimize soil erosion attributed to construction. Runoff will be managed so as not to affect downstream properties, resources, or nearby stream systems. In this regard, the proposed project is not anticipated to affect stream and wetland conditions in the area.

7. Flora and Fauna

Definition of Resource

Biological resources include species of vegetation, wildlife, fisheries, and habitat. Biological resources discussed in this section include botanical, avian, or

mammalian resources of special concern, particularly species listed under federal or state endangered species law. Also discussed are species considered sensitive, protected, or proposed for protection.

Affected Environment

The affected environment for biological resources described below is based on the biological resources survey report prepared for this EA unless otherwise noted (DLNR, April 2015). This report may be found in the appendixes.

a. Existing Conditions

A flora and fauna field survey of the Waihe'e Ridge trail corridor was undertaken. The results of this study are documented in the report entitled "DESCRIPTION OF THE FLORA AND FAUNA – Biological impact of the Waihe'e Ridge trail corridor improvements" which is incorporated in this EA document as Appendix "A".

b. Potential Impacts and Mitigation Measures

The flora and fauna report concludes that there are no endangered or threatened species of plant life and animal life which will be impacted by the project. More particularly, there will be no adverse impacts to these resources as a result of the proposed action.

8. Archaeological and Cultural Resources

Definition of Resource

Significant cultural resources are defined by the National Historic Preservation Act and Chapter 343 of the Hawai'i Revised Statutes (HRS). According to the National Historic Preservation Act (NHPA), a historic resource is defined as, "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in the National Register..." According to Chapter 343 of the HRS, cultural resources are defined as "cultural beliefs, practices, and resources of native Hawaiians and other ethnic groups." Chapter 343 requires that the environmental assessment process account for cultural resources in determining the significance of impacts that could occur as a result of a proposed action.

a. Existing Conditions

An archaeological assessment of the project area was undertaken, together with associated archival investigations. See Appendix "B".

b. Potential Impacts and Mitigation Measures

The archaeological assessment report explains that it is unlikely that the trail area was a major permanent settlement in the pre-contact era. Refer to Appendix "B". No surface cultural remains or historic surface features were identified. The report notes that modern era clearing and grading on the parcel associated with the development of the trail have likely disturbed any previously existing sites or surface deposits. Based on the foregoing, the report concludes that the proposed project will not have an adverse impact on any significant sites in the project area or nearby the project area. As such, no further archaeological work has been recommended. See Appendix "B".

9. Additional Cultural Resources

To better understand the relationship between the proposed action and cultural resources and practices in the immediate vicinity of the project site, an extensive consultation process with individuals who have knowledge of the area was undertaken by Dr. Chris Monahan. Refer to Appendix "C".

a. Existing Conditions

A Cultural Impact Assessment (CIA) was prepared for the project area. See Appendix "C". From a cultural context perspective, the CIA notes that the project area is situated on a rugged slope and unsuitable for wetland taro cultivation. Instead, a limited degree of dry land crop cultivation was likely practiced on the flatter and more gradually sloping coastal bluffs.

b. Potential Impacts and Mitigation Measures

This process included oral interviews, via telephone interviews, and email correspondences. Based on results of the consultation

process, it has been determined that the area of the proposed improvements have not been used for traditional cultural purposes within recent times. It is reasonably concluded, therefore, that the proposed actions will not affect the exercise of Native Hawaiian rights, or the rights of any other ethnic group, as it relates to gathering, access, or other customary activities.

10. Air Quality

Definition of Resource

Air quality is defined by the concentrations of specific pollutants of concern in the general outdoor atmosphere to which the public has access, with respect to the health and welfare of the general public. These pollutants are generated by many direct and indirect sources such as: Factories and power plants (stationary); automobiles, buses and planes (mobile); windblown dust and volcanic eruptions (natural), construction and site preparation (fugitive dust).

The United State Environmental Protection Agency (EPA) administers and enforces the Clean Air Act, a federal law that regulates air emissions from stationary and mobile sources. Passed by Congress in 1970, and later amended in 1977 and 1990, this law authorizes EPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and public welfare and to regulate emissions of hazardous, commonly occurring pollutants known as “criteria” pollutants. Thus far NAAQS have been set for six criteria pollutants (40 Code of Federal Regulations [CFR] 50): carbon monoxide (CO); nitrogen dioxides (NO₂); ozone (O₃) with nitrogen oxides [NO_x] and volatile organic compounds [VOCs] as precursors; particulate matter (PM) PM₁₀ – less than 10 microns in particle diameter and PM_{2.5} – less than 2.5 microns in particle diameter; lead (Pb); and sulfur dioxide (SO₂). Two types of standards have been established. "Primary standards" set limits to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly. "Secondary standards" set limits to protect public welfare which includes protection against decreased visibility, and damage to animals, crops, vegetation, and buildings. The EPA requires that states monitor the ambient air to

determine attainment of the NAAQS and regulate industries that emit these and other pollutants.

In addition to NAAQS, the Hawai'i DOH has established State ambient air quality standards (SAAQS) to further protect human health. SAAQS exist for the following pollutants: CO, NO₂, O₃, PM₁₀, Pb, hydrogen sulfide (H₂S), and SO₂. Performance standards exist for volatile organic compounds (VOC) and total suspended particulates (TSP) within HAR and are controlled by permit.

a. Existing Conditions

Given the project area's location in a relatively remote and heavily vegetated area, it does not, in general, experience adverse air quality conditions. There are no point sources of airborne emissions within close proximity to the project site. Point sources in the Central Maui region include the Māalaea Power Plant, Puunēnē Sugar Mill, and the rock quarry at Puunēnē, all of which are well over five (5) miles from the project site.

A non-point source of pollution in the vicinity of the project site is vehicular exhaust from Kahekili Highway and other nearby roadways. Emissions from these sources, however, are quickly dispersed by prevailing trade winds. Overall, Maui's air quality index is rated good, with 97 percent of days with good air quality and three (3) percent with moderate air quality (Scorecard, 2011).

b. Potential Impacts and Mitigation Measures

During construction, airborne particulates as a result of construction related activities may temporarily affect the ambient air quality within the immediate vicinity of the project site. Mitigation measures may include utilization of watering work areas to control dust, as well as other appropriate BMPs to ensure that fugitive dust from the project area is minimized. By effectively employing these mitigation measures, construction-related activities are not anticipated to pose a significant impact to the air quality in the surrounding area.

11. Noise

Definition of Resource

Noise is defined by the EPA as “unwanted or disturbing sound”, and in the HAR as "any sound that may produce adverse physiological or psychological effects or interfere with individual or group activities, including but not limited to communication, work, rest, recreation, or sleep".

While the typical human response to noise pollution is annoyance, Noise pollution can cause stress related illnesses (eg. high blood pressure, sleep disruption, and lost productivity) and potentially hearing loss, with prolonged exposure. The response of individuals to similar noise events is diverse and influenced by the type of noise; the perceived importance of the noise, and its appropriateness in the setting; the time of day and the type of activity during which the noise occurs; and the sensitivity of the individual. Most environmental noise includes a mixture of noise from distant sources that creates a relatively steady background noise in which no particular source is identifiable.

Sound is generally characterized by several variables, including frequency and intensity. Frequency describes the pitch of the sound and is measured in Hertz (Hz), while intensity describes the sound's loudness and is measured in decibels (dB). Normal speech has a sound level of approximately 60 dB. For the purpose of quantify sound for ordinance, sound level is usually expressed by reference to a known standard. Because the human ear is less sensitive to low audio frequencies, a table of octave values are added to the dB sound pressure level to make the A-weighted scale (dBA). The result is a standard scale relative to the loudness perceived by the human ear, which incorporates both sound intensity and frequency.

In 1970 under the CAA, the EPA established the Office of Noise Abatement and Control (ONAC) with the purpose of performing studies on noise and its effect on the public health and welfare. In 1972 Congress passed the

Noise Control Act, followed by the Quiet Communities Act in 1978. By 1981 the EPA concluded that noise issues were best handled at the State and local level. The Hawai'i DOH is the State administrator of noise control ordinance in Hawai'i. The DOH has set maximum permissible sound levels (specified in HAR §11-46-4), which cannot be exceeded beyond the source's property line. These maximums vary based on zoning district, being the highest for industrially zoned parcels. These noise limits apply to "stationary noise sources; and equipment related to agricultural, construction, and industrial activities". "Construction equipment" means any device designed and intended for use in construction, including but not limited to any air compressor, pile driver, bulldozer, pneumatic hammer, steam shovel, derrick, crane, tractor, grader, loader, power saw, pump, pneumatic drill, compactor, on-site vehicle, and power hand tool (HAR §11-46-4(a)).

a. Existing Conditions

The predominant source of noise in the vicinity of the project site stems from traffic traveling along Kahekili Highway. The lands adjacent to the trail parcel are State-owned lands and are used, in part, for cattle grazing. Agricultural home sites located along Kahekili Highway and north of Camp Maluhia and the trail across Makamaka'ole Gulch are not major noise generators.

b. Potential Impacts and Mitigation Measures

Ambient noise conditions may be temporarily affected by construction related activities. Construction machinery and activities are anticipated to be the dominant noise-generating sources during the construction period though most of the construction will likely be limited to hand tools due to the ruggedness of the trail terrain. Mitigation measures for construction-related activities may include equipment mufflers or other noise attenuating equipment.

Construction activities are anticipated to occur during daylight hours, Monday through Friday, excluding holidays. The use of BMPs for construction, combined with the area's remote location, will ensure that noise impacts associated with construction are

appropriately mitigated. In the long term, the trail improvement will not create noise conditions different from those associated with current operations.

12. Scenic and Open Space Resources

Definition of Resource

Visual resources are public in nature and include views of a project to and from neighboring scenic resources. When evaluating scenic quality, both natural and manmade components of the existing visual environment should be collectively considered. These components may be evaluated in terms of whether each contributes or detracts to the overall scenic landscape character. In turn, this evaluation contributes to the assessment of scenic quality levels, which are established by evaluating the distinctiveness and diversity of a particular landscape setting. Public concern over adverse visual impacts is also an important part of the visual impact assessment process. Public concerns over the visual impacts associated with a project are often directly connected to the size and scale of a project. Additionally, the number and presence of people or activities nearby will further inform the level of concern for impacts to the existing scenic quality of the area. Visual impacts associated with a project can be evaluated in the following objective terms: form, line, color and texture. Such terms are used to measure the existing scenic quality and proposed scenic quality with the addition of the project. This methodology allows for an objective assessment of visual resources. The visibility of a project determines how the Project will be seen from particular viewing areas, which directly relates to the level of concern nearby viewers will have. In general, however, perception of details relating to form, line, color, and texture diminishes with increasing distance.

a. Existing Conditions

The project site's location, nestled against the windward slopes of the West Maui Mountains, provides picturesque views of the Pacific Ocean and the Kahakuloa region with the mountains as a backdrop to the trail experience.

Kahekili Highway is noted by the County as possessing a high, significant scenic-resource value. It provides ocean, mountain,

agricultural, and island-wide views. The slopes of the West Maui Mountains provide for open space resources to the region as well.

b. Potential Impacts and Mitigation Measures

The proposed project will not obstruct views from the trail or from Kahekili Highway. As such, the proposed project will not adversely affect scenic resources.

13. Beach and Mountain Access

a. Existing Conditions

The project site is located approximately one (1) mile from the coastline. The driveway to the camp also provides access to the Waihe'e Ridge Trail used by hikers and the trail is the only access higher on the mountain.

b. Potential Impacts and Mitigation Measures

The proposed trail improvement projects are not anticipated to affect beach access conditions in the area. In addition, the proposed trail improvements are intended to improve access and use thereof to the Waihe'e Ridge Trail for hikers.

Socio-Economic Environment

Socioeconomic resources refer to the social and economic qualities of the human environment, such as demographic characteristics, employment and income-generating activities, and the ways in which people live, relate to one another, organize to meet their needs, and engage in leisurely activities.

1. Population

a. Existing Conditions

The population of the County of Maui has exhibited relatively strong growth over the past decade. The County's resident population grew by 20.9 percent between 2000 and 2010, compared to a 12.3 percent increase in the State of Hawai'i as a whole during the same time period. Maui County's population increased from 128,094

residents in 2000 to 154,834 residents in 2010. Population on the island of Maui exhibited even stronger growth than the County as a whole, with a 22.8 percent population increase over the decade. Approximately 144,444 residents lived on the island of Maui in 2010 (U.S. Census Bureau, 2000 and 2010).

Maui County's resident population is projected to rise to 174,450 people in 2020 and to 199,550 people in 2030 (SMS, 2006). The proposed project is located on the northwestern coast of Maui, within the Wailuku-Kahului Community Plan region. Just as Maui County and Maui Island's populations have grown, the resident population of the Central Maui region has also increased. The estimated population of the Wailuku-Kahului region in 2000 was 41,503 (SMS, June 2006), which comprised 35.3 percent of the island's population. In 2010, the region's population stood at approximately 54,400 residents, a 31.2 percent increase over 10 years (U.S. Census Bureau, 2010). The population of the Wailuku-Kahului region is projected to increase to 60,877 people in 2020 and to 71,223 people in 2030 (SMS, June 2006).

b. Potential Impacts and Mitigation Measures

The proposed trail improvements are intended to provide upgraded trail structure and enhanced safety factors for hiking use, as well as non-hiking trail users. The improvements are not considered a population generator. Accordingly, the proposed actions will not affect the island's population.

2. Economy

a. Existing Conditions

The Wailuku region is Maui County's center of governmental activity. Along with neighboring Kahului, the region encompasses a broad range of commercial, service, and public sector activities. In addition, the region is surrounded by approximately 32,000 acres of sugar cane. This vast expanse of agricultural land is managed by Hawai'ian Commercial & Sugar Company (HC&S), and was a key contributor to the local economy, though HC&S recently closed sugar harvesting activities and replacement revenue has not been identified.

Non-seasonally-adjusted unemployment rates for both Maui County and the Island of Maui in December 2014 were 3.8 percent and 3.6 percent, respectively. These rates both decreased from the December 2013 unemployment rates of 4.7 percent and 4.5 percent (Department of Labor and Industrial Relations, March 2015).

b. Potential Impacts and Mitigation Measures

In the short term, the proposed project will provide construction-related revenue and employment. Accordingly, the project will have a beneficial impact on the local economy during the construction phase.

In the long term, the proposed actions are not anticipated to have a significant impact on the economy of Maui County.

Public services

1. Police and Fire Protection

a. Existing Conditions

Police protection for the Wailuku region is provided by the Maui County Police Department headquartered on Mahalani Street, approximately 9.1 miles southeast of the project site. The region is served by the Department's Central Maui station, which is divided into three (3) sectors. Each sector is divided into three (3) beats, each patrolled by a single officer.

Fire prevention, suppression, and protection services for the Waiehu, Waihe'e, and Wailuku regions are provided by the County Department of Fire and Public Safety's Wailuku station, located on Kinipopo Street in Wailuku, approximately 7.8 miles southeast of the project site. The region is also served by the Department's Kahului station, located on Dairy Road in Kahului, approximately 10.0 miles southeast of the project site.

b. Potential and Impacts and Mitigation Measures

The proposed projects will not affect the service area limits or personnel for police and fire protection.

2. Medical Services

a. Existing Conditions

The island's major medical facility is Maui Memorial Medical Center, located approximately nine (9) miles southeast of the project site, midway between Wailuku and Kahului. Acute, general, and emergency care services are provided at the facility. Other private medical service providers in the Central Maui region, which have regular hours, include Maui Medical Group and Kaiser Permanente.

b. Potential Impacts and Mitigation Measures

The proposed projects will not affect requirements for medical services. As with police and fire protection services, service area limits for medical emergency responders will not be affected by the proposed project.

3. Solid Waste

a. Existing Conditions

Single-family residential solid waste collection service is provided by the County of Maui. Residential solid waste collected by County crews is disposed at the County's Central Maui Landfill, located four (4) miles southeast of the Kahului Airport. Commercial waste from private collection companies is also disposed at the Central Maui Landfill. A County-operated green waste recycling facility is also located at the Central Maui Landfill.

Maui Demolition and Construction Landfill, a privately owned facility, accepts solid waste and concrete from demolition and construction activities. This facility is located at Māalaea, approximately 14.2 miles south of the project site, near Honoapi'ilani Highway's junction with North Kīhei Road and Kūihelani Highway.

b. Potential Impacts and Mitigation Measures

Construction waste which may be generated from implementation of the project will be recycled or disposed at an appropriate construction waste disposal location following trail guidelines of

“carry in, carry out”. After project construction, the proposed actions will not result in the generation of additional solid waste. With these solid waste management measures, the contribution of construction waste to landfills will be minimized. Thus, the proposed actions are not anticipated to adversely affect capacity parameters of the County's solid waste system.

4. Recreational Resources

a. Existing Conditions

There are a number of public recreational facilities in the Central Maui region, including the War Memorial complex and the adjacent Keōpūolani Park. The Waihe'e Ridge Trail itself is considered a recreational opportunity, as various open land recreation activities such as hiking are carried out on this trail.

b. Potential Impacts and Mitigation Measures

The proposed projects are not anticipated to adversely impact the trails' existing recreational purposes, nor will it adversely affect use of the Waihe'e Ridge Trail or other recreational facilities/opportunities in Central Maui.

5. Schools

a. Existing Conditions

The Wailuku-Kahului region is served by the State Department of Education's (DOE) public school system and by several privately operated schools. Public schools operated by the DOE in the Kahului area include Lihikai, Kahului, and Pomaika'i Elementary Schools (Grades K to 5); Maui Waena Intermediate School (Grades 6 to 8); and Maui High School (Grades 9 to 12). Public schools operated by the DOE in the Wailuku area include Wailuku, Waihe'e, and Pu'u Kukui Elementary Schools (Grades K to 5); 'Iao Intermediate School (Grades 6 to 8); and Baldwin High School (Grades 9 to 12). The University of Hawai'i - Maui College, located southeast of the project site in Kahului, serves as the island's primary higher education institution.

b. Potential Impacts and Mitigation Measures

The proposed projects are not anticipated to impact school enrollments or facility requirements.

Infrastructure

Infrastructure is the basic structure of the affected environment, including utilities, transportation facilities, drinking water, and wastewater systems.

1. Roadways

a. Existing Conditions

The project site is located to the "mauka" (mountain) side of Kahekili Highway in Kahakuloa, Maui, Hawai'i. Access to the site is provided by a one-lane paved driveway off of Kahekili Highway. Kahekili Highway is a two-way, two-lane, undivided State-owned roadway that serves as the primary roadway throughout the north Wailuku region encompassed by Waiehu, Waihe'e, and Kahakuloa. Kahekili Highway begins in the "Happy Valley" district of Wailuku, where North Market Street, Mokuhau Road and Piihana Road converge, and continues north and around the West Maui Mountains where it eventually becomes Honoapi'ilani Highway near Honokōhau Bay.

b. Potential Impacts and Mitigation Measures

There will be a short-term increase in traffic along Kahekili Highway associated with construction workers and equipment entering and leaving the project site. Parking for construction workers will be on-site at the base parking lot to minimize additional traffic impacts. There are no anticipated long-term traffic impacts as there are no changes in trail capacity and operations resulting from the proposed action. No adverse impacts to traffic are anticipated as a result.

2. Water

a. Existing Conditions

Water to the Wailuku-Kahului region is provided by the Maui County, Department of Water Supply (DWS) Central Maui System which also serves the South Maui and Pāia areas. The main sources of water for this system include the 'lao and Waihe'e aquifers, the 'lao Tunnel, and the 'lao Waikapu ditch.

The project site is located within the Waihe'e Aquifer System, which has a sustainable yield of eight (8) million gallons per day (MGD). The current withdrawal from the Waihe'e Aquifer system is approximately six (6) MGD on a 12-month moving average basis.

The location currently receives water from the Kahakuloa Acres Private Water Company (KAPWC) through a 5/8-inch meter located in the Maluhia Country Ranches (MCR) subdivision. A 2-inch transmission pipeline runs from the meter through an easement on one of the MCR lots, traverses the Makamaka'ole Gulch State-owned parcel, and enters the lower end of the camp near the Rotary campsite. The only source of water is at the lower trailhead, the trail itself has no water facilities.

b. Potential Impacts and Mitigation Measures

The trail parking lot does not require domestic water service. In this regard, appropriate construction mitigation measures will be implemented to ensure the protection of the underlying aquifer. Such measures may include, as applicable, management of hazardous onsite materials to ensure proper security and handling, and the proper maintenance of construction vehicles and stationary equipment to ensure that there is no leakage of fuel and other petroleum-based fluids.

3. Wastewater

a. Existing Conditions

Wastewater from the Wailuku-Kahului region is treated at the Wailuku Kahului Wastewater Reclamation Facility (WKWWRF). The WKWWRF also receives flow from Kuau, Pāia, Skill Village, and Spreckelsville. Currently, the WKWWRF has a design capacity of 7.9 MGD and average dry weather flow of 4.4 MGD. Effluent disposal from the WKWWRF is via eight (8) gravity injection wells. Principal solids from the WKWWRF are treated, processed and digested, dewatered and then composted at the Central Maui Landfill. There are 15 major wastewater pump stations which are part of the WKWWRF system.

There are no existing County sewer system facilities at the work site.

b. Potential Impacts and Mitigation Measures

The proposed trail improvements will not require wastewater connections or service. In this regard, there will be no impacts to County collection, transmission and treatment systems.

4. Drainage

a. Existing Conditions

The proposed project site is located on the slopes of the West Maui Mountains at approximately 1,200-2000 feet above mean sea level (amsl). There are no drainageways at the site. Runoff currently sheet flows through the site and eventually enters a tributary of Makamaka'ole Gulch. A ridge borders the southwesterly portion of the property, preventing off-site runoff from entering the site.

b. Potential Impacts and Mitigation Measures

The increase in runoff resulting from the proposed trail improvements will be mitigated by drainage improvements outlines earlier such as rolling dips. The BMPs will collect runoff and implement control of the outflow of runoff. As such, there are no anticipated adverse effects on adjacent or downstream properties as a result of this project.

5. Energy and Communication Systems

a. Existing Conditions

There are no electrical or telephone utilities provided to the trail.

b. Potential Impacts and Mitigation Measures

While the majority of construction-related activities utilize hand or battery-powered operated construction equipment, there may be short-term electrical energy needs while the project is in construction. After construction is completed, all equipment will be removed and energy consumption will be reduced again to non-generation. The proposed actions are not expected to have any long-term adverse effects on the energy and communication systems in the area.

Cumulative and Secondary Impacts

Cumulative effects are defined by Title 11, Chapter 200, Hawai'i Administrative Rules (HAR), Environmental Impact Statement Rules as impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions.

Cumulative impacts can result from individually minor but collectively "significant actions taking place over a period of time".

A "secondary impact" or "indirect effect" from the proposed action is defined by Title 11, Chapter 200, HAR, as "effects which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. "

As mentioned previously, the proposed trail improvements are intended to enhance the existing trail system and add safety and environmental improvement factors. In this regard, the proposed trail improvements are not anticipated to cumulatively have a negative effect on the environment.

In addition, there are no reasonably foreseeable effects associated with the proposed action(s) which would be deemed a secondary impact.

Waihe'e Ridge Trail Improvements – Relationship to Land Use Plans, Policies, and Controls

A. STATE LAND USE DISTRICTS

Pursuant to Chapter 205, Hawai'i Revised Statutes (HRS), all lands in the State have been placed into one (1) of four (4) land use districts by the State Land Use Commission.

These land use districts have been designated "Urban", "Rural", "Agricultural", and "Conservation". The project site is classified

"Agricultural" and "Conservation" with a Land Study Bureau soil classification of "D" and "E", which allows for open land recreational facilities.

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

Chapter 226, HRS, also known as the Hawai'i State Plan, is a long-range comprehensive plan which serves as a guide for the future long-range development of the State by identifying goals, objectives, policies, and priorities, as well as implementation mechanisms. The proposed action is consistent with the following goals of the Hawai'i State Plan:

- A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people.
- Physical, social, and economic well-being, for individuals and families in Hawai'i, that nourishes a sense of community responsibility, of caring, and of participation in community life.

1. Objectives and Policies of the Hawai'i State Plan

The proposed action is consistent with the following objectives and policies of the Hawai'i State Plan:

- Chapter 226-11, HRS, Objectives and Policies for the Physical Environment Land-Based, Shoreline, and Marine Resources.
- 226-11(b)(1), HRS: Exercise an overall conservation ethic in use of Hawai'i's natural resources.
- 226-11(b)(3), HRS: Take into account the physical attributes of areas when planning and designing activities and facilities.
- 226-11(b)(4), HRS: Manage natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage.
- 226-11(b)(8), HRS: Pursue compatible relationships among activities, facilities, and natural resources.
- 226-11(b)(9), HRS: Promote increased accessibility and prudent use of inland and shoreline areas for public recreational, educational, and scientific purposes.

- Chapter 226-12, HRS, Objectives and Policies for the Physical Environment - Scenic, Natural Beauty, and Historic Resources.
 - 226-12(b)(3), HRS: Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.
 - 226-12(b)(5), HRS: Encourage the design of developments and activities that complement the natural beauty of the islands.
 - Chapter 226-23, HRS, Objectives and Policies for Socio-Cultural Advancement - Leisure.
 - 226-23(b)(1), HRS Foster and preserve Hawai'i's multi-cultural heritage through supportive cultural, artistic, recreational, and humanities-oriented programs and activities.
 - 226-23(b)(2), HRS: Promote a wide range of activities and facilities to fulfill the cultural, artistic, and recreational needs of all diverse and special groups effectively and efficiently.
 - 226-23(b)(3), HRS: Enhance the enjoyment of recreational experiences through safety and security measures, educational opportunities, and improved facility design and maintenance.
 - 226-23(b)(4), HRS: Promote the recreational and educational potential of natural resources having scenic, open space, cultural, historical, geological, or biological values while ensuring that their inherent values are preserved.
 - 226-23(b)(5), HRS: Ensure opportunities for everyone to use and enjoy Hawai'i's recreational resources.
 - 226-23(b)(10), HRS: Assure adequate access to significant natural and cultural resources in public ownership.

C. GENERAL PLAN OF THE COUNTY OF MAUI

As indicated by the Maui County Charter, the purpose of the general plan shall be to: ... indicate the desired population and physical development patterns for each island and region within the county; shall address the unique problems and needs of each island and region; shall explain opportunities and the social, economic,

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

Chapter 2.80B of the Maui County Code, relating to the General Plan and Community Plans, implements the foregoing Charter provision through enabling legislation which calls for a Countywide Policy Plan and a Maui Island Plan (MIP). The Countywide Policy Plan was adopted as Ordinance No. 3732 on March 24, 2010, while the Maui Island Plan, which delineates areas for future urban and rural growth as part of a Directed Growth Strategy, was adopted as Ordinance No. 4004 on December 21, 2012.

The following sections identify pertinent objectives, policies, implementing actions and related provisions set forth in the Countywide Policy Plan and the Maui Island Plan. It is recognized that both documents are comprehensive in nature and address a number of functional planning areas which apply to all programs, plans, and projects. However, for purposes of addressing General Plan compliance requirements, policy considerations which are deemed most relevant in terms of compatibility and consistency are addressed in this report section.

1. Countywide Policy Plan

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

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

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

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

1. *Excellence in the stewardship of the natural environment*

- and cultural resources;*
- 2. Compassion for and understanding of others;*
 - 3. Respect for diversity;*
 - 4. Engagement and empowerment of Maui County residents;*
 - 5. Honor for all cultural traditions and histories;*
 - 6. Consideration of the contributions of past generations as well as the needs of future generations;*
 - 7. Commitment to self-sufficiency;*
 - 8. Wisdom and balance in decision making;*
 - 9. Thoughtful, island appropriate innovation; and*
 - 10. Nurturance of the health and well-being of our families and our communities.*

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

- 1. Natural environment*
- 2. Local cultures and traditions*
- 3. Education*
- 4. Social and healthcare services*
- 5. Housing opportunities for residents*
- 6. Local economy*
- 7. Parks and public facilities*
- 8. Transportation options*
- 9. Physical infrastructure*
- 10. Sustainable land use and growth management*
- 11. Good governance*

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

PROTECT THE NATURAL ENVIRONMENT

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

- Objective 1: Improve the opportunity to experience the natural beauty and native biodiversity of the islands for present and future generations.
 - Policy: Preserve and provide ongoing care for important scenic vistas, view planes, landscapes, and open-space resources.

- Objective 2: Improve the quality of environmentally sensitive, locally valued natural resources and native ecology of each island.
 - Policy: Improve the connection between urban environments and the natural landscape, and incorporate natural features of the land into urban design.

- Objective 3: Improve the stewardship of the natural environment.
 - Policies:
 - a. Preserve and protect natural resources with significant scenic, economic, cultural, environmental, or recreational value.
 - b. Improve enforcement activities relating to the natural environment.

IMPROVE PARKS AND PUBLIC FACILITIES

Goal: A full range of island-appropriate public facilities and recreational opportunities will be provided to improve the quality of life for residents and visitors.

- Objective 1: Expand access to recreational opportunities and community facilities to meet the present and future needs of residents of all ages and physical abilities.
 - Policies:
 - a. Protect, enhance, and expand access to public shoreline and mountain resources.
 - b. Promote the development and enhancement of community centers, civic spaces, and gathering places throughout our communities.

- Objective 2: Improve the quality and adequacy of community facilities.
 - Policies:

- c. Ensure that parks and public facilities are safe and adequately equipped for the needs of all ages and physical abilities to the extent reasonable.
- d. Maintain, enhance, expand, and provide new active and passive recreational facilities in ways that preserve the natural beauty of their locations.
- Objective 3: Enhance the funding, management, and planning of public facilities and park lands.
 - Policy: Develop partnerships to ensure proper

2. Maui Island Plan

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

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

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

It is noted that Ordinance No. 4004 does not address the component relating to the implementation program. Chapter 2.80B of the Maui County Code, relating to the General Plan, was amended via Ordinance No. 3979 on October 5, 2012, to provide that the implementation program component be adopted no later than one (1) year following the effective date of Ordinance No. 4004. In December 2013 and March 2014, the Maui County Council approved the extensions for approval and adoption of

the implementation chapter. At its meeting of May 27, 2014, the Council approved the MIP's implementation component.

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

These planning categories address the following areas:

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

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

The proposed actions are located on Agricultural and Conservation lands and are not within a growth boundary area. In addition, the proposed trail improvements, and have been reviewed with respect to pertinent goals, objectives, policies and implementing actions of the MIP. A summary of these policy statements are provided below:

Heritage Resources-Scenic Resources

Goal: 2.5 Maui will continue to be a beautiful island steeped in coastal, mountain, open space, and historically significant views that are preserved to enrich the residents' quality of life, attract visitors, provide a connection to the past, and promote a sense of place.

Objective:

2.5.1 a: greater level of protection for scenic resources.

Policy:

2.S.1.b: Identify, preserve, and provide ongoing management of important scenic vistas and open space resources, including mauka-to-makai and makai-to-mauka view planes.

Infrastructure and Public Facilities-Parks

Goal: 6.6 Maui will have a diverse range of active and passive recreational parks, wilderness areas, and other natural-resource areas linked, where feasible, by a network of greenways, bikeways, pathways, and roads that are accessible to all.

Objective:

6.6.1 more effective, long-range planning of parks and recreation programs able to meet community needs.

Infrastructure and Public Facilities-Water

Goal: 6.3 Maui will have an environmentally sustainable, reliable, safe, and efficient water system.

Objective:

6.3.2 Increase the efficiency and capacity of the water systems in striving to meet the needs and balance the island's water needs.

Policies:

6.3.2.a Ensure the efficiency of all water system elements including well and stream intakes, water catchment, transmission lines, reservoirs, and all other system infrastructure.

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

D. WAILUKU-KAHULUI COMMUNITY PLAN

The project site is located within the Wailuku-Kahului Community Plan region, one (1) of nine (9) community plan regions established in the County of Maui. Planning for each region is guided by the respective community plan, which is designed to implement the Maui County General Plan. Each community plan contains recommendations and standards which guide the sequencing, patterns and characteristics of future development in the region.

The Wailuku-Kahului Community Plan was adopted by the County of Maui and took effect in 2002. Land use guidelines are set forth by the Wailuku-Kahului Community Plan Land Use Map. The project area is designated within the Agriculture and Conservation land use categories by the Wailuku-Kahului Community Plan Map.

The Agriculture category is defined as including uses indicative of areas for agricultural activity which would be in keeping with the economic base of the County and the requirements and procedures of Chapter 205, HRS, as amended. The proposed actions are consistent with the following goals, objectives, and policies of the Wailuku-Kahului Community Plan.

ENVIRONMENT

Goal: A clean and attractive physical and natural environment in which manmade developments or alterations to the natural environment relate to sound environmental and ecological practices, and important scenic and open space resources are maintained for public use and enjoyment.

Objective and Policy: Preserve agricultural lands as a major element of the open space setting which borders the various communities within the planning region. The close relationship between open space and developed areas is an important characteristic of community form.

CULTURAL RESOURCES

Goal: Identification, protection, preservation, enhancement, and where appropriate, use of cultural practices and sites, historic sites and structures, and cultural landscapes and view planes that:

1. Provide a sense of history and define a sense of place for the Wailuku-Kahului region.

Objectives and Policies:

1. Recognize the importance of historically and archaeologically sensitive sites and encourage their preservation through development project review.
2. Require development projects to identify all cultural resources located within the project area as part of initial project studies. Further, require that all proposed activity include recommendations to mitigate potential adverse impacts on cultural resources.

E. COUNTY ZONING

1. County Special Use Permit Requirement

The project site is designated "Agricultural" and "Conservation" according to Maui County zoning. The purpose of this category is to provide areas for agricultural activity and conservation venues which would be in keeping with the economic base of the County and the requirements and procedures of Chapter 205, Hawai'i Revised Statutes, as amended. In a phone conversation with the County of Maui, Department of Planning on 8/3/2016, they responded to a question from the consultant regarding allowable uses within Agricultural and Conservation lands. The Department of Planning cited Chapter 205- 2.d.12 as regulating conservation and agricultural land with an soil classification of C, D, E, and/or U and allowing for open area recreational facilities.

Because the project site has a soil classification of both D and E, open area recreational facilities are deemed an allowable use. Similarly, the Maui County Code (MCC) Section 19.30A.050.B.II also allows for open land recreation.

"Open Land Recreation" is defined in Section 19.04.040, MCC, as:

" . . . public or private recreational use or enjoyment, including, but not limited to, parks, picnic grounds, beaches, beach accesses, greenways and **areas for hiking**, fishing, hunting, camping, equestrian activities, and other scenic interests, on a parcel or area of land or water which may be

improved but which contains no buildings and which is set, aside, designated, or reserved for such purposes”.

The Department of Planning opined that the Waihe'e Ridge Trail improvements are a permitted use under the Chapter 205, HRS, and a non-conforming use under the Maui County Code, Chapter 19.30A. As such, no County Special Use Permit will be required for the trail improvements since no buildings are proposed.

The underlying land use designations for Parcel are as follows:

- State Land Use Classification: Agricultural/Conservation
- Wailuku-Kahului Community Plan: Agricultural/Conservation
- County Zoning: Agricultural/Conservation

The trail is considered a permitted use under Chapter 205, HRS, as well as MCC 19.30A as open area recreation and the improvements are considered an ancillary use.

F. COASTAL ZONE MANAGEMENT OBJECTIVES AND POLICIES

Pursuant to Chapter 205-A, Hawai'i Revised Statutes, projects should be evaluated with respect to Coastal Zone Management (CZM) objectives, policies and guidelines. The project site is approximately one (1) mile away from the coastline and will not involve work within the County of Maui's Special Management Area (SMA). However, coastal zone management considerations have been reviewed and assessed.

1. Recreational Resources

Objective: Provide coastal recreational opportunities accessible to the public.

- a. Improve coordination and funding of coastal recreational planning and management; and
- b. Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:

- i. Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;
- ii. Requiring replacement of coastal resources having significant recreational value, including

but not limited to surfing sites, fishponds, and sand beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the state for recreation when replacement is not feasible or desirable;

- iii. Providing and managing adequate public access consistent with conservation of natural resources, to and along shorelines with recreational value;
- iv. Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;
- v. Ensuring public recreational use of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;
- vi. Adopting water quality standards and regulating point and non-point sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;
- vii. Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and
- viii. Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, county planning commissions; and crediting such dedication against the requirements of Section 46-6, HRS

Response: The project site is located inland, approximately one (1) mile from the coastline. Based on the limited scope of the project, there are no anticipated impacts on coastal recreational opportunities or existing public access to the

shoreline.

2. Historic Resources

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

Policies:

- a. Identify and analyze significant archeological resources;
- b. Maximize information retention through preservation of remains and artifacts or salvage operations,' and
- c. Support state goals for protection, restoration, interpretation, and display of historic resources.

Response: A Cultural Impact Assessment (CIA) and an Archaeological Review have been completed for the project. The Cultural Impact Assessment reported that the project area has not been used for traditional cultural purposes within recent times. Similarly, the Archaeological Review concluded that no surface cultural remains or historic surface features were identified. As such, the proposed project is not anticipated to have an adverse effect on any cultural or customary traditions, or on any significant historic properties.

3. Scenic and Open Space Resources

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

Policies:

- a. Identify valued scenic resources in the coastal zone management area,'
- b. Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline,'
- c. Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources,' and

- d. Encourage those developments which are not coastal dependent to locate in inland areas.

Response: The project site itself is afforded scenic ocean, mountain, and open-space views. The Waihe'e Ridge Trail is surrounded by heavy vegetation which limits its visibility from Kahekili Highway. The Waihe'e Ridge Trail also offers the hikers panoramic views of the Central Maui region and West Maui Mountains. The trail improvement elements of the project will not have an adverse effect on scenic and open space resources.

4. Coastal Ecosystems

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

Policies:

- a. Improve the technical basis for natural resource management;
- b. Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;
- c. Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and
- d. Promote water quantity and quality planning and management practices which reflect the tolerance of fresh water and marine ecosystems and prohibit land and water uses which violate state water quality standards.

Response: The proposed project involves minimal grading to accommodate the trail improvements. Best Management Practices (BMPs) will be implemented during construction to mitigate potential erosion-related impacts.

5. Economic Uses

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

Policies:

- a. Concentrate coastal dependent development in appropriate areas;
- b. Ensure that coastal dependent development such as harbors and ports, and coastal related development such as visitor facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area,' and
- c. Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:
 - i. Use of presently designated locations is not feasible,
 - ii. Adverse environmental effects are minimized, and
 - iii. The development is important to the State's economy.

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

6. Coastal Hazards

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

Policies:

- a. Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards,
- b. Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint pollution hazards,
- c. Ensure that developments comply with requirements of the Federal Flood Insurance Program,

- d. Prevent coastal flooding from inland projects, and
- e. Develop a coastal point and nonpoint source pollution control program.

Response: The project site falls within Zone X, an area of minimal flooding, as indicated by the Flood Insurance Rate Map for the County of Maui. BMPs will be implemented during construction to mitigate potential erosion and stormwater impacts.

7. Managing Development

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

- a. Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development,
- b. Facilitate timely processing of applications for development permits and resolve overlapping of conflicting permit requirements, and
- c. Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life-cycle and in terms understandable to the public to facilitate public participation in the planning and review process.

Response: The Chapter 343, HRS EA involves review by governmental agencies and provides for public comment opportunity on the project. Applicable State and County requirements will be adhered to in the design and construction of the project.

8. Public Participation

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

Policies:

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

- b. Disseminate information on coastal management issues by means of' educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal-related issues, developments, and government activities; and
- c. Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.

Response: The project will meet County public awareness, education and participation objectives. Opportunities for agency and public review will be provided as part of the notification, review and comment process required for the EA.

9. Beach Protection

Objective: Protect beaches for public use and recreation.

Policies:

- a. Locate new structures inland from the shoreline setback to conserve open space and to minimize loss of improvements due to erosion;
- b. Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities; and
- c. Minimize the construction of public erosion-protection structures seaward of the shoreline.

Response: The Waihe'e Ridge Trail is located inland, approximately one (1) mile from the shoreline. As a result, there are no anticipated adverse impacts on beach resources.

10. Marine Resources

Objective: Implement the State's ocean resources management plan.

Policies:

- a. Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;
- b. Assure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;
- c. Coordinate the management of marine and coastal resources and activities management to improve effectiveness and efficiency;
- d. Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;
- e. Promote research, study, and understanding of ocean processes, marine life, and other ocean resources in order to acquire and inventory information necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and
- f. Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

Response: As previously stated, the project site is located inland and away from the ocean. Adverse impacts on marine and coastal resources are not anticipated from the proposed trail improvements.

IV. UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS AND IRREVERSIBLE AND IRRETRIVEABLE COMMITMENT OF RESOURCES

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

The proposed actions commit a defined area of land for improvements which is already in use for similar activities. Other resources which will be committed in the implementation of the proposed actions include material and fuel resources. The projects will result in short-term beneficial impacts related to temporary construction employment and spending.

V. ALTERNATIVES TO THE PROPOSED ACTION

Alternatives to the preferred alternative, which is the proposed action, include the "no action" alternative.

A. NO ACTION ALTERNATIVE

As one of the most popular hiking trails on Maui, the Waihe'e Ridge Trail is heavily hiked and utilized. As such, the trail is exhibiting signs of its usage, including but not limited to surface damage, drainage failures, over-vegetation and other factor which pose impact to hiking safety and the environment.

A no action alternative would deny the Division of Forestry and Wildlife the opportunity to Improve the trail for hikers and other users. Similarly, continued use of the trail in its current state represents potential future safety hazards for users of the trail and an economic and liability burden for the County and State.

VI. SIGNIFICANCE CRITERIA ASSESSMENT

The proposed actions involve improvements to the Waihe'e Ridge Trail on the State-owned parcel in Kahakuloa, Maui, Hawai'i. Since the proposed actions will involve the use of County and State funds with improvements and observation platform construction undertaken on State lands, compliance with Chapter 343, Hawai'i Revised Statutes (HRS), and Chapter 200 (Title 11), Hawai'i Administrative Rules, Environmental Impact Statement Rules is necessary. Every aspect of the proposed action, expected primary and secondary consequences, and the cumulative as well as the short-term and long-term effects of the action have been evaluated in accordance with the Significance Criteria of Section 11-200-12 of the Administrative Rules. Discussion of project conformance to the Significance Criteria follows:

1. Involves all irrevocable commitment to loss or destruction of any natural or

cultural resource.

The remote, densely vegetated nature and general topography of the trail results in an area conducive to recreational activities. There are no adverse effects to natural resources anticipated as a result of the project.

Similarly, the mountainous nature of the region provides for a unique and scenic trail experience for hikers who travel from outside the Kahakuloa region to utilize the trail.

As discussed previously in Chapter II, a Cultural Impact Assessment and Archaeological Review has been completed for the proposed project and may be found in the appendixes.

The Cultural Impact Assessment reported that the project area has not been used for traditional cultural purposes within recent times. Similarly, the Archaeological Review concluded that no surface cultural remains or historic surface features were identified. As such, the proposed project is not anticipated to have an adverse effect on any cultural or customary traditions, or on any significant historic properties.

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

The proposed actions involve lands designated as "Agricultural" and "Conservation" at the State and County levels. As the site contains soils with relatively low productivity ratings, the lands have not been used for agricultural production apart from cattle grazing on a portion of the State-owned parcel (Parcel).

The proposed improvements are limited in scope and are intended to enhance the existing trail facilities. Based on the foregoing facts, the proposed project will not curtail the beneficial use of the site.

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

The proposed improvements do not conflict with the State's Environmental Policy

and Guidelines as set forth in Chapter 344, Hawai'i Revised Statutes (HRS).

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

The proposed improvements will directly benefit the local economy by providing construction and construction-related employment. Therefore, the proposed actions will have a positive short-term effect on the economy. The proposed actions will result in improved trail components for the hikers and other users, as well as improved trail amenities to all who utilize it. These improvements contribute, in a positive way, to the social welfare of the island. Long-term adverse impacts to social welfare and cultural practices are not anticipated.

5. Substantially affects public health.

During the construction period, appropriate best management practices will be implemented to mitigate potential air quality and noise impacts. Following construction, there will be no long-term public health impacts resulting from the proposed actions.

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

The proposed actions are not anticipated to result in significant adverse secondary impacts. No significant population changes are anticipated as a result of the proposed project. There are no anticipated adverse effects on public services, such as police, fire, medical, educational, or solid waste collection, as service limits and service capacities will not be affected.

7. Involves a substantial degradation of environmental quality.

Construction activities will create temporary short-term nuisances related to noise and dust. Appropriate dust control and noise mitigation measures will be implemented by the contractor to ensure that fugitive dust and noise generated in connection with construction is minimized.

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

8. Is individually limited but cumulatively has considerable effect upon the

environment or involves a commitment for larger actions.

The proposed trail improvements and upgrades are standalone projects to improve the existing trail facilities. As such, the project is not anticipated to cumulatively have a considerable effect upon the environment or involve a commitment for larger actions.

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

As discussed previously in Chapter II, a flora/fauna study has been completed. And may be found in the appendixes.

Based on the results of this study, the project is not expected to have an adverse effect on rare, threatened, or endangered species of flora, fauna, avifauna, or their habitats.

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

Construction activities will result in short-term air quality and noise impacts. Best Management Practices (BMPs) for dust control will be implemented to minimize construction-related air quality impacts. Short-term noise impacts will occur primarily from construction material delivery equipment. Noise attenuating equipment, as well as proper equipment and vehicle maintenance and other BMPs are anticipated to mitigate adverse noise conditions from construction of trail improvement activities. Erosion control measures will mitigate silt and stormwater runoff flowing into downstream properties.

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

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

The project area is not located within any environmentally sensitive areas and, as such, there are no anticipated hazard-related effects as a result of the proposed actions.

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

The project site's location, nestled against the windward slopes of the West Maui Mountains, provides picturesque views of the Pacific Ocean and Kahakuloa region with the mountains as a backdrop to the camp. Kahekili Highway is noted by the County as possessing a high significant scenic-resource value. It provides ocean, mountain, agricultural, and island-wide views. The proposed actions will not obstruct views from the trail or from Kahekili Highway. The dense vegetation surrounding the area provides visual screening from Kahekili Highway. As such, the proposed project will not adversely affect scenic view corridors.

13. Requires substantial energy consumption.

The majority of construction-related activities utilize hand operated construction equipment, but there may be short-term electrical energy needs while the projects are in construction for specialized equipment for the platform building. After construction is complete, all equipment will be removed and there will be no energy consumption while the trail is being utilized. As such, this project component is not expected to require substantial energy consumption.

Based on the aforementioned findings, the proposed project will result in a **Finding of No Significant Impact (FONSI)** determination.

VII. LIST OF PERMITS AND APPROVALS

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

State of Hawai'i

1. Chapter 343, HRS compliance
2. National Pollutant Discharge Elimination System (NPDES) Permit, as applicable
3. Community Noise Permit, as applicable

County of Maui

1. Construction Permits (i.e., grading permit, building permit)

VIII. DISTRIBUTION LIST OF PARTIES TO BE CONSULTED FOR THE DRAFT ENVIRONMENTAL ASSESSMENT;

The following agencies constitute the distribution list for the Draft Environmental Assessment (EA) in order to solicit comments and responses. Agency comments and responses to substantive comments will be included in the Final EA.

Office of Conservation and Coastal Lands
Kalanimoku Building
1151 Punchbowl St., Room 131
Honolulu, HI 96813

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

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

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

U. S. Fish and Wildlife Service
300 Ala Moana Blvd., Rrn. 3-122
Box 50088
Honolulu, Hawai'i 96813

Draft Environment Assessment - Waihe'e Ridge Trail Improvement

WHALE Environmental Services LLC – August 2016

Comptroller
Department of Accounting and General Services
1151 Punchbowl Street, #426
Honolulu, Hawai'i 96813

Department of Agriculture
1428 South King Street
Honolulu, Hawai'i 96814-2512

State of Hawai'i
Department of Education
P.O. Box 2360
Honolulu, Hawai'i 96804

Office of Business Services
Department of Education
c/o Kalani High School,
4680 Kalaniana'ole Highway, #T-BIA
Honolulu, Hawai'i 96821

Clean Water Branch
State of Hawai'i
Department of Health
919 Ala Moana Blvd., Room 300
Honolulu, Hawai'i 96814

Health Program Chief
State of Hawai'i
Department of Health
54 High Street
Wailuku, Hawai'i 96793

Environmental Planning Office State of Hawai'i
Department of Health Office of Planning
919 Ala Moana Blvd., Suite 312 P. O. Box 2359
Honolulu, Hawai'i 96814

Draft Environment Assessment - Waihe'e Ridge Trail Improvement

WHALE Environmental Services LLC – August 2016

Department of Land and Natural Resources Wailuku, Hawai'i 96793
P. O. Box 621
Honolulu, Hawai'i 96809

Fire Department
County of Maui
Administrator Department of Fire and Public Safety
200 Dairy Road
Kahului, Hawai'i 96732

State Historic Preservation Division
601 Kamokila Blvd., Room 555
Kapolei, Hawai'i 96707

County of Maui
Department of Housing and Human Concerns
One Main Plaza
2200 Main Street, Suite 546
Wailuku, HI. 96793

Department of Parks and Recreation
700 Halia Nakoa Street, Unit 2
Wailuku, Hawai'i 96793

County of Maui
Department of Planning
250 South High Street
Wailuku, Hawai'i 96793

Office of Environmental Quality Control
235 S. Beretania Street, Suite 702
Honolulu, Hawai'i 96813

County of Maui
Police Department
55 Mahalani Street
Wailuku, Hawai'i 96793

Draft Environment Assessment - Waihe'e Ridge Trail Improvement

WHALE Environmental Services LLC – August 2016

Office of Hawaiian Affairs
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawai'i 96813

County of Maui
Department of Public Works
200 South High Street
Wailuku, Hawai'i 96793

County of Maui
Department of Environmental Management
2050 Main Street, suite 2B
Wailuku, Hawai'i 96793

County of Maui
Department of Transportation
200 South High Street
Wailuku, Hawai'i 96793

County of Maui
Department of Water Supply
200 South High Street
Wailuku, Hawai'i 96793

Maui Electric Company, Ltd.
P.O. Box 398
Kahului, Hawai'i 96733

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

x. REFERENCES

County of Maui, 2030 General Plan, Countywide Policy Plan, March 2010.

County of Maui Charter (2003 Edition).

County of Maui, Maui Island Plan, December 2012.

County of Maui, Office of Economic Development, Maui County Data Book 2011.

County of Maui, Wailuku-Kahului Community Plan, December 1987.

Federal Emergency Management Agency, Flood Insurance Rate Map, Community Panel No. 150003 0377E, September 2009.

Hawaii Cooperative Park Unit, Western Region Natural Resources and Research Division, National Park Service, Hawaii Stream Assessment, A Preliminary Appraisal of Hawaii's Stream Resources, prepared for Commission on Water Management, State of Hawaii, December 1990.

Scorecard, Criteria Air Pollutant Report: Maui County, HI, Available at <http://www.scorecard.org/env-releases/cap/county.tel?fips County Code=15009#air rankings>. Accessed 14 December 2012.

SMS, Socio-Economic Forecast: The Economic Projections for Maui County General Plan 2030, Maui County Planning Department, June 2006.

State of Hawaii, Department of Agriculture, Agricultural Lands of Importance to the State of Hawaii, January 1977.

State of Hawaii, Department of Labor and Industrial Relations (DLIR), <http://www.hjiwi.org>, March 2015.

State of Hawaii, Land Use Commission, Title 15, Chapter 15, Hawaii Administrative Rules, 1997, as amended 2000.

State of Hawaii, Office of State Planning, The Hawaii State Plan, 1991.

University of Hawaii (UH), Land Study Bureau, Detailed Land Classification Island of Maui, May 1967.

University of Hawaii at Hilo, Department of Geography, Atlas of Hawaii, Third Edition, 1998.

U.S. Census Bureau, Census 2010 Redistricting Data, Detailed Tables, Table H-I, Maui County and Maui County Block Groups. Retrieved from <http://factfinder2.census.gov/main.html>.

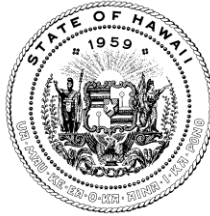
U.S. Department of Agriculture (USDA), Soil Conservation Service, Soil Survey of Islands of Kauai, Oahu, Maui, Moloka'i and Lanai, State of Hawaii, August 1972.

APPENDIX ONE

DESCRIPTION OF THE FLORA AND FAUNA

BIOLOGICAL IMPACT

DAVID Y. IGE
GOVERNOR OF HAWAII



SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KEKOA KALUHIWA
FIRST DEPUTY

JEFFREY T. PEARSON
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING
601 KAMOKILA BLVD, STE 555
KAPOLEI, HAWAII 96707

May 16, 2016

MEMORANDUM

TO: Scott Fretz, Maui District Manager
State of Hawaii, DLNR Division of Forestry and Wildlife
Via email to: Scott.Fretz@hawaii.gov

Log No: 2016.01113
Doc No: 1605MD01
Archaeology

A handwritten signature in cursive script, appearing to read "Morgan E. Davis".

FROM: Morgan E. Davis, Lead Archaeologist Maui Section
Historic Preservation Division

SUBJECT: **Chapter 6E-8 Historic Preservation Review**
Early Consultation for the Waihe'e Ridge Trail Maintenance Project
Kahakuloa Ahupua'a, Wailuku District, Island of Maui
TMK (2) 3-1-006:001 (por.)

Thank you for the opportunity to comment on the aforementioned project, which we received on May 9, 2016. The Division of Forestry and Wildlife (DOFAW) is proposing alterations to an existing trail managed by the Na Ala Hele trails (NAH) program.

This parcel has not been subject to a comprehensive archaeological inventory survey. Historic properties are known in the surrounding area. On April 15, 2016 I conducted a limited trail survey accompanied by members of DOFAW and NAH. The existing trail is clear and heavily used; recent storms have created a safety hazard and resulted in a number of visitor rescues. The conditions were muddy but the trail was open and survey lines were present. We were accompanied by a member of the ground crew who confirmed the locations of potential trail alternate routes, which were walked during a four hour period.

No historic properties were identified within the existing or proposed trail re-route paths. Therefore, we determine that there will be **no historic properties affected** by the proposed trail maintenance project. Please contact me at (808) 243-4641 or Morgan.E.Davis@hawaii.gov if you have any questions or concerns regarding this memorandum.

**DESCRIPTION OF THE FLORA AND
FAUNA – Biological impact of the
Waihe'e Ridge trail corridor
improvements**

Date: April 15, 2016

DEFINITION OF SURVEYED IMPACT AREA:

This review defined the "Impact area" for the trail improvements as being either the existing Waihe'e Ridge Trail corridor, and in addition the proposed trail reroutes with expected impact of 10' width. Observations of fauna included taxa heard, seen or physically on the impact area. Flora impacts were defined as affected plants in the reroute areas, and or so close to the existing trail improvements, that they could be expected to be physically impacted by improvement work activities. Ten Hawaiian native tree or shrub species were highlighted as species to be especially avoided by the during the improvement work.

FAUNA:

In the morning observation period (0930a.m. - 1230p.m.) 15 bird species, 4 arthropod species, and two molluscs were observed in the proposed impact area. All species observed were non-native taxa, except three species – 2 species of birds, and one butterfly species (bolded in the list).

Only one bird, the overwintering Pacific golden plover (*Pluvialis fulva*) or *kolea* was physically on the impact area (the existing trail). All other bird species were seen, or heard, in the near environs.

It is very unlikely that any fauna would be affected, except perhaps temporarily displaced during any work action. No rare native or endangered species of any taxon were observed in the proposed work site.

SCIENTIFIC NAME	COMMON NAME	STATUS
BIRDS		
ARDEIDAE (Egrets)		
<i>Bubulcus ibis</i>	cattle egret	non-native
PHASIANIDAE (Pheasants, peacocks)		
<i>Francolinus francolinus</i>	black francolin	non-native
<i>Pavo cristatus</i>	common peafowl	non-native
CHARADRIIDAE (Plovers)		
<i>Pluvialis fulva</i>	kolea (Pacific golden plover)	native

COLUMBIDAE (Doves, Pigeons)

<i>Streptotelia chinensis</i>	spotted dove	non-native
<i>Geopelia striata</i>	barred dove	non-native

MUSCICAPIDAE (Old-world Insect eaters)

<i>Cettia diphone</i>	Japanese bush-warbler	non-native
<i>Leiothrix lutea</i>	Red-billed leiothrix	non-native

STURNIDAE (Mynas, starlings)

<i>Acridotheres tristis</i>	Common myna	non-native
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ZOSTEROPIDAE (White-eyes)

<i>Zosterops japonicus</i>	Japanese white-eye	non-native
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THRAUPIDAE (Tanagers)

<i>Paroaria cristata</i>	red-crested cardinal	non-native
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FRINGILLIDAE (Finches and Hawaiian Honeycreepers)

<i>Carpodacus mexicanus</i>	house finch	non-native
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<i>Himatione sanguinea</i>	'apapane	native
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<i>Cardinalis cardinalis</i>	Northern cardinal	non-native
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ESTRILDIDAE (Old-world Finches)

<i>Lonchura atricapilla</i>	chestnut mannikin	non-native
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<i>Lonchura punctulata</i>	nutmeg mannikin	non-native
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MOLLUSCS

<i>Deroceras spp.</i>	slug (?name)	non-native
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<i>Veronicella cubensis</i>	Cuban slug	non-native
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<i>Veronicella leydigii</i>	black slug	non-native
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ARTHROPODS

LEPIDOPTERA (Butterflies, moths)

<i>Pieris rapae</i>	cabbage butterfly	non-native
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<i>Vanessa cardui</i> OR <i>V. virginicus</i>	painted lady	non-native
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<i>Agraulis vanillaeus</i>	Gulf fritillary	non-native
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<i>Vanessa tameamea</i>	pulelehua (Kamehameha Butterfly)	native
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FLORA

The vegetation of the affected project area consists primarily of non-native weedy grasses, herbaceous plants, and to a lesser extent various shrubs and trees. The vegetation along the existing Waihe'e Ridge Trail, beginning with the elevation approximately at "the second bench" and higher, included more of the native Hawaiian species detected on the survey. No lasting impacts to the native vegetation of the improvement area is expected, or necessary.

A total of 101 plant species were recorded during the survey as either inside or immediately bordering the area of impact. Non-native plant species comprised 88% of the total; 12% were

native species. Of the 12% native species: Six species, five ferns and only one tree, are endemic to the Hawaii ; and six species, all ferns, are indigenous native plants. It is likely that some minimal, non- life-threatening, amount of stem or leaf/frond damage may occur to some of the endemic or indigenous native species during the work. In order to reduce any lasting impact to native flora ten native species ‘of note’ along the alignment were identified, and for which they could be worked around, or completely avoided, during the trail improvement work. These particular native species ‘of note’ comprise the tree ferns, and diverse scattered native tree and shrub species – the contractor will be provided with photographs (from the trail) identifying these plant species so they may be avoided.

PLANTS ON THE WAIHEE RIDGE TRAIL IMPROVEMENTS ALIGNMENT, MAUI

KEY:

* alien

+ endemic

indigenous

SCIENTIFIC NAME	COMMON NAME
<u>Pteridophytes:</u>	
BLECHNACEAE	
* <i>Blechnum appendiculatum</i> _Willd.	Palm Fern
+ <i>Sadleria cyatheoides</i> Kaulf.	‘Ama’u
CYATHEACEAE	
+ <i>Cibotium glaucum</i> (Sm.) Hook. & Arn.	Hapu’u pulu
+ <i>Cibotium menziesii</i> Hook.	Hapu’u ‘i’i
DENNSTAEDTIACEAE	
+ <i>Pteridium aquilinum</i> (L.) Kuhn var. <i>decompositum</i> (Gaudich.) R. M. Tryon	Kilau
GLEICHENIACEAE	
# <i>Dicranopteris linearis</i> (Burm. f.) Underw. f. <i>linearis</i>	Uluhe

+*Diplopterygium pinnatum* (Kunze) Nakai Uluhe lau nui

LINDSAEACEAE

#*Sphenomeris chinensis* (L.) Maxon Pala'a

LOMARIOPSIDACEAE

**Nephrolepis brownii* (Desv.) Hovencamp & Miyamoto Asian sword fern

#*Nephrolepis cordifolia* (L.) C. Presl Kupukupu

#*Nephrolepis exaltata* (L.) Schott sbsp. *hawaiiensis* W.H. Wagner Ni'ani'au

LYCOPODIACEAE

#*Palhinhaea cernua* (L.) Carv. Vasc. & Franco Wawae'iole

#*Phlegmariurus phyllanthus* (Hook. & Arn.) R.D. Dixit

POLYPODIACEAE

**Phymatosorus grossus* (Langsd. & Fisch.) Brownsey Laua'e

PSILOTACEAE

#*Psilotum nudum* (L.) P. Beauv. Moa

THELYPTERIDACEAE

**Christella parasitica* (L.) H. Lev.

Gymnosperms:

AURACARIACEAE

**Araucaria columnaris* (Forst.) Hook. Cook pine

Dicots:

ANACARDIACEAE

**Schinus terebinthifolius* Raddi

APIACEAE

**Centella asiatica* (L.) Urb. Asian pennywort

ASCLEPIDACEAE

**Asclepias physocarpa* (E. Mey.) Schlecht. Balloon plant

ASTERACEAE

**Ageratina adenophora* (Spreng.) R. King & H. Robinson Maui pamakani

**Ageratina riparia* (Regel) R. King & H. Robinson Hamakua pamakani

**Ageratum conyzoides* L.

**Bidens pilosa* L. Spanish needle

**Conyza bonariensis* (L.) Cronq. Hairy horseweed

**Crassocephalum crepidioides* (Benth.) S. Moore - - - - -

**Cyanthilium cinereum* (L.) H. Rob. Little ironweed

**Elephantopus mollis* Kunth

**Emilia fosbergii* Nicolson

**Hypochoeris radicata* L. Gosmore

**Lapsana communis* L. Nipplewort

**Sigesbeckia orientalis* L. St. Paul's wort

**Sonchus oleraceus* L. Pualele

**Senecio madagascariensis* Poir. Madagascar fireweed

**Synedrella nodiflora* (L.) Gaertn.

**Verbesina encelioides* (Cav.) Benth. & Hook.

**Youngia japonica* (L.) DC Oriental hawkweed

CONVOLVULACEAE

#*Ipomoea indica* (J. Burm.) Merr. Koali 'awa

EUPHORBIACEAE

**Aleurites moluccana* (L.) Willd. Kukui

FABACEAE

**Chamaecrista nictitans* (L.) Moench Partridge pea

**Desmodium incanum* DC Spanish clover

**Desmodium triflorum* (L.) DC Tick clover

**Indigofera suffruticosa* Mill. Upright indigo

**Macroptilium lathyroides* (L.) Urb. Cowpea

**Mimosa pudica* L. Hilahila

**Neonotonia wightii* (Wight & Arnott) Lackey Glycine

**Senna alata* (L.) Roxb. Candlebush

LAURACEAE

**Persea americana* Mill Avocado

LYTHRACEAE

**Cuphea carthagenesis* (Jacq.) Macbr. Tarweed

MALVACEAE

**Triumfetta semitriloba* Jacq. Sacramento bur

MELASTOMATACEAE

**Clidemia hirta* (L.) D. Don

Koster's curse

**Tibouchina herbacea* (D.C.) Cogn.

Cane tibouchina

MELIACEAE

**Toona ciliata* M. Roem.

Australian red cedar

MORACEAE

**Ficus microcarpa* L. fil.

Chinese banyan

MYRTACEAE

**Eucalyptus botryoides* Sm.

Bangalay

**Eucalyptus robusta* Sm.

Swamp mahogany

**Eucalyptus saligna* Sm.

Sydney bluegum

**Melaleuca quinquenervia* (Cav.) S. T. Blake

Paperbark

+*Metrosideros polymorpha* Gaudichaud

'Ohi'a

**Psidium cattleianum* Sabine

Strawberry guava

**Psidium guajava* L.

Common guava

**Syzygium cumini* (L.) Skiels

Java plum

OXALIDACEAE

**Oxalis corniculata* L.

Yellow wood sorrel

PASSIFLORACEAE

**Passiflora edulis* Sims

Passionfruit

PHYLLANTHACEAE

**Phyllanthus debilis* Klein ex Willd.. Niuri

PLANTAGINACEAE

**Plantago lanceolata* L. Narrow-leaf plantain

**Plantago major* L. Common plantain

POLYGALACEAE

**Polygala paniculata* L. Rootbeer plant

ROSACEAE

**Rubus rosifolius* Sm. Thimbleberry

RUBIACEAE

**Spermacoce assurgens* Ruiz & Pav. Buttonweed

SOLANACEAE

#*Solanum americanum* Mill.. Popolo

VERBENACEAE

**Verbena littoralis* Kunth Vervain

Monocots

AGAVACEAE

**Cordyline fruticosa* (L.) A. Chev. Ti leaf

CYPERACEAE

**Cyperus rotundus* L. Nut sedge

ORCHIDACEAE

**Phaius tankarvilliae* (Banks ex L'Her.) Blume Monk's hood orchid

**Spathoglottis plicata* Blume Phillipine ground orchis

POACEAE

**Andropogon virginicus* L. Broomsedge

**Axonopus compressus* (Sw.) P. Beauv. Broad-leaf carpetgrass

**Axonopus fissifolius* (Raddi) Kuhlm. Narrow-leaf carpetgrass

**Cenchrus purpureus* (Schumach.) Morone Napier grass

**Chloris barbata* (L.) Sw. Swollen fingergrass

**Cynodon dactylon* (L.) Pers. Bermuda grass

**Digitaria ciliaris* (Retz.) Koeler Henry's crabgrass

**Digitaria violescens* Link Violet crabgrass

**Eleusine indica* (L.) Gaertn. Wiregrass

**Eragrostis pectinacea* (Michx.) Nees Carolina lovegrass

**Eremochloa ophiuroides* (Munro) Hackel Centipede grass

**Megathyrsus maximus* (Jacq.) Simon & Jacobs Guinea grass

**Melinis minutiflora* P. Beauv. Molasses grass

**Melinis repens* (Willd.) Zizka Natal redtop

**Paspalum conjugatum* Bergius Hilo grass

**Paspalum dilataum* Poir Dallis grass

**Paspalum paniculatum* L. Arocillo

**Paspalum scrobiculatum* L. Ricegrass

* <i>Paspalum urvillei</i> Steud.	Vasey grass
* <i>Sacciolepis indica</i> (L.) Chase	Glenwood grass
* <i>Setaria parviflora</i> (Poir.) Kerguelen	Yellow foxtail
* <i>Sporobolus africanus</i> (Poir.) Robyns & Tournay	Smutgrass
* <i>Urochloa mutica</i> (Forssk.) T.Q. Nguyen	California grass

ZINGIBERACEAE

* <i>Hedychium flavescens</i> Roscoe	Yellow ginger
* <i>Zingiber zerumbet</i> (L.) Roscoe ex Sm.	Shampoo ginger

APPENDIX TWO

DESCRIPTION OF CULTURAL IMPACT INTERVIEWS

DAVID Y. IGE
GOVERNOR OF HAWAII



SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KEKOA KALUHIWA
FIRST DEPUTY

JEFFREY T. PEARSON
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING
601 KAMOKILA BLVD, STE 555
KAPOLEI, HAWAII 96707

May 16, 2016

MEMORANDUM

TO: Scott Fretz, Maui District Manager
State of Hawaii, DLNR Division of Forestry and Wildlife
Via email to: Scott.Fretz@hawaii.gov

Log No: 2016.01113
Doc No: 1605MD01
Archaeology

A handwritten signature in cursive script, appearing to read "Morgan E. Davis".

FROM: Morgan E. Davis, Lead Archaeologist Maui Section
Historic Preservation Division

SUBJECT: **Chapter 6E-8 Historic Preservation Review
Early Consultation for the Waihe'e Ridge Trail Maintenance Project
Kahakuloa Ahupua'a, Wailuku District, Island of Maui
TMK (2) 3-1-006:001 (por.)**

Thank you for the opportunity to comment on the aforementioned project, which we received on May 9, 2016. The Division of Forestry and Wildlife (DOFAW) is proposing alterations to an existing trail managed by the Na Ala Hele trails (NAH) program.

This parcel has not been subject to a comprehensive archaeological inventory survey. Historic properties are known in the surrounding area. On April 15, 2016 I conducted a limited trail survey accompanied by members of DOFAW and NAH. The existing trail is clear and heavily used; recent storms have created a safety hazard and resulted in a number of visitor rescues. The conditions were muddy but the trail was open and survey lines were present. We were accompanied by a member of the ground crew who confirmed the locations of potential trail alternate routes, which were walked during a four hour period.

No historic properties were identified within the existing or proposed trail re-route paths. Therefore, we determine that there will be **no historic properties affected** by the proposed trail maintenance project. Please contact me at (808) 243-4641 or Morgan.E.Davis@hawaii.gov if you have any questions or concerns regarding this memorandum.



TCP Hawai‘i, LLC

**Documenting Traditional Cultural Properties of Hawai‘i
Preserving and Restoring Cultural and Natural Resources of Hawai‘i**

August 22, 2016

To: Mark Howland (via email)
WHALE Environmental Services, LLC
P.O. Box 455
Kahuku, HI 96731

**Re: Summary of Two Interviews Conducted in Support of a Cultural Impact Assessment for an
HRS Chapter 343 EA for Proposed Improvements to the Waihe‘e Ridge Trail**

Aloha Mark,

In response to your request sent to me via email on August 13, 2016, and taking into consideration additional information you subsequently sent via email, I conducted two (2) phone interviews in partial fulfillment of a Cultural Impact Assessment (CIA) supporting this project’s Environmental Assessment (EA) process.

On 8/17/16, I interviewed Mr. David “Buddy” Nobriga. On 8/22/16, I interviewed Mr. Ed Tamanaha. The pages that follow describe the results of these interviews, including short biographical sketches of the two interviewees.

In general, neither of the two interviewees identified any cultural resources that would be adversely impacted by the proposed project. Both men support the trail improvement and agree the project will result in safer trail experience for its users.

Please contact me if you have any questions about this document.

With aloha,

Christopher M. Monahan, Ph.D.
Principal, TCP Hawai‘i, LLC
333 Aoloa St., #303
Kailua, HI 96734
(808) 754-0304
mookahan@gmail.com

INTERVIEW WITH MR. DAVID (“BUDDY”) NOBRIGA – 17 AUGUST 2016

Chris Monahan interviewed Buddy Nobriga by phone at around 11:00am on 8/17/16.

BIOGRAPHIC SKETCH

A life-long resident of Maui, whose grandfather, Antone Nobriga, came to the island from Portugal (in 1886) when Hawai‘i was still a kingdom (ruled by King David Kalākaua), Mr. David (“Buddy”) Nobriga was born in Waihe‘e in 1926. Buddy Nobriga is in the Paniolo Hall of Fame (inducted in the class of 2001). Buddy’s grandfather (Antone Nobriga) originally came to the islands to work for the Wailuku Sugar Company, later leasing 700 acres in Kahakuloa and founded Nobriga’s Ranch. Buddy Nobriga learned how to be a cowboy from his grandfather, father and uncles. In addition to serving as the CEO of Nobriga’s Ranch, Buddy Nobriga also served his country as an Army sergeant; and, later, became the Chairman of the Board of Maui Soda Works. He served on the West Maui Soil & Water Conservation District for 50 years, and has received many awards in the business and public service community on Maui. He officially retired from Maui Soda Works several years ago.

METHODS

After introducing myself, and explaining my connection to the project, including the State’s need to complete a Cultural Impact Assessment in order to satisfy the requirements of an Environmental Assessment, I asked Mr. Nobriga if he would like to receive project information via email (e.g., project area maps, engineering drawings and/or narrative details). He declined, and I asked if it was okay to simply have a discussion by phone. He agreed to this approach.

MR. NOBRIGA’S CONCERNS AND COMMENTS

In general, Mr. Nobriga had no specific concerns about adverse impacts to any cultural resources in the proposed (Waihe‘e Ridge Trail Improvements) project area. In fact, he supports the trail improvements because they will increase the health and safety of its users.

He did have concerns about an area near the trailhead, downslope of the trail improvements, where he leases land to graze his cattle and parks some of his vehicles. He supports the recent addition of a new gate at the bottom of the trail area, but says he still occasionally finds trespassers inside this gated area.

Mr. Nobriga supports the trail improvement project, and does not know of any historic properties, archaeological sites or other cultural resources in or adjacent to the project area.

INTERVIEW WITH MR. ED TAMANAHA – 22 AUGUST 2016

Chris Monahan interviewed Ed Tamanaha by phone at around 8:45am on 8/22/16.

BIOGRAPHIC SKETCH

Ed Tamanaha currently serves as Camp Maluhia (Boy Scout Camp) Ranger in Waihe'e uka. He is in charge of outdoor programs and activities for campers accessing the mauka portion of Waihe'e Valley, up to Camp Maluhia. His family is from Maui Island.

METHODS

After introducing myself, and explaining my connection to the project, including the State's need to complete a Cultural Impact Assessment in order to satisfy the requirements of an Environmental Assessment, I asked Mr. Tamanaha if he would like to receive project information via email (e.g., project area maps, engineering drawings and/or narrative details). He declined, and I asked if it was okay to simply have a discussion by phone. He agreed to this approach. I asked him specifically if he had any concerns about cultural resources along the trail that might be adversely impacted by the project.

MR. TAMANAHA'S CONCERNS AND COMMENTS

In general, Mr. Tamanaha had no specific concerns about adverse impacts to any cultural resources in the proposed (Waihe'e Ridge Trail Improvements) project area. In fact, he enthusiastically supports the trail improvements because they will increase the health and safety of its users; the campers he works with use the trail all the time when they are up in the valley.

He did mention that he occasionally finds trespassers down in the lower portion of the trail, near its trailhead.

Mr. Tamanaha supports the trail improvement project, and does not know of any historic properties, archaeological sites or other cultural resources in or adjacent to the project area.

APPENDIX THREE

DESCRIPTION OF BEST MANAGEMENT PRACTICES (BMP)

AND

SITE SPECIFIC POLLUTION PREVENTION PROCEDURES (SSPPP)

Waihe'e Ridge Trail

Improvements and Maintenance

Best Management Practices (BMP)
and
**Site Specific Pollution
Prevention Procedures (SSPPP)**



prepared by:



WHALE Environmental Services LLC

P.O. Box 455, KAHUKU, HI 96731 808-294-8254

...with the assistance of: Trails Unlimited

BEST MANAGEMENT PRACTICES (BMP), and

SITE SPECIFIC POLLUTION PREVENTION PROCEDURES (SSPPP)

This document is prepared for the Waihe'e Ridge Trail Improvements in support of a Final Environmental Assessment (EA) prepared by WHALE Environmental Services LLC for the Department of Natural Resources, Division of Forestry and Wildlife (DOFAW). This document was created with the assistance of Ms. Torrie Nohara, Na Ala Hele, Trails and Access Specialist for DOFAW, and the design consultant for the Waihe'e Ridge Trail Improvements - Cam Lockwood of Trails Unlimited.

There are two main types of practices that lend to environmental protection during construction projects. The first is programmatic objectives which outline program guidance and installation objectives and are referred to as *Best Management Practices (BMP)*. The second type is predetermined site-specific objectives for site conditions and capabilities and is known as Site Specific Pollution Prevention Procedures (SWPPP).

Introduction

The following Environmental BMP Plan is designed to provide the various BMPs (Best Management Practices) as related to the Waihe'e Ridge Trail Improvements on Maui, HI. This document is intended to serve as the BMP Plan, the Pollution Prevention Plan, and the Erosion and Stormwater Control Plan for submission under NHDES permit needs, EPA, ACOE, USFW, and NRCS project reviews. The following submission is intended to serve as a general BMP plan for the overall project, showing all the possible BMPs that may be selected during the construction process. Site specific BMP plans have been developed for construction showing BMPs selected. BMPs selected for the construction period as shown as section 2 (SSPPP) site specific BMPs in this document.

Success is defined by:

- how effective best management practices (BMPs) are at controlling physical aspects of the land environment (e.g., erosion, vegetative cover) and
- how effective the project is at restoring and maintaining trail areas that are capable of meeting recreational requirements.

A BMP, as discussed in this document, is a category of one or more techniques that could be used to accomplish the restoration or improvement at a site. For example, the "Clearing and Thinning" BMP is described as a way to accomplish clearing

and/or thinning of vegetation. Several different techniques can be used to implement the 'Clearing and Thinning' BMP, which include, but is not limited to: mowing, hand grubbing, dozer grubbing, burning, herbicide application, etc. Each of these techniques document implementation steps and site design to determine if it is best suited to implement the "Clearing and Thinning" BMP at a potential project site.

Section One – General BMP(s).

General BMP(s) include *Good Housekeeping Practices*. To distinguish between General BMP(s) which include Good Housekeeping Practices from Site Specific Pollution Prevention Procedures, simply think that General BMP(s) address potential actions, and Site Specific measures cover predicted implementation.

For General BMP(s), it is necessary to think about potential pollutants. For any project, they may be:

Potential Sources of Pollution

Potential sources of sediment to stormwater runoff are:

- Clearing, grading, excavating, and un-stabilized areas
- Paving operations
- Demolition and debris disposal
- De-watering operations
- Drilling and blasting
- Material delivery and storage
- Landscaping Operations

Potential pollutants and sources, other than sediment, to stormwater runoff are:

Pollutants:

- Nutrients
- Heavy metals
- pH level in soil (acidic or base)
- pesticides or herbicides
- oils and greases

Final Environment Assessment - Waihe'e Ridge Trail Improvement

WHALE Environmental Services LLC – September 2016

- bacteria and viruses
- trash, debris, and solid wastes
- other toxic chemicals

Potential Sources are:

- Clearing, grading, excavating, and un-stabilized areas
- Paving operations
- Concrete wash-out and waste
- Structure construction (i.e.) culverts, headwalls, curbing
- Demolition and debris disposal
- De-watering operations
- Drilling and blasting
- Material delivery and storage
- Material use during construction
- Solid waste
- Hazardous waste
- Contaminated spills
- Sanitary/septic waste
- Vehicle use/fueling/storage
- Landscaping operations

In general, the following are concepts that BMP(s) must embrace:

- Minimize Disturbed Area and Protect Natural Features and Soil
- Control Stormwater Flowing onto and through the Project
- Stabilize Soils
- Protect Slopes
- Protect Storm Drain Inlets
- Establish Perimeter Controls and Sediment Barriers
- Retain Sediment On-Site
- Establish Stabilized Construction Exits
- Additional BMPs (if needed)

GOOD HOUSEKEEPING BMPS

The good housekeeping and pollution prevention BMP(s) that will be implemented to control pollutants in stormwater. There are seven categories:

- 3.1 *Material Handling and Waste Management***
- 3.2 *Establish Proper Building Material Staging Areas***
- 3.3 *Designate Washout Areas***
- 3.4 *Establish Proper Equipment/Vehicle Fueling and Maintenance Practices***
- 3.5 *Allowable Non-Stormwater Discharges and Control Equipment/Vehicle Washing***
- 3.6 *Spill Prevention and Control Plan***
- 3.7 *Any Additional BMPs***

SECTION 2 – Site Specific Pollution Prevention Procedures for the Waihe'e Ridge Trail Improvements.

There are 5 (five) site specific planned BMP(s) that related to this project and will be utilized to prevent pollution. They are:

Clearing and Thinning

1. Definition

Any activity that removes or thins the vegetative surface cover to support trail use. Clearing natural or man-made material to open land recreational activities.

2. Applicability

Specific site conditions will determine equipment or herbicide use.

- Heavy equipment includes, but is not limited to, dozers, tractors and crawlers equipped with a variety of blades, including multi-purpose blades, pushing blades, cutting blades and stacking blades; windrowing/blade scarification; free-mounted VBlades, V-Rakes; treecutters; grubber or rootcutters.
- Light equipment includes, but is not limited to, brush cutters, and root plows
- Herbicides will involve specific application directions and requirements.

Advantages/Benefits

Cleared woody vegetation may be chipped on site and used as mulch. Clearing woody vegetation enhances access and improves line-of-sight. Properly disposing of debris from clearing may support the site's fire management plan.

Disadvantages/Limitations

Most mechanical methods are ineffective on wet soils, steep slopes, and rocky soils. Bulldozing, rootplowing and disking excessively disturbs soil surfaces and may result in erosion. Using heavy equipment may result in soil compaction or the scalping of the organic and richer top soil layers. Heavy equipment may cause damage to roots. Herbicide use may kill desirable plant species. There are specific herbicides that should be used in areas susceptible to surface water contamination. Unremoved stumps pose hazards to hikers and trail users.

3. Planning/Design Limitations

Effectiveness

Planning should be based upon desired result for the cleared or thinned area: site access, line-of sight use for viewplanes, trail access, native species growth, and habitat restoration.

Clearing and thinning is best applied on relatively level terrain to prevent erosion. Some sites and vegetation may require multiple clearing or thinning iterations. Using large equipment is an effective technique for soils that contain rocks that are less than 40 cm in diameter.

Herbicides are an alternative to disturbing the soil surface with a plow. Proper selection and timing of application should kill the undesirable plants and not harm the young plants the following planting season.

Other factors to consider when preparing for site activities include:

- Seasonal and weather variations and conditions,
- Contractor management,
- Local union restrictions,
- Building code requirements,
- Availability of adequate energy, skilled labor, and building materials,
- Safety requirements,
- Traffic control,
- Environmental considerations, and
- Regulatory requirements and restrictions

4. Construction Considerations

Determine site area for disturbance in order to accommodate heavy equipment. Pay special attention to sensitive areas, such as steep slopes, highly erodible soils, and surface water during construction activities. Re-stabilize disturbed areas immediately after or in conjunction with clearing activities. Customize the proper technique for the targeted species to be removed.

5. Monitoring and Maintenance Considerations

An active long-term monitoring and maintenance plan should be established for the site to complement routine maintenance measures that may be compromised due to intensive land use activities at the site. The long-term plan should be comprised of four components, which are the four following types of monitoring:

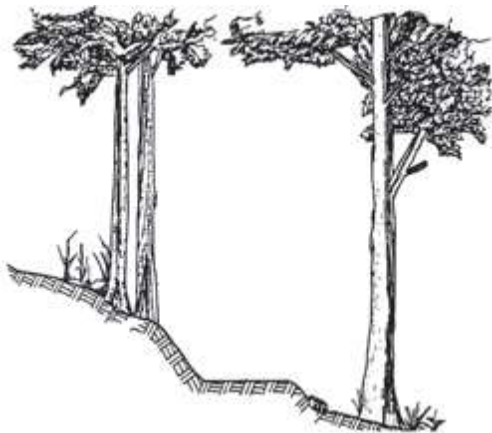
- **Routine:** Standard and seasonal monitoring at set intervals to ensure the BMP is stable and working properly. This may be done weekly, monthly, or quarterly depending on the area size, the objective, and the BMP. Monitoring may include visual inventory to document progress or lack thereof. Monitor clearing and thinning techniques as necessary, to ensure re-growth of the targeted species does not occur. Native vegetation should re-establish without invasive species. Monitor during the regional growing season. Conduct visual/windshield inspections to assess if re-growth of the targeted species has occurred. Reapply applicable clearing and thinning measures as needed.
- **Event driven:** Inspect BMP after significant training or weather events (e.g., heavy rain, flooding events). Monitoring may include sampling, measuring, or visual inventory of the restoration site. Maintain areas by removing hazardous snags or stumps.
- **Random:** Periodic inspections normally done out of convenience if the staff is in the area of concern for another purpose. Any failures found in BMP(s) should be noted and communicated to the trail manager immediately for resolution. Inspect cleared or thinned areas for invasive species that thrive in disturbed habitats.
- **Quantitative:** Scientific monitoring of BMP(s) to determine success relative to performance goals. Normally performed by the DOFAW staff. Quantitative monitoring requires proper communication to maximize efficiencies. For BMPs establishing vegetation, there should be routine monitoring, and use applicable quantitative monitoring to supplement project site data.

6. Applications for Trail Operations

- *Safety:* Clearing and thinning should not leave behind hazardous roots and tree stumps.
- *Interactions with BMP operation:* Vehicle or foot traffic in cleared areas can lead to re-emergence of stumps cleared previously below hazard levels. Traffic from hikers can compact soils around stumps lowering the ground-level relative to the stump height.
- *Season and duration considerations that interact with scheduling trail use:* Vegetative clearing and thinning takes place in the areas desired specifically for recreational activities. In some cases clearing and thinning may be delayed to accommodate seasonal trail use during high tourism or seasonal use.
- *Environmental encroachment concerns:* Ensure that clearing activities are cleared with environmental authorities to ensure no adverse impacts on endangered, threatened, or species of interest which inhabit the site have impacts from vegetative clearing and thinning.

Examples defining clearing and thinning activities are seen as follows:

The trail corridor includes the trail tread and the area above and to the sides of the tread. Trail standards typically define the edges of the trail corridor as the clearing limits (figure 21). Vegetation is trimmed back and obstacles, such as boulders and fallen trees, are removed from the trail corridor to make it possible to ride or walk on the tread.



The dimensions of the corridor are determined by the needs of the target users and the challenge of the trail. For example, in the Northern Rockies, trail corridors for traditional pack stock are cleared 2.5 meters (8 feet) wide and 3 meters (10 feet) high. Hiking trails are cleared 2 meters (6 feet) wide and 2.5 meters (8 feet) high. Check with your local trail manager to determine the appropriate dimensions for each of your trails.

Clearing and Brushing

Working to wipe out your trail is no less than that power in the sky– the sun. The sun and photosynthesis convert dirt and water into a new plant. No sooner is a trail corridor cleared of plants than new ones rush toward this avenue of sunlight.

Plants growing into trail corridors or trees falling across them are a significant threat to trail integrity. Brush is a major culprit. Other encroaching plants such as thistles or dense ferns may make travel unpleasant or even hide the trail completely. If people have trouble traveling the trail tread, they move over, usually along the lower edge, or make their own trail. This result is a changing trail path with increase environmental impact, which explains why clearing and thinning is vital and needs to be done correctly and maintained.

In level terrain, the corridor is cleared an equal distance on either side of the tread centerline. For a hiking trail, this means that the corridor is cleared for a distance of 1 meter (3 feet) either side of center. Within 300 millimeters (1 foot) of the edge of the tread, plant material and debris should be cleared all the way to the ground. Farther than 500 millimeters (1.5 feet) from the trail edge, plants do not have to be cleared unless they are taller than 500 millimeters (1.5 feet) or so. Fallen logs usually are removed to the clearing limit.

On moderate to steep side slopes, a different strategy may be useful. Travel along the lower (outer) edge of the tread is a common cause of tread failure. You can use trailside material to help hold traffic to the center of the tread. A downed log cut nearly flush with the downhill edge of the trail will encourage travelers to move up to avoid it. Rocks, limbed trees and the like can all be left near the lower edge of the tread to guide traffic back to the center so long as the guide material does not prevent water from draining off the trail.

Remember that the scorched earth look created by a vegetation-cleared corridor with straight “slash and hack” edges is not very pleasing to the eye. Work with natural vegetation patterns to feather or meander the edges of the clearing work do not leave straight lines. Cutting intruding brush back at the base of the plant rather than in midair gives a better clearing limit boundary. Cut all plant stems close to the ground. Scatter the resulting debris as far as practical. Toss stems and branches so the cut ends lie away from the trail. A carefully trimmed corridor can give a trail a special look, one that encourages users to return.

Removing Trees

Usually, trees growing within the corridor should be removed. Seedlings will eventually grow into trail hindering adolescent trees. They are a lot easier to pull up by the roots when they are small than they are to lop when they grow up.

Prune limbs close to the tree trunk. For a clean cut, make a shallow undercut first, then follow with the top cut. This prevents the limb from peeling bark off the tree as it falls.

Cut fallen trees out as wide as your normal clearing limits on the uphill side, but closer to the trail on the downhill side. Roll the log pieces off the trail and outside the clearing limits on the downhill side. Never leave them across ditches or waterbar outflows. If you leave logs on the uphill side of the trail, turn or bury them so they will not roll or slide onto the trail.

It is hard to decide whether or not to remove leaners, trees that have not fallen but are leaning across the trail. If a leaner is within the trail clearing zone, it should be removed. Beyond that, it is a matter of discretion whether a leaner needs to be cut. You need to consider the amount of use on the trail, how long it will be before the trail is maintained again, the soundness of the tree, and the potential hazard the leaner is creating.

Grade Stabilization Structures

1. Definition

A structure used to stabilize the grade or to control head cutting in natural or artificial channels. Commonly utilized grade stabilizations structures include toe walls and drop spillways. A toe wall is a mechanical system that functions like a weir and contains a non-enclosed water over fall. A drop spillway is a mechanical system, which lowers water through a box or pipe structure. This system internally dissipates most of the energy produced by the water. Concrete catch basins, plastic drop pipes, and steel slopes culverts are all examples of drop spillways.

2. Applicability

Advantages/Benefits

Grade stabilization structures benefit sites where:

- The capability of earth and/or vegetative BMP measures cannot adequately handle the velocity of water flow through an area;
- Excessive grades or overfall conditions are encountered; or
- Water is to be lowered structurally from one elevation to another.

Grade stabilization structures are used to control the velocity of runoff in a natural or artificial channel by lowering the water from one level to another. Essentially, grade stabilization structures establish a series of shorter and lower reaches within a steeper and erosive reach, thus establishing a permanent base elevation below which an eroding channel cannot lower the channel floor. Drop spillways and toe walls control the channel grade not only at the spillway crest, but also through the ponded reach upstream.

Disadvantages/Limitations

Grade stabilization structures should only be installed in a straight section of channel with a minimum of 100 feet of straight channel upstream and downstream of the structure. Additionally, grade stabilization structures should only be used where the grade below the structure is stable or can be stabilized.

Toe wall structures are limited to area where the vertical drop is less than 4 feet, flows are intermittent, downstream grades are stable, and tail water depth and design is equal to or greater than one-third the height of the overfall. Similarly, drop spillways should not be utilized in areas where the vertical drop is greater than 10 feet.

3. Planning/Design Limitations

Effectiveness: A wide of range of alternative types of structures are available for this practice, and an intensive site investigation is required to plan and design an appropriate grade stabilization structure for a specific site.

This BMP is effective in natural or artificial channels where the concentration and flow velocity of water require structures to stabilize the grade or to prevent the advancement of gullies and headcuts. A grade stabilization structure may be used where a permanent, low maintenance, easily constructed, and very stable structure is required.

Drop spillways are specified for drops of less than 10 feet. Toe walls are specific for drop of less than 4 feet. They are used where a permanent low maintenance, easily constructed, and very stable structure is required. The type of spillway or toe wall is only applicable where the grade below the structure is stable or can be stabilized

- For grade stabilization in the lower reaches of channels and outlets.
 - Erosion control for protection of fields, roads, ditches, and other areas subject to gully erosion.
- Grade control for stabilizing ditches or gullies.
- Outlets for culverts or surface runoff at the upper end along drainage ditches.
- Control of tail water at the outlet of a spillway or culvert.
- Protect the outlet end of grassed waterways and chutes.

4. Construction Considerations

Grade stabilization structures must be designed for stability after installation. Thus, the crest of the inlet should be constructed at an elevation that stabilizes upstream headcutting. Only work on disturbed, cleared, or graded areas necessary for construction and flag areas that should not be disturbed.

Excavated material should be stored or disposed of outside of the floodplain. Account for seasonal and mission constraints that construction activities must coincide with.

Additionally, construction should not occur during fish spawning or migration periods. Construction vehicles and equipment should not be driven, operated, fueled, cleaned, maintained, or stored in the wet or dry portions of channel where wetland vegetation, riparian vegetation, or aquatic organisms may be destroyed. The exterior of vehicles and equipment that will encroach on the channel should be maintained free of grease, oil, fuel, and residues.

1. Long Term Monitoring and Maintenance Considerations

An active long-term monitoring and maintenance plan should be established for the site to complement routine maintenance measures that may be compromised due to intensive land use activities at site. (Please see previous section).

Specific designed BMPs for the Waihe'e Ridge Trail Improvements are as follows:

Sediment Basin

Definition and Purpose

A sediment basin is a shallow depression installed at the outlet of a trail rolling dip to capture sediment eroded from the trail. During trail maintenance the captured sediment is recycled back into the rolling dip structure or into the trail tread. Use of sediment basins is a sediment control practice that also reduces connectivity and sediment delivery to watercourses.

Application

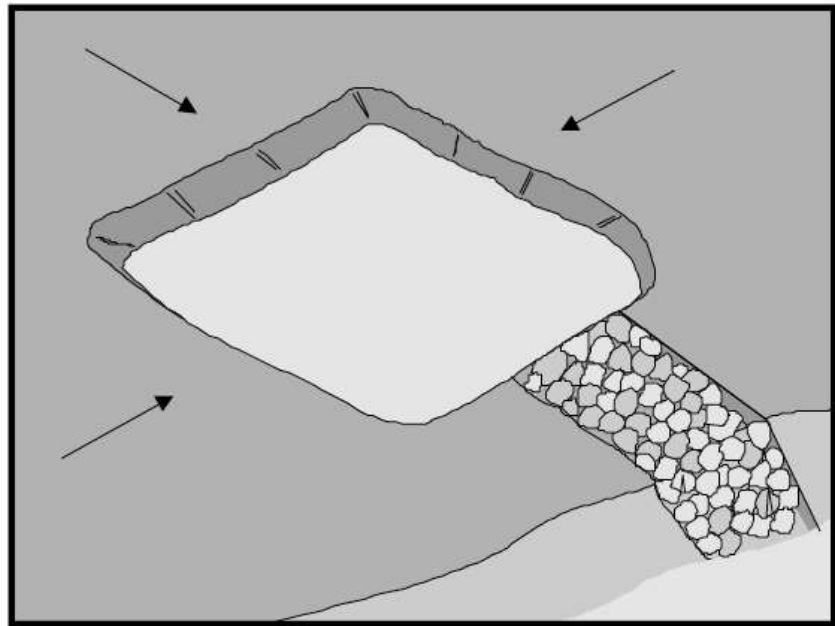
Sediment basins can be installed at rolling dip outlets where the trail prism is wide enough, or where slope gradients below the trail are not too steep. At critical sites, or as necessary, sediment basins may be supplemented by one or more practices such as a

spillway, an energy dissipater at the base of the spillway, a hay bale or straw wattle sediment trap, or enhanced infiltration using humic acids.

Implementation

Planning and Design

On new construction, and during reconstruction, locate water breaks to allow the construction and maintenance of sediment basins. Size the basins for 1.2 times the anticipated amount of sediment they will normally collect between maintenance cycles and for xx% of the flow expected from a xx-year



xx-hour storm. A qualified watershed specialist should be consulted when sizing sediment basins. (*design criteria for sizing basins inputs percentage of flow {xx may be equal to 50% of flow}, and xx year represents storm event {i.e. – 5, 10, 25, 50, or 100 year storm event}, and xx-hour represents inches per hour {i.e. – 1, 2, 3 inches per hour}.*)

Inspection and Maintenance

Inspect for sediment capture capacity. Capacity should be adequate to handle the sediment that is expected before the next scheduled maintenance. If the basin needs to be emptied before the next scheduled maintenance, and conditions are too dry for cycling the sediment back into the trail, store the sediment in a location that will keep it moist or allow remoistening before recycling into the trail. Inspect the basin overflow outlet and energy dissipater for function and wear, especially piping and incipient erosion. Inspect any sediment traps (straw wattles) located below the energy dissipater and repair as needed. On the slope below the sediment trap or energy dissipater, examine litter the soil surface under the duff and litter for evidence of un-trapped

sediment and trace it as far as it goes. Maintain overflow outlet, energy dissipater, and sediment traps as needed.

Notes

On wider trails where the side slope below the trail is too steep for a sediment basin, narrowing the trail by pulling in the berms and fill material can sometimes create space for a small sediment basin.

Trail Rolling Dip

Definition and Purpose

A trail rolling dip is a water control structure designed to control erosion by diverting runoff from the trail. Trail rolling dips consist of a shallow dip or undulation, out-sloped and installed diagonally across the trail, and a broad convex hump, high enough to assure all runoff is diverted from the trail. Rolling dips are installed at frequent intervals to prevent runoff from accumulating to a volume that causes excessive tread erosion. Where possible, trail rolling dips should include a sediment basin to allow recycling soil back into the drainage structure and trail tread.

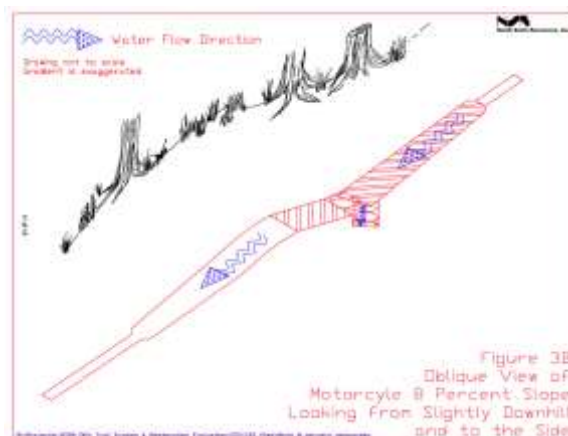
Application

Trail rolling dips are used to disperse runoff from existing trails, especially trails that were originally roads, and to disperse runoff from steeper trails with long continuous grades. Trails properly designed and constructed as OHV recreational trails usually are drained by frequent breaks in grade, and generally have less need for trail rolling dips than trails that originated as roads or that were poorly located and designed.

Implementation

Planning and Design

Location is key to proper function of these water breaks. Locate where all the other associated structures (sediment basin, overflow outlet, sediment trap, etc.) can be installed, and where runoff diverted from the



trail will not reach a watercourse. Do not locate on outside turns because normal traffic will develop a berm that blocks free drainage of the outlet.

Key elements of trail rolling dip design are making it broad and long, with convex shoulders and top, and a well out-sloped drain bottom, and high enough to have a reverse grade to divert all runoff from the trail. A good location is more important than following a rigid spacing rule, but generally rolling dips should be 50 to 100 feet apart. If this spacing is not close enough, the trail probably has other issues that need to be looked into.

Installation

Trail rolling dips need to be constructed and maintained when soil moisture is sufficient to allow good compaction.

Inspection and Maintenance

Inspect to assure the outlet is open so water does not pond at the bottom of the dip outlet. Inspect for wear at the top of the diversion structure and on the shoulder coming up and out of the low point or drain bottom. If this shoulder is too short or too concave, it will create a wear point. On a well-designed rolling dip regular maintenance with a rock rake will keep the outlet open.

This is a way to force water off existing trails with the rolling grade dip. A rolling grade dip is used on steeper sections of trail. It also works well to drain water off the lower edge of contour trails. A rolling grade dip is a long ramp about 4 meters (15 feet) built on the downhill side of a trail descending at a greater than 5-percent grade. A rolling grade dip includes:

- A short climb of 3 to 5 meters (10 to 20 feet) at 3 percent close and barrier
- A return to the descent (figure 16).

Water running down the trail cannot climb over the short rise and will run off the out-sloped tread at the bottom of the outflow. There is nothing to rot or be dislodged. Maintenance is simple.

Minor Tread Relocation

Definition and Purpose

This erosion control practice is relocation of trail tread within an existing road/trail prism or a defined trail corridor, to avoid trail sections that have excessive erosion, or problems related to drainage or sediment delivery.

Application

Short segments of trail with chronic problems such as excessive grade, wetness, or connectivity that need minor tread relocation. In many cases minor tread relocation of short trail segments can be more cost-effective than a complete reroute.

Implementation

Planning and Design

Identify the real source of the problem and evaluate the site to verify that the replacement segment will actually correct the problem, not merely move it elsewhere. Locate and design water control structures that will effectively control and disperse runoff on both the replacement trail segment and the decommissioned trail segment. If the relocation is outside the existing trail/road prism, verify that the replacement segment is within the allowable corridor.

Installation

Construct the replacement route and install the necessary water control structures. Restore the abandoned segment to provide water control and effective ground cover. Install traffic barriers and signing as necessary to exclude traffic from the restored segment.

Inspection and Maintenance

Inspect for proper water control on both the replacement and restored segments. Inspect for reestablishment of ground cover on the restored segment. Maintain any barriers or signs used to keep traffic off of the restored segment. Provide normal

maintenance for the TSs used in the reroute (for example rolling dip, sediment basin, etc.).

Reroutes are short sections of newly constructed trail. These incorporate design features of a rolling contour trail that encourages water to sheet across the trail.

- Locating the new section of trail on a sideslope
- Keeping the trail grade less than half of the grade of the hillside
- Building with a full bench cut to create a solid, durable tread
- Constructing plenty of grade reversals
- Outsloping the tread
- Compacting the entire trail tread

Make sure the new section that connects to the old trail has nice smooth transitions—no abrupt turns.

Drain Dips/Nicks (Aprons and Takeoff Channels)

1. Definition:

Turnouts and aprons are transitions from flow diversions or channels that convey concentrated, high-velocity flows to discharges into undisturbed areas with low-velocity non-erosive flows. Turnouts and aprons are designed to convert concentrated flow into sheet flow - NOT to filter or retain sediments. Turnouts may be a ditch, trench, or other conveyance used to divert stormwater runoff away from a road surface or adjacent ditch into undisturbed areas of vegetation. Turnouts may be used in conjunction with aprons or with level spreaders. Aprons consist of permanent layers of loose angular stones or aggregate material with a filter fabric or granular underlining placed over an erodible soil surface. In higher flow events, turnouts may require diversion to a catch basin.

Drain dips or nicks are water control structures utilized where trails are incised and need drainage feature to control erosion, and are designed to control erosion by diverting water from the trail so runoff does not accumulate to a volume that causes excessive tread erosion. Drain dips are inexpensive to construct and maintain and should be used as frequently as possible.

2. Applicability

Advantages/Benefits

Both turnouts and aprons convert the concentrated flow in diversions and channels to non-erosive sheet flow. They reduce the energy of flowing water, thus reducing its erosive scouring and sediment load-carrying capacity.

Turnouts prevent channel bottom incision or prevent gully development by diverting the flow of erosive volumes of runoff in the channel to stable, well vegetated, and/or undisturbed areas before the initiation of down-cutting occurs. Aprons provide low cost and easily constructed energy dissipation. They serve as a transitional structure to reduce the erosive energy of concentrated runoff at discharge outlets allowing the safe conveyance of low energy water to vegetated slopes or waterways.

Disadvantages/Limitations

Outlets at the top of cuts or on slopes steeper than 10 percent cannot typically be protected by aprons due to re-concentration of flows and high velocities encountered after the flow leaves the apron. Drain dips are typically installed on gentle trail gradients where the potential for sediment production and runoff volume is low. Drain Dips are typically installed with a grade reversal, and may be supplemented with an energy dissipater or a sediment trap.

Implementation

Planning and Design

When locating new trails, identify sites where drain dips may be used. Drain dips are not capable of handling large amounts of runoff, so they need to be located where the length of drained trail is not too long and the volume of runoff is low.

Installation

Shape the “cone” portion of the knick and construct a 10 to 15 percent out-slope. Make sure the transition to the outlet can handle the runoff without creating a gully, or armor the outlet.

Inspection and Maintenance

Inspect to see the outlet is open and the out-slope is maintained. The most common cause of failure is a blocked outlet. The slight outside berm that develops with traffic is enough to block flow from the outlet and to cause ponding. Traffic when the outlet is wet

causes rutting, which accelerates failure. Frequent trail maintenance with a rock rake can help keep drain dips open and functional.

Energy Dissipater

Definition and Purpose

An energy dissipater is a structure designed to control erosion by dispersing, absorbing, or deflecting the energy of concentrated running water at the outlet of a drainage structure or water conveyance structure. Energy dissipaters generally work by reducing the velocity of flow or by spreading out the flow to reduce its energy.



Application

Energy dissipaters are typically used at the outlets of spillways, overside drains, culverts, French drains, diversion ditches, or other conduits or pipes that concentrate runoff. At a smaller scale, they may also be used at the outlets of trail rolling dips, enhanced reverse grades, and Drain Dips/Knicks/Takeoff Channels .

Implementation

Planning and Design

When water is concentrated into a conveyance such as an over-side drain, culvert, etc. it accumulates energy, especially if there is a steep drop involved.

Installation

Use rock large enough so that it will not be dislodged by the concentrated runoff.

Inspection and Maintenance

Inspect the area for evidence of rills or gullies below the dissipater. If necessary, increase the size of the rock area or use larger rocks.