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GOVERNOR OF HAWAII

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OFC. OF ENVIR. QUALITY CONTROL

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
OFFICE OF CONSERVATION AND COASTAL LANDS
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

REF: OCCL: AJR

Schofield Generating Station Project

OCT 28 2015

Jessica Wooley, Director
Office of Environmental Quality Control
Department of Health, State of Hawai'i
235 Beretania St., Rm. 702
Honolulu, HI 96813

SUBJECT: **FINAL ENVIRONMENTAL IMPACT STATEMENT (FEIS)** for the Schofield Generating Station Project located in the Wahiawā District, Island of Oahu, *TMKs: (1) 7-7-001:001-002; 7-3-001:001, 002, 006-009, 011-013, 019, 022, 024; 7-6-001:001, 006; 9-4-012:001, 003, 011*

Dear Ms. Wooley,

Please be informed that on **October 23, 2015**, the Board of Land and Natural Resources (BLNR) approved the acceptance of the Final Environmental Impact Statement (FEIS) for the proposed Schofield Generating Station Project (SGSP). With this letter the Department of Land and Natural Resources (DLNR) herby transmits the SGSP FEIS for publication in the **November 8, 2015** issue of the OEQC bulletin the *Environmental Notice*. The notice of the Draft Environmental Impact Statement (DEIS) for this proposed project was published in the OEQC **May 8, 2015** issue of the *Environmental Notice*.

Any substantive comments received by the applicant during the DEIS comment period were responded to in writing; copies of those correspondences are incorporated into the submitted FEIS. We understand that publication of the FEIS in the *Environmental Notice* will initiate a 45-day public consultation period (**November 8, 2015** to **December 23, 2015**) to provide an avenue for all interested parties to comment on the proposed action.

In accordance with NEPA, an announcement of the FEIS will also be published in the Federal Register. Publication of this notice will initiate a 30-day waiting period, after which the U.S. Army will issue its *Record of Decision*.

Enclosed is a completed *OEQC publication form*, two (2) copies of the *FEIS*, and PDF File of the same, and an electronic copy of the *publication form* in MS Word format. Simultaneous with this letter, we have submitted the summary of the proposed land use in a text file by electronic mail to your office.

If you have any questions please contact Alex J. Roy, M.Sc. of our Office of Conservation and Coastal Lands staff at 808-587-0316 should you have any questions.

Sincerely,

Suzanne D. Case, Chairperson
Board of Land and Natural Resources

Enclosures: *One (1) CD w/OEQC publication form in MS Word, and SGSP FEIS in pdf*
OEQC Bulletin Publication Form (hard copy)
FEIS (two (2) hard copies)

APPLICANT ACTIONS
SECTION 343-5(C), HRS
PUBLICATION FORM (JANUARY 2013 REVISION)

Project Name: Schofield Generating Station Project

Island: **Oahu**

District: **Wahiawa**

TMK: **7-7-001:001, -002; 7-3-001:001, -002, -006, -007, -008, -009, -011, -012, -013, -019, 022, -024; 7-6-001:001, -006; 9-4-012:001, -003, -011**

Permits:

- Easements – Army; Department of Land and Natural Resources (DLNR)
- Conservation District authorization – DLNR, Office of Conservation and Coastal Lands (OCCL)
- Lease - Army
- Air Permit (Covered Source and Prevention of Significant Deterioration) – U.S. Environmental Protection Agency (EPA)/ Hawaii Department of Health (HDOH)
- Notice of Proposed Construction or Alteration – Federal Aviation Administration (FAA)
- Airport Hazard Area Zone Permit – FAA
- Decision and Order – Public Utilities Commission (PUC)
- Excavation Permit – Army
- Site Plan Review – Army
- Hazardous Waste Generator ID number (construction and operation) – EPA
- Spill Prevention, Control, and Countermeasures Plan (construction and operation) – EPA
- Equipment and Materials Handling, including materials disposal – Hawaii Department of Transportation (DOT)
- Energy Information Administration (EIA) registration – EIA
- NPDES for storm water (construction and operation) – HDOH
- Permit and/or variance for noise during construction – HDOH
- Emergency and Hazardous Chemical Inventory – Army; HDOH; Honolulu Fire Department
- Pressure Vessel Installation Permit – Hawaii Department of Labor
- Street Usage Permit – DOT
- Use and Occupancy Agreement (UOA) – DOT
- Approval to Cross State Water – Army Corps of Engineers
- Building Permit – Honolulu Department of Planning and Permitting
- Flammable and Combustible Liquid Tanks Installation – Honolulu Fire Department
- Liquiefied Petroleum Gas Tank Installation – Honolulu Fire Department
- Licenses to inspect, test, and maintain fire protection system – Honolulu Fire Department
- Fire Alarm Systems Acceptance Test Permit – Honolulu Fire Dept.
- Fire Plans Review Fee – Honolulu Fire Dept.
- Telecommunications License – New Cingular Wireless PCS, LLC

Approving Agency:
Department of Land and Natural Resources
1151 Punchbowl Street, Room 131
Honolulu, HI 96813
Attn: Carty Chang, (808) 587-0400

Applicant:
Hawaiian Electric Company, Inc.
P.O. Box 2750
Honolulu, HI 96840-0001
Attn: Jack Shriver, (808) 543-4088

Consultant:
Tetra Tech, Inc.
1999 Harrison St., Ste. 500
Oakland, CA 94612
Attn: Kristin Shields, (703) 946-3238

Status (check one only):

__DEA-AFNSI	Submit the approving agency notice of determination/transmittal on agency letterhead, a hard copy of DEA, a completed OEQC publication form, along with an electronic word processing summary and a PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov; a 30-day comment period ensues upon publication in the periodic bulletin.
__FEA-FONSI	Submit the approving agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and a PDF copy (send both summary and PDF to oeqchawaii@doh.hawaii.gov; no comment period ensues upon publication in the periodic bulletin.
__FEA-EISPN	Submit the approving agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov; a 30-day consultation period ensues upon publication in the periodic bulletin.
__Act 172-12 EISPN	Submit the approving agency notice of determination on agency letterhead, an OEQC publication form, and an electronic word processing summary (you may send the summary to oeqchawaii@doh.hawaii.gov. NO environmental assessment is required and a 30-day consultation period upon publication in the periodic bulletin.
__DEIS	The applicant simultaneously transmits to both the OEQC and the approving agency, a hard copy of the DEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the DEIS (you may send both the summary and PDF to oeqc@doh.hawaii.gov); a 45-day comment period ensues upon publication in the periodic bulletin.
✓__FEIS	The applicant simultaneously transmits to both the OEQC and the approving agency, a hard copy of the FEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the FEIS (you may send both the summary and PDF to oeqc@doh.hawaii.gov); no comment period ensues upon publication in the periodic bulletin.
__ Section 11-200-23 Determination	The approving agency simultaneous transmits its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS to both OEQC and the applicant. No comment period ensues upon publication in the periodic bulletin.
__Statutory hammer Acceptance	The approving agency simultaneously transmits its notice to both the applicant and the OEQC that it failed to timely make a determination on the acceptance or nonacceptance of the applicant's FEIS under Section 343-5(c), HRS, and that the applicant's FEIS is deemed accepted as a matter of law.
__Section 11-200-27 Determination	The approving agency simultaneously transmits its notice to both the applicant and the OEQC that it has reviewed (pursuant to Section 11-200-27, HAR) the previously accepted FEIS and determines that a supplemental EIS is not required. No EA is required and no comment period ensues upon publication in the periodic bulletin.
__Withdrawal (explain)	

Summary (Provide proposed action and purpose/need in less than 200 words. Please keep the summary brief and on this one page)**:**

The Proposed Action is the granting of an 8.13-acre lease and a 2.5-acre easement of U.S. Army land on Schofield Barracks and Wheeler Army Airfield and the granting of an 1.28-acre easement and 0.7-acre conservation district authorization on state land to Hawaiian Electric Company, Inc. to construct, operate, and maintain a 50-megawatt capacity biofuel-capable power generation plant to include associated power poles, high tension power lines, and related equipment and facilities.

The primary purpose of the Proposed Action is two-fold: to provide improved energy security to the U.S. Army Garrison-Hawaii at Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia and to provide new secure, firm, dispatchable, flexible, and renewable energy generation to the grid on Oahu, Hawaii.

The needs for the Proposed Action are to increase energy security for the Army and Oahu; assist the Army in supporting renewable energy-related laws and Executive Orders and meeting its renewable energy goals; assist Hawaiian Electric in meeting the Hawaii Renewable Portfolio Standard goals; and to improve future electrical generation on Oahu.

Final
Environmental Impact Statement

Schofield Generating Station Project
U.S. Army Garrison-Hawaii

This environmental document is prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) and Hawaii Environmental Policy Act (HEPA)

Proponent (NEPA):

U.S. Army Garrison-Hawaii
947 Wright Avenue
Schofield Barracks, HI 96857

Approving Agency (HEPA):

State of Hawaii Department of Land and Natural Resources
1151 Punchbowl Street, Rm 131
Honolulu, HI 96813

Applicant (HEPA):

Hawaiian Electric Company, Inc.
P.O. Box 2750
Honolulu, HI 96840

Prepared by:

Tetra Tech, Inc.

October 2015

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DEPARTMENT OF THE ARMY

Final

ENVIRONMENTAL IMPACT STATEMENT

Schofield Generating Station Project
U.S. Army Garrison-Hawaii

October 2015

APPROVED BY:

Richard A. Fromm	**Charles A. Flynn**
Colonel, U.S. Army	**Major General, U.S. Army**
Commanding	**Commanding**
U.S. Army Garrison-Hawaii	**U.S. Army Hawaii**

Rhonda Suzuki
Chief, Environmental Division
U.S. Army Garrison-Hawaii

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ENVIRONMENTAL IMPACT STATEMENT

AGENCIES: U.S. Army Hawaii and U.S. Army Garrison-Hawaii (USAG-HI)

TITLE OF PROPOSED ACTION: Schofield Generating Station Project at USAG-HI

AFFECTED JURISDICTION: USAG-HI Schofield Barracks, Wheeler Army Airfield, Field Station Kunia, and the neighboring communities

PREPARED BY: U.S. Army Corps of Engineers, Mobile District; U.S. Army Environmental Command; and Hawaiian Electric Company, Inc. (Hawaiian Electric) with technical assistance from Tetra Tech, Inc.

APPROVED BY: Rhonda Suzuki, Chief, Environmental Division, U.S. Army Garrison-Hawaii; Richard A. Fromm, Colonel, Commanding, U.S. Army Garrison-Hawaii; and Charles A. Flynn, Major General, U.S. Army, Commanding

ABSTRACT: This environmental impact statement (EIS) was prepared in accordance with Title 32 of the *Code of Federal Regulations* Part 651 (Environmental Effects of Army Actions), the National Environmental Policy Act (NEPA), and the Hawaii Environmental Policy Act (HEPA). The EIS considers the proposed implementation of the Schofield Generating Station Project at USAG-HI in Central Oahu. The EIS identifies, evaluates, and documents the effects of the Army's granting of a lease on Schofield Barracks, and the granting of easements by the Army and the State of Hawaii Department of Land and Natural Resources to Hawaiian Electric for the construction and operation of a multifuel-capable 50-megawatt power plant and associated transmission line. This is the Army's Preferred Alternative. A No Action Alternative is also evaluated. Implementation of the Preferred Alternative would result in short- and long-term direct and indirect beneficial and adverse effects. All adverse effects would be less than significant. Cumulative impacts would be less than significant.

The Preferred Alternative was reviewed for consistency with the following land use plans, policies, and controls: Army Regulation 210-20 (Real Property Master Planning for Army Installations), USAG-HI Installation Design Guide, Hawaii State Plan, State Sustainability Plan 2050, HRS Chapter 205 (Land Use Law), Hawaii Coastal Zone Management Program, Oahu General Plan, Central Oahu Sustainable Community Plan, and Honolulu Land Use Ordinance. The Preferred Alternative would be consistent with the applicable provisions of these land use regulations, plans, policies, and controls. There are no unresolved issues associated with implementing the Preferred Alternative.

REVIEW: The Final EIS is available during a 30-day waiting period, beginning with publication of the Notice of Availability in the *Federal Register* as well as in the *Honolulu Star-Advertiser*. Following the end of the 30-day waiting period, the Army will issue its Record of Decision. The Final EIS can be viewed at the following website: www.garrison.hawaii.army.mil/schofieldplant. Copies of the Final EIS are available for review at the Sergeant Rodney J. Yano Main Library (on Schofield Barracks); Fort Shafter Library; Wahiawa Public Library; Mililani Public Library; Waialua Public Library; University of Hawaii libraries including Thomas H. Hamilton Library, Edwin H. Mookini Library, Maui College Library, and Kauai Community College Library; Hawaii State libraries including Kaimuki Regional Library, Kaneohe Regional Library, Pearl City Regional Library, Hawaii Kai Regional Library, Hilo Regional Library, Kahului Regional Library, and Lihue Regional Library, and the Hawaii State Library Documents Center; the Legislative Reference Bureau Library; and the City and County of Honolulu Department of Customer Services Municipal Library. In consideration of the environment, printed copies of the Final EIS are available upon request. Please contact Department of the Army, Directorate of Public Works, U.S. Army Garrison-Hawaii ATTN: IMHW-PWE (L. Graham), 947 Wright Avenue, Wheeler Army Airfield, Schofield Barracks, Hawaii 96857-5013 or sgspcomments@tetratech.com.

The Department of Land and Natural Resources has accepted the EIS, completing the HEPA process. Notification of acceptance of the EIS and completion of the HEPA process will be published in the State of Hawaii Office of Environmental Quality Control publication *The Environmental Notice.*

EXECUTIVE SUMMARY

This joint environmental impact statement (EIS) was prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) and the Hawaii Environmental Policy Act (HEPA). The United States Department of the Army (Army) is the project proponent under NEPA and the Hawaii Department of Land and Natural Resources (DLNR) is the approving agency under HEPA.

The EIS analyzes the environmental impacts of the Proposed Action and No Action Alternative. The purpose of this EIS is to inform Army and Hawaii decision makers and the public of the potential environmental impacts of the Proposed Action and No Action Alternative.

Purpose of and Need for the Proposed Action

The purpose of and need for the Proposed Action were developed by the Army and Hawaiian Electric Company (Hawaiian Electric). The primary purpose of the Proposed Action is twofold:

- To provide improved energy security to the U.S. Army Garrison-Hawaii (USAG-HI) at Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia
- To provide new secure, firm, dispatchable[1], flexible, and renewable energy generation to the grid on Oahu, Hawaii

Together, Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia require approximately 32 megawatts (MW) of peak power to meet all operational requirements, administrative functions, logistics, and quality-of-life functions. These installations support several critical Army and U.S. Department of Defense (DoD) missions and warfighting units in the U.S. Pacific Command Area of Responsibility. The Proposed Action would help ensure that the Army can continue critical national security and first responder missions, particularly when the electric utility grid on Oahu has been compromised by a natural or man-made disaster.

The needs for the Proposed Action are as follows:

- Increase energy security for the Army and Oahu
- Assist the Army in compliance with renewable energy-related laws and Executive Orders and meeting its renewable energy goals
- Assist Hawaiian Electric in meeting the Hawaii Renewable Portfolio Standard goals
- Improve future electrical generation on Oahu

Summary of the Proposed Action and Alternatives

The Proposed Action, referred to as the Schofield Generating Station Project (SGSP), consists of:

(1) The Army's lease of 8.13 acres of land and the related granting of a 2.5-acre interconnection easement on Schofield Barracks and Wheeler Army Airfield to Hawaiian Electric to construct, operate, and maintain a 50-megawatt- (MW-) capacity renewable

[1] *Dispatchable energy sources* can be turned on or off and adjust their power output, as the system operators direct, to meet grid requirements.

energy power plant to include associated power poles, high-tension power lines, and related equipment and facilities.

(2) The State of Hawaii Department of Land and Natural Resources' granting of a 1.28-acre easement and a 0.7-acre conservation district authorization to Hawaiian Electric, allowing for the construction of a 46-kilovolt (kV) electrical power transmission line between the SGSP site and the existing Wahiawa Substation.

(3) Hawaiian Electric's construction, ownership, operation, and maintenance of a 50-MW-capacity, biofuel-capable power generation plant and 46-kV subtransmission line required to connect the Schofield Generating Station to the Hawaiian Electric grid.

The proposed facilities would be constructed and operated in accordance with all applicable laws and with approval of the Hawaii Public Utilities Commission (PUC).

The electricity produced by the SGSP would normally supply power to all Hawaiian Electric customers through the islandwide electrical grid. During outages that meet the criteria specified in the operating agreement, SGSP output would first be provided to Army facilities at Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia up to their peak demand of 32 MW, to meet their missions, and would additionally support the grid up to its full capacity. If there was a full island outage, the plant could be used to blackstart other plants on the island.

Under the No Action Alternative, the Army would not lease the property or grant the easement and Hawaiian Electric would not construct or operate the SGSP.

The Army and Hawaiian Electric also considered other alternatives that, upon analysis, did not meet the purpose and need for the Proposed Action or satisfy the screening criteria and thus were eliminated from further evaluation.

List of Permits and Approvals

The Proposed Action would require the permits and approvals in Table ES-1 and consultation with the U.S. Fish and Wildlife Service under section 7 of the Endangered Species Act, the State Historic Preservation Division under section 106 of the National Historic Preservation Act, the Coastal Zone Management Program in accordance with the Coastal Zone Management Act, and the National Marine Fisheries Service Pacific Islands Regional Office in accordance with the Magnuson-Stevens Fishery Conservation and Management Act.

Affected Environment and Environmental Consequences

Resource categories addressed in the EIS are land use; airspace use; visual resources; air quality, including climate and greenhouse gasses; noise; traffic and transportation; water resources; geology and soils; biological resources; cultural resources; hazardous and toxic substances; socioeconomics, including environmental justice; and utilities and infrastructure.

Impacts were assessed assuming full-time operation of the generating facility (24 hours a day, 365 days a year). Under normal conditions, the facility would likely operate less than full time, so projected impacts could be less.

Table ES-1
Required Permits and Approvals

Permit or Approval	Generating Station, Interconnection, or Both	Agency	Status
Decision and Order	Both	PUC	Application filed May 16, 2014
Environmental Impact Statement	Both	Army; DLNR	In preparation
Lease	Generating Station	Army	Dependent upon completion of NEPA/HEPA process
Easements	Interconnection	Army; DLNR	Dependent upon completion of NEPA/HEPA process
Conservation District Authorization	Interconnection	DLNR	Dependent upon completion of NEPA/HEPA process
Air Permit (Covered Source and Prevention of Significant Deterioration)	Generating Station	HDOH	Application filed April 28, 2014
Notice of Proposed Construction or Alteration	Both	Federal Aviation Administration	Not started
Airport Hazard Area Zone Permit	Both	Federal Aviation Administration	Not started
Excavation Permit	Generating Station	USAG-HI	Not started
Site Plan Review	Generating Station	USAG-HI	In preparation
Hazardous Waste Generator Identification Number	Generating Station	U.S. Environmental Protection Agency	Not started
Spill Prevention, Control, and Countermeasure Plan	Generating Station	U.S. Environmental Protection Agency	Not started
Equipment and Materials Handling, including Materials Disposal	Generating Station	Hawaii Department of Transportation	Not started
Energy Information Administration Registration	Generating Station	Energy Information Administration	Not started
National Pollutant Discharge Elimination System (NPDES) Permit for stormwater	Generating Station	HDOH	Not started
Permit and/or Variance for Noise during Construction	Both	HDOH	Not started
Emergency and Hazardous Chemical Inventory	Generating Station	Army; HDOH; Honolulu Fire Department	Not started
Flammable and Combustible Liquid Tank Installation	Generating Station	Honolulu Fire Department	Not started
Liquefied Petroleum Gas	Generating Station	Honolulu Fire	Not started

Permit or Approval	Generating Station, Interconnection, or Both	Agency	Status
Tank Installation		Department	
Licenses to Inspect, Test, and Maintain Fire Protection System	Generating Station	Honolulu Fire Department	Not started
Fire Alarm Systems Acceptance Test Permit	Generating Station	Honolulu Fire Department	Not started
Fire Plans Review Fee	Generating Station	Honolulu Fire Department	Not started
Pressure Vessel Installation Permit	Generating Station	Hawaii Department of Labor	Not started
Street Usage Permit	Both	Hawaii Department of Transportation	Not started
Use and Occupancy Agreement	Interconnection	Hawaii Department of Transportation	In preparation
Approval to Cross State Water	Interconnection	U.S. Army Corps of Engineers	Not started
Building Permit for Substation Work	Interconnection	Honolulu Department of Planning and Permitting	Not started
Telecommunications License	Interconnection	New Cingular Wireless PCS, LLC	In preparation

Notes: DLNR = Army = United States Department of the Army; Hawaii Department of Land and Natural Resources; HDOH = Hawaii Department of Health; HEPA = Hawaii Environmental Policy Act; NEPA = National Environmental Policy Act; PUC = Public Utilities Commission; USAG-HI = U.S. Army Garrison-Hawaii

The severity of environmental impacts is characterized as none, minor, moderate, significant, or beneficial. Impacts that range from none to moderate are considered less than significant. There could be adverse and beneficial impacts to the same resource. The environmental consequences of the Proposed Action and No Action Alternative, discussed in the resource sections in Section 3, are summarized in Table ES-2. Implementing the Proposed Action would result in minor-to-moderate adverse effects, as well as beneficial effects. Under a full-time operation scenario, minor adverse effects could be expected with regard to land use, airspace, traffic and transportation, water resources, geology and soils, biological resources, cultural resources, hazardous and toxic substances, and utilities and infrastructure. Moderate adverse effects could be expected for visual resources, air quality, and noise. In addition, some beneficial effects could also be expected for air quality, traffic and transportation, biological resources, hazardous and toxic substances, socioeconomics, and utilities and infrastructure. None of the effects from construction or operation of the SGSP, either individually or cumulatively, would rise to the level of significant under NEPA. Implementing the No Action Alternative would have no direct or indirect adverse or beneficial impacts.

Mitigation Measures and Best Management Practices

Impacts would be less than significant for all resources; therefore, no mitigation measures are proposed. No activities outside compliance with existing regulations, permits, and plans would be required. Best management practices (BMP) and design measures that would minimize adverse

effects would be implemented for these resources: visual, air quality, noise, traffic and transportation, water, geology and soils, biological resources, and hazardous and toxic substances.

Consistency with Land Use Policies, Plans, and Controls

The SGSP is subject to two types of land use controls. One type is applicable to portions of the SGSP on Army land (on-post); the other governs elements of the proposed project that are not on Army-owned land (off-post). The Proposed Action was reviewed and found to be consistent with applicable federal, state, and local land use plans, policies, and controls.

Table ES-2
Environmental Consequences

Resource Area	Proposed Action	No Action Alternative
Land use	Minor adverse	None
Airspace	Minor adverse	None
Visual resources	Moderate adverse	None
Air quality	Moderate adverse and beneficial	None
Noise	Moderate adverse	None
Traffic and transportation	Minor adverse and beneficial	None
Water resources	Minor adverse	None
Geology and soils	Minor adverse	None
Biological resources	Minor adverse and beneficial	None
Cultural resources	Minor adverse	None
Hazardous and toxic substances	Minor adverse and beneficial	None
Socioeconomics	None or beneficial	None
Utilities and infrastructure	Minor adverse and beneficial	None
Overall Environmental Consequences	**Minor to moderate adverse, and beneficial**	**None**

Cumulative Impacts

On-post, past, present, and reasonably forseeable future actions include various Army growth and force structure realignment projects that would involve construction and operation of new facilities in support of changing training scenarios and operational requirements. Off-post, past, present, and reasonably forseeable future actions include additional development of Central Oahu as a residential area to relieve housing pressure in downtown Honolulu. Off-post development would occur in accordance with land use and development plans that promote conservation of Hawaii's unique natural and cultural resources.

These actions themselves would have adverse effects ranging from beneficial to significant adverse. The Proposed Action's contribution to cumulative impacts would range from beneficial to moderate adverse. Overall, the cumulative impacts of the SGSP, in combination with past, present, and reasonably foreseeable future actions, would be less than significant.

Unresolved Issues

No unresolved issues associated with implementing the Proposed Action have been identified.

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SECTION 1
PURPOSE, NEED, AND SCOPE

1.1 INTRODUCTION

The Proposed Action, referred to as the Schofield Generating Station Project (SGSP), consists of:

> (1) The U.S. Department of the Army's (Army) lease of 8.13 acres of land and the related granting of a 2.5-acre interconnection easement on Schofield Barracks and Wheeler Army Airfield to Hawaiian Electric Company (Hawaiian Electric) to construct, operate, and maintain a 50-megawatt- (MW-) capacity renewable energy power plant to include associated power poles, high-tension power lines, and related equipment and facilities. The lease would be under the authority of Title 10 of the *United States Code* (USC) §2667, "Leases: non-excess property of military departments and Defense Agencies." The interconnection easement property would be under the authority of 10 USC §2668, "Easements for rights-of-way."
>
> (2) The State of Hawaii Department of Land and Natural Resources (DLNR) granting of a 1.28-acre easement and a 0.7-acre conservation district authorization to Hawaiian Electric, allowing for the construction of a 46-kilovolt (kV) electrical power transmission line between the SGSP site and the existing Wahiawa Substation.
>
> (3) Hawaiian Electric's construction, ownership, operation, and maintenance of a 50-MW-capacity, biofuel-capable power generation plant and 46-kV subtransmission line required to connect the Schofield Generating Station to the Hawaiian Electric grid. Hawaiian Electric would be the sole owner of the plant and the electrical power transmission facilities.

The proposed facilities would be constructed and operated in accordance with all applicable laws, with approval of the Hawaii Public Utilities Commission (PUC). For the Hawaii Environmental Policy Act (HEPA), the purpose and need discussions in sections 1.3 and 1.4 are considered the statement of objectives.

1.2 SCOPE OF THE ANALYSIS

This environmental impact statement (EIS) was developed in accordance with the National Environmental Policy Act (NEPA) [42 USC §§ 4321–4370 (f)] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], along with Council on Environmental Quality (CEQ) implementing regulations and 32 CFR Part 651, *Environmental Analysis of Army Actions*.[1]

It was also developed in accordance with HEPA [Chapter 343, Hawaii Revised Statutes (HRS), Environmental Impact Statement Law] and the law's implementing administrative rules [Hawaii Administrative Rules (HAR) Chapters 11–200, Environmental Impact Statement Rules, and 11-201, Environmental Council Rules of Practice and Procedure].

[1] CEQ: Regulations for Implementing the Procedural Provisions of NEPA, 40 CFR Parts 1500–1508 and Army implementing regulations contained in 32 CFR Part 651.

Pursuant to 40 CFR §1506.2 and HRS §343-5(h), this EIS has been prepared in accordance with the requirements of both HEPA and NEPA. The Army is the project proponent under NEPA and the Hawaii DLNR is the approving agency under HEPA.

The purpose of the EIS is to inform Army and Hawaii decision makers and the public of the potential environmental impacts of the Proposed Action and No Action Alternative. The EIS analyzes the environmental impacts from constructing and operating the SGSP at Schofield Barracks. An interdisciplinary team of environmental resource specialists and planners prepared this document. The Army, Hawaiian Electric, and DLNR received public input on the issues analyzed in the EIS (see section 1.5, Public Involvement, for further information).

1.3 PURPOSE OF THE PROPOSED ACTION

The primary purpose for leasing the property and constructing the SGSP is twofold:

- To provide improved energy security to the U.S. Army Garrison-Hawaii (USAG-HI) at Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia
- To provide new secure, firm, dispatchable[2], flexible, and renewable energy generation to the grid on Oahu, Hawaii

Together, Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia require approximately 32 MW of peak power to meet all operational requirements, administrative functions, logistics, and quality-of-life functions. These installations support several critical Army and U.S. Department of Defense (DoD) missions and warfighting units in the U.S. Pacific Command Area of Responsibility. The Proposed Action would help ensure that the Army continues critical national security and first responder missions, particularly when the electric utility grid on Oahu has been compromised, by a natural or man-made disaster.

The energy security purpose has been established by the USAG-HI Garrison Commander and endorsed by the Army's Installation Management Command and the Assistant Chief of Staff for Installation Management at Headquarters, Department of the Army. This purpose is consistent with the goals of the Army's Energy Security Implementation Strategy (AESIS) 2009, specifically AESIS Energy Security Goal 3: "Increase use of renewable/alternative energy" and Energy Security Goal 4: "Assure access to sufficient energy supplies" (Army Senior Energy Council and Office of the Deputy Assistant Secretary of the Army for Energy and Partnerships 2009). The AESIS states that Energy Security Goal 4 should:

> *Improve and maintain the Army's access to sufficient power and fuel supplies when and where needed. Energy is a critical resource in conducting Army missions. Vulnerabilities to external disruption of power and fuel sources should be minimized and the potential for industry partnerships to enhance energy security and generate net revenues for the Army should be considered.*

An additional Army objective of the SGSP is to contribute to nationwide Army energy goals, including:

- The Army's goal to produce or procure 1 gigawatt (GW) of renewable energy generation on Army-owned real property or at Army facilities by 2025, part of the broader DoD goal

[2] *Dispatchable energy sources* can be turned on or off and adjust their power output, as the system operators direct, to meet grid requirements.

to produce or procure 3 GW of renewable energy on Army, Navy, and Air Force installations by 2025

- The 10 USC §2911(e) goal to produce or procure on Army real property at least 25 percent of the electrical energy consumed by 2025
- The Executive Order (EO) 13693 [Planning for Federal Sustainability in the Next Decade (2015)] ~~13514 (Federal Leadership in Environmental, Energy, and Economic Performance)~~ goal to reduce Scope 1 and Scope 2 greenhouse gas (GHG) emissions ~~by at least 34 percent~~ from 2008 levels by 2025 ~~2020~~

Hawaiian Electric has several objectives that would be met by implementing the Proposed Action, including:

- Provide 50 MW of new, easily dispatchable capacity to support the Oahu grid, which will contribute to Hawaiian Electric's ability to deactivate older, less efficient generating units
- Add a fleet of modern, efficient generating units that can use multiple fuels, including biofuel, and facilitate integration of additional renewable resources that will contribute to meeting or exceeding the state Renewable Portfolio Standard (RPS)
- Provide a quick-starting, high ramp rate[3] facility to help maintain grid stability and support the increasing penetration of variable and distributed sources of power generation, such as wind and solar, on the Hawaiian Electric grid
- Have a power generation facility at elevation and away from coastlines, which contributes to continuity of electrical power in the event of natural disaster
- Provide reliable backup power to Wheeler Army Airfield to enhance military, National Guard, and civilian disaster response capabilities
- Locate a generation facility on a military installation to contribute to energy security for Hawaiian Electric customers if there is a man-made threat

1.4 NEED FOR THE PROPOSED ACTION

The Proposed Action addresses the needs of the Army and of Hawaiian Electric. The following sections discuss these needs in more detail.

1.4.1 Increased Energy Security for the Army and Oahu

There are five distinct needs that fall within the umbrella of energy security: (1) elevation and distance from coastline to reduce susceptibility to coastal effects, (2) blackstart capability[4], (3) dedicated power supply to prevent disruption to Army operations, (4) physical security against natural and man-made threats, and (5) protection of first responders and disaster response capabilities. These needs are discussed in more detail below.

[3] *Ramp rate* is the speed at which the generation from a power plant can be increased (ramp up) or decreased (ramp down). A high ramp rate means that the generators can be increased and decreased quickly to respond to system variability.

[4] *Blackstart* means the capability to restore a power station to operation without relying on the external electric power transmission network.

Currently, all of the major power generation facilities on Oahu are on or near the shoreline, and several rely on seawater for cooling. Although designed to be resistant to ocean effects, such as storms and tsunamis, their locations near the coast have inherent risks. The SGSP avoids this risk because it would be centrally sited at a high elevation away from the shoreline. The proposed property is 870 feet above sea level, while other Oahu generating stations are at elevations of 24 feet or less.

The SGSP would be designed with blackstart capability. This would enable the SGSP to start itself up and export power in the event of a grid outage. The SGSP would also have the capability and capacity to provide the electrical power necessary to start up the simple-cycle combustion turbines at the Waiau Power Plant (Units 9 and 10), thus expediting grid restoration while simultaneously providing power to local Army and Wahiawa community loads. Through this capability, the SGSP can be used to restore power to the rest of the Hawaiian Electric grid. Although Hawaiian Electric has several blackstart-capable units, the addition of the SGSP as a blackstart-capable unit at a high elevation and on a military base, capable of starting itself and other major Hawaiian Electric generation units on Oahu, would significantly contribute to grid resiliency in a major outage. The proposed project site is at one of the more remote load centers on the Hawaiian Electric grid, which is vulnerable to line and substation damage. Adding the SGSP in this area would enhance the reliability of power to the surrounding communities.

The Army recognizes the vulnerabilities of its installations and operations posed by reliance on centrally distributed, utility-provided energy grids. The DoD 2014 Quadrennial Defense Review directly addresses many of these challenges and states, "Our actions to increase energy and water security, including investments in energy efficiency, new technologies, and renewable energy sources, will increase the resiliency of our installations and help mitigate these effects." A major finding of the Defense Science Board in its 2008 report, *DoD Energy Strategy – More Fight, Less Fuel*, was that installations:

> *…rely almost entirely on the national power grid and other critical national infrastructure, which is highly vulnerable to prolonged outage from a variety of threats, placing critical missions at unacceptably high risk of extended disruption…backup power is often based on diesel generator sets with limited on-site fuel storage, undersized for new Homeland defense missions, not prioritized to critical loads and inadequate in duration and reliability.*

These energy system vulnerabilities are especially concerning to the Army installations on Oahu where the risk of outages is greater than in the continental U.S. due to the isolation of its island grid. The following factors contribute to this increased risk of outages at Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia:

- They are all on a remote section of the main electrical transmission system.
- Transmission lines to the installations run between the Waianae and Koolau mountain ranges and are at higher risk to wind damage due to increased velocities and funneling effects of the ranges and the location of the lines on the downward slope.

In recent years, Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia experienced major extended outages, including:

- 15 October 2006: An earthquake caused an islandwide blackout on Oahu causing a 10- to 12-hour power outage at the Army installations.
- 5 December 2007: A wind storm caused power line damage that resulted in the loss of power at Schofield Barracks' Menoher Substation for about 72 hours.

- 11 December 2008: Heavy storms and flooding damaged Army and Hawaiian Electric power lines causing a multiday power outage affecting Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia.
- 26 December 2008: A lightning storm caused an islandwide blackout on Oahu that resulted in an 11-hour power outage at Schofield Barracks.

During extended outages, the installations experience operational losses of company and battalion operation facilities, barracks, maintenance hangers, training facilities, dining facilities, and tactical maintenance facilities, which can compromise the primary mission. Safety is jeopardized because battery-powered life-safety lighting for fire and other exits is lost during extended outages once the batteries are drained. Soldiers and their families must seek food and necessities off-post, putting them at risk because of unsafe road conditions. Diminished water services from limited pumping weakens firefighting abilities. During these extended outages, public works resources that could contribute to damage control are preoccupied with fueling and troubleshooting Army emergency generators.

During extended outages, the SGSP would be designed to continue providing secure power to Army operations at Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia. The SGSP would have on-site storage capacity for a variety of fuels, sufficient to meet the full electricity requirement of the installations for 5 days. The plant and fuel tanks would be secured behind Hawaiian Electric site fencing, within the installation fence, and under the protection of Schofield Barracks and its security capabilities, thus providing a more secure and dependable power source in case of terrorist activities or other man-made threats.

Energy security benefits, such as reduced restoration time from the start of an outage, would extend to the surrounding community of Wahiawa, including the civilian hospital. Maintaining power at the Wheeler Army Airfield during extended outages would benefit Oahu residents if there was a civil emergency or natural disaster by enabling critical support from the Army's first responders. Providing reliable power to the Army's centrally located airfield make it a good choice for use by the Federal Emergency Management Agency (FEMA) and other disaster responders, particularly if the coastal areas are compromised.

The U.S. Armed Forces have a historic precedent and enduring role in supporting civil authorities during times of emergency, which is codified in national defense strategy as a primary mission of the DoD:

> *Defense Support of Civil Authorities is support provided by federal military forces, Department of Defense civilians, DOD contract personnel, DOD component assets, and National Guard forces (when the Secretary of Defense, in coordination with the governors of the affected states, elects and requests to use those forces in Title 32, United States Code, status or when federalized) in response to requests for assistance from civil authorities for domestic emergencies, law enforcement support, and other domestic activities, or from qualifying entities for special events.*

The SGSP would enable service members to mobilize tsunami or hurricane relief either before or after an emergency and bring critical supplies to the islands when traditional transportation channels are destroyed or interrupted, or would take too long. The DoD and National Guard could respond and bring the nation's resources for the benefit of both Oahu and the state as a whole.

1.4.2 Renewable Energy-Related Laws, Executive Orders, and Established Goals Applicable to the Army

The Army must support the federal mandates and EOs listed in Table 1.4-1, which address the need to increase energy security and promote the production and use of electricity derived from renewable energy sources. The Army has established a goal in response to a presidential request to produce 1 GW or more of renewable energy on lands controlled by the Army by 2025. The SGSP, through the requirement that it be a renewable energy-producing facility, would achieve up to 50 MW of that goal. By requiring that no less than 50 percent of the fuel used be biofuel, the Army and Hawaiian Electric would encourage the development and production of biodiesel and biofuels on the islands of Hawaii and assist the State of Hawaii in becoming less dependent on imported fuels and fossil fuels.

Table 1.4-1.
Summary of Legislation and Executive Orders Affecting Energy Use

Federal Mandate	Topic	DoD Performance Target
10 USC §2911(e)	Goal regarding using renewable energy to meet facility energy needs	It shall be the goal of the DoD to produce or procure not less than 25 percent of its total quantity of facility energy consumed within its facilities during fiscal year 2025 and each fiscal year thereafter from renewable energy sources.
EO 13693, Planning for Federal Sustainability in the Next Decade ~~13514, *Federal Leadership in Environmental, Energy, and Economic Performance*~~	GHG emission reduction	Reduce: Scopes 1, 2, and 3 ~~2~~ GHGs ~~by 34 percent~~ from 2008 levels by 2025 ~~2020~~. ~~Scope 3 GHGs by 13.5 percent from 2008 levels by 2020.~~

1.4.3 Hawaii Renewable Portfolio Standard Goals

HRS section 269-92 (as amended by the 2015 State Legislature) sets the following RPS targets for ~~Under Hawaii's RPS~~ the Hawaiian Electric companies (Hawaiian Electric; Maui Electric Company, Ltd.; and Hawaii Electric Light Company, Inc.) and all other electric utilities in the state to ~~must meet the following percentages of renewable electrical energy sales~~:

- 10 percent of net electricity sales by 31 December 2010
- 15 percent of net electricity sales by 31 December 2015
- 30 ~~25~~ percent of net electricity sales by 31 December 2020
- 40 percent of net electricity sales by 31 December 2030
- 70 percent of net electricity sales by 31 December 2040
- 100 percent of net electricity sales by 31 December 2045

The Hawaiian Electric companies achieved 18 percent of net electricity sales from renewable energy in 2014. Because of its ability to use substantial amounts of biofuel in a cost-effective manner, the ~~The~~ proposed SGSP would contribute to Hawaiian Electric's ~~continued~~ ability to continue increasing the proportion of the renewable energy it generates to meet or exceed the ~~these~~ RPS and other long-range renewable energy goals.

1.4.4 Future Electrical Generation on Oahu

For reliable system operation, the balance of the generating units and grid devices (e.g., energy storage) must have different operating attributes than those commonly associated with baseload generation. In general, the majority of these generating units would provide the ancillary services needed for system operation and include the following capabilities:

- Dispatchable (i.e., able to schedule, commit, and load)
- Blackstart
- Frequency regulation
- Voltage regulation
- Turndown to lower minimum loads
- Daily and seasonal cycling
- Energy efficiency

Although there are generating units that have some of these capabilities to varying degrees, the type of unit that has all of them, and to the greatest degree, is a reciprocating internal combustion engine that burns fuel. The fuel could be renewable (biomass or biofuel) or fossil (coal, oil, or gas). Hawaiian Electric plans to transform the generation fleet from one dominated by baseload generating units that provide bulk energy, to one that has a mix of more flexible generators with attributes that meet the future electric system's requirements. The installation of new quick-starting, agile, efficient, multifuel engines, like those planned for the SGSP, is a key component of the planned, modernized generation system.

1.5 PUBLIC INVOLVEMENT

The Army, Hawaiian Electric, and DLNR are committed to engaging the many and diverse stakeholders in Hawaii who have an interest in Schofield Barracks, the surrounding community, and Oahu's energy planning. Public participation provides an opportunity for the public to be informed about the project and its objectives and to provide information and perspectives about potential impacts, alternatives, and other considerations.

By providing a means for public information and input, the procedural aspects of HEPA and NEPA promote better-informed decision making. Persons who were known to have a potential interest in the Proposed Action were notified and invited to participate in the EIS process. The distribution list is in section 10.

The Army and DLNR conducted distinct but coordinated scoping processes under NEPA and HEPA, respectively. The HEPA EIS preparation notice (EISPN) was in the 8 January 2014 issue of *The Environmental Notice,* published by the State of Hawaii Department of Health (Hawaii DOH), Office of Environmental Quality Control, initiating a 30-day comment period. The NEPA notice of intent (NOI) to prepare an EIS was published in the *Federal Register* on 17 January 2014 (Vol. 79, No. 12), initiating a 45-day comment period. The Army and DLNR accepted comments under either process from 8 January through 2 March 2014. During this period, the public, organizations, and agencies were encouraged to provide comments.

The Army and DLNR published a public notice in the *Honolulu Star-Advertiser* and provided a press release to local media on 17 January 2014 that announced the times and locations of two public scoping meetings to solicit public input and comments on the scope of the EIS. Public

scoping meetings were held on 5–6 February 2014 at the Mililani Mauka Elementary School and Wahiawa District Park. Copies of the NOI, EISPN, and public notice are in Appendix A.

The Army, Hawaiian Electric, and DLNR reviewed seven comments received in response to the NOI and 13 comments received in response to the EISPN. With the exception of one comment transcribed at the Wahiawa public meeting, all comments were received by email or U.S. mail. Issues identified during the scoping process included:

- Identifying the source of fuel to be used.
- Comparing different fuels that could be used at the plant—specifically biofuel, diesel, and liquefied natural gas (LNG)—in terms of environmental impacts. Clarify the fuel mix to be used.
- Analyzing cost considerations, including the comparative cost-effectiveness of different fuel types, project designs, and operating scenarios; fuel transportation costs; effects of fuel price fluctuations; and effects on Hawaiian Electric ratepayers.
- Analyzing the use of other renewable technologies such as solar or wind.
- Defining and describing *first call to power* and *islanding.*
- Analyzing a robust range of alternatives, including alternative sites (specifically a site closer to the substation) and plant capacities.
- Providing details about the power plant water system, including identifying and describing the water source, containment mechanisms, regular discharges (if any), spill containment, cooling system, and water conservation measures.
- Describing the project's relation to Hawaii's renewable energy goals, policies, and regulations including the Hawaii RPS and the Hawaii Clean Energy Initiative.

Appendix A ~~B~~ has copies of the comments received during the scoping process.

The Draft EIS was made available for public review for 45 days from 23 April to 9 June 2015, in accordance with CEQ (NEPA) and Chapter 343, HRS (HEPA) requirements.

The Notice of Availability (NOA) of the Draft EIS was published in the *Federal Register* on 24 April 2015. Notice of the availability of the Draft EIS also was published in the 23 April 2015 issue of *The Environmental Notice* and in the 24 April 2015 issue of the *Honolulu Star-Advertiser*. A notice of the availability of the Draft EIS and public meetings was mailed to individuals and organizations on the distribution list (section 10). Copies of the Draft EIS were made available for public review at 19 libraries and on the USAG-HI website.

During the Draft EIS review period, individuals and organizations interested in the proposed project were invited to attend public meetings about the project. The Army and Hawaiian Electric held one agency meeting and two public meetings, and gave a presentation at the Wahiawa Neighborhood Board meeting. The public meetings were held in Mililani on 20 May 2015 and in Wahiawa on 21 May 2015. During each meeting, the Army and Hawaiian Electric gave a presentation describing the Proposed Action and the EIS process. Displays summarized the Proposed Action and the environmental consequences, and handouts and public comment forms were distributed to meeting participants. Members of the project team were present to answer questions and discuss the project with meeting participants.

Interested individuals and organizations also were invited to provide oral and written comments on the Draft EIS. A total of 44 oral and written comments were received. During the two public meetings, 10 oral comments were received and transcribed for the record by a court reporter. The Army received 34 written comments during the Draft EIS review period. The Army and Hawaiian Electric considered all comments when preparing the Final EIS. Copies of the written and oral comments and responses to the comments are included in Appendix A. Changes to the EIS are summarized in section 1.7 and shown throughout the EIS in underlined text for additions and ~~strikethrough~~ text for deletions.

A list of citizens, organizations, and public agencies submitting comments on the Draft EIS is provided in Table 1.5-1. Note that some commenters provided more than one comment, but are listed only once.

Table 1.5-1.
Citizens, Organizations, and Agencies Commenting on the Draft EIS

Name	Organization/Affiliation
Federal Government	
Stephen S. Anthony, Center Director	U.S. Department of the Interior, U.S. Geological Survey, Pacific Islands Water Science Center
Michelle Lynch, Chief, Regulatory Office	U.S. Army Corps of Engineers, Honolulu District
Kathleen Martyn Goforth, Manager, Environmental Review Section	U.S. Environmental Protection Agency–Region 9
Patricia Sanderson Port, Regional Environmental Officer	U.S. Department of the Interior, Office of Environmental Policy and Compliance, Pacific Southwest Region
State Government	
Alec Wong, Chief	State of Hawaii Department of Health–Clean Water Branch
Marvin Kaleo Manuel, Acting Planning Program Manager	State of Hawaii Department of Hawaiian Home Lands
James K. Kurata, Public Works Administrator	State of Hawaii Department of Accounting and General Services
Laura Leialoha Phillips McIntyre, Program Manager	State of Hawaii Department of Health, Environmental Planning Office
Leo R. Asuncion, Acting Director	State of Hawaii Office of Planning
Timmy Chee	State of Hawaii Department of Land and Natural Resources (Land Division-Oahu District)
Lisa Hadway	State of Hawaii Department of Land and Natural Resources (Division of Forestry and Wildlife)
Alex J. Roy	State of Hawaii Department of Land and Natural Resources (Office of Conservation and Coastal Lands)
Alton Miyasaka, Acting Administrator	State of Hawaii Department of Land and Natural Resources (Division of Aquatic Resources)
W. Roy Hardy, Acting Deputy Director	State of Hawaii Department of Land and Natural Resources (Commission on Water Resource Management)
Carty S. Chang, Chief Engineer	State of Hawaii Department of Land and Natural Resources (Engineering Division)
Dr. Kamana ‘opono Crabbe, Chief Executive Officer	State of Hawaii Office of Hawaiian Affairs
Maynard Young, Manager, Facilities Planning and Design	University of Hawaii System, Office of Capital Improvement
Representative Marcus R. Oshiro, 46th District	Hawaii State Legislature, House of Representatives

Nolan S. Hirai, P.E., Manager	State of Hawaii Department of Health-Clean Air Branch
Local Government (City and County of Oahu)	
Louis M. Kealoha, Police Chief	City and County of Honolulu Police Department
Socrates D. Bratakos, Assistant Chief	City and County of Honolulu Fire Department
Michael D. Formby, Director	City and County of Honolulu Department of Transportation Services
Ernest Y. W. Lau, P.E., Manager and Chief Engineer	City and County of Honolulu Board of Water Supply
Robert Kroning, P.E., Director	City and County of Honolulu Department of Design and Construction
George Atta, FAICP, Director	City and County of Honolulu Department of Planning and Permitting
Gary Nakata, Director Designate	City and County of Honolulu Department of Community Services
Business and Industry	
Les Loo, Network Engineer	Hawaiian Telcom
Organizations	
Walter R. Benavitz Jr., Chair, Government Action Committee	Wahiawa Community and Business Association
Public	
Ed Wagner	Citizen
Miriam-Christene H. Peters	Citizen
Robert Young	Citizen
Fred Asmus	Citizen
Walter Benavitz	Citizen
Alesia Au	Citizen
Lei Learmont	Citizen
Blake Mcelheny	Citizen
Marcus Oshiro	Citizen (and State Representative for District 46)
Thora-J Keaunui Cuaresma	Citizen
Ron Gunderson	Citizen

Under the NEPA process, the Army can issue its Record of Decision (ROD) after issuing the Final EIS and following a 30-day mandatory waiting period. The Army will publish a notice announcing the availability of the ROD in the *Federal Register* and *Honolulu Star-Advertiser*, and at www.garrison.hawaii.army.mil/schofieldplant. Under the HEPA process, after ~~issuing~~ receiving the applicant's (Hawaiian Electric's) Final EIS, the approving agency (DLNR) has 30 days to make a determination of acceptance or non-acceptance. If it does not make a determination, the Final EIS will be deemed accepted. The action cannot proceed until the ROD is signed and published in the *Federal Register*, and ~~the Final EIS is accepted, or deemed accepted, by DLNR~~ the HEPA process is complete.

1.6 ORGANIZATIONAL STRUCTURE OF THE EIS

The EIS is organized into the following sections:

- Section 2, Description of the Proposed Action and Alternatives, presents the Proposed Action and No Action Alternative and includes a list of all required permits and approvals.
- Section 3, Affected Environment and Environmental Consequences, describes the environmental setting and impacts for each resource area, and the existing resources and

environmental conditions at the project site and within the region of influence (ROI). The conditions presented form the baseline for analyzing the environmental impacts of the alternatives. Resource categories addressed in the EIS are land use, airspace use, visual resources, air quality, climate, GHGs, noise, traffic and transportation, water resources, geology and soils, biological resources, cultural resources, hazardous and toxic substances, socioeconomics (including environmental justice), and utilities and infrastructure. The Environmental Consequences portions identify and describe the potential adverse and beneficial environmental impacts expected to result from implementing the Proposed Action and alternatives. This analysis includes potential direct and indirect effects and mitigation measures that could reduce or eliminate the adverse effects.

- Section 4, Consistency with Existing Land Use Plans, Policies, and Controls, describes how the proposed project would or would not be consistent with relevant land use plans, policies, and controls.
- Section 5, Cumulative Impacts, presents other past, present, and reasonably foreseeable projects and identifies the cumulative environmental effects that could result from implementing those projects, along with the Proposed Action and alternatives.
- Section 6, Other Required Considerations, addresses other important considerations, such as significant unavoidable adverse effects.
- Section 7, References, lists the references used while preparing the EIS.
- Section 8, List of Preparers and Contributors, lists EIS preparers and contributors.
- Section 9, Consultation and Coordination, lists the agencies and individuals consulted while preparing the EIS.
- Section 10, Distribution List, identifies recipients of the Notice of Availability for the Draft EIS and Final EIS.
- Section 11, Acronyms and Abbreviations, identifies the acronyms and abbreviations used in this document.

1.7 CHANGES BETWEEN THE DRAFT AND FINAL EIS

The Army reviewed and considered all written and oral comments on the Draft EIS when preparing the Final EIS. Changes made in response to comments and other substantive changes made to the EIS between the draft and final versions are summarized here. Minor editorial changes and updates were made throughout the document as necessary and are not listed here. Changes are shown throughout the EIS in underlined text for additions and revisions and ~~strikethrough~~ text for deletions. The following sections contain the indicated changes:

- Section 1.4.3 was updated with new information about RPS targets.
- Section 1.5 was updated with information about the Draft EIS public review period, including a list of citizens, organizations, and public agencies submitting comments on the Draft EIS.
- Section 1.7 was added to summarize changes between the Draft and Final EIS.

- Section 2.2.1.5 was updated to discuss Hawaiian Electric's biofuels purchasing policy, which includes a section on local feedstock support mechanisms that describes Hawaiian Electric's support for developing local biofuel producers and a section on sourcing requirements for biofuel that requires third-party certification of biofuel sourcing. The biofuels purchasing policy was added for reference as Appendix B.
- Sections 3.1.1.2, 4.1, and 4.2 were updated to clarify the Army master planning process.
- Section 3.4.1.1 was updated to clarify the source of the monitoring data presented in Table 3.4-1.
- Section 3.4.1.5 was updated to reflect recent regulatory changes regarding GHG emissions.
- Section 3.4.2.1.1 was updated to add text quantifying construction emissions of criteria pollutants.
- In Section 3.4.2.1.2.3, Table 3.4-8 was updated to be consistent with Table 2.0-1 in *Prevention of Significant Deterioration & Covered Source Permit Application for the SGSP (January 2015)*.
- Section 3.4.2.1.2.4 was updated to add a reference to Hawaiian Electric's Prevention of Significant Deterioration & Covered Source Permit Application.
- In Section 3.4.2.1.2.5, sulfur dioxide (SO_2) emissions in Table 3.4-9 were updated to be consistent with the *Proposed Schofield Generating Station Weight of Evidence Ambient Air Quality Analysis*, dated January 2015.
- Section 3.4.2.1.2.5 was updated with information about lifecycle GHG emissions from biofuels and fossil fuels.
- Section 3.4.2.1.3 was updated with additional potential best management practices (BMPs) for fugitive dust control.
- Sections 3.7.1.1 and 3.7.2.1.1 were updated with information about flood zones.
- Section 3.7.1.2 was updated with information about the pending total maximum daily load (TMDL) determination for Waikele Stream.
- Section 3.7.2.1.1 was updated with information about the project's National Pollutant Discharge Elimination System (NPDES) permit.
- Sections 3.7.2.1.2 and 3.13.1.3 were updated with information about the SGSP's water usage.
- Section 3.10.2.1 was updated with information about the State Historic Preservation Division (SHPD) consultation for the project.
- Section 3.10.2.1.1 was updated with information about actions to be taken if iwi küpuna or Native Hawaiian cultural deposits were identified during construction.
- Section 3.11.2.1.2 was updated with urea storage information.
- Section 4.4.1 was updated to explain how the SGSP would support the Hawaii State Plan goal of living within the natural resource limits of the State.
- Section 7 was revised with new and updated references.

- Section 10 was updated to reflect the distribution list for the Final EIS.
- Section 11 was updated to add a new acronym.
- Appendices A and B were combined and updated to include information from the Draft EIS public review period. Appendix A now includes subsections A1-EIS preparation notices; A2-scoping comments (and responses to comments submitted under HEPA); A3-Draft EIS public notices; and A4-comments on the Draft EIS (submitted in writing or taken verbatim from the public meeting transcripts) and response letters sent to all citizens, agencies, and organizations that provided comments on the Draft EIS.

  Appendix B was updated to contain Hawaiian Electric's biofuel purchasing policy (the information previously in Appendix B is now in Appendix A).

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SECTION 2
DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

This section describes the Proposed Action (section 2.2) and the No Action Alternative (section 2.3). Section 2.4 discusses other alternatives considered but not carried forward for analysis. The Army and Hawaiian Electric's preferred alternative is the Proposed Action.

2.1 SCREENING CRITERIA

In addition to the statements of the Proposed Action's purpose and need in section 1, the Army and Hawaiian Electric established the following criteria to aid in identifying viable alternatives that could meet those needs.

Mission Compatibility. The project must be compatible with the military missions and training occurring at Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia. Site development and operations may not adversely affect training activities, operations, or the installation master plan.

On-Installation Energy Generation Potential for Increased Energy Security. The project must allow the installation greater control of and access to its energy supplies and transmission while reducing the duration of external distribution failures. The source should meet or exceed the peak power requirement when considering capacity factors, maintenance, and reliability of the systems. The plant's power should be available to USAG-HI on a first-priority basis when a qualifying outage occurs. The project should also be compatible with the installation's long-term energy master plan, including the relocation of the Castner Substation to a more central location on Schofield Barracks.

Grid Access and Electrical Tie-in Potential. The facility should be as close as possible to existing transmission facilities to optimize the cost, security, and reliability of the interconnection to the grid and the Army facilities to be served. The grid infrastructure to which the SGSP connects must have the capacity to transport, or to be upgraded to transport, the full rated power of the project. The interconnection must be capable of providing this power to the grid (i.e., serve all Hawaiian Electric customers) and also have the capability to be "islanded"[5] to meet Army energy security needs, with the minimum amount of upgrades and cost.

Geophysical Factors. The project site must have topography, aspect, slope, and soils compatible with the proposed infrastructure.

Geography. The project must be sited on high ground in a more central location on the island not susceptible to coastal effects, such as tsunami and storm surge.

Environmental Factors. The project location and facilities must allow acceptable accommodation of any sensitive cultural and natural resources.

Safety and Unexploded Ordnance. The project must be sited to avoid exposure to unexploded ordnance and damage from munitions. It must not conflict with military training activities or jeopardize the personal safety of those constructing or operating the facilities.

[5] The term *islanding* refers to manipulating certain components of the grid (e.g., breakers and switches) to electrically isolate the three Army installations and the generating station from the rest of the grid. When islanded, the SGSP would be the sole source of utility electrical power to the three Army installations and isolate them from any faults that may might be present on the larger Oahu grid.

Project Cost and Use of Proven Renewable Technologies. The project must use proven renewable energy technologies that can be financed at reasonable rates. It must be economically feasible for the Army, Hawaiian Electric, and Oahu ratepayers.

Compliance with Federal and State Mandates and DoD, Army, and Hawaiian Electric Goals. The project must contribute to compliance with government mandates, Army and Hawaiian Electric goals and objectives regarding renewable energy production, energy security, and GHG emissions reduction.

Utility Considerations. The project must be compatible with Hawaiian Electric's grid and infrastructure, support and enhance Hawaiian Electric's ability to meet anticipated energy and power requirements, address emergency demands, enhance the ability to integrate intermittent and distributed sources (e.g., wind, solar) into the grid, and meet daily peaking and cycling requirements.

Installation Energy Needs. The project must be capable of meeting the energy and peak power needs of the Army installations (Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia) for up to 5 days without resupply from off-site and up to 30 days without resupply from off-island. The project must be capable of meeting these needs under the project's normal operating conditions, with consideration for maintenance, repair, and other activities. The combined peak demand of the three Army installations was approximately 32 MW in 2012.

Power Outage. During a natural or man-caused power outage, the project must provide reliable backup power to the installations and the capability to reduce the time required to restore power to the community. The reliability of the energy source would be enhanced if it is on a military installation where it is minimally susceptible to disruption during such events and not influenced by coastal events.

Funding. Congressionally appropriated funding to execute a commercial-scale renewable energy power plant project is not available, so the project must not rely on federal funding.

Physical Security. The generating station and the interconnection to the Army facilities, to the maximum extent practicable, must be in a secure facility to provide first response capability if there is a man-caused catastrophe.

Firm and Dispatchable Power. The project must provide firm and dispatchable power—power that can be started up quickly and provide power when and as required, independent of the availability of external power sources. The project must be able to meet the system operation needs for peaking, cycling, and baseload generation. The project must provide blackstart and quickstarting capabilities to help maintain grid stability.

Low Load, High Ramp Rate, and Broad Power Range. The project must be able to operate at low load to provide the capability to reliably restore power to the Army's load centers following an outage. It must have the capability to ramp up and down over a broad range of power output, to enhance Hawaiian Electric's ability to rapidly respond to system needs, and to integrate more variable generation sources such as wind and solar.

Fuel Efficiency. The project must use a power generation technology that is highly efficient across a broad spectrum of its load profile to minimize customer fuel costs and project environmental impacts, while maximizing the project's load flexibility and usability.

Multifuel-Capable. The project must be capable of using a variety of fuels, including biofuels and natural gas. This fuel flexibility would meet two goals. First, it would allow the opportunity to take advantage of low cost fuel pricing options as they become available, which would save customer costs. Second, it would ensure that the project has the capability to provide energy

security throughout its lifetime, regardless of the future availability or cost of any single fuel source.

Renewable Energy Goals. The project must generate renewable energy and contribute to meeting the Army's goals and objectives regarding renewable energy production, and Hawaiian Electric's RPS goals.

2.2 PROPOSED ACTION

The Proposed Action, referred to as the SGSP, consists of the following:

(1) The U.S. Army's lease of 8.13 acres of land and the related granting of a 2.5-acre interconnection easement (Figures 2.2-1 and 2.2-2), on Schofield Barracks and Wheeler Army Airfield to Hawaiian Electric to construct, operate, and maintain a 50-MW-capacity renewable energy power plant to include associated power poles, high-tension power lines, and related equipment and facilities. The lease would be under the authority of 10 USC §2667, "Leases: non-excess property of military departments and Defense Agencies." The interconnection easement property would be under the authority of 10 USC §2668, "Easements for rights-of-way."

(2) The State of Hawaii Department of Land and Natural Resources granting of a 1.28-acre easement and a 0.7-acre conservation district authorization to Hawaiian Electric to construct a 46-kV electrical power transmission line between the SGSP site and the existing Wahiawa Substation.

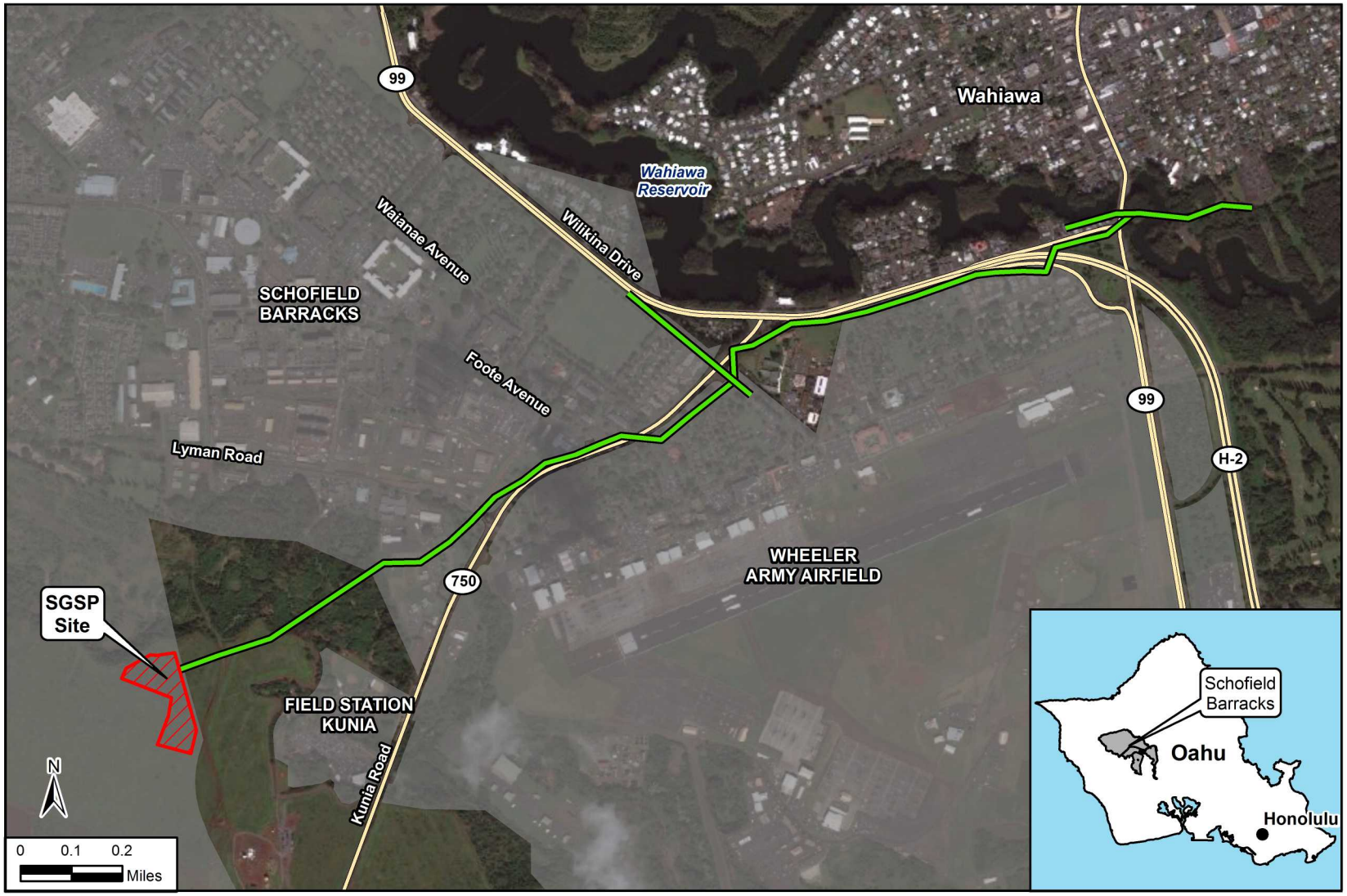
(3) Hawaiian Electric's construction, ownership, operation, and maintenance of a 50-MW-capacity, biofuel-capable power generation plant and 46-kV subtransmission line required to connect the Schofield Generating Station to the Hawaiian Electric grid. Hawaiian Electric would be the sole owner of the plant and the electrical power transmission facilities.

The electricity produced by the SGSP would normally supply power to all Hawaiian Electric customers through the islandwide electrical grid. During outages that meet the criteria specified in the Operating Agreement, SGSP output would first be provided to Army facilities at Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia up to their peak demand of 32 MW to meet their missions and would additionally support the grid up to its full capacity, including Wahiawa and the Wahiawa General Hospital. If there were a full island outage, the plant could also be used to blackstart other plants. See section 2.2.3, Operation, for a more detailed discussion of how and under what conditions the generating station would operate.

2.2.1 Power Generation Plant

The Schofield Generating Station would consist of six Wartsila 20V34DF (or similar) multifuel-capable, reciprocating internal combustion engine-generator sets and associated equipment. Figure 2.2-3 shows the proposed plant layout. A portion of the site would be paved to provide internal access to all project facilities and on-site buildings. The areas around equipment, where not paved, would have graveled surfacing. Access to the site during construction would be by a temporary road connected to Kunia Road. After construction, when the plant is operational, permanent access to the site would be through Schofield Barracks through the Lyman Gate entrance.

Each engine would be equipped with selective catalytic reduction (SCR) equipment containing catalysts to reduce nitrogen oxide (NOx) emissions, and an oxidation catalyst to reduce carbon



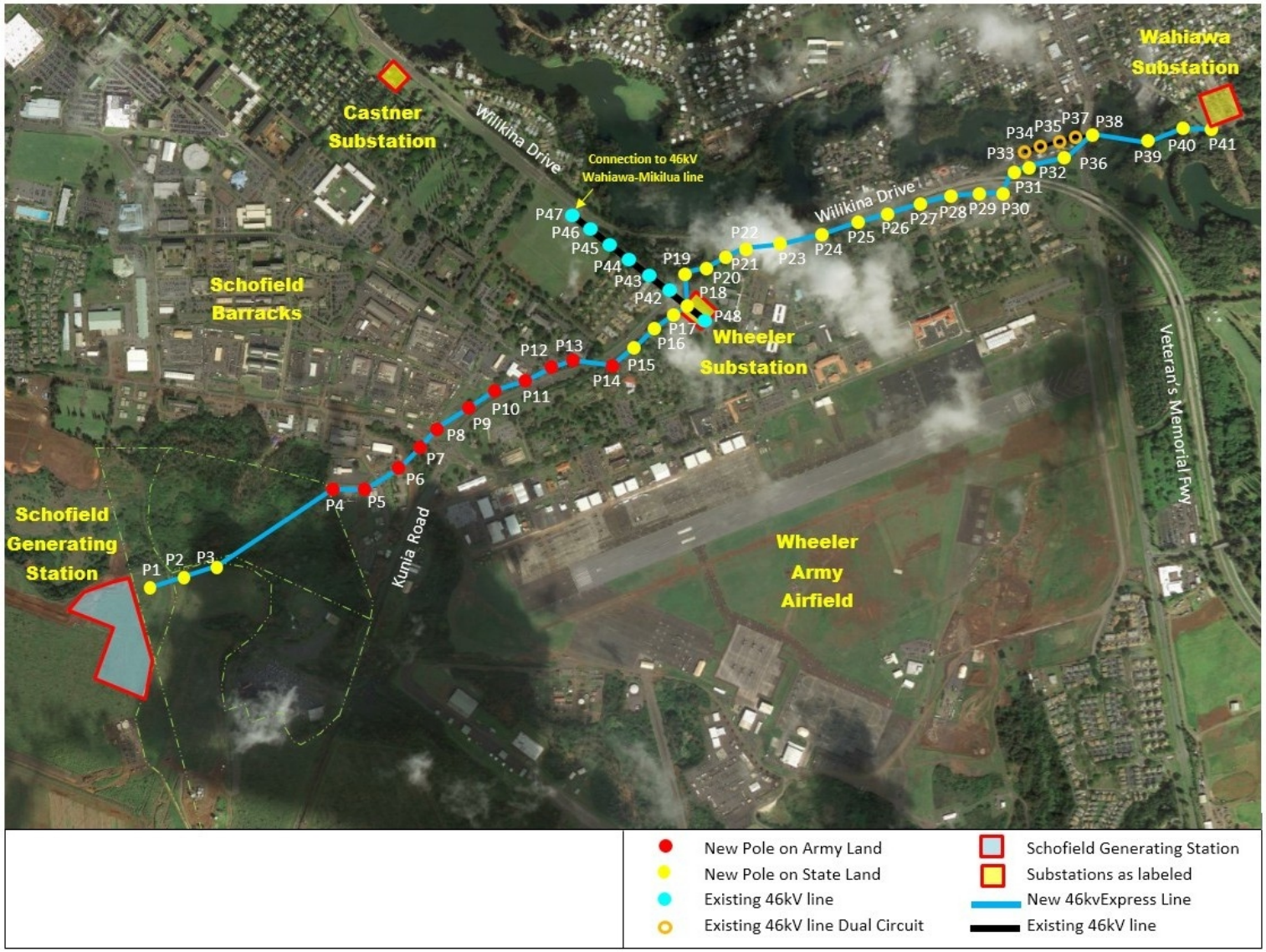
LEGEND

- DoD/Federal Land
- State Route
- SGSP Site
- Planned Interconnection Route

Project Location

Figure 2.2-1

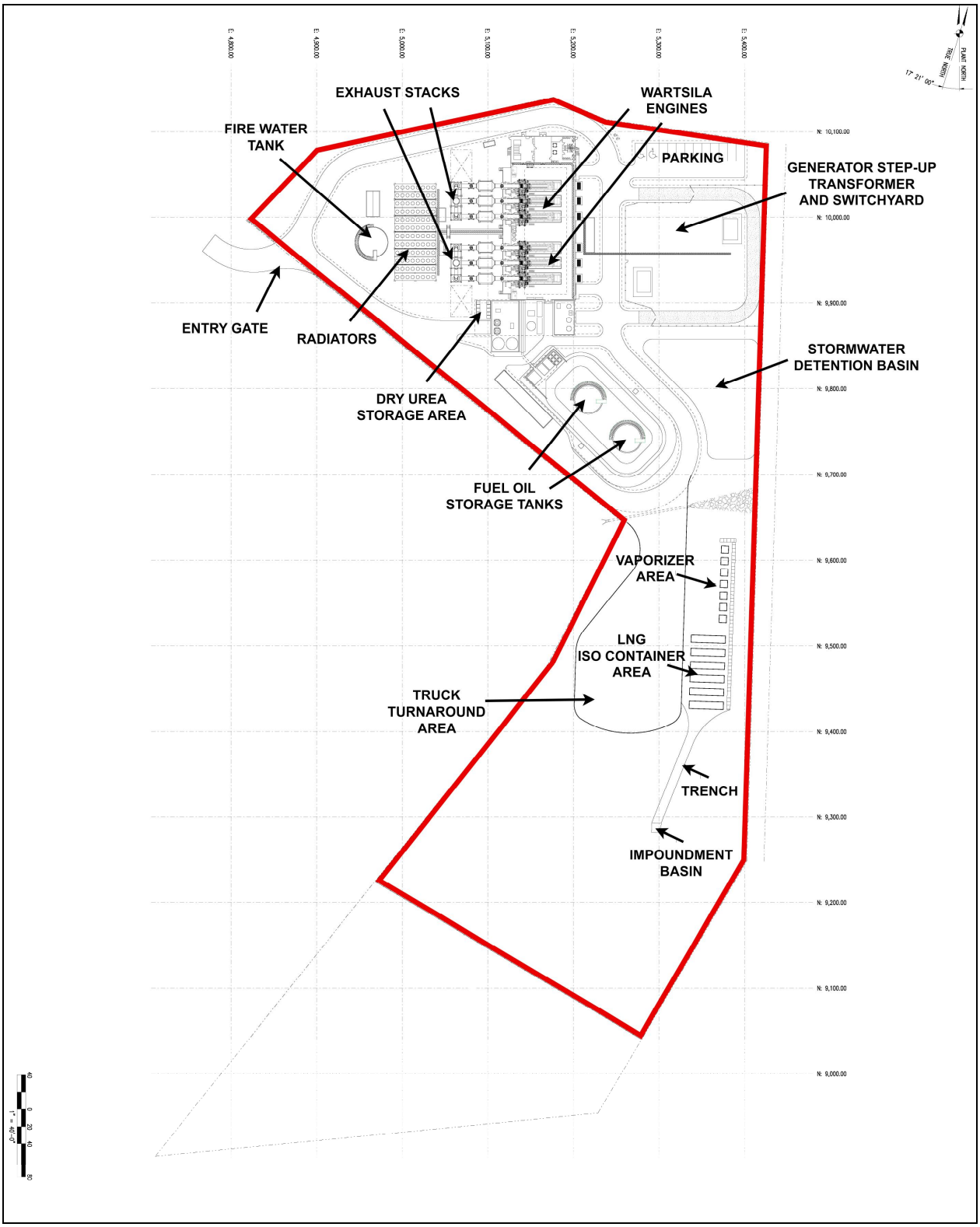
Source: Schofield Barracks GIS 2014, ESRI 2011.



New Pole on Army Land	Schofield Generating Station
New Pole on State Land	Substations as labeled
Existing 46kV line	New 46kvExpress Line
Existing 46kV line Dual Circuit	Existing 46kV line

SGSP Site Boundary and 46kV Route

Figure 2.2-2



Reduced SGSP Site Footprint Area

Proposed Power Plant Layout

Figure 2.2-3

Source: Quanta Power Generation 2014.

monoxide (CO) emissions. The new facility would provide a total gross generation rating of 50 MW.

Auxiliary equipment would include inlet air filters, gas exhaust silencers and stacks, a closed-loop air cooled radiator array, generator step-up and auxiliary transformers, fuel and lubricating oil handling equipment and associated storage tanks, a water purification system, a urea mixing system to supply the SCR emissions control system, a switchyard, and a facility to receive and re-gasify LNG. The generator sets would be installed in a single engine hall. Each generator set would generate approximately 8.4 MW gross. Associated equipment would include emission control systems necessary to meet the proposed emission limits.

Each of the six engine-generator sets is expected to have an overall annual availability (i.e., operability rate) of more than 95 percent, including scheduled and forced outages. The design of the plant would provide operating flexibility. Each engine is designed to start and be fully operational in 6 minutes or less. This capability is well-adapted to meeting changing grid conditions. Each engine provides various ancillary services, such as ramp up, ramp down, spinning reserve, and voltage and frequency regulation, allowing these units to readily adapt to changing conditions that might arise with large amounts of as-available generation on the grid.

The engines can operate at partial load, with a minimum load of 50 percent. Because each engine can operate independently, this gives the 50-MW plant a minimum load of approximately 4.2 MW. Operational modes would be driven by good operating practices, system conditions, and dispatch requirements.

The power plant site would be enclosed by a chain-link security fence that meets Hawaiian Electric security requirements. The generating station's fence would be completely inside and independent of the Schofield Barracks perimeter security fence. While Hawaiian Electric's other facilities have barbed wire-topped chain-link fences to meet security requirements, because of its unique location within the Schofield Barracks security perimeter, barbed wire is not considered necessary for the SGSP fence, and it will not be installed.

2.2.1.1 Reciprocating Engine-Generators

Six separate reciprocating engine-generator trains would operate in parallel in the engine hall and power block. Each reciprocating engine would provide approximately 17 percent of the total power block output. The reciprocating engine subsystems include the inlet air filtration, reciprocating engine, generator, and instrumentation. The reciprocating engine is composed of a cylinder block, valves, pistons, connecting rods, and a crankshaft. It is similar to a conventional automobile engine, only larger. Each reciprocating engine contains 20 cylinders, pistons, and connecting rods arrayed in V-formation. Reciprocating engine control and instrumentation would cover the engine governing system and the protective system.

Thermal energy is produced in the reciprocating engines through the combustion of fuel that is converted into mechanical energy to drive the crank shaft and electric generators. The generator sets would be equipped with the following required systems to provide safe and reliable operation:

- Fuel systems
- Lubricating oil systems
- Compressed air systems
- Cooling systems

- Intake air and exhaust gas systems
- Emission control systems
- Fire detection and protection systems
- Oily water collection systems
- Engine-generator control and protection systems

The engine-generator sets would be arrayed in two groups of three engines each and installed in a single engine hall 190 feet long, 75 feet wide, and 33 feet high.

2.2.1.2 Catalyst Housing

The catalyst housings, one for each reciprocating engine's exhaust system, are equipped with catalyst modules to reduce air emissions. The SCR emission control system would inject a 40-percent urea solution into the exhaust gas upstream of the catalyst module. Proper mixing would be ensured using a mixing duct equipped with static mixers. The subsequent chemical reaction would reduce NOx to nitrogen and water, reducing NOx concentration in the exhaust gas, to conform to the air permit. (Detailed engineering would determine final and permitted levels.)

An oxidation catalyst would be installed in the housing to reduce the concentration of CO and volatile organic compounds (VOC) in the exhaust gas emitted to atmosphere to conform to the air permit. (Detailed engineering would determine final and permitted levels.) The exhaust from each catalyst housing would be discharged from two 95-foot-tall exhaust gas silencer stacks, as seen in Figure 2.2-4.

2.2.1.3 Major Electrical Equipment and Systems

The bulk of the electric power produced by the facility would be transmitted to the power grid through a direct connection with a new 46-kV transmission line. A small amount of electric power (~1.0 MW) would be used on-site to power auxiliaries (e.g., pumps, radiator fans, control systems) and general facility loads (i.e., lighting, heating, and air conditioning).

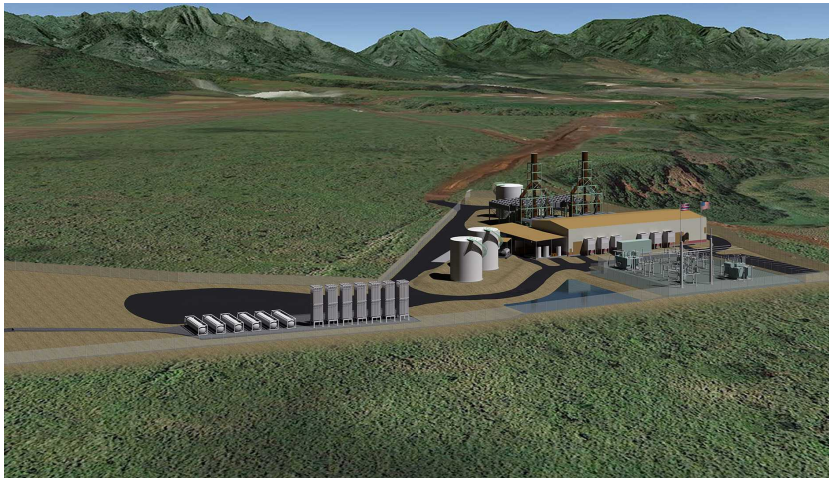
Electric power would also be converted from alternating current (AC) to direct current (DC) and would be used as backup power for control systems and other uses.

2.2.1.3.1 Alternating Current Power

Power would be generated by the six generators at 13.8 kV and then stepped up using two 13.8/46 kV, natural ester-filled generator step-up transformers to support connection to the local 46-kV network. Surge arrestors protect the transformer from surges in the 46-kV system caused by lightning strikes or other system disturbances. The transformers would be set on a concrete foundation that includes a secondary containment reservoir to contain the transformer fluid if there is a leak or spill.

The high-voltage side of the generator step-up transformers would be connected through gas-insulated (SF6) circuit breakers to a single-circuit, three-phase, overhead 46-kV transmission line that would connect to the existing Hawaiian Electric 46-kV grid.

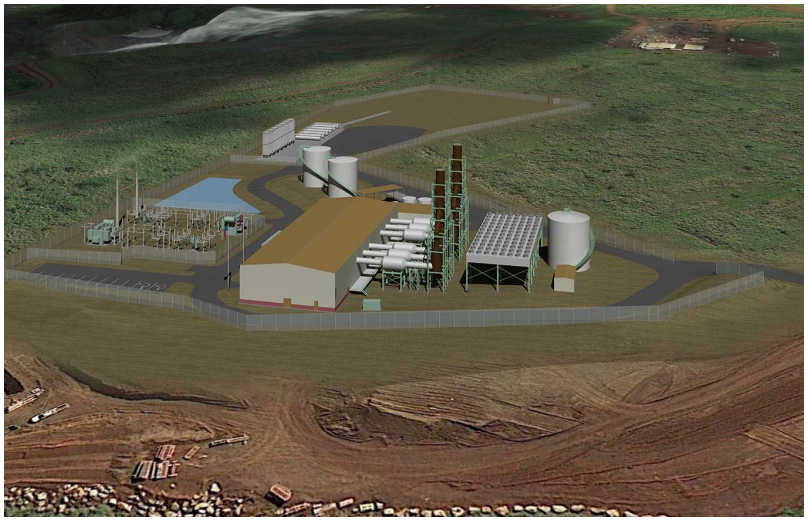
Auxiliary station power would be stepped down from 13.8 kV to 480 volts using two auxiliary service transformers. When running, the units would supply this auxiliary power. When the units are not running, station auxiliary power would be back-fed from the grid through the generator step-up transformers. Station auxiliary power would supply plant low-voltage switchgear and motor control centers (MCC).



Looking west

Looking south

Looking northeast



Looking southeast

3-D Visual Renderings of Plant Layout

Source: Quanta Power Generation 2014.

Figure 2.2-4

Each station service transformer would be the dry type and sized to supply 480-volt, 3-phase power to the plant's 480-volt MCCs. The MCCs would provide power to the 480-volt motor loads and other low-voltage plant loads.

2.2.1.3.2 125-Volt Direct Current Power Supply System

A 125-volt DC power supply system for the new engines consisting of a 100-percent capacity battery bank, two 100-percent static battery chargers, a switchboard, and two or more distribution panels would be supplied for the balance-of-plant and essential engine equipment.

Under normal operating conditions, the battery chargers supply DC power to the DC loads. The battery chargers are fed by 480-volt AC (VAC) and continuously charge the battery banks while supplying power to the DC loads.

Under abnormal or emergency conditions, when power from the AC power supply (480-volt) system is unavailable, the batteries supply DC power to the DC system loads. Recharging of a discharged battery occurs whenever 480-volt power becomes available from the AC power supply system. The rate of charge depends on the characteristics of the battery, battery charger, and the connected DC load during charging. The anticipated maximum recharge time would be 12 hours.

The 125-volt DC system would also be used to provide control power to the 13,800-volt switchgear, the 480-volt load centers, critical control circuits, and the plant control system.

2.2.1.3.3 Uninterruptible Power Supply System

The reciprocating engines would have an essential service 120-VAC, single-phase, 60-hertz uninterruptible power supply supplying power to essential instrumentation, critical equipment loads, and unit protection and safety systems that require uninterrupted AC power.

2.2.1.3.4 Blackstart Generator

The system includes a 300-kilowatt, battery-started, emergency diesel generator that in the event of a complete plant and grid outage would have the capability to start independently and provide power to all auxiliary equipment necessary to start up and operate the plant.

2.2.1.4 Microwave Tower

There would be a microwave tower at the generating station site as a redundant path of communication. The microwave tower signal would be directed to Mauna Kapu that would redirect the signal back to the Waiau Power Plant and be tied to the existing gridwide communication system. These communication links would be used for two-way communications between the generating station and Hawaiian Electric's main control center at its Ward Avenue facility.

2.2.1.5 Fuel System

The reciprocating engines would use a liquid biofuel blend and would also be capable of burning natural gas derived from LNG. If operated at full power all six units combined would require approximately 450 million British thermal units of fuel per hour, equivalent to approximately 3,600 gallons of biodiesel blend per hour. The Army and Hawaiian Electric have agreed that at least 50 percent of the fuel used by the generating station will be biofuel, and that the generating station will use a minimum of 3.5 million gallons per year of biofuel. For the remainder of the generating station's fuel requirements, Hawaiian Electric would have the flexibility to use

biofuel, diesel, or LNG, if and when LNG becomes available on the island, in any combination that it deems most efficient and cost-effective.

Hawaiian Electric sources fuel via an established competitive procurement process designed to ensure that the utility provides cost-effective electricity to all ratepayers. Contracts established under this process typically expire after a few years, so the contracts that would provide fuel to the SGSP are likely not those that are currently in place. Therefore, it is not possible to state the specific source(s) of fuel for the proposed power plant.

Biodiesel would be delivered to the site in fuel trucks with approximate capacities of 5,800 gallons and diesel delivered in fuel trucks with approximate 9,000-gallon capacities. These trucks would enter the site through the Schofield Barracks Lyman Gate. The expected truck traffic load would depend on plant usage, and could vary from one to nine trucks per day when in normal operations or islanded mode. In the extreme case of continuous operation at a rated capacity of 100 percent biodiesel, the traffic load would be 15 trucks per day. To store liquid fuel, the generating station would include two 32-foot-diameter by 40-foot-high aboveground fuel storage tanks. Two tanks are planned to provide redundancy and reserve capacity during planned tank maintenance. Each tank would have a maximum net capacity of 210,000 gallons. Combined, these tanks would have the capability of storing up to 420,000 gallons of fuel. The facility would include secondary containment for 110 percent of one tank, in accordance with industry and Army regulations for aboveground storage tanks.

When LNG becomes available as a fuel source, it would be delivered to the site in International Standards Organization (ISO) container trucks holding approximately 10,000 gallons. LNG would be delivered to a separate receiving area. The trailer-mounted LNG ISO containers would be disconnected from the delivery trucks and be the on-site LNG storage. The ISO containers maintain the LNG at cryogenic temperatures, maintaining the natural gas in liquid form. The containers would be connected to a LNG manifold, so that the LNG flows from the containers through the manifold piping to a bank of seven vaporizers. The vaporizers allow the LNG to absorb heat from the surrounding air, converting the LNG back to a gas. The gas would flow from the vaporizers, through an underground pipe, to the engine hall. The receiving area and manifold system would be designed to accommodate up to six LNG ISO containers at one time. Assuming that the LNG ISO containers arrive holding 10,000 gallons of fuel, each one could support approximately 2 hours of full-power operation of the entire generating station. The empty ISO containers would be trucked away and replaced with full containers.

To optimize fuel efficiency, Hawaiian Electric intends to seek PUC approval to shift its primary location for biofuel use from the Campbell Industrial Park CT-1 unit (a flexible simple-cycle combustion turbine) to the SGSP. Due to differences in plant operation and efficiencies, this would result in a significant increase in the amount of renewable energy produced by the same amount of biofuel. If approved by the PUC, this project would increase Hawaiian Electric's biofuel consumption from the current 3 million gallons per year to a minimum of 3.5 million gallons per year.

One of Hawaiian Electric's goals remains to reduce Hawaii's dependence on imported fossil fuel and the adverse environmental and economic impact of burning fossil fuel to generate electricity for residents of and visitors to the Hawaiian Islands. A transition from petroleum fuels to biofuels derived from sustainably produced and preferably locally sourced feedstock offers potential for near-term reductions in GHG emissions and increased security from continuing oil market price volatility and potential supply interruptions. Hawaiian Electric maintains a biofuel purchasing policy that was developed in cooperation with the National Resources Defense Council (NRDC) in 2007 and updated in 2013 (Hawaiian Electric 2013). This policy outlines Hawaiian Electric's

preference for procuring locally sourced biofuel and the requirement to obtain biofuel generated from sustainable sources. The policy includes a section on local feedstock support mechanisms that discusses Hawaiian Electric's support for development of local biofuel producers and a section on sourcing requirements for biofuel that requires third-party certification of biofuel sourcing. A copy of the policy is included as Appendix B.

2.2.1.6 Water Supply and Use

The power plant would connect to the Army's potable water supply infrastructure that is currently being installed on the South Range. The project would be designed to minimize water use. Water would primarily be required to make the urea solution needed for the SCR emissions control system. Other minor water uses would include:

- Makeup water for air radiator cooling system
- Washdown of equipment
- Landscaping
- Hose bibs
- Periodic additions to the on-site fire water tank
- Drinking and cleaning water for an anticipated staff of three people per shift (e.g., sinks, toilets, and showers)
- Eyewash stations

The largest water load would be the SCR system. To maintain air emissions required by the air permit, a liquid solution of 40 percent urea is injected into the exhaust duct before the exhaust gases enter the SCR. If all six engines were operating at full power, a total of approximately 372 gallons per hour of urea solution would be required. This urea solution would be made on-site, by mixing dry urea pellets and demineralized water. The demineralized water would be generated on-site by using potable water and passing it through a reverse-osmosis water treatment system. Approximately 340 gallons per hour of potable water would be required to generate the maximum anticipated flow rate of 372 gallons of 40-percent urea solution per hour.

The plant itself would use service water for cooling the generators and lube oil systems. SGSP engines would employ closed-loop air radiators for cooling, so water losses would be minimal and independent of ambient conditions. It is estimated that 0.05 gallon per minute would be used for makeup water when all engines are in operation. Cooling water from the engines circulates through tube bundles with fins that radiate heat and are cooled by fans circulating the air. The coolant is a solution of water and a rust inhibitor. Frequency converters control the fans to minimize parasitic load and noise. This system uses little water, and the engine coolant systems are filled from isolated maintenance water tanks. Any necessary treatment is done in the maintenance water tanks. During maintenance, the coolant is pumped back to the tanks to enable water recycling without discharge.

2.2.1.7 Waste Management

Wastes from the power plant include process and sanitary wastewater, nonhazardous waste, and hazardous waste. Waste management is the process by which these wastes would be properly collected, treated, and disposed.

2.2.1.7.1 Wastewater

The domestic wastewater collection system would collect sanitary wastewater from sinks, toilets, showers, and other sanitary facilities, and discharge to a new plant sanitary sewer pipeline that interconnects to the Army wastewater lift station just north of the generating station property.

The process wastewater collection system would collect area wash down, sample drains, and drainage from facility equipment areas. Drips from process water used in engine cooling, liquid dripped from seals, condensate from compressors, and area wash downs are collected in a system of floor drains, hub drains, and piping and routed to water collection sumps adjacent to the engine house.

All material draining into these sumps would go to the oil/water separator. The clean water from the oil/water separator would be discharged to the sanitary sewer system. The sludge in the oil/water separator would be sampled prior to periodic removal to determine if it is a hazardous waste. It is anticipated to be a recyclable oily waste product rather than a hazardous material. If required, a licensed hazardous waste transporter would remove the accumulated sludge and recycle it or dispose of it at a permitted recycling facility or hazardous waste disposal site.

Stormwater runoff from area drains in the lubricating oil and diesel tank areas would be collected in sumps that would routinely be checked for level and contamination (oil sheen or physical contamination) and periodically pumped to the oil/water separator. Uncontaminated water from these sumps would be discharged to the plant stormwater drainage system. Clean effluent from the oil/water separator would be discharged to the sanitary sewer system. Stormwater from these sumps containing any cleaning chemicals or collected spills would be trucked off-site for disposals at an approved wastewater disposal facility.

A stormwater detention basin is included in the design. The design of the stormwater detention basin would include bird deterrent measures such as netting, bird balls, or an equivalent system to prevent the use of the basin by birds or waterfowl that are attracted to water bodies.

2.2.1.7.2 Nonhazardous Waste

All solid wastes generated by the facility (e.g., used oils, used solvents, used cleaners, spent coolants, waste fuels, wash waters, cleaning residues and debris, scrap metal) would be characterized to determine if they are a hazardous waste. The project would produce construction, operation, and maintenance nonhazardous solid wastes typical of power generation operations. Because the SGSP would be constructed at a currently undeveloped site, no demolition or associated waste is anticipated. Construction wastes generally include soil, scrap wood, excess concrete, empty containers, scrap metal, and insulation. Generation plant wastes include oily rags; scrap metal and plastic; insulation material; defective or broken electrical materials; empty containers; and other solid wastes, including the typical refuse generated by workers. Solid wastes would be trucked off-site for recycling or disposal through a waste management contractor.

2.2.1.7.3 Hazardous Waste

The methods to properly manage and dispose of hazardous wastes must be in full compliance with applicable state and federal hazardous waste regulations. When possible, used lubricating oil would be recovered and recycled as used oil, in full compliance with HAR 11-279, as opposed to being managed as a hazardous waste. If applicable, spent lubrication oil filters must be managed in accordance with HAR 11-261-4(b)(13) to allow for metal recycling or disposal in a Class I landfill. Spent SCR and oxidation catalysts would be recycled by the supplier or disposed of in

accordance with applicable regulatory requirements. Workers would be trained to handle hazardous wastes generated at the site.

2.2.1.8 Hazardous Materials

A variety of hazardous materials would be stored and used during the construction and operation of the SGSP. The storage, handling, and use of all hazardous materials would be in accordance with applicable laws, ordinances, regulations, and standards. Hazardous materials would be stored in appropriate storage facilities. Bulk chemicals would be stored in storage tanks, and most other chemicals would be stored in returnable delivery containers. Chemical storage and chemical feed areas would be designed to contain leaks and spills. A drainage system, entering into concrete containment pits, would be constructed to contain leaks and spills of a full-tank capacity without overflowing the containment area. For multiple tanks in the same containment area, the capacity of the largest single tank plus sufficient freeboard to contain precipitation would determine the capacity of the containment area and drain piping. Drain piping for reactive chemicals would be trapped and isolated from other drains to prevent vapors from causing a chemical reaction.

2.2.1.9 Safety Precautions and Spill Preparedness

The urea storage and delivery area would have spill containment. There would be safety showers and eyewashes adjacent to, or near, chemical storage and use areas. Plant personnel would use approved personal protective equipment during chemical spill containment and cleanup, be properly trained in the handling of these chemicals, and instructed in the procedures to follow in case of a chemical spill or accidental release. Adequate supplies of absorbent material would be stored on-site for spill cleanup.

2.2.1.10 Air Emissions Control and Monitoring

Air emissions from the reciprocating engines would be controlled using state-of-the-art emission control systems. Emissions that would be controlled include NOx, VOCs, CO, and particulate matter.

The SCR would be used to control NOx concentrations in the exhaust gas emitted to the atmosphere in conformance with the air permit (detailed engineering would be required to determine final and permitted levels). The SCR process would use a urea solution system and a catalyst to reduce NOx to nitrogen and water. The SCR equipment would include a reactor chamber; catalyst modules; urea storage, transfer, and injection systems; and monitoring equipment and sensors.

An oxidizing catalytic converter would be used to reduce the CO concentration in the exhaust gas emitted to the atmosphere to conform to the air permit (detailed engineering would be required to determine final and permitted levels). Emissions monitoring and reporting would be done as required by the air permit.

2.2.1.11 Lighting

The lighting system provides illumination for operation under normal conditions and for egress under emergency conditions and includes emergency lighting for manual operations during an outage of the normal power source. The system provides 120-volt convenience outlets for portable lamps and tools. The lighting includes these components:

- All outdoor lighting would be fully shielded with full cut-off luminary lights to minimize light pollution and the impact on migratory birds.
- Frequently switched indoor lighting (such as office and maintenance areas) controlled by wall-mounted switches. Infrequently switched indoor lighting (such as in equipment buildings) controlled by panel board circuit breakers.
- Self-contained battery-backed emergency lighting and exit signs to provide safe egress from buildings during a total loss of plant power. Emergency lighting would be designed to maintain the necessary illumination for a minimum of 90 minutes.
- Ground fault circuit interrupter feeds for all 120-volt outdoor receptacles—receptacles located so equipment at grade can be reached with a 75-foot extension cord.
- Fixtures placed to provide lighting levels that comply with the Occupational Safety and Health Administration safety standards.

2.2.1.12 Fire Protection System

The fire protection system would be designed to protect personnel and limit property loss and plant downtime if there is a fire.

SGSP buildings would be furnished with automatic fire detection and suppression systems the type and capabilities would be determined during detailed design. Portable carbon dioxide and dry chemical extinguishers would be located throughout the power plant site, including switchgear rooms. Extinguishers would be sized, rated, and spaced in accordance with National Fire Protection Association (NFPA) 10.

The project would comply with applicable provisions of the Fire Code of the City and County of Honolulu (HRS Chapter 20), which adopts, with stated modifications, the NFPA's Uniform Fire Code. Hawaiian Electric would maintain vegetation at the generating station and along the interconnection easement in accordance with this code so it does not present a fire hazard. Hawaiian Electric would obtain required permits from the Honolulu Fire Department prior to fuel storage tank installation. The fire protection and fire alarm systems at the generating station would comply with applicable provisions of the code, and Hawaiian Electric would obtain the necessary permits and licenses for these systems.

Site firefighting water would be supplied by an underground loop piping system from an on-site water storage tank (8-hour time interval as required by NFPA 22) that would be filled from a service water line provided by the Army. The fire water supply and pumping system would provide firefighting water to yard hydrants, hose stations, and water spray and sprinkler systems. The system would be capable of supplying maximum water demand for any automatic sprinkler system, plus water for fire hydrants and hose stations. Hydraulic calculations would be done to demonstrate that the fire protection loop has the capacity to provide the required firefighting water for the power plant. There would be a plant firewater loop, designed and installed in accordance with NFPA 24, to reach all parts of the facility. The fire hydrants and the fixed suppression systems would be supplied from the firewater loop. The firewater systems would have sectionalizing valves to allow isolation of a failure in any part of the system, so the remainder of the system could continue to function properly. The fire protection system would include a backup diesel fire pump.

Fixed fire suppression systems would be installed at determined fire risk areas, such as the fuel forwarding pumps, engines, and lube oil equipment. Fixed firefighting monitor stations would be installed around the fuel storage tanks. Separation criteria, as defined by NFPA, must be used to

determine spacing of the transformers, urea storage, and other areas that pose a fire risk or health hazard, such as fuel, lube oil, and hydraulic oil piping and containment, and the fire pump skid. Sprinkler systems would be installed in the control room building and fire pump enclosure as required by NFPA and local codes. Each generator step-up and auxiliary transformer would have an Automatic Water Spray (Deluge) System.

If there was a major fire, plant personnel would be able to call upon the Honolulu or Federal Fire Department for assistance.

2.2.2 Transmission Line

The power generated would be delivered to the grid through a new 46-kV transmission line (refer to Figure 2.2-2).

2.2.2.1 Transmission Line Route

The new transmission line would begin at the SGSP switchyard (pole 1), cross the Waikele Stream gulch (Poles 3-4), and continue back onto the Schofield Barracks installation. The new line would parallel an existing 12-kV line on Schofield Barracks along Kunia Road (Poles 4-13) and cross onto Wheeler Army Airfield at the residential area near Foote Gate. This line would continue along Kunia Road (Poles 14-22) until it meets and continues along Wilikina Drive (Poles 23-30). The express line would traverse the south side of Wilikina Drive, cross the Veterans Memorial Freeway entrance, and continue to the end of Wilikina Drive. The next portion of the preferred line route up to Lake Wilson would be installed on a new pole line in an open area along Kamehameha Highway (Poles 31-38). The last portion of the express line (Poles 38-41) continues across Lake Wilson into the Wahiawa Freshwater State Park. Approximately 623 feet of the line would go through the park parallel to the existing 46-kV Wahiawa-Mikilua circuit and would terminate at the Wahiawa Substation.

At pole 17 this line would connect to an existing extension of the Wahiawa-Mikilua 46-kV line. This connection allows for the islanding of the Army facilities during specific scenarios as outlined in the proposed Operating Agreement and would serve as an alternate means to connect the SGSP to the grid during periods when the main line is not available. The existing extension from pole 42 to pole 47 would need a new higher-rated conductor and new power poles to be able to accommodate electricity generated by the SGSP.

2.2.2.2 Transmission Line Poles

To connect the SGSP to the Wahiawa Substation would involve installing 11 new poles on Army land, 26 new poles on State of Hawaii land, and 4 new poles near the Wahiawa Substation, and replacing 6 existing poles. The electrical work would consist of installing 41 new steel poles for the new 46-kV overhead alignment and 6 new steel poles to replace the poles in the line extension from the Wahiawa-Mikilua line. The major materials to be installed are 32 (60- to 70-foot) steel poles, 15 (70- to 80-foot) steel poles, 8 motor-operated switches, and approximately 20,400 circuit feet of fiber optic cable and 795-KCM all-aluminum overhead conductor. The major materials to be removed are 6 wood poles and approximately 1,592 circuit feet of 3/0 all aluminum-alloy overhead conductor. The new poles would be painted in a neutral color to minimize their visual intrusiveness and vegetation would be strategically placed to screen the view of the poles or to lessen the visual dominance of the transmission line, particularly in the vicinity of Sperry Loop on Wheeler Army Airfield.

2.2.2.3 Switchyard Interface

The switchyard would consist of a control house, microwave tower adjacent to the control house, circuit breakers, transformers, switches, and lightning arresters. It would have three modes of operation: Parallel (normal), Parallel (backup), and Islanded. The Parallel normal would be in effect when the new 46-kV line is providing power from the SGSP directly to the Hawaiian Electric grid. The Parallel backup would be used when the SGSP is connected to the Hawaiian Electric grid through the Wahiawa-Mikilua line. The Islanded mode would be operated when the SGSP is needed to serve the Army through the Wahiawa-Mikilua line.

2.2.2.4 Wahiawa Substation

The transmission line would terminate at the existing Wahiawa Substation. To interconnect the transmission line to the system, equipment would be added to the substation. All improvements to the substation would be in the existing substation footprint. The additional equipment would include a new bay for the new 46-kV express line circuit to tie into the grid, a gas circuit breaker, two transformers, two manual disconnect switches, two motor operated disconnect switches, and a lightning arrester. Associated steel structures, concrete pads, conduits, and grounding grid would be installed to support this new equipment. New panels would be installed at the control house to accommodate additional protection, communication and supervisory control, and data acquisition equipment.

2.2.2.5 Construction

Construction is anticipated to occur between early 2016 and mid-2017. Construction would begin with soils and piling work. Any piles would be driven to appropriate depths and cut to the appropriate foundation levels. Underground utilities, conduits, and grounding grids would be laid. The subsequent layers of engineered fill would be installed to complete the soil exchange.

After the soils and piling work, the foundation work would begin. When foundations reach their required strength, the erection of the engine hall steel structures would begin. Subsequently, as foundations are made ready, steel structures for stacks and auxiliary equipment support would be installed.

The prefabricated engine hall building would be installed next. It would be delivered in sections and set on the completed foundation after steel work was complete. Tanks would be installed after the building was constructed.

As engine hall erection proceeds, mechanical and electrical contractors would start work on piping runs, cable tray, conduits, and building lighting. The access road would be prepared at the onset of construction to enable the delivery of the engines, generators, and auxiliary equipment. Engines would be delivered to the site and offloaded by the rigging contractor directly to their foundations. Auxiliary equipment would be delivered to the laydown area and offloaded by crane or forklift for later installation. Step-up transformers would be delivered to the switchyard area and assembled. Once the engines are delivered and set, the ventilation units would be installed on the engine hall. After all large equipment is delivered, the on-site roadways and gravel areas would be completed.

During the final phase of construction, the mechanical auxiliary equipment would be installed and connected. At the same time, the electrical auxiliary equipment and interconnecting cable tray, conduit, and cabling would be installed. Final tie-ins to utility sources would take place after all piping and wiring is in place.

When all interconnections are completed the pre-commissioning phase begins. During this stage, the equipment and associated piping and cabling is checked and tested. Landscaping and finishing items would be completed as precommissioning continues. The temporary access road would be removed, the fence line completed, and the area restored.

There would be an average and peak workforce of approximately 100 and 230, respectively, of construction craft people and supervisory, support, and construction management personnel on-site during construction. There would be an average of 70 vehicles and a peak of 90 vehicles per day at the site. The vehicle trips and types of vehicles are shown in Table 2.2-1.

Construction would be scheduled during hours agreed to with the Army, generally between 7:00 a.m. and 7:00 p.m. on weekdays and 8:00 a.m. and 5:00 p.m. on Saturdays. Additional hours might be necessary to make up schedule deficiencies or to complete critical construction activities (e.g., pouring concrete at night, working around time-critical shutdowns and constraints). During some construction periods and during the commissioning phase of the project, some activities would continue 24 hours a day, 7 days a week.

The peak construction site workforce level is expected to last from Month 6 through Month 9 of the anticipated 24-month construction period. Table 2.2-1 provides an estimate of the average and peak construction traffic during the construction period for the plant.

Table 2.2-1.
Construction Traffic

Vehicle Type	Average Number of Vehicles per Day	Peak Number of Vehicles per Day
Construction worker vehicles	62	79
Delivery vehicles	5	7
Heavy trucks	3	4
Total	**70**	**90**

Construction laydown and parking areas would be in existing site boundaries and might require additional laydown areas outside the site boundaries during certain phases. Construction access would be from Kunia Road on a temporary construction access road, southeast of the project site. Materials and equipment would be delivered by truck.

Construction of the SGSP would require the trimming and removal of some trees. Removal or trimming of woody vegetation and trees taller than 15 feet would be done between 16 September and 31 May, the period of time outside the pupping season for the Hawaiian hoary bat. If tree trimming or removal were to become necessary between 1 June and 15 September, the Army would ensure that Hawaiian Electric has submitted protocols to the U. S. Fish and Wildlife Service (USFWS), and the USFWS has approved such protocols to survey for potential roosting bats using thermal imaging equipment, prior to any tree removal or tree trimming between 1 June and 15 September.

2.2.3 Operation

Hawaiian Electric's expected or normal operations mode for the generating station is to use it as needed to respond to the variable electricity demand and generation characteristics of the Hawaiian Electric islandwide grid. In normal operations mode, the generating station would serve all Hawaiian Electric's customers. Because of the SGSP's flexibility, even in normal operations mode, when and how long the facility would operate would vary daily and is difficult to predict.

Hawaiian Electric estimates that in normal operations mode, the SGSP would be used during the following times:

- Overnight (10:00 p.m.–8:00 a.m.), it is estimated to be used 25 percent of the time during the peak morning demand hours of 6:30–8:00 a.m., for a total energy output of 4,100 MW-hours per year.
- During the day (8:00 a.m.–5:00 p.m.), it is estimated to be used, but hours and durations of use would be expected to vary widely, so no particular energy output is estimated.
- During the evening (5:00–10:00 p.m.), it is estimated to be operated at full load for 3 hours nightly, for a total energy output of 54,750 MW-hours per year.

Under circumstances where the Army experiences a qualified outage[6] or a validated threat[7], Hawaiian Electric would be obligated to provide electrical service to the Army using the generating station. Although these situations might not necessarily require islanding the Army facilities from the rest of the 46-kV grid, there may be circumstances where islanding is necessary. While the generating station is in island mode due to an islandwide outage, it would be available to supply limited electrical power to customers other than the Army if the situation allows for inclusion of some or all of the Wahiawa Substation loads into the electrical island. Once the situation that dictated islanding no longer exists, the generating station would be taken out of island mode and would once again be available to serve all customers. To shift the generating station from island mode to normal mode, Army customers in the electrical island boundaries would have their service interrupted for several minutes during the switch.

Hawaiian Electric would adjust plant operations as Oahu's energy production and usage patterns change. Initially the generating station would operate as described above. If demand increases, operations of other generating facilities declines, or future renewable resources do not develop, full-time operation of the generating station could become a viable operating scenario. The generating station would be capable of running at full capacity continuously (i.e., 24 hours a day, 365 days a year, less maintenance periods). Hawaiian Electric's PUC and air operating permits would allow for 100 percent full-time operations. As the generating station would be equipped and permitted to operate 7 days a week and 24 hours per day, and the exact operational profile of the plant cannot be defined in detail at this time because it depends on system load, transmission system status, operations of other generating facilities, and future renewable resources being developed, this EIS provides analysis of full (100 percent) operation as a reasonably foreseeable upper bound of effects. Because full operation would have the greatest potential for impacts, normal operations with intermittent islanding would have lesser impacts.

Regardless of the number of hours the generating station is operated, it would be manned 24 hours a day, 7 days a week, over three shifts. Each shift would consist of a supervisor and an operator. There would be 10 people assigned to the facility to maintain this level of staffing.

During operation, it would sometimes be necessary to trim vegetation so to prevent encroachment on the transmission line. Removal or trimming of woody vegetation and trees taller than 15 feet would be done between 16 September and 31 May.

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[6] A *qualified outage* is one where Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia have a sustained and simultaneous power outage during which the generating station could feasibly restore power.

[7] A *validated threat* is a situation in which the Army and Hawaiian Electric agree that there is a threat to the security of mission continuity of the Army facilities, in response to which the provision of power directly from the generating station would increase Army security or continuity of mission.

2.2.4 Permits and Approvals

As required by HAR §11-200-10(11), this section lists all known or anticipated federal, state, and county discretionary permits and approvals, and ministerial permits and approvals, for the Proposed Action.

Hawaiian Electric, as the owner and operator of the SGSP, will have the responsibility of applying for and acquiring all necessary permits. The Hawaii DOH, Clean Air Branch, has indicated to USAG-HI that the project and associated emissions should not have an effect on the Army's Covered Source Permit.

The Proposed Action would require the permits and approvals in Table 2.2-2, and consultation with the USFWS under section 7 of the Endangered Species Act of 1973 (ESA) (16 USC §§ 1531-1544), and the SHPD under section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (54 USC §306108).

Table 2.2-2.
Required Permits and Approvals

Permit or Approval	Generating Station, Interconnection, or Both	Agency	Status
Decision and Order	Both	PUC	Application filed 16 May 2014
Environmental Impact Statement	Both	Army; DLNR	In preparation
Lease	Generating Station	Army	Dependent upon completion of NEPA/HEPA process
Easements	Interconnection	Army; DLNR	Dependent upon completion of NEPA/HEPA process
Conservation District Authorization	Interconnection	DLNR	Dependent upon completion of NEPA/HEPA process
Air Permit (Covered Source and Prevention of Significant Deterioration)	Generating Station	Hawaii DOH	Application filed 28 April 2014
Notice of Proposed Construction or Alteration	Both	Federal Aviation Administration	Not started
Airport Hazard Area Zone Permit	Both	Federal Aviation Administration	Not started
Excavation Permit	Generating Station	USAG-HI	Not started
Site Plan Review	Generating Station	USAG-HI	In preparation
Hazardous Waste Generator Identification Number	Generating Station	U.S. Environmental Protection Agency	Not started
Spill Prevention, Control, and Countermeasure Plan	Generating Station	U.S. Environmental Protection Agency	Not started
Equipment and Materials Handling, including Materials Disposal	Generating Station	Hawaii Department of Transportation	Not started
Energy Information Administration Registration	Generating Station	Energy Information Administration	Not started
NPDES Permit for Stormwater	Generating Station	Hawaii DOH	Not started

Permit and/or Variance for Noise during Construction	Both	Hawaii DOH	Not started
Emergency and Hazardous Chemical Inventory	Generating Station	Army; Hawaii DOH; Honolulu Fire Department	Not started
Flammable and Combustible Liquid Tank Installation	Generating Station	Honolulu Fire Department	Not started
Liquefied Petroleum Gas Tank Installation	Generating Station	Honolulu Fire Department	Not started
Licenses To Inspect, Test, and Maintain Fire Protection System	Generating Station	Honolulu Fire Department	Not started
Fire Alarm Systems Acceptance Test Permit	Generating Station	Honolulu Fire Department	Not started
Fire Plans Review Fee	Generating Station	Honolulu Fire Department	Not started
Pressure Vessel Installation Permit	Generating Station	Hawaii Department of Labor	Not started
Street Usage Permit	Both	Hawaii Department of Transportation	Not started
Use and Occupancy Agreement	Interconnection	Hawaii Department of Transportation	In preparation
Approval to Cross State Water	Interconnection	U.S. Army Corps of Engineers	Not started
Building Permit for Substation Work	Interconnection	Honolulu Department of Planning and Permitting	Not started
Telecommunications License	Interconnection	New Cingular Wireless PCS, LLC	In preparation

Notes: DLNR = Hawaii Department of Land and Natural Resources, Hawaii DOH = Hawaii Department of Health, PUC = Public Utilities Commission, USAG-HI = U.S. Army Garrison, Hawaii

2.2.5 Anticipated Schedule and Cost

Construction of the generating facility, from procurement through commercial operation, would take approximately 24 months. Procurement would begin in November 2015. Construction would begin in early 2016. Commissioning would begin in mid-2017, with full commercial operation anticipated in October 2017.

The Army would not incur capital expenditures for the project. The Army's cost to implement the Proposed Action is represented by the value of the 8.13 acres that would be leased to Hawaiian Electric. The land was appraised at $4.4 million in April 2014 and the net present value of the entire lease (30 years with a 15-year option at a rental rate of $352,000 per year) is $8,207,748.

The anticipated capital cost of the SGSP is approximately $170 million. Of this, approximately $118 million is for the generating station, $17 million for the interconnection (transmission line, switchyard, and substation), $21 million for overhead costs (costs that are essential to the project but not attributable to any particular operation), and $14 million is the allowance for funds used during construction (the cost of short-term debt to finance construction expenses).

2.2.6 Historic and Cultural Setting

Oahu's central plateau is politically and culturally important. The ancient lands of Lihue, south of Schofield Barracks on the eastern slopes of the Waianae Range and portions of Wahiawa overlap

in the lower reaches of the central plateau to encompass the project area. The majority of the transmission line is in the lower elevations of Waianae Uka Ahupuaa. One of Oahu's largest ahupuaa, Waianae Uka Ahupuaa, extends from the tablelands across the crests of the Waianae and Koolau mountain ranges. The west end of the transmission line is in two historically referenced ili: Paupauwela in Honouliuli Ahupuaa and Pouhala in Waikele Ahupuaa. A recent subsurface archaeological investigation found no evidence of traditional Hawaiian or early historic cultural deposition at the proposed power generation plant site or in the transmission line corridor.

2.3 NO ACTION ALTERNATIVE

The No Action Alternative, prescribed by the CEQ, provides a basis for the affected environment and serves as a benchmark against which the Proposed Action can be evaluated. Under the No Action Alternative, the Army and State of Hawaii would not provide the lease of land or grant associated interconnection easements, and the 50-MW generating station would not be constructed or operated. The Army would continue relying on existing public utility infrastructure for its electricity supply. Hawaiian Electric would continue to operate its existing electricity infrastructure on Oahu. The Army would continue using multiple small backup generators if public power supplies were interrupted. Both the Army and Hawaiian Electric would miss an opportunity to achieve mandated renewable energy goals as well as the opportunity to provide greater energy security for the Army and Hawaiian Electric customers.

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED EVALUATION

The Army and Hawaiian Electric considered the following alternatives but eliminated them from further evaluation for the reasons stated. To be considered for evaluation, an alternative to the Proposed Action had to meet the purpose and need for the Proposed Action (as described in sections 1.3 and 1.4), and had to satisfy the screening criteria in section 2.1.

2.4.1 Purchase Renewable Energy Credits

Under this alternative, there would be no renewable energy or energy security development on Schofield Barracks. Instead, renewable energy credits (RECs) would be purchased on the open market or through a REC brokerage. A REC typically represents delivery of 1 MW-hour of renewable energy to the grid and all associated environmental benefits of displacing 1 MW-hour of conventional energy. RECs allow the environmental attributes associated with renewable energy production to be monetized and marketed. This alternative would not alleviate the energy threats to the installations or enhance energy security. Energy dependence on off-post electrical supplies and transmission would continue. Because RECs could arise from renewable energy production at facilities far from the installations, the REC purchases are unlikely to provide the environmental, socioeconomic, and energy security benefits associated with localized renewable energy production. This alternative does not satisfy the purpose and need for the Proposed Action and is not further evaluated.

2.4.2 Army constructs, owns, and operates on-post renewable energy generation facilities enabling 24/7 islanding from grid

Under this alternative, the Army would construct, own, and operate renewable energy power generation facilities and associated infrastructure at Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia. These facilities would remain dormant until a power outage and then

would be activated to enable islanding from the grid during an emergency. The facilities would not supply power to all Oahu customers but would serve only the installations. This alternative would guarantee that power could be reliably delivered to support Army operations during an emergency, alleviating the energy threats to the installations and enhancing energy security. It would not provide additional power to the local communities or the energy security benefits for the island. This alternative is not a viable option because no funding for such an alternative has been made available to the Army, so this alternative does not satisfy the purpose and need for the Proposed Action and is not further evaluated.

2.4.3 Hawaiian Electric constructs, owns, and operates a renewable energy facility off-post

Under this alternative, Hawaiian Electric would construct and operate a multifuel power generation facility and associated infrastructure off-post. The facility would be similar to the proposed 50-MW plant and include biofuel-capable reciprocating engine-generator sets and associated equipment. A facility of this type would likely provide some measure of environmental and socioeconomic benefit. Because it would be off-post, it would not alleviate the energy threats to installations or enhance energy security. Under this alternative, benefits under EO 13423 would not be realized. As discussed in sections 1.4.1 and 2.1, Hawaiian Electric needs a generating station at elevation and away from coastlines to improve energy security for all customers. Since the company has no land meeting this requirement, a new parcel of land would have to be purchased or leased. By siting the project on federal lands on Schofield Barracks, with a lease agreement allowing Hawaiian Electric to provide a service guarantee in lieu of monetary payments for the land, the project meets the geographic requirement at the lowest cost to customers. This alternative does not satisfy the purpose and need for the Proposed Action and is not further evaluated.

2.4.4 Construct and operate a power generation facility using another type of renewable energy technology

Under this alternative, Hawaiian Electric or the Army would construct and operate a utility-scale, renewable-energy, power generation facility on-post to supply electricity to the installations. Renewable energy technologies considered were solar photovoltaic, wind, and geothermal. Solar photovoltaic and wind facilities were eliminated from further consideration because they are not firm-reliable sources of power, and would not alleviate the energy threats to the installations or enhance energy security. Energy dependence on off-post electrical supplies and transmission would continue. Geothermal technology uses high-temperature thermal energy directly from the earth to power turbines and produce energy. It was eliminated from further consideration because there are currently no verified geothermal resources in the region that could be economically viable or immediately available using existing technologies. This alternative does not satisfy the purpose and need for the Proposed Action and is not further evaluated.

2.4.5 Construct and operate a power generation facility at another location on USAG-HI land

Under this alternative, Hawaiian Electric or the Army would construct and operate a utility-scale renewable energy power generation facility to supply electricity to the installations on Schofield Barracks or Wheeler Army Airfield but at a different location than the 8.13-acre site in the South Range area identified in the Proposed Action. USAG-HI personnel from the Directorate of Public Works Environmental and Planning Divisions screened on-post locations against the following criteria:

- Land not allocated to other mission support needs, including military housing
- Close to existing utility lines serving Schofield Barracks, Wheeler Army Airfield, and Kunia Field Station
- No substantial known environmental issues
- Outside the airfield accident potential zone
- Compatible with surrounding land uses
- Relatively flat topography
- Downwind of sensitive land uses
- Adequate space available to accommodate project footprint and required antiterrorism force protection setbacks

This alternative was eliminated from further consideration because no on-post site (other than the selected generating station site) meeting the criteria could be foun

SECTION 3
AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section describes the affected environment and environmental consequences for each resource area. The affected environment portions describe the existing resources and environmental conditions at the project site and in the ROI. These conditions form the baseline for analyzing the environmental impacts of the alternatives. Resource categories addressed in the EIS are land use, airspace use, visual resources, air quality (including climate and GHGs), noise, traffic and transportation, water resources, geology and soils, biological resources, cultural resources, hazardous and toxic substances, socioeconomics (including environmental justice), and utilities and infrastructure.

The environmental consequences portions identify and describe the potential direct and indirect adverse and beneficial environmental impacts expected from implementing the Proposed Action or No Action Alternative. Impacts were assessed assuming full-time operation of the generating facility (i.e., 24 hours a day, 365 days a year). In the near-term, the facility would likely operate less than full time, so projected impacts could be less. Cumulative impacts are addressed in section 5.

To maintain a consistent evaluation of impacts in the EIS and in accordance with the Army NEPA regulations, significance thresholds were established for each resource. Although some thresholds have been designated based on legal or regulatory limits or requirements, others reflect discretionary judgment on the part of the Army in accomplishing its primary mission of military readiness, while fulfilling its conservation stewardship responsibilities.

Quantitative and qualitative analyses were used to determine whether, and the extent to which, a significance threshold would be exceeded. Based on the results of these analyses, this EIS identifies whether a particular potential impact would be adverse or beneficial, and to what extent. Context and intensity were taken into consideration in determining a potential impact's significance, as defined in 40 CFR Part 1508.27. The severity of environmental impacts has been characterized as none, minor, moderate, significant, or beneficial:

- **None** – No measurable impacts are expected to occur.
- **Minor** – A minor impact would either be isolated and localized, not measurable on a wider scale, or so insignificant that it would be discountable.
- **Moderate** – A moderate impact would be measurable on a wide scale (e.g., outside the footprint of disturbance or on a landscape level). If it was adverse, it would not exceed limits of applicable local, state, or federal regulations.
- **Significant** – A significant impact could exceed limits of applicable local, state, or federal regulations or would untenably alter the function or character of the resource. It would be considered significant unless mitigable to a less-than-significant level.
- **Beneficial** – This impact would benefit the resource/issue.

Impacts that range from none to moderate are considered less than significant. For all impacts that are identified as significant and where mitigation is possible and feasible, appropriate mitigation measures are identified to reduce the impacts to a less than significant level. Mitigation measures are formulated consistent with CEQ NEPA regulations, section 1508.20, and HAR §11-200. Adverse impacts and beneficial impacts could apply to the same resource.

3.1 LAND USE

Land use refers to the human use of the land for various purposes, including economic production, institutional uses, and natural resources conservation. Land use is frequently regulated by management plans, policies, zoning ordinances, and regulations that determine allowable and compatible uses or that protect environmentally sensitive areas or resources. The ROI for land use is the project site and property within one mile of the proposed generating station site or within 0.25 mile of the interconnection easement.

3.1.1 Affected Environment

3.1.1.1 Land Ownership

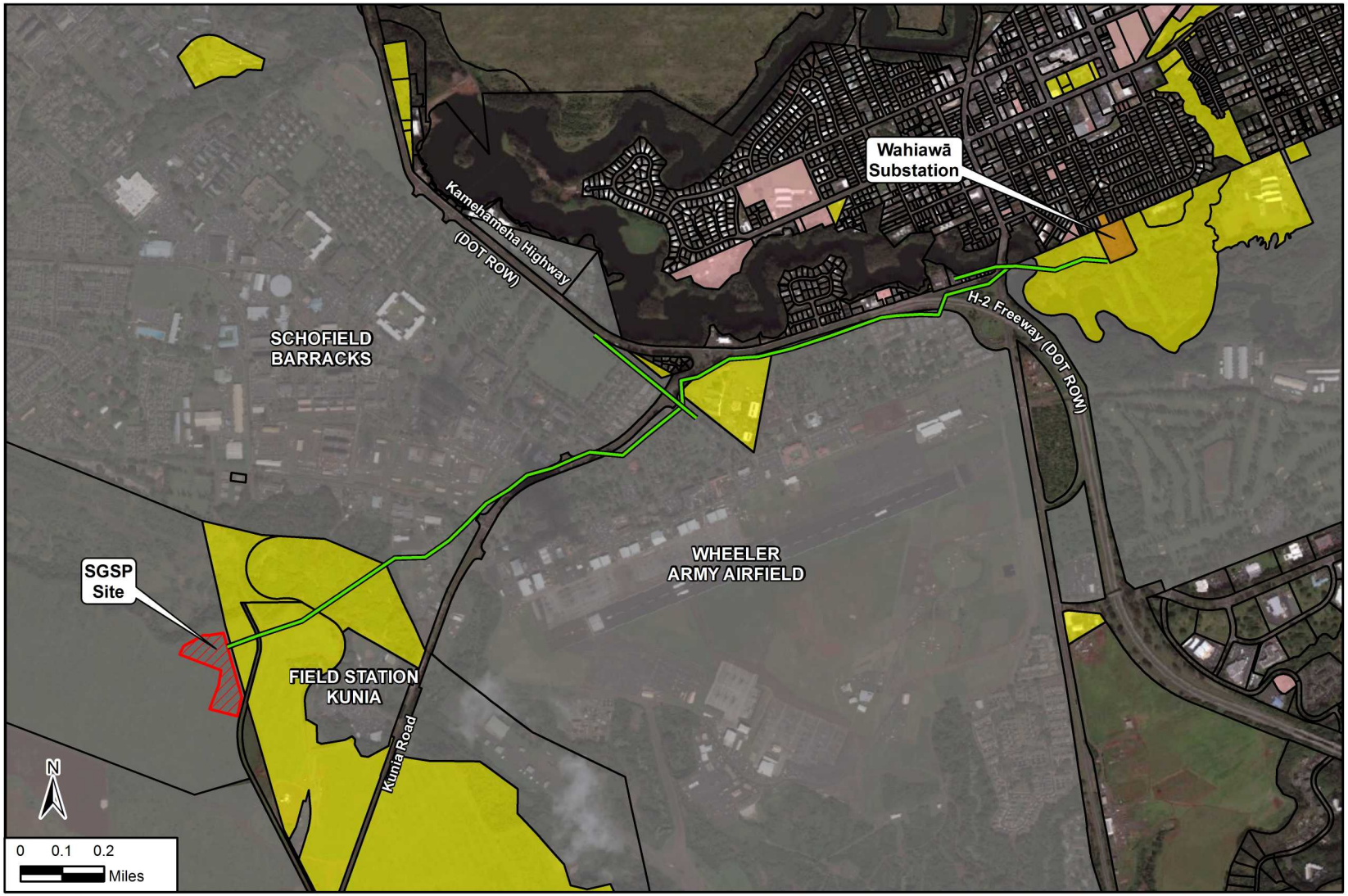
Land ownership on and around the SGSP is shown on Figure 3.1-1 and Table 3.1-1. The site is on Army-owned property on Schofield Barracks' South Range. The interconnection easement is partially on Army-owned property on Schofield Barracks and Wheeler Army Airfield and partially on properties owned or leased by the State of Hawaii. The Wahiawa Substation is on land owned by Hawaiian Electric.

3.1.1.2 Land Use Policies, Plans, and Controls

The SGSP is subject to two types of land use controls. One type is applicable to portions of the SGSP on Army land (on-post); the other governs elements of the proposed project that are not on Army-owned land (off-post). An overview of these controls is provided below. The project's consistency with land use plans, policies, and controls is detailed in section 4.

Army Land Use Regulations and Plans. Army Regulation 210-20, Real Property Master Planning for Army Installations, defines the real property master planning concept and requirement and establishes policies and responsibilities for implementing the real property master planning process at Army installations. In accordance with Army Regulation 210-20, USAG-HI developed the ~~master plan and~~ *Real Property Master Plan Digest* (USAG-HI 2009),which ~~The master plan~~ identifies the generating station site and surrounding land areas as a light industrial area. The~~se~~ document~~s~~ describes and analyzes existing land uses and identifies ~~identify~~ development constraints and opportunities. Portions of the South Range, including some of the generating station site and adjacent land to the west, are identified as a development opportunity. The Wheeler runway accident potential zone (APZ) south of the generating station site is identified as a development constraint. The interconnection easement is not identified as a development opportunity or a constrained area.

The South Range that the Army purchased a few years ago is largely undeveloped and is addressed in a separate area development plan. Development at the South Range is envisioned as an industrial and operations area to provide unit operations, command and control facilities, and a large organizational maintenance facilities complex, primarily for the needs of the Army Modularity and Grow the Army initiatives (USAG-HI 2009).



LEGEND

- SGSP Site
- Planned Interconnection Route
- TMK Boundary

Ownership

- Govt. County of Honolulu
- Govt. Federal
- Govt. State
- Hawaiian Electric Company

Land Ownership in the Project Area

Figure 3.1-1

Source: Schofield Barracks GIS 2014, ESRI 2011.

Table 3.1-1.
Land Ownership, Use, and Designations

Segment	Owner	Current Land Use	Adjacent Land Use	State Land Use District	County Zoning
Schofield Generating Station	Army	Vacant former agricultural land	Vacant former agricultural land	Urban	F-1
Poles 1-2	Hawaii DLNR and Department of Agriculture	Vacant former agricultural land and Waikele Stream Gulch east of pole 3	Vacant former agricultural land	Agriculture	Ag-1
Poles 3-9	Army	Open area between military buildings	Military-related offices and shop/industrial	Urban	F-1
Poles 10-14	Army	Kunia Road right-of-way open area	Military-related offices and shop/industrial	Urban	F-1
Poles 15-19	State of Hawaii DOT	Kunia Road right-of-way open area	Military residential and Wheeler Middle School	Urban	F-1
Poles 20-29	State of Hawaii DOT	Kunia Road or Wilikina Drive right-of-way open area	Mixed military and civilian residential	Urban	R-5
Pole 30	State of Hawaii DOT	Wilikina Drive right-of-way open area	South Fork Kaukonahua Stream (P-1 Restricted Preservation) and Commercial (B-2 Community Business)	Urban	R-5
Poles 31- 32	State of Hawaii DOT	Wilikina Drive right-of-way open area	Commercial (B-2 Community Business)	Urban	R-5
Poles 33-38	State of Hawaii DOT	Wilikina Drive right-of-way open area	Wahiawa State Freshwater Park	Conservation	P-2
Wahiawa Substation	Hawaiian Electric	Substation	Wahiawa State Freshwater Park	Conservation	P-2
Poles 39-41	Hawaii DLNR, Office of Conservation and Coastal Lands	Kunia Road right-of-way open area	Military residential	Urban	P-1
Pole 42-44	Army	Open area near edge of installation	Military residential	Urban	F-1
Poles 45-47	Army	Open area near edge of installation	Ralston Athletic Field	Urban	F-1
Pole 48	Army	Kunia Road right-of-way open area	Military residential and administrative	Urban	F-1
Wheeler Substation	Army	Substation	Military residential and administrative	Urban	F-1

Source: Hawaii Office of Planning Geographic Information Systems 2014, City and County of Honolulu 2014
Notes: DLNR = Department of Land and Natural Resources; DOT = Department of Transportation;
Ag-1 = Restricted Agriculture; F-1 = Federal and Military; R-5 = Residential; P-1=Restricted Preservation; P-2 = General Preservation

Off-Post Land Use Regulations and Controls. The portions of the interconnection easement that would not be on Army property are subject to state and county land use regulations in Chapter 205, HRS, and Chapter 21, Revised Ordinances of Honolulu. Other relevant plans and controls are:

- Hawaii State Plan
- Hawaii State Sustainability Plan 2050
- Hawaii Coastal Zone Management Program
- Oahu General Plan
- Central Oahu Sustainable Community Plan

Refer to section 4, Consistency with Existing Land Use Plans, Policies, and Controls, for more information about each plan or program.

3.1.1.3 Land Use Districts

The types of land use on and adjacent to the project site and the applicable land use designations are described in Table 3.1-1. Chapter 205, HRS, gave the State Land Use Commission the authority to place all land in Hawaii into one of four state land use districts: urban, rural, agriculture, and conservation. The land use districts in the project area are shown on Figure 3.1-2 and described in Table 3.1-1. The generating station site and most of the interconnection easement are in the urban district. The western portion of the interconnection easement is in the agriculture district. The eastern portion of the interconnection easement is in the conservation district.

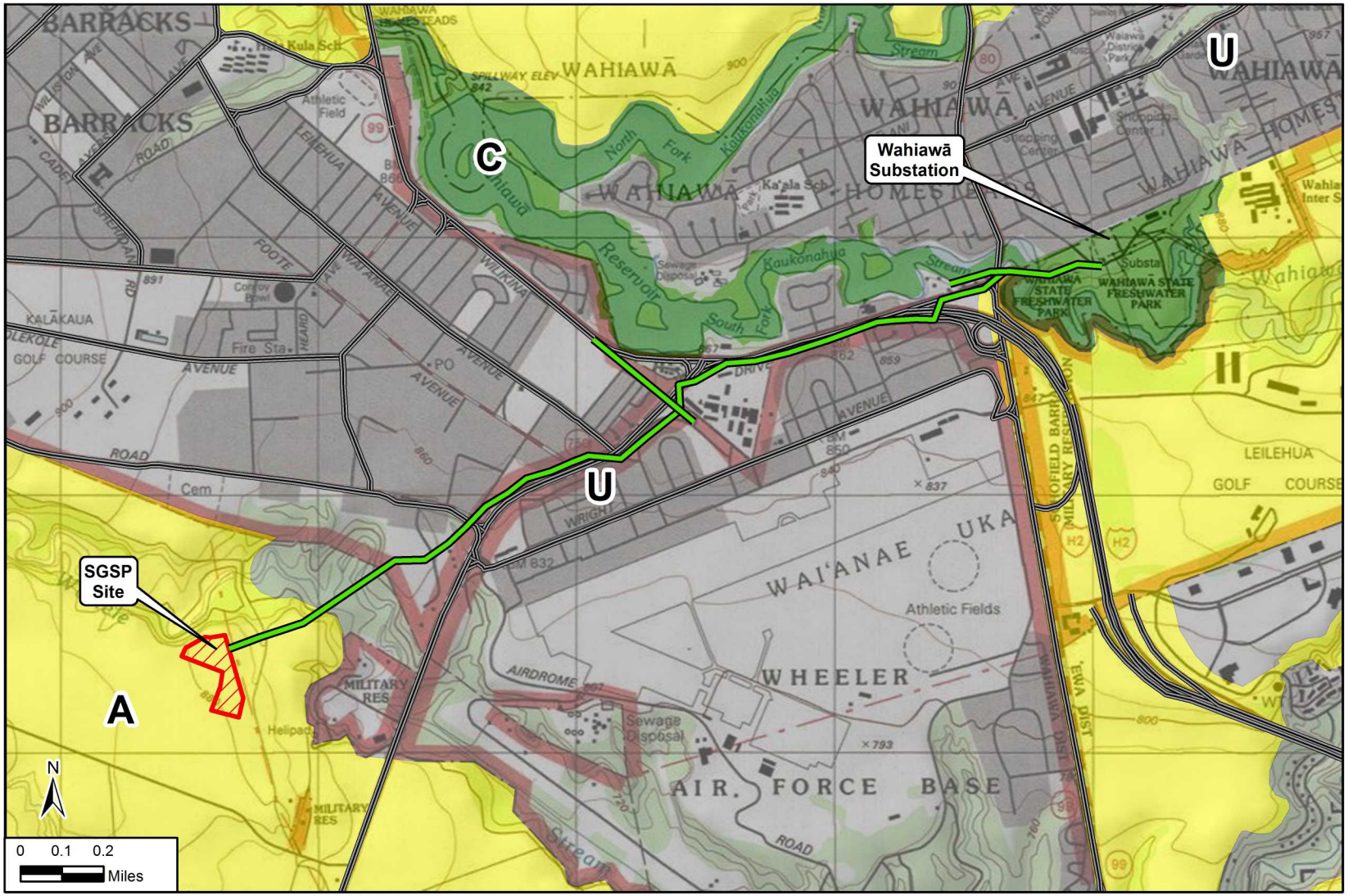
Off-post, the counties make all land use decisions in the urban districts in accordance with their land use plans and regulations. Honolulu adopted a land use ordinance regulating land use to encourage orderly development by establishing zoning districts and specifying the kinds of development and development standards that must be adhered to in each district. The City and County of Honolulu zoning designations in the off-post urban district near the project are shown on Figure 3.1-3 and described in Table 3.1-1.

3.1.1.3.1 Generating Station Site

The generating station site is vacant and covered by dense vegetation, as is nearly all of the land adjacent to it, with the exception of an area to the north where a sewer lift station is being constructed. Prior to the Army's purchase of the South Range, the generating station site and surrounding areas were part of a pineapple plantation.

The Waikele Stream gulch is northeast of the site. It is a densely vegetated, deep ravine where development opportunities are limited by the steep topography. Field Station Kunia is approximately 1,500 feet east-southeast of the generating station site along Kunia Road. The nearest existing residential area is along Lyman Road, approximately 0.5 mile north of the generating station site.

Land west of the generating station site is slated for development of new infrastructure and facilities to support the Infantry Brigade Combat Team. The planned land use closest to the generating station site is for light industrial, such as motor pools and unit operations support facilities. The nearest residential use is a planned extension of the Kalakaua housing area about 0.4 mile north of the site. These planned land uses are superimposed over existing land uses in Figure 3.1-4.



LEGEND

- SGSP Site
- Planned Interconnection Route

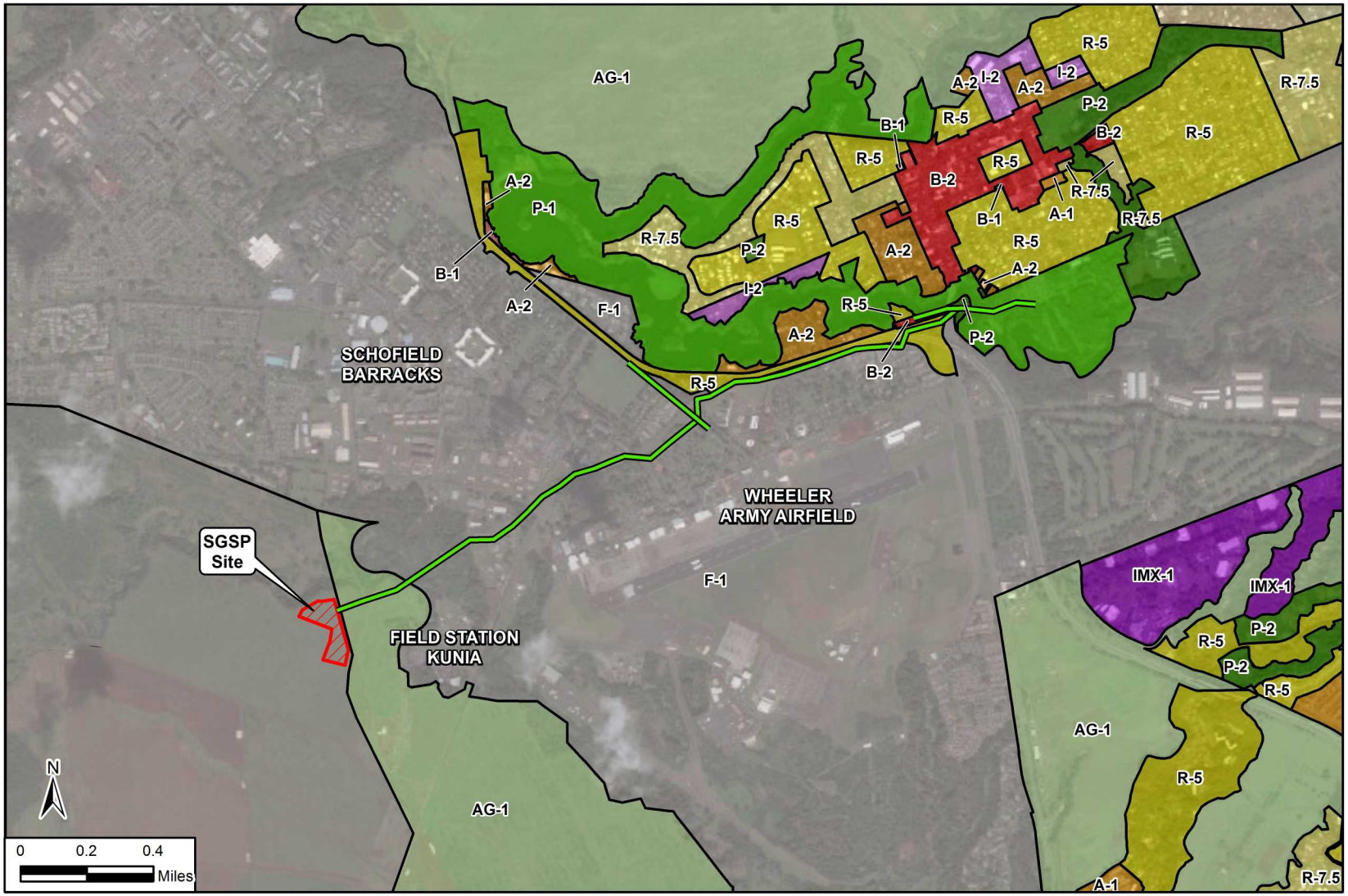
Land Use District

- Agriculture
- Conservation
- Urban

State Land Use Districts in the Project Area

Figure 3.1-2

Source: Hawaii OP GIS 2014, ESRI 2011.



LEGEND

- SGSP Site
- Planned Interconnection Route

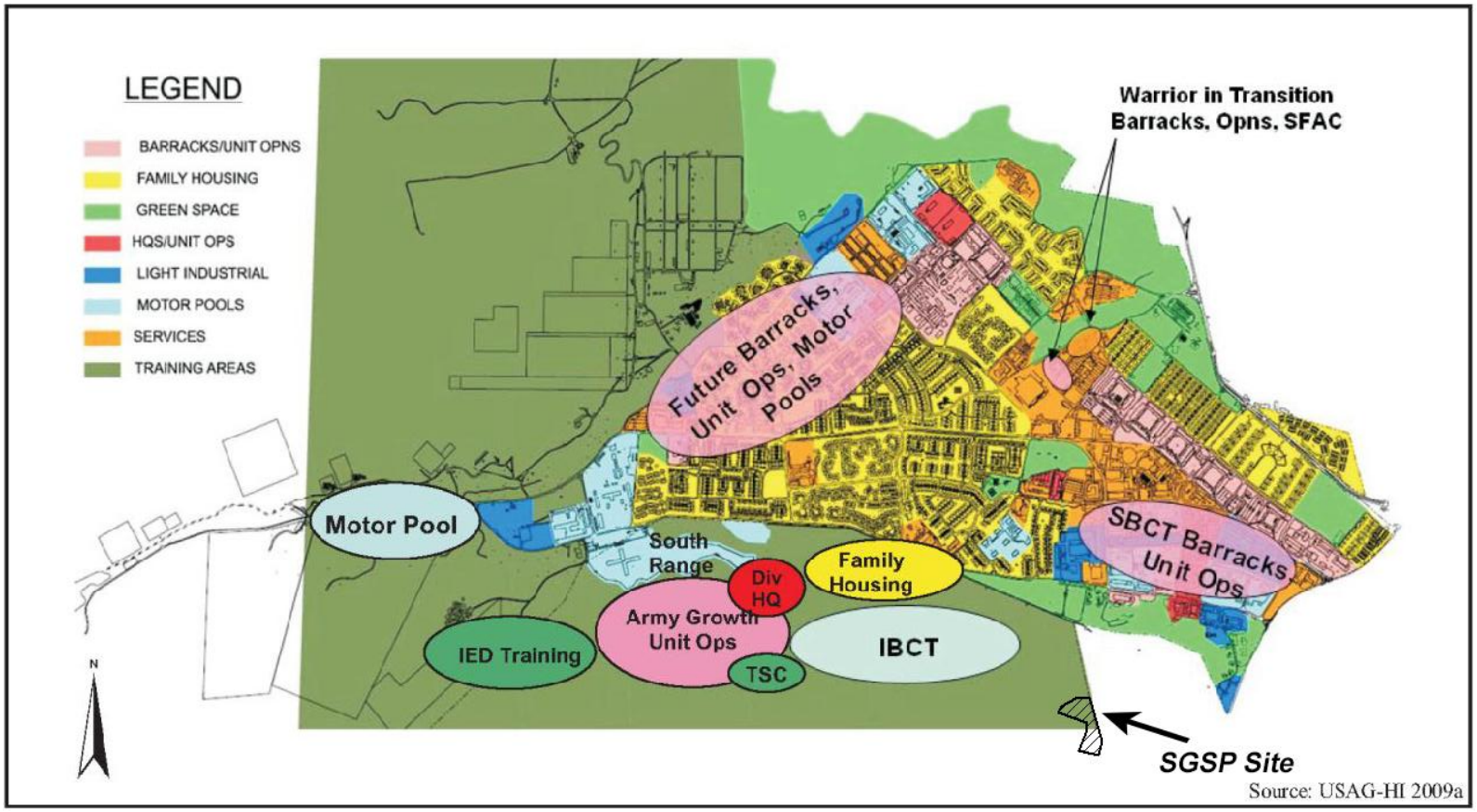
Zoning District

- A-1 Low Density Apt.
- A-2 Medium Density Apt.
- AG-1 Restricted Agriculture
- B-1 Neighborhood Business
- B-2 Community Business
- F-1 Federal and Military
- I-2 Intensive Industrial
- IMX-1 Industrial Mixed Use
- P-1 Restricted Preservation
- P-2 General Preservation
- R-7.5 Residential
- R-5 Residential

County Zoning Districts

Figure 3.1-3

Source: Hawaii OP GIS 2014, Schofield Barracks GIS 2014, ESRI 2011.



Notes: IBCT = Infantry Brigade Combat Team, IED = improvised explosive device, SBCT = Stryker Brigade Combat Team, TSC = Theater Sustainment Command

Existing and Planned Land Use at Schofield Barracks

Figure 3.1-4

3.1.1.3.2 Interconnection Easement

The interconnection easement is adjacent to several different land use categories: fallow agricultural land, military office and shop/industrial, military residential, school, public residential, commercial, conservation (Lake Wilson and Wahiawa Freshwater State Park), and outdoor recreation (e.g., Ralston Athletic Field). More detail on these land uses and the applicable state land use district and county zoning is provided in Table 3.1-1.

3.1.2 Environmental Consequences

Land use impacts were assessed by comparing the situation that would exist with and without the Proposed Action and determining the extent to which the project's presence would interfere with other already-planned land uses. Land use impacts would be considered significant if the project would:

- Conflict with an approved land use plan, policy, or control
- Substantially conflict with established land uses in the area
- Disrupt or divide established land use configurations or communities

Table 3.1-2 summarizes impacts for the Proposed Action and No Action Alternative. A detailed analysis of these alternatives follows the table.

Table 3.1-2.
Impacts to Land Use

Type of Impact	Proposed Action	No Action Alternative
Conflict with an approved land use plan, policy, or control	Minor	None
Substantially conflict with established or reasonably foreseeable land uses in the area	Minor	None
Disrupt or divide established or reasonably foreseeable land use configurations or communities	Minor	None
Overall Impacts	**Minor**	**None**

3.1.2.1 Proposed Action

Short-term minor adverse effects would occur from constructing a temporary access road on undeveloped land from Kunia Road to the generating station site.

3.1.2.1.1 Construction

A temporary access road would be built to allow construction traffic to access the generating station site from Kunia Road. The road would be primarily through fallow agricultural fields. This would involve clearing vegetation and dedicating the area to this land use for the duration of construction. The land is currently vacant and there are no other planned uses during the construction period. When construction is complete, Hawaiian Electric and its contractor would restore the road to its preproject condition, so the temporary access road would have minor effects on land use.

Construction vehicles would enter the interconnection easement directly from the generating station site or from adjacent roads, so no temporary access roads would be required to access that portion of the project site.

Construction activities at the SGSP, including laydown areas, would not extend beyond the site boundary, so land use effects would be limited to the site boundaries.

3.1.2.1.2 Operation

Operation of the Proposed Action would not conflict with applicable land use plans, policies, or controls in the USAG-HI master plan, *South Range Area Development Plan*, Army Regulation 210-20, Hawaii State Plan, *Hawaii State Sustainability Plan 2050*, Hawaii Coastal Zone Management Program, *Oahu General Plan*, or *Central Oahu Sustainable Community Plan*. Further discussion of the project compatibility with these land use plans, policies, and controls is provided in section 4.

The USAG-HI master plan identifies the generating station site and surrounding land areas as a light industrial area, and the generating station would be compatible with that designation. The South Range Area Development Plan identifies the area to the west for development of motor pools and unit operations support facilities, which would be compatible with a light industrial area and with the SGSP, so the generating station would not disrupt development plans for the South Range. It would be on the eastern portion of the South Range and would not divide planned South Range facilities. The generating station would be compatible with land use designations and development plans for the site and surrounding area.

The interconnection easement would not require the relocation of or otherwise disrupt any existing facilities. The interconnection easement would run parallel to roadways, where transmission lines are typical features, or through areas where there are already transmission lines. It would not physically divide any existing land uses or undeveloped areas. The line would cross Lake Wilson and run through Wahiawa State Freshwater Park, a designated conservation area; however, in this area, the line would follow the alignment of an existing 46-kV line. The existing 46-kV line and the new 46-kV line would both be suspended from a single line of new replacement poles. These new poles would be approximately 10 feet taller than the existing poles in order to meet updated pole strength requirements. These changes would be visible, but would have only a minor adverse impact on the scenic (and, therefore, recreational land use) value of the park. The interconnection easement would be consistent with the USAG-HI master plan (for portions of the route that are on Army property), and with state and county land use and zoning regulations (for portions of the route that are off Army property).

3.1.2.1.3 Mitigation Measures and BMPs

Because the project would not result in significant impacts to land use, no mitigation measures would be required.

3.1.2.2 No Action Alternative

Under the No Action Alternative, the SGSP would not be constructed so there would be no impact on land use. The Army may consider alternative uses of the generating station site through its real property master planning process.

3.2 AIRSPACE

3.2.1 Affected Environment

In the context of aviation, airspace is the portion of the atmosphere that can be used by aircraft. An aircraft's use of airspace is subject to rules and restrictions designed to promote safe air operations and minimize use conflicts, especially near airports and airfields where aircraft are

taking off and landing. The ROI for airspace is the airspace above the SGSP project site.

The Federal Aviation Administration (FAA), part of the U.S. Department of Transportation, is the federal agency that manages airspace in the United States. The FAA's mission includes promoting air safety and the efficient use of navigable airspace. The FAA regulates military operations in the National Airspace System through the implementation of FAA Handbook 7400.2E and FAA Handbook 7610.4J, Special Military Operations. The latter was jointly developed by the DoD and FAA to establish policy, criteria, and specific procedures for air traffic control planning, coordination, and services during defense activities and special military operations.

Title 14 CFR §77 requires notifying the FAA at least 45 days prior to the start of construction or the date an application for a construction permit is filed, whichever is earliest, for certain types of construction near certain airports and heliports. The FAA should be notified using FAA Form 7460-1, Notice of Proposed Construction or Alteration. The notification must include pertinent information about the project, and appropriate attachments showing the type and location of the project. FAA Form 7460-2, Supplemental Notice, is used to notify the FAA of progress on or abandonment of projects requiring notice using FAA Form 7460-1.

DoD Uniform Facilities Criteria (UFC) 3-260-01, Airfield and Heliport Planning and Design, also applies to new construction near airfields and heliports.

In the United States, airspace is classified as Class A, B, C, D, E, or G (Class F is not used). Classes A through E are considered controlled airspace and Class G airspace is uncontrolled. Flight rules and air traffic control procedures govern safe operations in each type of designated airspace. Airspace can also be classified as special use airspace. Special use airspace includes designated military operations areas, restricted areas, alert areas, and other areas where airspace use is restricted or prohibited. Airspace may also be temporarily or periodically restricted, for example, to prevent civilian aircraft from interfering with military training.

Most of the airspace above Oahu is controlled airspace. The area around Honolulu International Airport is Class B airspace, while the other airports on the island are Class D. Special use airspace near the project site is an intermittent restricted area 1.4 nautical miles west and a daily alert area 3.4 miles east (Figure 3.2-1).

Wheeler Army Airfield is adjacent to Schofield Barracks to the east and supports military helicopters and small fixed-wing aircraft that use Schofield Barracks for training. It is being expanded to support the landing and departure of fully loaded U.S. Air Force tactical airlift aircraft (USAG-HI 2010). The Army's first responders and disaster response capabilities are also at Wheeler Army Airfield. The airfield could be used as a base of operations by FEMA and other disaster response agencies.

The runway at Wheeler Army Airfield is approximately 0.5 mile east of the proposed generating station site (Figure 3.2-1). The area around the runway, including airspace above and around the SGSP project site, is Class D airspace. This Class D airspace can be visualized as an inverted cone around the runway, extending vertically from ground level to 2,500 feet and horizontally from the runway for 5 statute miles (i.e., 4.3 nautical miles). There is a helicopter pad approximately 800 feet southeast of the SGSP project site, but it is not operational (Deweese 2015).

Each DoD air installation maintains an Air Installations Compatible Use Zones (AICUZ) program to promote air safety and compatible land use planning. As part of Wheeler Army Airfield's AICUZ program, the Army has established clear zones and APZs on either side of the runway.

The SGSP project site does not overlap the clear zones or APZs and is just north of APZ 1 (Figure 3.2-1).

3.2.2 Environmental Consequences

Impacts on airspace are assessed by evaluating the potential effects of project activities on navigable airspace, special use airspace, flight routes and flight patterns, and airports and airfields. Impacts on navigable airspace are assessed by determining whether the project would reduce the amount of navigable airspace by creating new or expanding existing special use airspace, by introducing temporary flight restrictions, or by constituting an obstruction to air navigation. Impacts on special use airspace are assessed by determining the project's requirement for modifications to existing special use airspace. Impacts on flight routes and flight patterns are assessed by determining whether the project would require a change to flight routes and flight patterns, including changes to altitudes or instrument procedures. Impacts on airports and airfields are assessed by determining whether the project restricts access to or affects traffic flows at airports or airfields.

Impacts on airspace would be considered significant if the project would create an obstruction to air navigation, reduce the amount or availability of navigable airspace, limit military or civilian operations involving aviation, or result in a safety hazard for air operations or people working on the ground at the project area. Table 3.2-1 summarizes impacts for the Proposed Action and No Action Alternative. A detailed analysis of these alternatives follows the table.

Table 3.2-1.
Summary of Impacts to Airspace

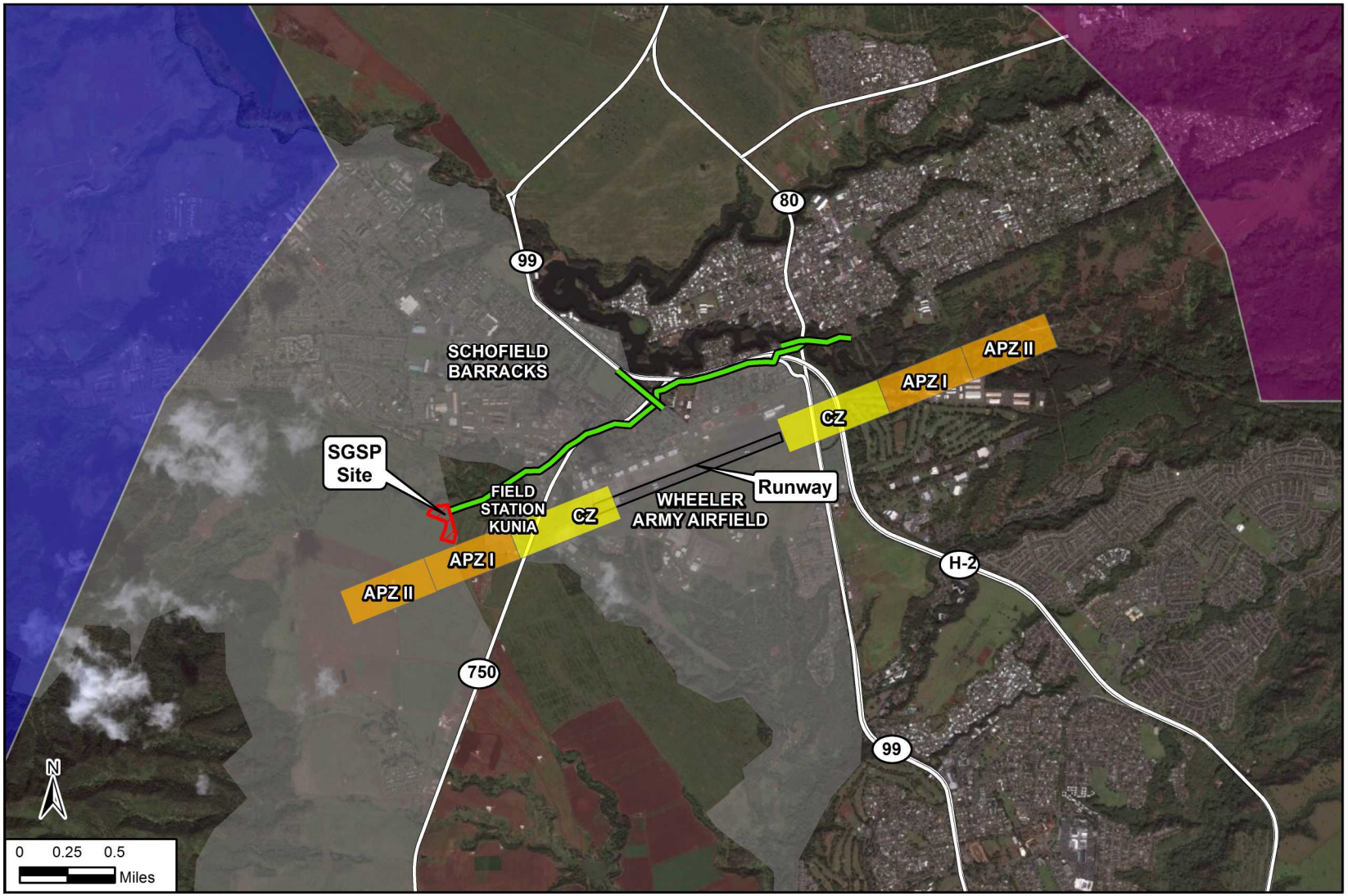
Type of Impact	Proposed Action	No Action Alternative
Obstruct air navigation	None	None
Reduce navigable airspace	None	None
Limit aviation operations	Minor	None
Result in a safety hazard	Minor	None
Overall Impacts	**Minor**	**None**

3.2.2.1 Proposed Action

No significant impacts on airspace would be expected if the Proposed Action is implemented. Neither construction equipment nor the generating station structure would create an obstacle to air navigation or adversely affect military and civilian aviation operations. The two exhaust silencer stacks at the generating station would be approximately 95 feet above ground level, and transmission poles would be 60 to 80 feet above ground level. Some construction equipment used to build these structures would be slightly taller. The height of these structures and their proximity to Wheeler Army Airfield was a critical consideration informing the project design throughout the process.

3.2.2.1.1 Construction

Project construction would require FAA notification under 14 CFR §77. Hawaiian Electric would notify the FAA at least 45 days before the start of construction (or the date an application for a construction permit is filed, whichever is earlier) by submitting FAA Form 7460-1. Hawaiian Electric, the Army Liaison to the FAA, and FAA specialists would work together to resolve any project design or construction issues that would affect Wheeler Army Airfield flight operations. Similarly, the site layout design and all construction operations (including equipment operation)



LEGEND

- DoD/Federal Land
- State Route
- SGSP Site
- Planned Interconnection Route
- Clear Zone
- Accident Potential Zone
- U.S. Special Use Airspace
  - Alert Area
  - Restricted Area

Airspace

Figure 3.2-1

Source: Schofield Barracks GIS 2014, FAA 2014, ESRI 2011.

would have to meet the airfield clearances and other requirements of UFC 3-260-01, Airfield and Heliport Planning and Design. Hawaiian Electric, USAG-HI, and Wheeler Army Airfield Aviation Safety would work together to resolve any project design or construction issues that could affect Wheeler Army Airfield flight operations and to make sure the plan conformed to UFC 3-260-01. Any issues would be satisfactorily resolved before construction to minimize impacts on airports and airfields, navigable airspace, and flight routes and flight patterns.

There would be no impacts to special use airspace from implementing the Proposed Action. The nearest special use airspace is 2 miles from the project site (east of the east end of the interconnection easement), far enough away that no modification of special use airspace would be required.

3.2.2.1.2 Operation

Airspace designations, flight paths, airspace use, and air operations at Wheeler Army Airfield, and the local and regional airspace were all factored into project design to ensure that no modifications to these would be required once the generating station was constructed and operational. Operation and maintenance activities might infrequently involve the use of construction equipment taller than the structures on the site for activities, such as maintaining the transmission line or exhaust stacks. This would be taken into account during the permitting process so that there would be no impact to airspace.

Hawaiian Electric would comply with FAA notification procedures and applicable DoD UFC standards. Facility design and plans for operation and maintenance would be approved by the FAA with support from Wheeler Army Airfield Aviation Safety personnel. Approvals would not be granted until any potential effects on airspace were satisfactorily resolved.

3.2.2.1.3 Mitigation Measures and BMPs

No mitigation measures for airspace would be required. The FAA permit would specify any applicable BMP and they would be implemented.

3.2.2.2 No Action Alternative

There would be no effects on airspace if the No Action Alternative was implemented. The project would not be constructed, so there would be no change to airspace use or designations on or around the project site.

3.3 VISUAL RESOURCES

3.3.1 Affected Environment

Visual resources describe the visual quality or character of an area and consist of the landscape features and the social environment from which they are viewed. The landscape features that define an area of high visual quality may be natural (e.g., mountain views) or man-made (e.g., a city skyline).

This section describes the visual resources in the project area. It begins with an overview of the existing appearance and visual character of the ROI, followed by a description of applicable guidance documents, distinct visual features, scenic views, and sources of light and glare. The ROI is the viewshed of the SGSP, including areas visible from the project site and areas from which the SGSP would be visible.

There are historic districts at Schofield Barracks and Wheeler Army Airfield. These districts and the project's effects on them, including visual effects, are described in section 3.10.

3.3.1.1 Existing Appearance and Visual Character

The ROI is characterized by low-density development separated by large areas of undeveloped land. Developed areas are dominated by Schofield Barracks, Wheeler Army Airfield, and Wahiawa. Topography in the developed areas is relatively flat, so views are typically limited. Undeveloped areas are dominated by agriculture in lower-lying flat areas and unmanicured vegetation in hilly terrain farther afield. More expansive views are generally available only from agricultural fields and higher elevations.

The generating station site is in the eastern portion of Schofield Barracks' South Range. Viewed from off-site, it is covered with dense vegetation consisting of tall grasses, shrubs, and young trees (Figure 3.3-1). With the exception of a sewer lift station under construction to the north, the adjacent properties are undeveloped and covered by similar vegetation. Views from the generating station site to the south and west consist of dense vegetation in the foreground and agricultural fields and the Waianae Mountains in the background. To the north and northeast, the near-field views are into a wooded ravine carved by Waikele Stream (which is intermittent where it passes the project site), while views progressively farther afield include Schofield Barracks, Wheeler Army Airfield, Wahiawa, and the Koolau Mountain Range. To the east, foreground views are of vegetation and Field Station Kunia with background views of Wheeler Army Airfield and the Koolau Mountains.

The interconnection easement passes through undeveloped and developed areas. The easement itself consists primarily of low grasses. Features adjacent to and around the interconnection easement include roads, road signs, fences, transmission lines and poles, shrubs, trees, and buildings. Figure 3.3-2 shows the typical views of the interconnection easement. Poles 1-4 would be near the Waikele Stream gulch, an undeveloped and vegetated area. The remainder of the interconnection easement is in developed areas whose appearance is dominated by roadways, structures, and relatively small green spaces. Poles 38-40 would cross Lake Wilson and traverse a portion of Wahiawa Freshwater Park (Figure 3.3-3), a largely undeveloped area with a relatively natural appearance.

View from northern boundary of generating station site facing south.

View from southeast corner of generating station site (orange survey marker is southeast corner) to the northwest across the site.

Figure 3.3-1. Views of the Generating Station Site

View facing north from vicinity of proposed pole 4 toward proposed pole 5.

View looking south along Kunia Road toward Lyman Gate and location of proposed pole 8.

View of crossing of Kunia Road toward proposed location of pole 14.

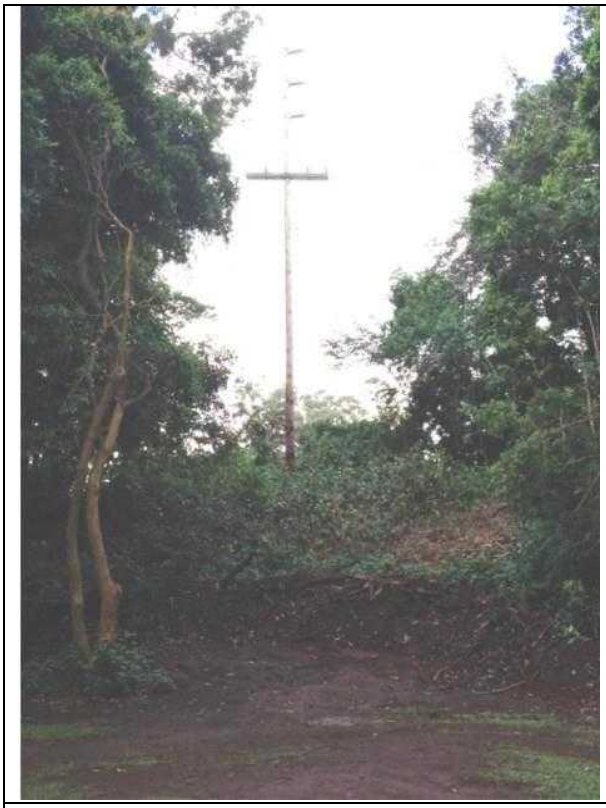
View of existing pole line in the vicinity of proposed poles 42–47. (Existing 46-kV tap to Wahiawā-Mikilua circuit.)

View looking north along Kunia Road toward proposed location of pole 19.

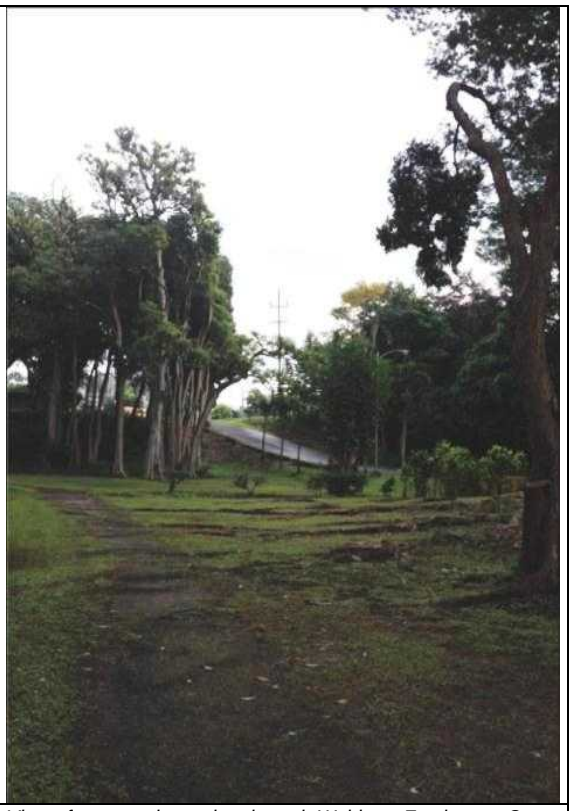
View of freeway crossing near proposed location of poles 30–31.

Source: Hawaiian Electric 2014b

Figure 3.3-2. Typical Views along Interconnection Easement



View of proposed location of pole 38 after crossing Lake Wilson. Photo taken within Wahiawa Freshwater State Park.



View of proposed crossing through Wahiawa Freshwater State Park to Wahiawa Substation (proposed poles 39–41).

Figure 3.3-3. Views along the Interconnection Easement in Wahiawa Freshwater State Park

3.3.1.2 Guidance Documents

The Army and the City and County of Honolulu adopted guidance documents that address visual resources and the aesthetic environment.

3.3.1.2.1 Schofield Barracks Installation Design Guide

The *Schofield Barracks Installation Design Guide* (IDG) provides direction for improving the visual quality on Schofield Barracks (USAG-HI 2004). The IDG defines visual themes that apply in different visual zones on the installation. It is used to guide design, construction, and maintenance activities to foster an orderly, attractive, and visually harmonious environment. The IDG includes standards and guidelines for site planning; architectural character; colors and materials; vehicular and pedestrian circulation; and landscape elements, including plant material, seating, signs, lighting, and utilities. The IDG incorporates the principles of sustainable design and addresses safety considerations such as antiterrorism force protection setbacks (USAG-HI 2004).

The IDG was last updated in 2004, so it does not specifically address the South Range, which was not part of the installation at the time. A 2013 installation land use map designates the South Range, including the generating station site, a light industrial area (USAG-HI 2013a). “Industrial” is one of the visual themes addressed in the IDG. The IDG envisions consolidating industrial uses near the installation periphery and away from the core cantonment area and recommends

screening views of industrial facilities with landscape buffers. Section 11.6 of the IDG addresses utility systems. It states that electrical infrastructure such as substations and transformers "should be designed and located to minimize their visual impact and be compatible with the character of their setting" (USAG-HI 2004). It recommends placing transmission lines along the edges of land use areas to avoid dividing areas or creating unusable areas. It envisions placing transmission lines underground where possible to reduce visual clutter and enhance visual character.

The interconnection easement would be adjacent to two IDG visual themes: company campus (poles 12-14) and historic family housing (poles 14-18 and 42-47). The company campus theme combines administration, training, and soldier amenities whereas the historic family housing theme is comprised of housing in the Schofield Barracks Historic District. The interconnection easement would also overlap two visual zones: Lyman Gate (poles 6-10) and Foote Gate (poles 10-12). Both gates were assessed as low in visual quality with a cluttered appearance.

3.3.1.2.2 Central Oahu Sustainable Communities Plan

The *Central Oahu Sustainable Communities Plan* (COSCP) is Central Oahu's guide to development policy for the region (HDPP 2002a). It includes goals and guidelines for community development, including the revitalization of Wahiawa, and preserving the area's natural and cultural resources.

The COSCP acknowledges that electrical infrastructure will likely be expanded to support community growth and states that transmission lines should be placed underground when possible and that power plants should be in industrial areas away from residences. The plan notes that utility corridors can double as greenways that support development of a regionwide open space network.

With respect to visual resources, the plan includes regionwide guidelines and guidelines specific to Wahiawa. Regionwide, the plan identifies visual landmarks and significant vistas described in section 3.3.1.3. In Wahiawa, the plan states that views across Lake Wilson and the natural scenic character of Wahiawa Freshwater Park should be preserved.

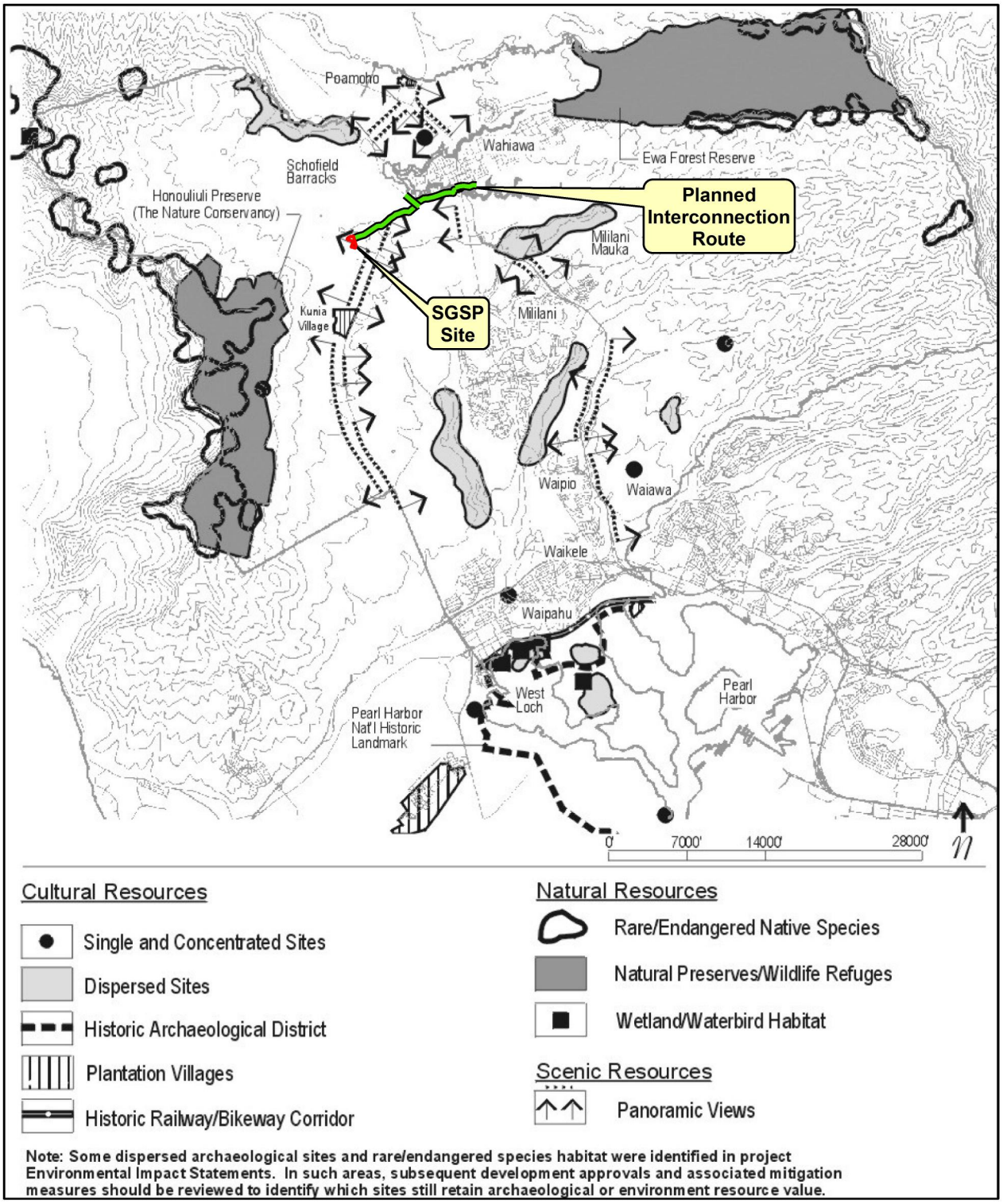
3.3.1.3 Distinct Visual Features and Scenic Views

The IDG does not specify distinct visual features or scenic views, but it states generally that scenic and other attractive views and vistas should be preserved (USAG-HI 2004). Views of the Waianae or Koolau Mountains, views of the historic districts, and views of distinct visual features such as the Post Cemetery are considered scenic views and vistas in the ROI that should be preserved.

The COSCP defines important public views and calls for their preservation (HDPP 2002a). Public views are defined as views "…along streets and highways, *mauka-makai* view corridors, panoramic, and significant landmark views from public places, views of natural features, heritage resources, and other landmarks, and view corridors between significant landmarks." The COSCP includes a table of important public views, two of which are in the ROI (Figure 3.3-4):

- Distant vistas of the shoreline and Pearl Harbor from the H-2 Freeway
- Views of the Waianae and Koolau Mountains from Kunia Road, Kamehameha Highway, and H-2 Freeway

To protect these views, the COSCP calls for the design and siting of all structures to reflect the need to maintain and enhance available views of significant landmarks and makes it public policy to oppose development that would block certain important public views, including the two above.



Important Public Views

Figure 3.3-4

Source: HDPP 2002a.

It also recommends that new transmission lines should be placed underground whereever possible under criteria specified in state law (HDPP 2002a).

3.3.1.4 Light and Glare

Outdoor nighttime lighting is common throughout the developed portions of the ROI. Outdoor lighting is common on roadways, along sidewalks, in parking lots, and on buildings for architectural enhancement and for safety and security. Lights enhance safety and mobility but can detract from an environment if they affect areas where light is not desirable. The IDG requires that all on-post lighting be "located or designed to prevent undesirable spillover of light into other areas" (USAG-HI 2004).

Sources of glare in the ROI include reflective surfaces such as building windows, some building materials or coatings, and vehicle components (e.g., windows, mirrors, chrome, and paint). Although there are no sources of glare on or adjacent to the generating station site, there are many buildings and roadways along the interconnection easement.

3.3.2 Environmental Consequences

This section examines the project's effects on visual resources. The visual impact analysis is supported by preparing visual simulations of the proposed facilities. Effects on visual resources would be significant if the Proposed Action created visual intrusions or contrasts appreciably affecting the quality of the landscape, violated or obstructed implementation of a policy related to visual resource preservation, blocked or degraded a distinct visual feature or scenic view, or created glare or illumination that would be obtrusive or incompatible with existing land use. Visual impacts on the historic districts are discussed in section 3.10. Table 3.3-1 summarizes impacts for the Proposed Action and No Action Alternative. A detailed analysis of these alternatives follows the table.

Table 3.3-1.
Impacts to Visual Resources

Type of Impact	Proposed Action	No Action Alternative
Create visual intrusions or contrasts appreciably affecting the quality of the landscape	Moderate	None
Violate or obstruct implementation of a policy related to visual resource preservation	Moderate	None
Block or degrade a distinct visual feature or scenic view	Moderate	None
Create glare or illumination that would be obtrusive or incompatible with existing land use	Minor	None
Overall Impacts	**Moderate**	**None**

3.3.2.1 Proposed Action

Short- and long-term moderate adverse effects would result from implementation of the Proposed Action. Short-term minor effects would be caused by the visibility of construction equipment, materials, and disturbed soil. Long-term moderate effects would be caused by the visibility of the generating station from some important public views along Kunia Road and introducing new overhead transmission lines. Long-term minor effects would be the visibility of the generating station and transmission lines from non-sensitive viewpoints and the introduction of new sources of light and glare. Visual impacts to the Wheeler Army Airfield Historic District are addressed in section 3.10.

3.3.2.1.1 Construction

Short-term minor adverse effects on the visual environment would result from construction. At the generating station site, site preparation would involve clearing vegetation. When construction commences, large construction equipment such as cranes and scaffolding would be visible from the surrounding areas. Material laydown areas and areas of bare soil would be visible. Hawaiian Electric and its contractor would employ good housekeeping at the site so materials and equipment would be kept in an orderly manner and the site would not appear cluttered or unorganized.

At first, the construction would be low-lying and visible from a few public vantage points. As the taller facilities are erected, they would be visible from farther afield. After construction, the SGSP would become a permanent visual feature of the local landscape.

The transmission poles and lines would be installed using cranes and other large equipment. This activity would be noticeable to passersby, especially when occurring along roadways. Hawaiian Electric and its contractor would employ good housekeeping measures to minimize the visual impact. Construction would progress along the interconnection easement (typically no more than a week in any one location) so construction would be visible from any one place for a limited amount of time.

Because the appearance of the construction sites would be typical of those types of activities, Hawaiian Electric and its contractors would employ good housekeeping so construction areas would appear clean and orderly, and construction activities would be temporary, construction effects would be minor.

3.3.2.1.2 Operation

3.3.2.1.2.1 Generating Station

After construction, the SGSP would become a lasting visual feature. The permanent structures at the generating station would include exhaust stacks as tall as 95 feet, and storage tanks. The engine hall would be about 160 feet long, 70 feet wide, and 32 feet high. A visual rendering of the preliminary design for the facility as it would appear to an observer looking in a northwesterly direction from a point approximately 200 feet above Kunia Road is provided on Figure 2.2-4.

In the immediate area, the generating station would be visible from adjacent areas of Schofield Barracks, particularly from some houses in the Kalakaua housing area. The generating station would be in a designated industrial area where such facilities are appropriate. It would be designed in accordance with the specifications of the IDG and would appear orderly and uncluttered (USAG-HI 2004). Although it would have an industrial appearance, it would be appropriately sited, designed, and maintained, so visibility from the Kalakaua housing area would be assessed a moderate adverse effect. The generating station would not be visible from the Schofield Barracks or Wheeler Army Airfield historic districts. However, a couple of the transmission line poles would be visible from certain vantage points within the Wheeler Army Airfield historic districts. Those impacts are discussed in section 3.10.

The generating station would be visible from the Kunia Road and Kamehameha Highway, important public views defined in the COSCP (Figure 3.3-4) (HDPP 2002a). Although these public views would be somewhat degraded by an industrial facility, the generating station would not block distant views of the Waianae and Koolau Mountains from Kunia Road and Kamehameha Highway. It would be obscured by buildings, trees, embankments, walls, or topography from all other portions of nearby thoroughfares and from lower-lying portions of

Wahiawa to the northeast. The color scheme of the facility, including the exhaust stacks, would be earth-tones (in accordance with Army guidelines), which would reduce the visibility of the site against the backdrop of the Waianae Mountains. Because the generating station would introduce an industrial facility into these important public views, there would be a moderate adverse effect. Since the generating station would not block views of the mountains, would not be visible from many vantage points, and would be in a designated industrial area on a military installation, where industrial facilities are not an appreciably contrasting visual feature, impacts would not reach the level of significant.

Farther afield, the generating station would be visible from high but distant points in the surrounding communities and from the Koolau and Waianae mountain ranges. From this distance, it would not appear as a distinct feature but rather as part of general development in the area, so the visual effect would be minor.

The generating station would have outdoor nighttime security lighting. In accordance with the IDG and as a BMP, outdoor nighttime lighting would be shielded so the bulb could be seen only from ground level and would minimize light transmission beyond the plant boundary resulting in minimal light pollution. The engine hall has few windows and the equipment is not a substantial source of glare, so effects related to light and glare would be minor.

3.3.2.1.2.2 Transmission Line

The transmission line poles and lines would be visible only in the areas through which they pass. Poles 9-13, 19, 33-35, and 37-48 would be in an existing easement where there are other transmission lines. Effects in these areas would be minor because the new poles would add only slightly to the existing views of overhead lines. Poles 38-41 would cross Lake Wilson and the Wahiawa Freshwater Park before the line terminates at the Wahiawa Substation. Because this segment is an upgrade to an existing line, it would be consistent with the COSCP policy to preserve views across Lake Wilson and the natural scenic character of Wahiawa Freshwater Park (HDPP 2002a).

Poles 1-8, 14-18, 20-32, and 36 would be placed where there are currently no transmission lines. Because the topography in the area is relatively flat, the transmission lines would be visible only in a localized area and would not likely be visible from any important public views defined in the COSCP. Because the areas surrounding these new alignments are developed with many infrastructure features including roads, road signs, parking areas, fences, and street lights, the addition of the transmission lines would not appreciably contrast with or alter the visual character of the area, so the visual impact of the poles in new alignments would be localized and minor.

Portions of the transmission line would be visible from the historic districts. Visual impacts on the historic districts are discussed in section 3.10.

The transmission lines would not include lighting or be a source of glare, so there would be no effects related to light and glare.

The IDG and COSCP call for placing transmission lines underground when appropriate (USAG-HI 2004; HDPP 2002a). HRS section 269-27.6(a) makes it the responsibility of the PUC to determine whether a new line should be placed above or below ground. In its application to the PUC, Hawaiian Electric requested that the PUC approve construction of this transmission line aboveground, due to the significantly higher cost to the customers of placing it underground.

3.3.2.1.3 Mitigation Measures and BMPs

Because the project would not result in significant impacts to visual resources, no mitigation measures would be required.

These BMPs would be implemented:

- During construction, Hawaiian Electric and its contractor would employ good housekeeping so materials and equipment are kept in an orderly manner and do not appear cluttered and unorganized.
- The SGSP would conform to the design principles and standards of the IDG (USAG-HI 2004). The color scheme of the facility, including the exhaust stacks, would be earth-tones, which would reduce the visibility of the site against the backdrop of the Waianae Mountains.
- Outdoor nighttime lighting would be shielded so the bulbs can be seen only from ground level and will minimize light transmission beyond the plant boundary, resulting in minimal light pollution.

3.3.2.2 No Action Alternative

Under the No Action Alternative, there would be no adverse effects on visual resources because visual resources in the ROI would be unchanged.

3.4 AIR QUALITY

3.4.1 Affected Environment

Air pollution is the presence in the outdoor atmosphere of one or more contaminants that are injurious to humans, plants, or animals, or that interfere with the enjoyment of life and property. Air quality as a resource incorporates several components describing the levels of overall air pollution in a region, and sources of and regulations governing air emissions. A discussion of the affected environment as it relates to air quality, including the National Ambient Air Quality Standards (NAAQS), local ambient air quality, regional climate, and GHGs, follows. The ROI for air quality is the Hawaii Air Quality Control Region (AQCR), which consists of the territorial area encompassed by the outermost boundaries of the State of Hawaii.

3.4.1.1 National Ambient Air Quality Standards and Attainment Status

The U.S. Environmental Protection Agency (EPA) Region 9 and the Hawaii DOH regulate air quality in Hawaii. The Clean Air Act (CAA) (42 USC 7401-7671q), as amended, gives EPA the responsibility to establish the primary and secondary NAAQS (40 CFR 50) that set acceptable concentration levels for seven criteria pollutants: (1) particulate matter less than 10 microns in diameter (PM_{10}); (2) particulate matter less than 2.5 microns in diameter ($PM_{2.5}$); (3) sulfur dioxide (SO_2); (4) carbon monoxide (CO); (5) nitrogen dioxide (NO_2); (6) ozone (O_3); and (7) lead. Short-term standards for 1-, 8-, and 24-hour periods have been established for pollutants contributing to acute health effects, while long-term standards (based on annual averages) have been established for pollutants contributing to chronic health effects. The of Hawaii has adopted State Ambient Air Quality Standards (SAAQS) in addition to those established under federal regulations.

Federal regulations designate AQCRs that have concentrations of one or more of the criteria pollutants that exceed the NAAQS as nonattainment areas. Federal regulations designate AQCRs with levels below the NAAQS as attainment areas. Honolulu County (and, therefore, all areas

associated with the Proposed Action) is in the State of Hawaii AQCR (AQCR 246) (40 CFR 81.76). EPA designated Honolulu County as in attainment or unclassifiable/attainment for all criteria pollutants for which designations have been issued (EPA 2013). Because the proposed project is completely in an area designated as in attainment or unclassifiable for all criteria pollutants for which designations have been issued, the general conformity requirements do not apply and no formal conformity determination is required.

EPA monitors levels of criteria pollutants at representative sites in each region throughout Hawaii. ~~For reference,~~ Table 3.4-1 compares federal and state air quality standards and the monitored concentrations of criteria pollutants at the monitoring location closest to Schofield Barracks (EPA 2013). Monitored concentrations were the values reported for 2011 by the Hawaii Department of Health Clean Air Branch Honolulu monitoring station obtained from the EPA AirData database.

Table 3.4-1.
Air Quality Standards and Monitored Data Near Schofield Barracks

Pollutant	Hawaii Air Quality Standards	Federal Air Quality Standards	Monitored Data Near Schofield Barracks
Carbon monoxide (CO)			
1-hour maximum[a] (ppm)	9	35	1.2
8-hour maximum[a] (ppm)	4.4	9	1.0
Lead			
3-month average (μg/m^3)	1.5	0.15	(no data)
Nitrogen dioxide (NO_2)			
1-hour (ppb)[b]	NE	100	22.0
Ozone (O_3)			
8-hour maximum[c] (ppm)	0.08	0.075	0.05
Sulfur dioxide (SO_2)			
1-hour average[a] (ppb)	0.5	0.5	(no data)
3-hour maximum[a] (ppm)	0.5	0.5	(no data)
24-hour maximum[a] (ppb)	140	140	3.0
Annual average (ppb)	30	NE	(no data)
Particulate matter less than 2.5 microns in diameter ($PM_{2.5}$)			
24-hour 98th percentile[c] (μg/m^3)	NE	35	20
Annual mean[d] (μg/m^3)	NE	12.0	9
Particulate matter less than 10 microns in diameter (PM_{10})			
24-hour maximum[a] (μg/m^3)	150	150	46
Annual Average (μg/m^3)	NE	12	2.6
Hydrogen sulfide			
1-hour average (ppm)	0.025	NE	(no data)

Sources: Hawaii DOH 2013a; EPA 2013; and 40 CFR §50.1-§50.18.

Notes: NE = not established; ppm = parts per million; ppb = parts per billion; μg/m^3 = micrograms per cubic meter; $PM_{2.5}$ = particulate matter less than 2.5 microns in diameter; PM_{10} = particulate matter less than 10 microns in diameter.

[a] Not to be exceeded more than once per year.

[b] The 3-year average of the 98th percentile of 1-hour concentrations at each population-oriented monitor must not exceed 35 μg/m^3.

[c] The 3-year average of the fourth-highest daily maximum 8-hour average O_3 concentrations over each year must not exceed 0.075 ppm.

[d] The 3-year average of the annual mean $PM_{2.5}$ concentrations must not exceed 12.0 μg/m^3.

3.4.1.2 Installationwide Emissions at Schofield Barracks

Based on the installation's potential to emit (PTE) NO_x and PM_{10}, Schofield Barracks is a major source of air emissions. An installationwide Title V permit (Covered Source Permit [CSP No. 0226-01-C]) was issued in September 2007 and is being renewed. The CSP limits the amount of pollutants from significant emission sources in various ways, depending on the source type (e.g., restricting operating hours, fuel type, throughput amount, and emission rates). As part of the CSP requirements, the installation submits a comprehensive emissions statement annually. Table 3.4-2 summarizes the 2010 installationwide actual emissions and PTE of criteria pollutants and GHGs at Schofield Barracks.

Table 3.4-2.
Criteria Pollutants and GHG Emissions at Schofield Barracks

	Criteria Pollutants Emissions (tons per year [tpy])				
Emissions (tpy)	**NO_x**	**SO_2**	**CO**	**VOC**	**PM_{10}**
Actual emissions	26.0	1.1	10.1	14.8	43.0
PTE	164.0	5.9	60.0	29.3	126.1

	GHG Emissions (tpy)			
Emissions (tpy)	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Actual emissions	4,908	416.9	0.13	13,703
PTE	57,470	417.7	3.3	67,265

Source: USAPHC 2012.

Notes: CO_2 = carbon dioxide; CO_2e = carbon dioxide equivalent; CH_4 = methane; GHG = greenhouse gas; N_2O = nitrous oxide; PM_{10} particulate matter less than 10 microns in diameter; SO_2 = sulfur dioxide; PTE = potential to emit; VOC = volatile organic compound.

3.4.1.3 Regulatory Setting

Hawaii DOH oversees programs for permitting the construction and operation of new sources of air emissions in Hawaii. Hawaii air permitting is required for many industries and facilities that emit regulated pollutants. Hawaii DOH sets permit rules and standards for emissions sources based on the amount of the emissions and type of pollutants emitted. This section outlines the primary federal and state permitting regulations, with a discussion of how they would apply to the proposed SGSP.

There are three types of air permits available through the Hawaii DOH for constructing and operating new emissions sources: (1) Prevention of Significant Deterioration/Covered Source permits (PSD/CSP) in attainment areas; (2) Major Source permits (Title V/CSP); and (3) Minor (Noncovered) Source permits. Only the PSD/CSP is discussed in detail because it is the permit that would apply to the SGSP. Other components of the Proposed Action, such as the transmission line or switching station upgrades, would not require air permits.

Permitting requirements for proposed stationary sources are based on their overall PTE of criteria pollutants. Thresholds that determine the type of construction permit required depend on the quantity and the type of emissions. Because Hawaiian Electric would own and operate the SGSP, it was determined that Hawaiian Electric would be the proper applicant and permittee, and that SGSP would not be added to the installationwide permit for Schofield Barracks.

3.4.1.3.1 Prevention of Significant Deterioration

PSD regulations (i.e., 40 CFR §52.21 and HAR Title 11, Chapter 60.1, Subchapter 7) define a "major stationary source" as (1) any source belonging to a list of 28 source categories that emits or has the potential to emit 100 tons per year (tpy) or more of any pollutant regulated under the CAA, or (2) any other source that emits or has the potential to emit 250 tpy or more of any PSD-regulated pollutant. New major sources are subject to PSD review for all pollutants with emission increases exceeding the significant emissions rate outlined in Table 3.4-3.

Table 3.4-3.
Significant Emission Rates of Regulated Pollutants

Pollutant	Prevention of Significant Deterioration Significant Emission Rate (tons per year)
Carbon monoxide (CO)	100
Nitrogen oxide (NO_x)	40
Sulfur dioxide (SO_2)	40
Total particulate matter (PM)	25
Particulate matter less than 10 microns in diameter (PM_{10})	15
Particulate matter less than 2.5 microns in diameter ($PM_{2.5}$)	10
Volatile organic compounds (VOCs)	40
Lead	0.6
Fluorides	3
Sulfuric acid mist	7
Hydrogen sulfide	10
Total reduced sulfur	10
Reduced sulfur compounds	10
Municipal waste combustor (MWC) organics	3.5E-06
MWC metals	15
MWC acid gases	40
Asbestos	0.007
Beryllium	0.0004
Mercury	0.1
Vinyl chloride	1
Benzene	Any Amount
Arsenic	Any Amount

Source: HAR §11-60.1-1, August 28, 2001

The PSD regulations specify that new major stationary sources in an attainment or unclassifiable area must undergo PSD review. Under HAR 11-60.1-83(g), Hawaii DOH is required to approve, conditionally approve, or deny a PSD/CSP application within 12 months after receipt of a complete application. The criteria that must be addressed for sources that are subject to PSD regulations are:

- Best Available Control Technology (BACT) review for each regulated pollutant
- Ambient air quality analysis
- Establishing procedures for measuring and recording emissions or process rates or both;
- Compliance with any applicable New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP) requirements

- A public participation process

PSD regulations are specifically designed to protect air quality in areas with sensitive viewsheds known as Class I and Class II areas.

3.4.1.3.2 Nonattainment New Source Review

Nonattainment New Source Review (NNSR) permits are required for any new major sources in a nonattainment area. Because the proposed project is in an area designated as attainment or unclassifiable for all NAAQS for which designations have been issued, NNSR does not apply.

3.4.1.3.3 Operating Permits

Under Hawaii DOH's Covered Source regulations (HAR §11-60.1), a CSP is required for (1) any major source, (2) any source subject to an applicable NSPS, (3) any source subject to an applicable NESHAP, and (4) any source subject to PSD. The HAR defines a major source as (1) any source that emits or has the potential to emit any hazardous air pollutant (HAP) in the aggregate of 10 tpy or more or 25 tpy or more of any combination of HAP, or (2) any source that emits or has the potential to emit 100 tpy or more of any air pollutant. A minor (Noncovered Source) permit would be required if emissions were below these thresholds and a federally enforceable limit would not be necessary.

3.4.1.3.4 NSPS and NESHAP

In addition to the permitting requirements to construct and operate new emissions sources, NSPS and NESHAP set emissions standards for categories of new stationary emissions sources of both criteria pollutants and HAPs. Section 111 of the CAA required EPA to develop NSPS or technology-based standards for specific categories of stationary sources that cause or contribute significantly to air pollution. The NSPS program sets uniform emissions limitations for many industrial sources. The CAA Amendments of 1990, under revisions to section 112, required EPA to list and promulgate NESHAP to reduce HAP emissions, such as formaldehyde, benzene, xylene, and toluene from industrial source categories of major and area sources (40 CFR Part 63).

3.4.1.3.5 State Implementation Plan

The State of Hawaii has a regulatory structure in place designed to prevent air quality deterioration for attainment areas. These rules and regulations are contained in the *State Implementation Plan* (SIP). SIPs are the regulations and other materials for meeting clean air standards and associated CAA requirements. SIPs include:

- State regulations that EPA has approved
- State-issued, EPA-approved orders requiring pollution control at individual companies
- Planning documents such as area-specific compilations of emissions estimates and computer simulations (modeling analyses) demonstrating that the regulatory limits ensure that the air would meet air quality standards

3.4.1.4 Climate and Greenhouse Gases

The average high temperature in the Schofield Barracks area is 82.6 degrees Fahrenheit (or 28.1 degrees Celsius) in September, the hottest month, and the average low temperature is 59.9 degrees Fahrenheit (or 15.5 degrees Celsius) in February, the coldest month. The area has average annual precipitation of 69.6 inches (or 176.8 centimeters) per year. The wettest month is December, with an average rainfall of 8.0 inches (or 20.3 centimeters) (Idcide 2014).

GHGs are both naturally occurring and synthetic gases that trap heat in the atmosphere. They contribute to an increase in the temperature of the Earth's atmosphere by letting solar energy into the atmosphere, which then cannot escape. According to the Kyoto Protocol, there are six GHGs—carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6)—some of which are produced by both human and naturally occurring activities. The principal GHGs that enter the atmosphere because of human activities are:

- ***Carbon dioxide (CO_2)*** – CO_2 enters the atmosphere through the burning of fossil fuels (i.e., oil, natural gas, and coal), solid waste, and trees and wood products, and from other chemical reactions (e.g., the manufacture of cement). CO_2 is removed from the atmosphere (or *sequestered*) when plants absorb it as part of the biological carbon cycle.
- ***Methane (CH_4)*** – CH_4 is emitted during the production and transport of coal, natural gas, and oil; from livestock and other agricultural practices; and from the decay of organic waste in landfills.
- ***Nitrous oxide (N_2O)*** – N_2O is emitted during agricultural and industrial activities, and during combustion of fossil fuels and solid waste.

In addition, GHGs are measured in carbon dioxide equivalent (CO_2e) units that reflect the amount of CO_2 by weight emitted into the atmosphere that would produce the same estimated radiative forcing as a given weight of another radiative active gas. CO_2e is computed by multiplying the weight of the gas being measured (e.g., CH_4) by its estimated global warming potential (1 for CO_2, 25 for CH_4, and 310 for N_2O) (IPCC 2007).

Biogenic CO_2 emissions are those generated during the combustion or decomposition of biologically based material. They include the CO_2 portion of biofuels such as biodiesel and the combustion of wood waste. Nonbiogenic CO_2 emissions are generated during the combustion of nonbiologically based material such as fossil fuels (e.g., diesel and natural gas). It is generally understood that GHG emissions from the burning of biogenic fuels do not increase the total amount of GHGs in the Earth's atmosphere; and therefore, do not contribute to global warming as much as the burning of fossil fuels.

Although CO_2 emitted from the burning of biofuels is normally considered part of the Earth's natural carbon cycle, transportation, storage, and processing of the biofuel has some amount of CO_2 emissions. There are often indirect CO_2 emissions and changes in carbon sequestration from land use changes if the energy consumption for harvesting or production of biofuels is included in the analysis. EPA is studying the effects of these and other factors to more accurately account for biogenic CO_2 emissions from stationary sources (EPA 2014a ~~2011~~). Natural gas is nonbiogenic, but is known as a low-carbon fuel because it releases lesser amounts of GHGs compared to than the equivalent amount of energy generated from other fossil fuels.

3.4.1.5 Regulatory Setting and Permitting for GHG

EO 13693 ~~13514~~, Planning for Federal Sustainability in the Next Decade ~~*Federal Leadership in Environmental, Energy, and Economic Performance*~~, expands on the energy reduction and environmental performance requirements for federal agencies identified in EO 13423, Strengthening Federal Environmental, Energy, and Transportation Management. The goal of EO 13693 ~~13514~~ is to establish an integrated strategy toward sustainability in the federal government and to make reducing GHG emissions a priority for federal agencies. The GHG emissions generated directly and indirectly by an entity such as a federal agency can be classified into three "scopes" based on the source of the emissions:

- **Scope 1 emissions** are direct GHG emissions from sources owned or controlled by the entity. Scope 1 includes emissions from fossil fuels burned on-site, from owned or leased vehicles, and from other direct sources.
- **Scope 2 emissions** are direct GHG emissions from the generation of electricity, heating and cooling, or steam generated off-site but purchased by the federal entity.
- **Scope 3 emissions** include indirect GHG emissions from sources not owned or directly controlled by the entity but related to the entity's activities. Scope 3 GHG emission sources currently required for federal GHG reporting include employee travel and commuting, contracted solid waste disposal, and contracted wastewater treatment.

In response to EO 13693 ~~13514~~, DoD set the goal to reduce Scope 1 and 2 GHGs by 34 percent and Scope 3 GHGs by 13.5 percent by fiscal year (FY) 2020.

In 2014 ~~2010~~, CEQ released draft guidance on when and how federal agencies should consider GHG emissions and climate change in NEPA analyses. The draft guidance includes a presumptive effects threshold (i.e., reference point) of 27,563 tpy (25,000 metric tpy) of CO_2e emissions from a federal action (CEQ 2014).

EPA promulgated two GHG regulations: (1) Mandatory Reporting of GHGs Rule (MRR), which requires the reporting of GHG emissions annually, and (2) GHG Tailoring Rule, which requires BACT for GHGs to be addressed for new or modified sources occurring after 2 January 2011. The MRR final rule applies to fossil fuel suppliers and industrial gas suppliers, direct GHG emitters, and manufacturers of heavy-duty and off-road vehicles and engines. The rule does not require control of GHGs, but requires that sources above certain threshold levels be monitored and the emissions reported. The GHG Tailoring Rule recently promulgated by EPA established a CO_2e threshold for permitting (i.e., construction and operation) of 75,000 tpy for new sources. This rule "tailors" the major source permitting rules outlined above (i.e., Title V, PSD, and NNSR) to apply to GHGs. Based on a recent U.S. Supreme Court decision, the status of the GHG Tailoring Rule is uncertain.

3.4.2 Environmental Consequences

This section discusses the potential environmental effects on air quality that would result from the Proposed Action. The environmental consequences for air quality include the direct, indirect, and cumulative effects of the construction and operation of the proposed SGSP and a regulatory review of the SGSP. Impacts on air quality would be significant if emissions attributable to the project would threaten the attainment status of the region or would contribute to a violation of any federal, state, or local air regulation. Table 3.4-4 summarizes impacts for the Proposed Action and No Action Alternative. A detailed analysis of both is in the sections following the table.

Table 3.4-4.
Summary of Impacts to Air Quality

Type of Impact	Proposed Action	No Action Alternative
Local increase in criteria pollutants	Moderate	None
Local increase in GHG	Moderate	None
Regional increase in criteria pollutants	Beneficial with some local adverse effects	None
Regional increase in GHG	Beneficial with some local adverse effects	None
Temporary increase in fugitive dust	Minor	None
Permanent increase in fugitive dust	None	None
Overall Impacts	**Moderate**	**None**

Note: GHG = greenhouse gas

3.4.2.1 Proposed Action

Short-term minor and long-term moderate adverse direct effects would be expected. Short-term effects would be caused by air emissions generated during construction, and long-term direct effects would be caused by operational emissions. The operation of the generating station would indirectly reduce the emissions of some criteria pollutants and GHGs by reducing the use of off-post fossil fuel-based electricity. These reductions in regional emissions of SO_2 and GHGs (and NO_x in the case of LNG) would be beneficial and appreciably greater than direct operational emissions from the proposed SGSP. Because the proposed plant would in and of itself constitute a major stationary source of air emissions, overall impacts to air quality are considered moderately adverse. The PTE for the proposed SGSP would exceed the PSD major source threshold for the installation and PSD review would be required.

3.4.2.1.1 Construction

Short-term minor adverse effects would be expected from construction of the power generating station and installation of transmission lines. Mobile and stationary equipment would be used in construction. Construction equipment would generate emissions from the combustion of diesel fuel and gasoline. There would be fugitive dust during site grading and construction. These effects would be minor and would end when construction is complete. BMPs would be implemented to minimize air emissions during construction. Construction BMPs are presented under the heading Mitigation Measures and BMPs.

Construction emissions were estimated for fugitive dust, on- and off-road diesel equipment, delivery vehicles (including fuel delivery), and worker trips (Table 3.4-5). The estimated construction emissions would be *de minimis* (of minimal importance) and would have minor adverse effects. For analysis purposes, it was assumed that all construction activities would be compressed into a single 12-month period. Therefore, regardless of the ultimate implementation schedule, annual emissions would be less than those shown herein. Moderate changes in the quantity and types of equipment used would not have a substantial influence on the emission estimates and would not change the level of effects under NEPA.

Table 3.4-5.
Estimated Emissions from Construction of the SGSP

Activity/Source	CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$	CO_2
Heavy Equipment	2.8	5.7	0.8	<0.1	0.3	0.3	453.7
Delivery of Equipment	1.2	1.3	0.2	<0.1	<0.1	<0.1	150.1
Surface Disturbance	0.0	0.0	0.0	0.0	1.9	0.1	0.0
Worker Commutes	1.8	0.2	0.2	3.7	<0.1	<0.1	191.3
Total Emissions	5.8	7.2	1.2	3.7	2.3	0.5	795.1

Source: CARB 2012; SCAQMD 1993; and EPA 1995.

3.4.2.1.2 Operation

Long-term moderate adverse direct effects would be expected from the direct emissions of criteria pollutants, HAPs, and GHGs. It is understood that, as part of the lease agreement, Hawaiian Electric would meet the Army's requirement that a minimum of 50 percent of the electricity generated at SGSP would come from burning a minimum of 3.5 million gallons per year of biofuel. Therefore, three fuel use scenarios were carried forward for a more detailed analysis of air quality impacts, including running the generating station on (1) 100 percent biodiesel, (2) 50 percent biodiesel/50 percent diesel, and (3) 50 percent biodiesel/50 percent LNG. As shown in Table 3.4-6 ~~5~~, operating with 100 percent biodiesel or 50 percent biodiesel/50

percent diesel would generate the most criteria pollutants; operating with 50 percent biodiesel/50 percent diesel would generate the most GHGs; and operating with 50 percent biodiesel/50 percent LNG would generate the most HAPs. These scenarios would meet the lease conditions, and would constitute a reasonable upper bound of operational emissions. Table 3.4-7 ~~6~~ outlines the emissions from operating the SGSP based on the conservative assumption that the generating station would operate 24 hours per day, 365 days per year (or 8,760 hours per year) under full load. Once installed, the transmission lines would have no emissions or effects on air quality.

Table 3.4-6 ~~5~~.
Comparison of SGSP Operating Scenarios

Direct Emissions	Operating Scenarios		
	100% Biodiesel	50% Biodiesel/ 50% Diesel	50% Biodiesel/ 50% LNG
Criteria pollutants	Highest levels[a]	Highest levels[a]	Lowest levels
Hazardous air pollutants	Lowest levels[a]	Lowest levels[a]	Highest levels
Greenhouse gases[b]	Lowest levels	Highest levels	Median levels

Notes: % = Percent; LNG = Liquefied natural gas

[a] Both biodiesel and diesel would have the same emissions profile for both criteria pollutants and HAPs.

[b] Net based on ~~life cycle analysis including~~ nonbiogenic CO2e, as reflected in Table 3.4-8.

Table 3.4-7 ~~6~~.
Estimated Emissions 100% Operation of the SGSP

Pollutant	Total Emissions (tons per year)		
	100% Biodiesel	50% Biodiesel/ 50% Diesel	50% Biodiesel/ 50% LNG
Criteria Pollutants			
Carbon monoxide (CO)	86.9	86.9	73.2
Nitrogen oxide (NO_x)	739.9	739.9	442.7
Sulfur dioxide (SO_2)	9.4	9.4	9.4
Total particulate matter (PM)	72.3	72.3	52.0
Particulate matter less than 10 microns in diameter (PM_{10})	130.1	130.1	96.8
Particulate matter less than 2.5 microns in diameter ($PM_{2.5}$)	130.1	130.1	96.8
Volatile organic compounds (VOCs)	125.4	125.4	106.7
Hazardous Air Pollutants			
Acetaldehyde	4.69E-02	4.69E-02	3.70E-01
Acrolein	1.47E-02	1.47E-02	3.44E+00
Benzene	1.44E+00	1.44E+00	8.65E-01
Biphenyl	0.00E+00	0.00E+00	1.42E-01
1,3-Butadiene	0.00E+00	0.00E+00	2.40E-01
Ethylbenzene	0.00E+00	0.00E+00	4.65E-02
Formaldehyde	1.47E-01	1.47E-01	4.37E+00
Hexane	0.00E+00	0.00E+00	7.41E-01
Methanol	0.00E+00	0.00E+00	1.67E+00
Methyl chloride	0.00E+00	0.00E+00	1.34E-02
Naphthalene	2.42E-01	2.42E-01	1.37E-01
Phenol	0.00E+00	0.00E+00	1.60E-02
1,1,2,2-Tetrachloroethane	0.00E+00	0.00E+00	1.66E-03
Toluene	5.23E-01	5.23E-01	4.18E-01
2,2,4-Trimethylpentane	0.00E+00	0.00E+00	1.67E-01
Vinyl chloride	0.00E+00	0.00E+00	9.95E-03

Pollutant	Total Emissions (tons per year)		
	100% Biodiesel	50% Biodiesel/ 50% Diesel	50% Biodiesel/ 50% LNG
Xylene	3.59E-01	3.59E-01	6.02-01
Arsenic compounds	2.05E-02	2.05E-02	1.02E-02
Beryllium compounds	5.77E-04	5.77E-04	2.88E-04
Cadmium compounds	8.93E-03	8.93E-03	4.47E-03
Chromium compounds	2.05E-02	2.05E-02	1.02E-02
Lead compounds	2.60E-02	2.60E-02	1.30E-02
Manganese compounds	1.47E+00	1.47E+00	7.35E-01
Mercury compounds	2.23E-03	2.23E-03	1.12E-03
Nickel compounds	8.56E-03	8.56E-03	4.28E-03
Polycyclic organic matter	3.94E-01	3.94E-01	2.00E-01
Selenium compounds	4.65E-02	4.65E-02	2.33E-02
Total HAPs	**4.77**	**4.77**	**14.25**
Greenhouse Gases			
Carbon dioxide (CO_2)	302,890	303,136	263,037
Nitrous oxide (N_2O)	134	434	130
Methane (CH_4)	113	210	109
Total carbon dioxide equivalent (CO_2e)	303,137	303,780	263,276
Biogenic CO_2e	302,890	151,445	151,445
Nonbiogenic CO_2e	247	152,335	111,831

Source: Hawaiian Electric 2014a.

Notes: LNG = liquefied natural gas; HAPs = Hazardous air pollutants; As a reasonable worst case, emissions include full operations without start-ups.

3.4.2.1.2.1 Emissions Controls

The SGSP would consist of six Wartsila 20V34DF reciprocating engine-generator sets and associated equipment. Each engine would come with SCR equipment containing catalysts to reduce NO_x emissions, and an oxidation catalyst to reduce CO emissions. SCR would be used to control NO_x concentrations in the exhaust gas emitted to the atmosphere. The SCR process would use a urea-to-ammonia system, and the ammonia in the stack exhaust would be limited to 10 ppm at 15 percent oxygen. An oxidizing catalytic converter would be used to reduce the CO concentration in the exhaust gas emitted to the atmosphere to 20 ppm at 15 percent oxygen at full load. Particulate emissions would be controlled using best combustion practices and high-efficiency air inlet filtration for all fuels. The use of low-sulfur biodiesel or diesel would also reduce particulate emissions, as they are low in sulfur and other impurities.

3.4.2.1.2.2 Regulatory Review

Permitting scenarios vary based on the final design, timing of the project, and the types of controls ultimately selected. These could differ in specific features from the ones described herein. However, during the final design stage and the permitting process either the actual equipment, controls, or operating limitations would be selected to reduce the PTE below the major source threshold; or the PSD permitting process would ensure the NAAQS for which designations have been issued was not exceeded and the emissions from the projects would be included in the regional emissions inventory, ensuring that it would not interfere with the state's ability to maintain the NAAQS. This is inherent to federal and state air regulations, and leads to a forced preservation of clean air in attainment regions. Therefore, regardless of the ultimate permitting scenario, effects would be less than significant.

The proposed SGSP meets the definition of a major stationary source as outlined in the PSD regulations because it has PTE regulated pollutants in amounts equal to or greater than 250 tpy (40 CFR §52.21 and HAR Title 11, Chapter 60.1, Subchapter 7). Because the Schofield Barracks area is designated as attainment or unclassifiable for all of the NAAQS, a PSD review is required for all pollutants that are emitted or may be emitted above the applicable PSD threshold. Table 3.4-8 ~~7~~ shows the PTE for SGSP compared to the PSD major source thresholds, and shows the SGSP is subject to PSD review for NO_X, O_3, PM, PM_{10}, $PM_{2.5}$, beryllium, benzene, and arsenic.

Table 3.4-8 ~~7~~.
Potential to Emit for SGSP Compared to the Prevention of Significant Deterioration Major Source Thresholds

Pollutant	SGSP Potential to Emit (tons per year)	PSD Major Source Thresholds (tons per year)	Exceeds Threshold
Carbon monoxide (CO)	87.4	100	No
Nitrogen oxide (NO_x)	1,035.4	40	**Yes**
Sulfur dioxide (SO_2)	9.4 ~~10.1~~	40	No
Total particulate matter (PM)	72.3	25	**Yes**
Particulate matter less than 10 microns in diameter (PM_{10})	130.1 ~~139.8~~	15	**Yes**
Particulate matter less than 2.5 microns in diameter ($PM_{2.5}$)	130.1 ~~139.8~~	10	**Yes**
Volatile organic compounds (VOCs)	125.4	40	**Yes**
Lead	0.3 ~~0.0~~	0.6	No
Fluorides	0.2 ~~0.0~~	3	No
Sulfuric acid mist	6.6	7	No
Hydrogen sulfide	0.0	10	No
Total reduced sulfur	0.0	10	No
Reduced sulfur compounds	0.0	10	No
Municipal waste combustor (MWC) organics	0.0	3.5E-06	No
MWC metals	0.0	15	No
MWC acid gases	0.0	40	No
Asbestos	0.0	0.007	No
Beryllium	0.0006	0.0004	**Yes**
Mercury	0.0	0.1	No
Vinyl chloride	0.0	1	No
Benzene	1.4	Any Amount	**Yes**
Arsenic	0.02	Any Amount	**Yes**

Source: Hawaiian Electric 2014a; HAR §11-60.1 August 28, 2001; 40 CFR Part 52.

Note: PSD = prevention of significant deterioration; For permitting purposes - emissions include full operations with start-ups and are based on the highest possible emissions for any of the three fuel use scenarios (see Table 3.4-5).

Because Hawaiian Electric would own and operate the SGSP, it was determined that Hawaiian Electric would be the proper applicant and permittee, and that SGSP would not be added to the installationwide permit for Schofield Barracks.

3.4.2.1.2.3 NSPS and NESHAP

The SGSP would meet the NSPS requirements outlined in 40 CFR Part 60 Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. NSPS Subpart

IIII standards establish requirements primarily for NO_x and particulates, and limits fuel sulfur content to 1,000 ppm for larger engines [40 CFR §60.4207(d)]. Because the facility would be constructed after 12 June 2006, and at an area source of HAP emissions, the SGSP would meet the NESHAP requirements outlined in 40 CFR Part 63 Subpart ZZZZ, National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines, by complying with the applicable NSPS Subpart IIII requirements.

3.4.2.1.2.4 General Conformity

Because the project is completely in an area designated as attainment or unclassifiable for which NAAQS designations have been issued, no formal conformity determination is required. The SGSP would be exempt from the general conformity requirements because it includes stationary sources that would require a permit under the PSD program [40 CFR §93.153(d)(1)].

Predictive dispersion modeling and an ambient air quality analysis were done that demonstrated the proposed SGSP would not cause or contribute to the violation of any NAAQS/SAAQS, PSD Class II increment, or have adverse effects to nearby Class I areas. Below is an overview of the analysis conducted during the permitting process. Preliminary modeling inputs, assumptions, and results are contained in Hawaiian Electric's *Prevention of Significant Deterioration & Covered Source Permit Application for the SGSP* and supplemental modeling report (Hawaiian Electric 2015 ~~2014a, 2014e~~).

NAAQS/SAAQS or PSD Class II Increment Analysis. Hawaii regulations require an ambient air quality analysis for any regulated air pollutant with any increase in emissions [HAR §11-60.1-143(1)]. The NAAQS/SAAQS or PSD Class II increment analysis was done. These analyses are done in two phases: (1) a preliminary analysis, and (2) a full-impact analysis. The preliminary analysis modeled the potential SGSP emissions for each pollutant to determine if a full-impact analysis was required. If concentrations from the preliminary analysis are below the air quality significance impact levels (SIL), then no further NAAQS/SAAQS or PSD Class II increment analysis is required. This does not exclude the pollutants from PSD Class I increment modeling or additional evaluation requirements.

For the SGSP, the preliminary analysis demonstrated that concentrations of PM_{10}, $PM_{2.5}$, and NO_2 would be above the SIL for the worst-case load, so a full-impact analysis was done to demonstrate that the NAAQS/SAAQS and the PSD Class II increments would not be threatened. The full-impact analysis included all nearby existing sources and ambient background concentrations. The results showed that the SGSP would not cause or contribute to a violation of the NAAQS, SAAQS, or any PSD Class II increment (Hawaiian Electric 2014a, 2014e).

PSD Class I Area Analysis. The 1977 CAA Amendments give federal land managers an affirmative responsibility to protect the natural and cultural resources of Class I areas from adverse effects from new sources of air emissions. Haleakala National Park is the closest Class I area and is approximately 125 miles (200 kilometers) east-southeast of the SGSP on the Island of Maui. A detailed modeling showed maximum concentrations for all pollutants and averaging periods would be below the Class I SILs (Hawaiian Electric 2014a, 2014e).

Odor. Any odors emitted from the SGSP would be limited and not readily perceptible beyond the site boundary. The exhaust of the units would be primarily CO_2 and water with other trace elements, and it would not be detected in any nearby areas, including on-post housing north of the proposed site. Any emissions and potential odors would be dispersed by the temperature and velocity of the exhaust plume from the stacks. In addition, prevailing winds predominately blow southward, so under most circumstances any odors that the plant would generate would blow away from the housing area. The fuel tanks are enclosed with internal floating roofs to reduce

fuel evaporation, and would not emit any odors that would be of concern to residents. The urea system would not emit any odors. These effects would be minor.

Additional Evaluations. An assessment determined the SGSP would have less than significant effects on visibility at the U.S.S. Arizona Memorial (the nearest Class II area), on vegetation and soils, or on endangered species. The SGSP would have less than significant effects from HAPs, sulfuric acid mist, and ammonia (Hawaiian Electric 2014a).

3.4.2.1.2.5 Indirect Effects

There would be additional indirect (i.e., secondary) long-term beneficial effects from reductions in the use of other power generating stations currently supplying power to the island because the emissions from more modern power generating stations are generally lower than those from older ones. Biodiesel, diesel, and LNG have lower sulfur content than other fuel sources. As shown in Table 3.4-9 ~~8~~, the primary reductions would be to NO_x, SO_2, and GHG emissions. Nonbiogenic emissions shown do not account for increases from transportation, storage, and processing of fuels or other indirect sources of GHGs, and as such may be higher than those in Table 3.4-8. The overall net NO_x emissions would only be reduced with the use of LNG at the SGSP, but would increase with the use of biodiesel or diesel. Overall, these effects would be moderately beneficial, especially with the combined use of biofuels and LNG.

Greenhouse Gases. In response to EO 13693 ~~13514~~, DoD set the goal to reduce Scope 1 and 2 GHGs by 34 percent and Scope 3 GHGs by 13.5 percent by FY 2020. DoD is continuing to implement measures, including for the SGSP, to reach its GHG reduction goals in accordance with EO 13693 ~~13514~~. Armywide efforts to reduce GHG emissions include the Net Zero Initiative, projects supported by the Army's Office of Energy Initiatives, and the Army's overall reduction in force.

Table 3.4-9 ~~8~~.
Indirect Emission Reductions from Reductions in Power Consumption

Plant Size		**50**	**MW**
Energy Generated		438,000	MWhr
	Emissions (tons per year)		
	NO_x	**SO_2**	**Nonbiogenic CO_2e**
Emission Factors (pounds/megawatt hour)	2.5	4.0	1,622
100% Biodiesel at SGSP	739.9	9.4 ~~10.1~~	247
Fossil fuel combustion	545.7	880.4	355,187
Potential savings from displaced electricity at other plant	(194.2)	870.4	354,940
50% Biodiesel/50% Diesel at SGSP	739.9	10.1	152,335
Fossil fuel combustion	545.7	880.4	355,187
Potential savings from displaced electricity at other plant	(194.2)	870.4	202,852
50% Biodiesel/50% LNG at SGSP	442.7	9.7	111,831
Fossil fuel combustion	545.7	880.4	355,187
Potential savings from displaced electricity at other plant	103.0	870.7	243,356

Source: EPA 2014a, b.

Notes: CO_2e = carbon dioxide equivalent; LNG = liquefied natural gas; MW = megawatt; MWhr = megawatts per hour; NOx = nitrogen oxide; SO2 = sulfur dioxide.

As a reasonable worst case - emissions include full operations without start-up. Nonbiogenic emissions do not account for increase from transportation, storage, and processing or other indirect sources of GHGs, and as such may be higher than those shown in this table.

Regardless of how the facility was operated, any increase or decrease in GHGs from the SGSP would be in Scope 2 and 3 emissions (i.e., GHG emissions from a source not owned or directly controlled by the Army). They would be related to the Army's activities and included in its GHG reporting requirements under EO 13693 ~~13514~~. Operating the SGSP on 100 percent biodiesel would have the largest benefit by potentially reducing direct emissions of nonbiogenic GHGs ~~emissions~~ by approximately 355,187 tpy. Operating the SGSP on 50 percent LNG/50 percent biodiesel would potentially reduce direct emissions of nonbiogenic GHGs ~~emissions~~ by approximately 243,356 tpy. Operating the SGSP on 50 percent diesel/50 percent biodiesel would potentially reduce direct emissions of nonbiogenic GHGs ~~emissions~~ by approximately 202,852 tpy. These effects would be moderately beneficial.

Table 3.4.10 outlines the lifecycle GHG emissions of different fuel types over a wide range of scenarios and includes GHG emissions from basic transportation, storage, and processing. The data provided in the table does not account for over-ocean transportation to and from Hawaii, which could cause lifecycle GHG emissions to be higher than those shown for all fuel types. The *IPCC Special Report on Renewable Energy Sources and Climate Change* indicates that lifecycle GHG emissions from all first- and next-generation biofuels have lower lifecycle GHG emissions than fossil fuels (IPCC 2012). Table 3.4-10 shows overall ranges of lifecycle GHG emissions from biofuels, natural gas, and oil/diesel. The median lifecycle GHG emissions of all biofuels are between 432 and nearly 964 grams CO_2e/kWh lower than their fossil-fueled counterparts. The maximum lifecycle GHG emissions for any biopower scenario is 75 grams CO_2e/kWh; whereas the minimum lifecycle GHG emissions for any fossil fuel scenario is 290 grams CO_2e/kWh. Therefore, regardless of the exact source and type of biofuel ultimately used, the total lifecycle GHG emissions would be no more than 26 percent of those generated by fossil fuels for the same amount of electricity. The use of biofuels under the Proposed Action would have a net benefit to the environment when compared to using fossil fuels under the No Action Alternative. This is representative of all biofuels and all biopower processing and transportation scenarios. The effects would be moderately beneficial.

Table 3.4-10. Lifecycle GHG Emissions from Biofuels and Fossil Fuels

Values	Lifecycle GHG Emissions (grams CO_2eg/kWh)			
	Biofuels[a]	Natural Gas	Oil/Diesel Fuel	Coal
Minimum	-633	290	510	675
50th percentile	37	469	840	1001
Maximum	360	930	1170	1689

Source: IPCC 2012.

Note: [a] Negative estimates for biopower are based on assumptions about avoided emissions from residues and wastes in landfill disposals and co-products.

3.4.2.1.3 Mitigation Measures and BMPs

The direct, indirect, and cumulative effects associated with air quality would be minor to moderate. Because the effects would be less than significant, no mitigation measures for air quality would be required. No activities other than compliance with existing regulations, permits, and plans would be required to reduce the level of impact to less than significant.

BMPs would be required for constructing and operating the SGSP. Construction of the generating station and the transmission lines would be done in full compliance with Hawaii regulatory requirements using compliant practices or products. These requirements appear in HAR §11-60.1, Air Pollution Control. They include:

- Visible emissions (§11-60.1-32)

- Fugitive dust (§11-60.1-33)
- Storage of volatile organic compounds (§11-60.1-39)
- Open burning (§11-60.1-52)

No person shall handle, transport, or store any material in a manner that might allow unnecessary amounts of air contaminants to become airborne. During construction, reasonable measures might be required to reduce fugitive dust, which could include ~~including~~:

- Using water for control of dust, the grading of roads, or the clearing of land
- Paving roadways and maintaining them in a clean condition
- Covering open equipment for conveying or transporting material likely to create objectionable air pollution when airborne
- Promptly removing spilled or tracked dirt or other materials from paved streets
- Planning the different phases of construction, focusing on minimizing the amount of dust-generating materials and activities, centralizing on-site vehicular traffic routes, and locating potential dust-generating equipment in areas of the least impact
- Providing an adequate water source at the site prior to start-up of construction activities
- Landscaping and providing rapid cover of bare areas, including slopes, starting from the initial grading phase
- Minimizing dust from shoulders and access roads
- Providing adequate dust control measures during weekends, after hours, and prior to daily start-up of construction activities
- Controlling dust from debris being hauled away from the project site. Also controlling dust from daily operations of material being processed, stockpiled, and hauled to and from the facility

As part of the PSD permitting process, BMPs associated with operating the proposed SGSP may include:

- BACT review for each criteria pollutant and GHG
- Predictive air dispersion modeling
- Establishing procedures for measuring and recording emissions or process rates or both
- Meeting the NSPS and NESHAP requirements
- A public involvement process

This is not an all-inclusive listing. Hawaiian Electric, the Army, and any contractors would comply with all applicable Hawaii air pollution control regulations.

3.4.2.2 No Action Alternative

The No Action Alternative would not cause changes to air quality, as the SGSP would not be built. There would be no construction, and no changes in operations. If the No Action Alternative were selected, the overall net decrease in both criteria pollutants and GHG from reduction in the use of off-post fossil-fuel-based electricity would not be realized.

3.5 NOISE

3.5.1 Affected Environment

Sound is a physical phenomenon consisting of vibrations that travel through a medium, such as air, and are sensed by the human ear. Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise intrusive. Human response to noise varies depending on the type and characteristics of the noise, distance between the noise source and the receptor, receptor sensitivity, and time of day. Noise is often generated by activities essential to a community's quality of life, such as construction or vehicular traffic. The ROI for noise is the proposed SGSP site, proposed transmission route, and nearby areas that would experience elevated noise from the project.

Sound varies by both intensity and frequency. Sound pressure level, described in decibels (dB), is used to quantify sound intensity. The dB is a logarithmic unit that expresses the ratio of a sound pressure level to a standard reference level. Hertz are used to quantify sound frequency. The human ear responds differently to different frequencies. "A-weighting", measured in A-weighted decibels (dBA), approximates a frequency response expressing the perception of sound by humans. Sounds encountered in daily life and their dBA levels are in Table 3.5-1.

Table 3.5-1.
Common Sounds and Their Levels

Outdoor	Sound Level (dBA)	Indoor
Motorcycle	100	Subway train
Tractor	90	Garbage disposal
Noisy restaurant	85	Blender
Downtown (large city)	80	Ringing telephone
Freeway traffic	70	TV audio
Normal conversation	60	Sewing machine
Rainfall	50	Refrigerator
Quiet residential area	40	Library

Source: Harris 1998.
Note: dBa = Sound measured in A-weighted decibels

3.5.1.1 The Military Noise Environment and Land Use Compatibility

The military noise environment consists primarily of three types of noise: transportation noise from aircraft and vehicles, noise from firing at small-arms ranges, and impulsive noise from large-caliber weapons firing and demolition operations. Army Regulation 200-1 defines recommended noise limits from Army activities for established uses of land with respect to environmental noise. Three noise zones are defined in the regulation:

- Zone I: Relatively quiet noise environment. Acceptable for housing, schools, medical facilities, and other noise-sensitive land uses.
- Zone II: Moderately loud noise environment. Normally not recommended for housing, schools, medical facilities, and other noise-sensitive land uses.
- Zone III: Loud noise environment. Not recommended for housing, schools, medical facilities, and other noise-sensitive land uses.

The metric used in defining noise zones for small-arms ranges is peak level (dBP). Peak level is the maximum instantaneous sound level that occurs during an acoustic event. In the case of small arms, it is the maximum instantaneous sound level made by a given weapon at a given distance. Peak level for small-arms weapons is strongly correlated with community annoyance (Hede 1982). Other metrics used by the Army to quantify the noise environment at Army installations are the C-weighted and A-weighted day-night average sound levels (CDNL and ADNL). Day-night average sound level (DNL) is a time-weighted average sound energy over 24 hours; a 10-dB penalty is added to the nighttime levels (10 p.m. to 7 a.m.). These characteristics make it a useful descriptor for continuous noise, such as a busy highway, aircraft noise, or the ongoing components of repetitious blast noise. Table 3.5-2 has noise limits and zones for land use planning for small arms firing, aircraft, and large-caliber weapons firing and demolition operations.

In 1974, EPA provided information suggesting that continuous and long-term noise levels in excess of DNL 65 dBA are normally unacceptable for noise-sensitive land uses such as residences, schools, churches, and hospitals. This is consistent with Army policy, particularly for aircraft noise. The State of Hawaii maintains a noise ordinance that limits the maximum sound level (L_{max}) in residential areas to 55 dBA between 7:00 a.m. and 10:00 p.m. and 45 dBA between 10:00 p.m. and 7:00 a.m. The Noise Control Act of 1972 (42 USC 4901 *et seq*.) directs federal agencies to comply with applicable federal, state, interstate, and local noise control regulations to the fullest extent consistent with agency missions. Military training activities are specifically exempt from the act. For other activities, the act does not require compliance with state or local noise control regulations for on-post areas, but for off-post areas only. The Army incorporates state or local noise regulations to the greatest extent practicable in determining the level of impact under NEPA.

Table 3.5-2.
Noise Limits for Noise Zones

Noise Zone	General Level of Noise	Small-arms (dBP)	Aircraft (ADNL dBA)	Large-Caliber Weapons (> 20 millimeters) and Demolition (CDNL dBC)	Recommended Uses
I	Low	< 87	< 65	< 62	Noise-sensitive land uses acceptable
II	Moderate	87–104	65–75	62–70	Noise-sensitive land uses normally not recommended
III	High	> 104	> 75	> 70	Noise-sensitive land uses not recommended

Source: U.S. Army 2008.

Notes: ADNL = A-weighted day-night average sound levels; CDNL = C-weighted day-night average sound levels; dBA = A-weighted decibels; dBC = C-weighted decibels; dBP = P-weighted decibels

3.5.1.2 Existing Noise Environment

Existing sources of noises that can be heard in the ROI include road traffic, aircraft overflights, and small arms and large caliber weapons firing. The noise from military aircraft and weapons extends to areas outside the boundary of both Schofield Barracks and Wheeler Army Airfield. The noise from industrial-type operations and the movement of heavy military vehicles does not

have a considerable effect on the surrounding civilian communities or military housing areas (USAPHC 2010).

At Wheeler Army Airfield, the primary sources of noise are fixed- and rotary-wing aircraft operations. These operations are a substantial component of the military training conducted principally by the 25th Infantry Division, and a variety of DoD and Army National Guard organizations. The existing aircraft noise contours from Wheeler Army Airfield are shown on Figure 3.5-1. The aircraft noise zone II (as described in Table 3.5-2) extends beyond the southeastern boundary of Wheeler Army Airfield about 0.7 mile. Noise zone III (as described in Table 3.5-2) does not extend beyond installation boundaries. The proposed SGSP site is in the zone II contour, which is compatible with this land use and activity.

The existing small-caliber weapons noise contours are shown on Figure 3.5-2. The majority of the noise contours remain in the installation, with the zone II noise contour extending off-post into areas of agricultural and preservation land uses. A portion of installation housing is in zone II.

The zone III noise contours are contained completely in the installation boundaries. The project site is not in the zone II or zone III small-arms noise contours.

The existing large-caliber weapons noise contours are shown on Figure 3.5-3. The majority of the zone III noise contours are contained on-post except for an area approximately 1,200 feet off-post to the north in an agriculturally zoned area. The zone II noise contours extend off-post to the north and south, but are contained entirely in agricultural and restricted preservation zoned areas. There are no incompatible land uses off-post in the zone II or zone III noise contours. On-post, the zone II noise contours overlap the housing area east of the firing points. The project site is not in the zone II or zone III large-caliber noise contours.

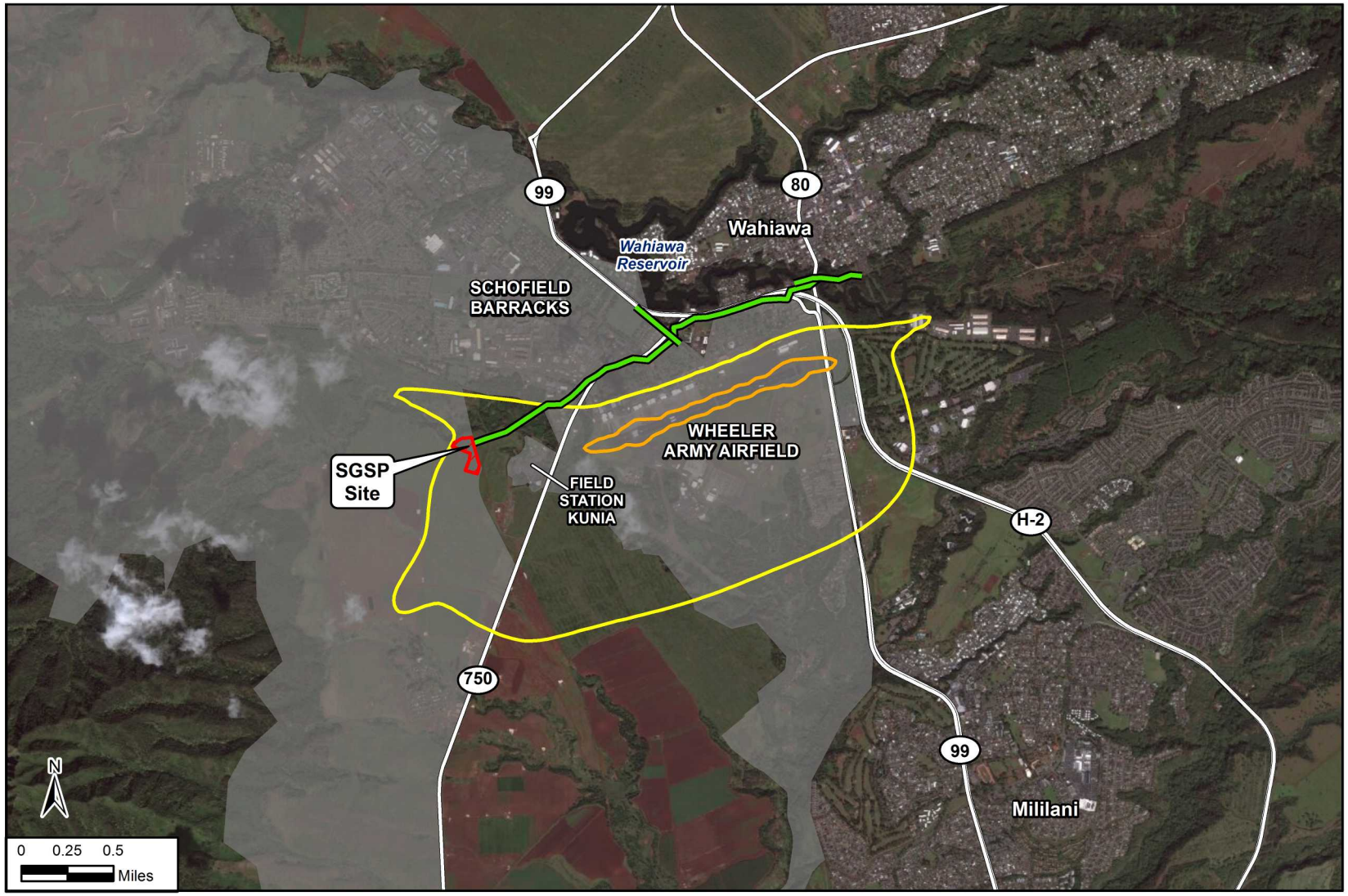
The installations have ongoing efforts to minimize noise from operations and training. Aircraft fly-friendly zones have been established around Mililani and Wahiawa; the minimum altitude for military aircraft flying over land adjacent to the boundary is 1,000 feet above ground level; and helicopter traffic is routed along the boundary rather than over private property. Small-arms ranges have been located to provide adequate distance from the installation boundary so the firing should not disturb neighbors. Large-caliber ranges have been located to provide adequate distance from the installation boundary so the training should have limited effects on neighbors.

Individuals near the project site are subjected to multiple sources of noise during the day, including road traffic, aircraft overflights, and small-arms and large-caliber weapons firing. Table 3.5-3 outlines the estimated existing sound levels at the closest noise-sensitive receptors and their approximate distance to the proposed SGSP.

Table 3.5-3.
Estimated Background Noise Levels at Nearby Noise-Sensitive Areas

Closest Noise-Sensitive Area (NSA)				Estimated Existing Sound Levels (dBA)		
					Average Sound Level	
Distance to Noise-Sensitive Area [feet (meters)]	Direction	Type	Land Use Category	DNL	Daytime	Nighttime
1,000 (320)	Northwest	Future residential	Military	65	63	57
2,300 (700)	Northwest	Existing residential				
4,900 (1,500)	Northeast	Existing residential				
3,400 (1,000)	North	School				

Source: USAPHC 2010.
Notes: dBA = A-weighted decibels; DNL = day-night average sound level



LEGEND

- DoD/Federal Land
- State Route
- SGSP Site
- Planned Interconnection Route

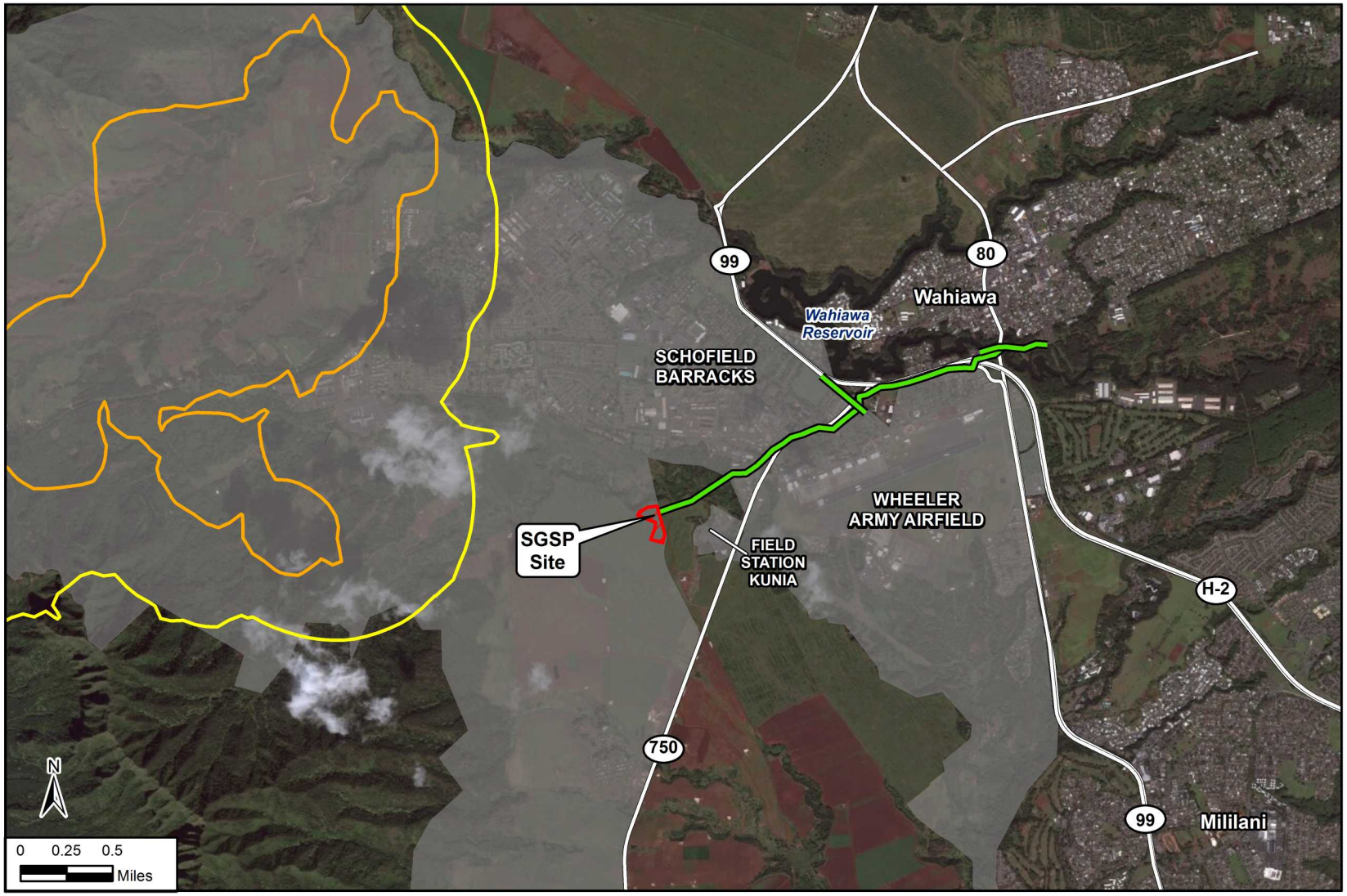
Wheeler Army Airfield Noise Contours

- Zone II – 65 dBA DNL
- Zone III – 75 dBA DNL

Existing Aircraft Noise Contours from Wheeler Army Airfield

Figure 3.5-1

Source: Schofield Barracks GIS 2014, ESRI 2011, USAPHC 2010.



LEGEND

- DoD/Federal Land
- State Route
- SGSP Site
- Planned Interconnection Route

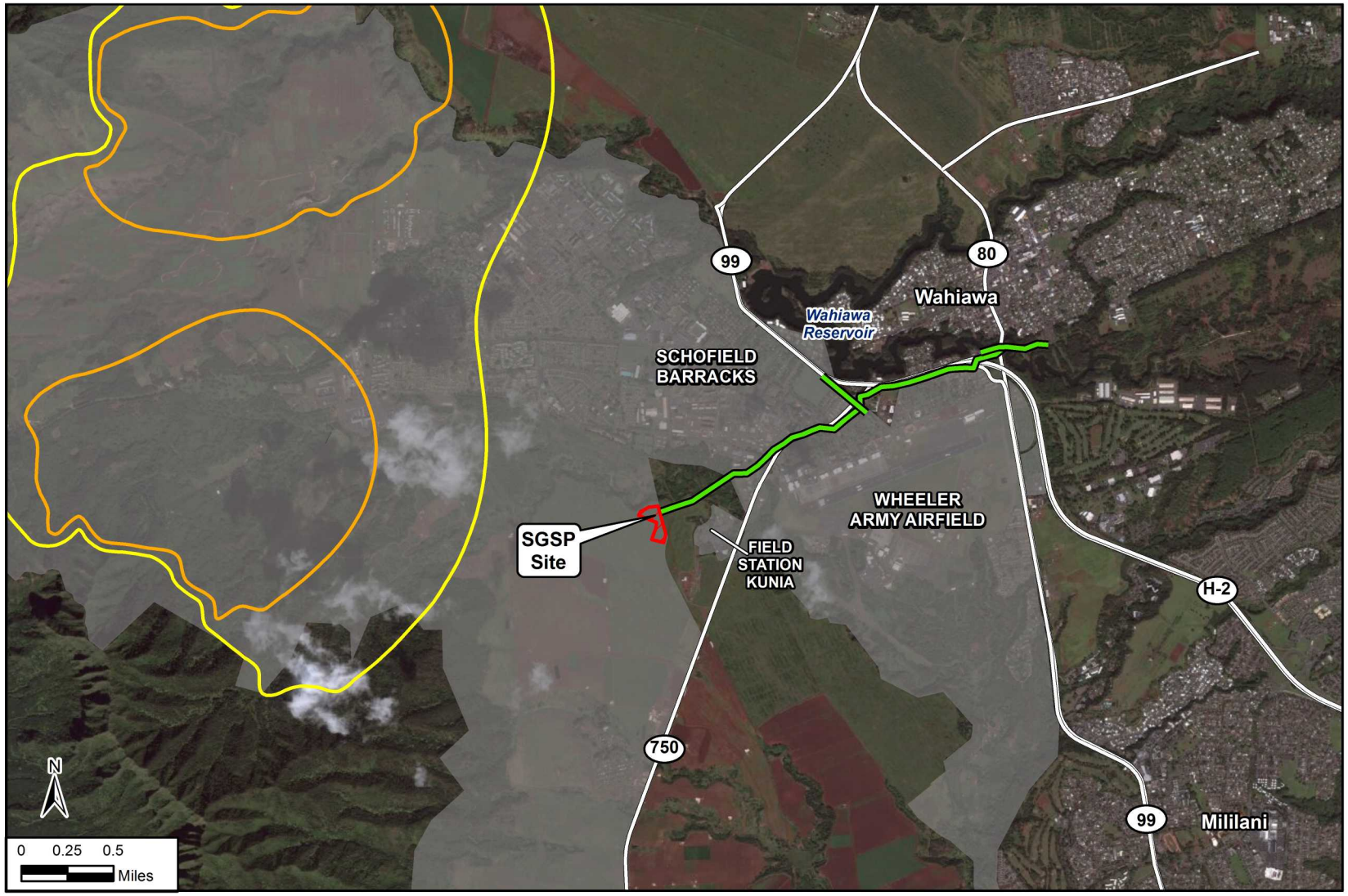
Small Arms Noise Contours

- Zone II
- Zone III

Existing Small-Caliber Noise Contours

Figure 3.5-2

Source: Schofield Barracks GIS 2014, ESRI 2011, USAPHC 2010.



LEGEND

- DoD/Federal Land
- State Route
- SGSP Site
- Planned Interconnection Route

Large Arms Noise Contours

- Zone II
- Zone III

Existing Large-Caliber Noise Contours

Figure 3.5-3

Source: Schofield Barracks GIS 2014, ESRI 2011, USAPHC 2010.

3.5.2 Environmental Consequences

This section discusses the environmental impacts to the noise environment from the Proposed Action. Impacts were primarily assessed by reviewing existing noise conditions, and determining the potential effects construction and operation would have on nearby noise-sensitive areas. Detailed sound modeling was done to estimate sound levels from operation of the station. There would be a significant noise impact if the project would (1) result in the violation of applicable federal, state, or local noise ordinances, (2) create a noise environment that would be incompatible with existing land uses, or (3) be loud enough to threaten or harm human health. Table 3.5-4 summarizes impacts for the Proposed Action and No Action Alternative. A detailed analysis of both the Proposed Action and the No Action Alternative follows the table.

Table 3.5-4.
Summary of Noise Impacts

Type of Impact	Proposed Action	No Action Alternative
Temporary increase in construction noise	Minor	None
Increase in traffic noise	Minor	None
New permanent sources of noise	Minor	None
Land use compatibility	Moderate	None
Increase in training noise	None	None
Overall impacts	**Moderate**	**None**

3.5.2.1 Proposed Action

Short-term minor and long-term moderate adverse effects would be expected. Short-term effects would result from construction, and long-term effects would result from operational noise. With reductions by design, the Proposed Action would not likely create appreciable long-term increases in areas of incompatible land use from noise, and would not lead to a violation of any federal, state, or local noise regulation.

3.5.2.1.1 Construction

The Proposed Action would require the construction of the generating station and transmission lines. Table 3.5-5 has typical noise levels that EPA has estimated for the main phases of outdoor construction (dBA at 50 feet). Individual pieces of construction equipment typically generate noise levels of 80 to 90 dBA at a distance of 50 feet. With multiple items of equipment operating concurrently, noise levels can be relatively high during the day at locations within several hundred feet of active construction. The zone of relatively high construction noise typically extends 400 to 800 feet from the site of major equipment operations. There are no noise-sensitive areas within 800 feet of the project site; however, there are some within 800 feet of the transmission line route. Given the temporary nature of proposed construction and the limited amount of noise heavy equipment would generate, these impacts would be minor.

Construction noise would dominate the soundscape for all on-site personnel. Construction personnel, and particularly equipment operators, would wear adequate personal hearing protection to limit exposure and ensure compliance with any state or federal health and safety regulations.

Limited truck and worker traffic may be audible at some off-post locations, particularly during transmission line installation. During installation, construction activities and associated noise would not be fixed in one location for long durations but would progress along the right-of-way.

Noise would be temporary and would subside at any particular location as it progresses to subsequent segments of the route, and all construction would occur during normal business hours, so these effects would be minor.

Table 3.5-5.
Noise Levels Associated with Outdoor Construction

Construction Phase	Sound Level (dBA)
Ground clearing	84
Excavation, grading	89
Foundations	78
Structural	85
Finishing	89

Source: EPA 1971.
Note: dBA = A-weighted decibels.

3.5.2.1.2 Operation

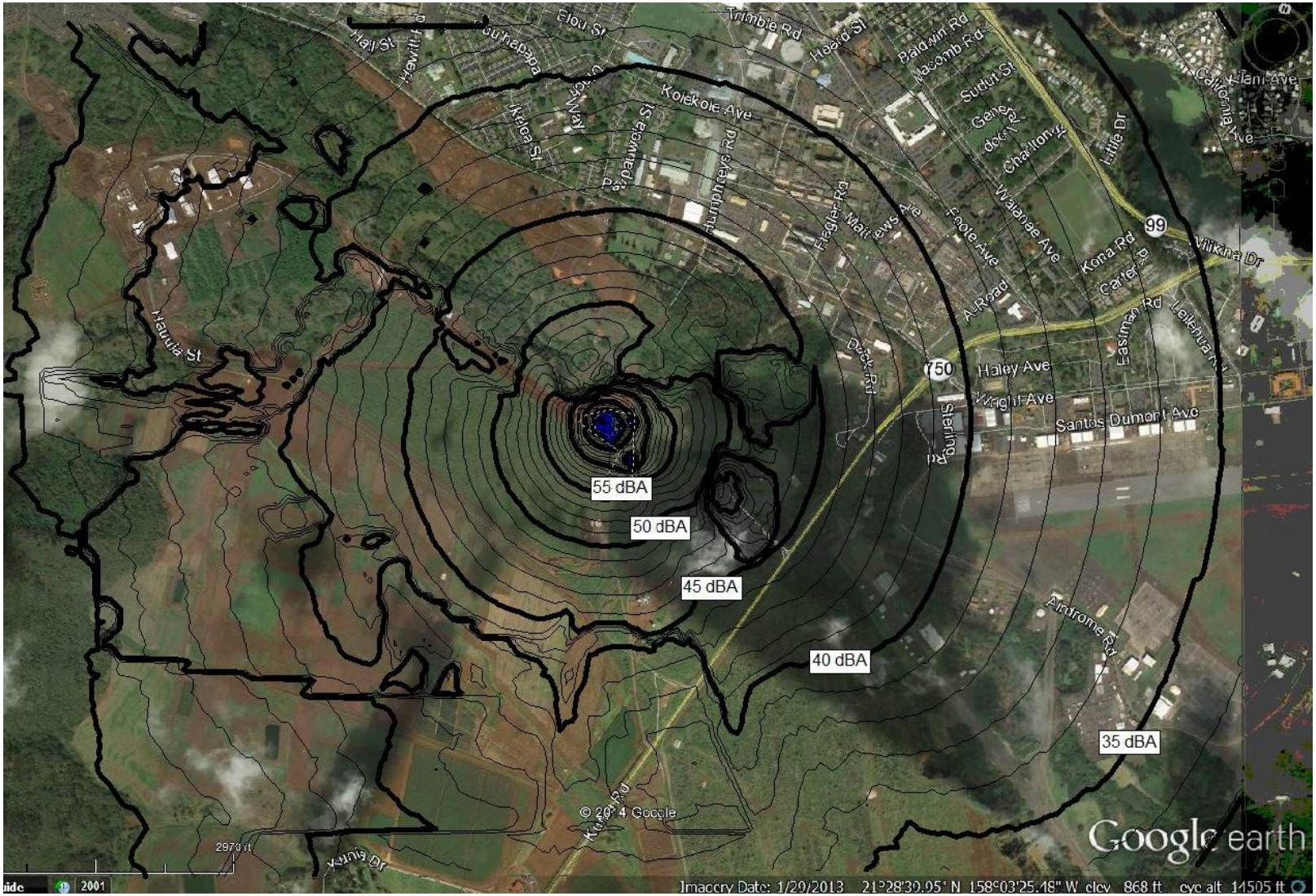
Cadna/A sound modeling software was used to estimate sound levels that would be generated by operation of the station. Cadna/A takes into account the reduction of noise from spreading out over distances, ground and atmospheric effects, shielding from barriers and buildings, and reflections from surfaces. International Standard ISO 9613-2:1996, Acoustics—Attenuation of sound during propagation outdoors—Part 2: General method of calculation (ISO 1996), was used for air absorption and other sound propagation calculations in the assessment. Results are based on equipment noise data without any additional noise reduction factors.

During full operation, sound from the facility could be present 24 hours per day, 7 days per week. There would be several components of the facility that would generate sound levels of 80 to 90 dBA adjacent to the equipment. Based on the currently available information, the estimated overall sound level contours surrounding the proposed SGSP are shown on Figure 3.5-4.

Sound levels could exceed 65 dBA up to 100 feet north and west of the site, 55 dBA up to 500 feet west and east of the site, and 45 dBA approximately half a mile (2,500 feet) in all directions from the site. The proposed facility might be audible beyond this distance during periods of quiet, particularly at night, when it would sound like a faint, far-off hum. There are no existing or planned off-post noise-sensitive areas that would be exposed to 55 dBA between 7:00 a.m. and 10:00 p.m. or 45 dBA between 10:00 p.m. and 7:00 a.m., so, there would be no violation of the State of Hawaii noise ordinance. There are no existing or planned on-post noise-sensitive areas that would be exposed to 55 dBA between the hours of 7:00 a.m. and 10:00 p.m.; however, approximately half the Schofield Barracks Kalakaua Neighborhood north of the site could be exposed to 45 dBA between the hours of 10:00 p.m. and 7:00 a.m. when the plant was operating (Figure 3.5-4). The Noise Control Act does not require compliance with state noise control regulations for on-post areas; however, the Army incorporates local noise ordinances to the greatest extent practicable in determining the level of impact under NEPA. So, because the nighttime levels would exceed the threshold outlined in the state noise ordinance for a limited number of on-post residences, the overall effects would be moderate (i.e., less than significant).

Estimated DNL contours from the proposed generating station are shown on Figure 3.5-5.

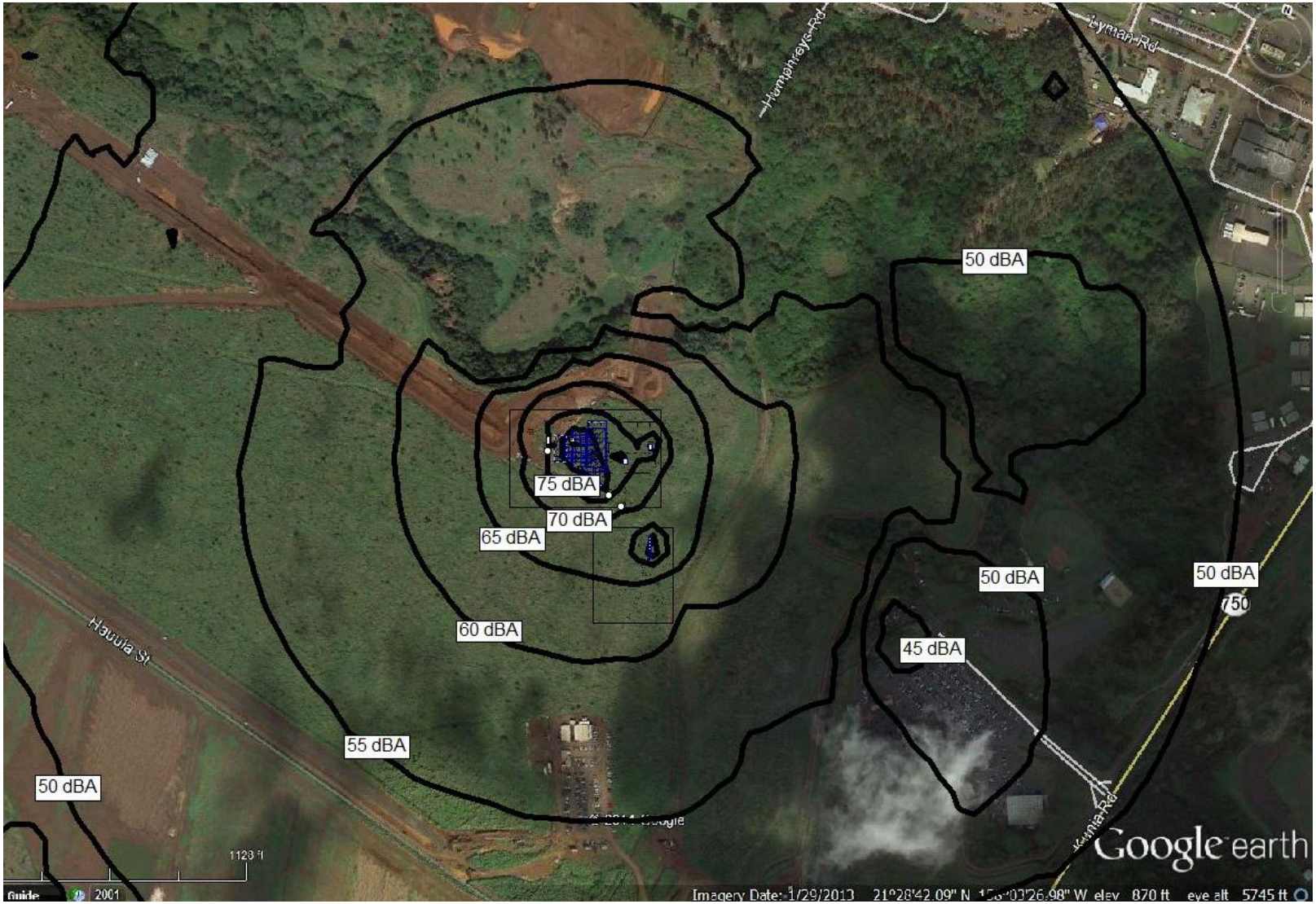
Sound levels would exceed 55 dBA DNL on the entire site and approximately one quarter of a mile (1,250 feet) in all directions from the proposed facility. Based on standard annoyance



Source: ATCO 2014.

Overall Sound Levels from Proposed SGSP

Figure 3.5-4



Source: ATCO 2014.

Day Night Sound Levels (DNL) from the Proposed SGSP

Figure 3.5-5

curves, this level would be highly annoying for up to 12 percent of individuals exposed. Sound levels would exceed 65 dBA DNL on the entire site and approximately 300 to 500 feet in all directions from the proposed facility. These levels would be highly annoying for up to 35 percent of individuals exposed, and is normally not recommended in residential areas (U.S. Army 2008). However, because there are no existing or planned noise-sensitive areas within the 55 or 65 dBA DNL contours for the proposed SGSP, these effects would be minor.

3.5.2.1.3 Mitigation Measures and BMPs

No mitigation measures for noise would be required. The direct, indirect, and cumulative effects associated with noise would be minor to moderate. No activities outside current engineering controls, compliance with existing regulations, permits, and plans would be required to reduce the level of effects to less than significant.

Although construction-related noise impacts would be minor, BMPs would be used to reduce further any realized noise impacts:

- Construction would primarily occur during normal weekday business hours.
- Construction equipment would be properly maintained and in good working order.

To ensure that sound levels attributable to the proposed generating station would be adequate to protect human health and welfare with an adequate margin of safety, within 60 days of completion of the power station, Hawaiian Electric would have a post-construction sound survey done by an independent acoustical consultant and file it with the Army. If the noise attributable to the operation of the station at full load does not fully comply and meet the thresholds outlined under all federal, state, or local noise regulation, including the Hawaii noise control regulation and Army Regulation 200-1, additional noise controls would be installed within one year of the in-service date to meet these levels. A second noise survey would be done and filed no later than 60 days after the installation of the any additional noise controls.

3.5.2.2 No Action Alternative

There would be no changes to the ambient noise environment from selecting the No Action Alternative. Installation operations and the current levels of training noise would continue without change. Ambient noise conditions would remain unchanged.

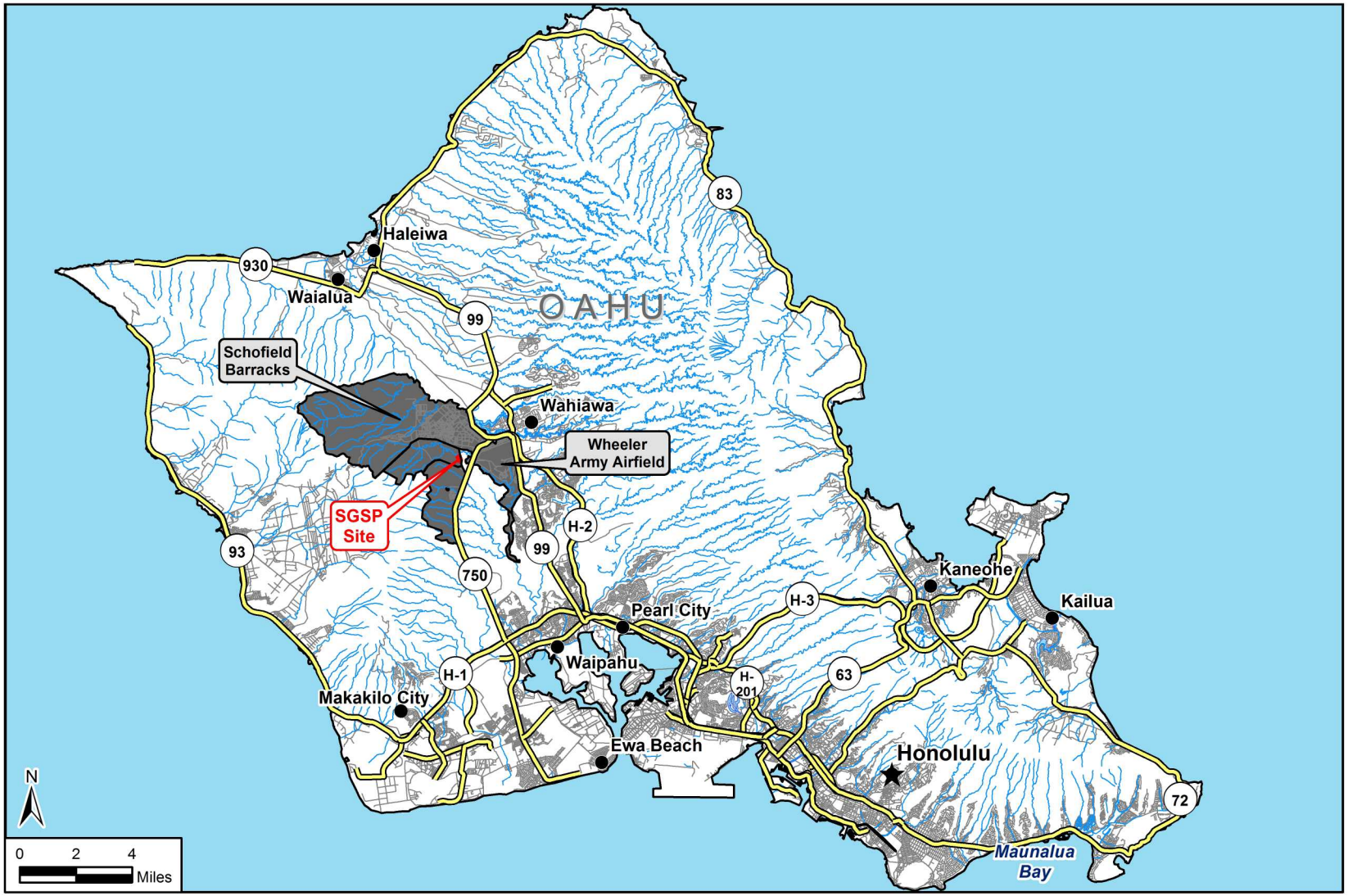
3.6 TRAFFIC AND TRANSPORTATION

3.6.1 Affected Environment

Traffic and transportation resources incorporate several components describing the levels of vehicle traffic and types of transportation infrastructure in an area. This section provides an overview of the existing transportation and roadway network, existing traffic conditions, access control points (ACP), and other transportation modes including rail, aviation, transit systems, and ports. The ROI for traffic and transportation is the roadway network serving Schofield Barracks and the project site. A traffic study was done in direct support of this EIS, and is included as Appendix C.

3.6.1.1 Existing Roadway Network

Schofield Barracks is in central Oahu approximately 15 miles northwest of Honolulu. Schofield Barracks is bounded by Veteran's Memorial Highway (H-2), State Highway 99 (Kamehameha Highway), and Kunia Road to the east (Figure 3.6-1). Kunia Road runs northeast-southwest,



LEGEND

- SGSP Site
- State Route
- Road
- Stream

Regional Transportation Network

Figure 3.6-1

Source: Schofield Barracks GIS 2014, Hawaii OP GIS 2014.

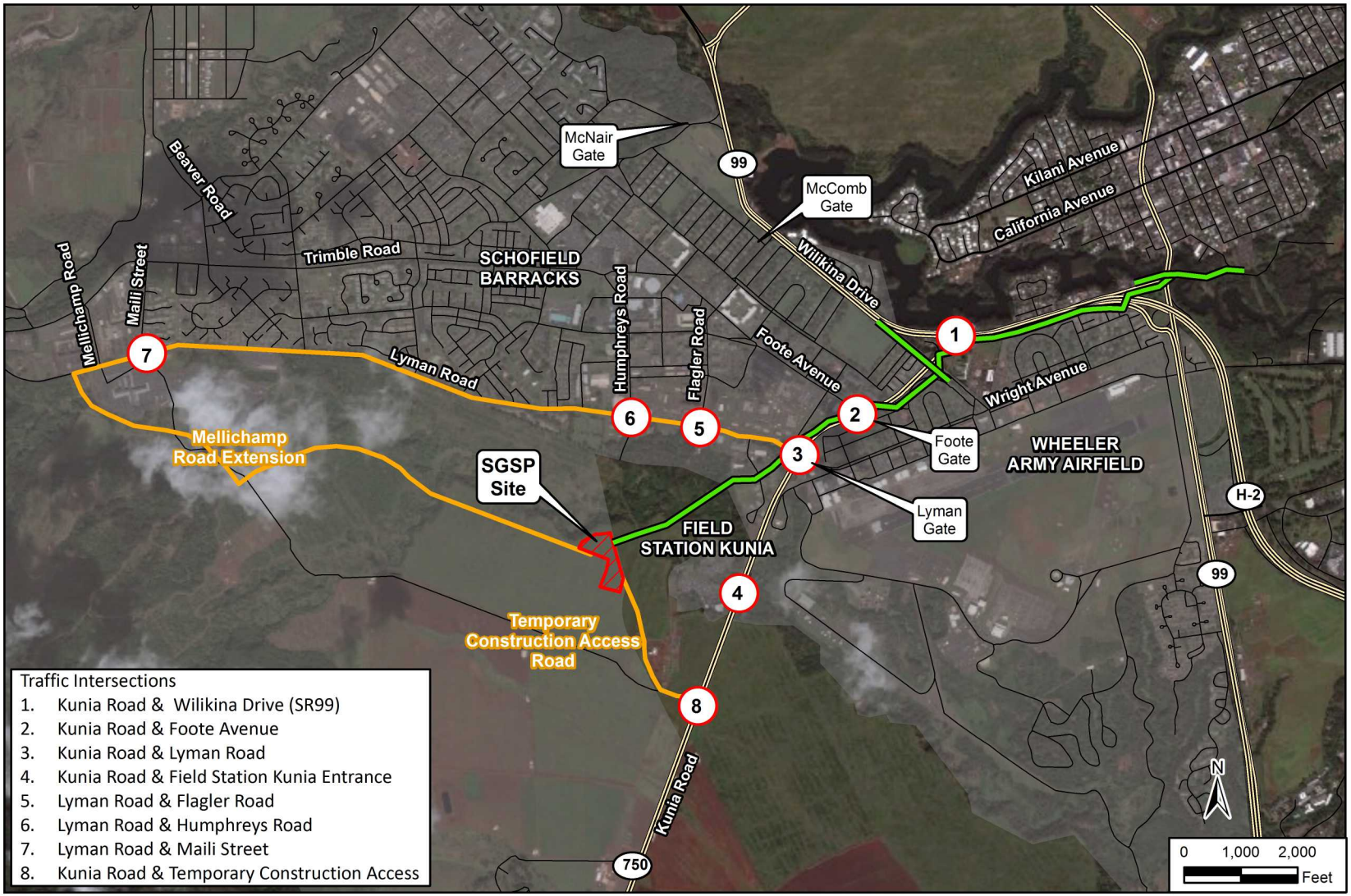
separating Schofield Barracks from Wheeler Army Airfield. State highways 99 and 930 (Farrington Highway) are the northbound routes leading to Haleiwa and Waialua. H-2 begins at Wilikina Drive outside Schofield Barracks and Wheeler Army Airfield and continues south to its interchange with the Queen Liliuokalani Freeway (H-1) in Pearl City. H-1 is one of two continuous east-west routes in the Honolulu roadway network at the southern portion of the island. H-1 extends from Makakilo on the west coast through Pearl City and Honolulu to its termination near Maunalua Bay on the south coast. The John A. Burns Freeway (H-3) extends from its interchange with H-1 and the Moanalua Freeway (H-201) in Halawa Heights to the border of Marine Corps Base Hawaii on the east coast. H-201 connects with H-1 and H-3 and passes Fort Shafter, Tripler Army Medical Center, and Red Hill.

On-Post Roadways. Schofield Barracks has approximately 85 miles of paved roadways and 3 miles of unpaved roadways (USAG-HI 2013b). The two main roadways serving Schofield Barracks are Foote Avenue/Trimble Road and Lyman Road, which are east-west roadways that traverse the main cantonment area. Foote Avenue connects the Foote Gate with the commercial area and barracks. West of the commercial area, Foote Avenue turns into Trimble Road (heading north) and continues west to the training areas. Foote Avenue/Trimble Road is a 4-lane roadway between the Foote Gate and Beaver Road, approximately 1.2 miles west of the commercial area. Commercial and visitor traffic enter through Lyman Gate, at the intersection of Lyman Road and Kunia Road, southwest of the Foote Gate. Lyman Road runs parallel to Foote Avenue on the southern post boundary and extends west to the training ranges (Tetra Tech 2011a). On Wheeler Army Airfield, Lyman Road turns into Wright Avenue with several side streets leading north and south to other on-post areas.

3.6.1.2 Existing Traffic Conditions

Traffic on roadways in and leading to Schofield Barracks and Wheeler Army Airfield experience delays during peak periods. This includes intersections along Kunia Road coming from Wahiawa. There are several areas near the proposed Schofield Generating Station and transmission line that are periodically congested. The first is the commercial area in the central portion of the Main Post of Schofield Barracks, where the Post Exchange, food courts, commissary, and other shops are located. The commercial area attracts both vehicular and pedestrian traffic, and peak traffic periods are lunchtime and weekends. Another area of congestion is at the gates along Kunia Road, especially during periods of heightened security, when traffic backs up onto Kunia Road. Lyman Road can become congested during the morning and evening commute hours, and during lunchtime. Most traffic congestion occurs between the Lyman Gate and Humphreys Road. Additional traffic can extend to Hewitt Road and possibly Carpenter Street. During nonpeak periods, traffic normally flows freely and without delays (Tetra Tech 2011a). In addition to Schofield Barracks, the Wheeler Army Airfield gate at Lyman Road and roadways leading to and from Wahiawa vicinity of the transmission line are periodically congested.

Level of service (LOS) is a measure of the operational conditions on a roadway or at an intersection. LOS ranges from A to F, with “A” representing the best operating conditions (free flow, little delay) and “F” the worst (congestion, long delays). LOS A, B, and C are typically considered good operating conditions. The existing LOS for peak period traffic was analyzed for roadways that would have the greatest potential to be affected by the Proposed Action (Figure 3.6-2 and Table 3.6-1). The existing traffic during both a.m. and p.m. peak periods ranged from LOS B at Kunia Road and the Field Station Kunia entrance, Lyman Road and Humphreys Road, and Lyman Road and Maili Street, to LOS F at Lyman Road and Flagler Road. In general, the intersections of Kunia Road and Wilikina Drive, Lyman Road and Flagler Road, and Kunia Road and Lyman Road are congested during both the a.m. and p.m. peak periods (Tetra Tech 2014a).



LEGEND

- DoD/Federal Land
- Access Route
- SGSP Site
- Planned Interconnection Route

Studied Intersections Near SGSP

Figure 3.6-2

Source: Schofield Barracks GIS 2014, Hawaii OP GIS 2014, ESRI 2011.

3.6.1.3 Access Control Points

Schofield Barracks provides access from the external roadway network through four ACPs, as shown in Figure 3.6-2. A description of the operating hours, access restrictions, and peak traffic volumes are in Table 3.6-2. The gate closest to the project site is Lyman Gate, through which all visitors must enter. Daily traffic volumes for Macomb and McNair gates were unavailable; however, these ACPs are not expected to be affected by the Proposed Action.

Table 3.6-1.
Existing LOS on Roadways within Proposed Project Area

Evaluated Intersection	Existing Conditions Level of Service	
	a.m.	p.m.
(1) Kunia Road & Wilikina Drive (SR99)	D	D
(2) Kunia Road & Foote Avenue	C	C
(3) Kunia Road & Lyman Road	D	D
(4) Kunia Road & Field Station Kunia entrance	B	B
(5) Lyman Road & Flagler Road	F	F
(6) Lyman Road & Humphreys Road	B	B
(7) Lyman Road & Maili Street	B	B
(8) Kunia Road & Temporary Construction Access	N/A	N/A

Source: Tetra Tech 2014a
Note: N/A = not applicable; no level of service data exist for intersection 8 because it is a temporary construction access point.

Table 3.6-2.
Schofield ACP Hours, Restrictions, and Daily Peak Traffic Volume

Access Control Point	Hours	Restrictions	Peak Traffic Volume (vph)	
			a.m.	p.m.
Lyman	24-hour access daily	Required visitor and delivery gate / Field Station Kunia entrance	1,126	1,532
Foote	5:00 a.m.–9:30 p.m.	No visitors or deliveries	1,249	1,027
Macomb	5:00 a.m.–9:30 p.m. (Monday–Friday only)	No visitors or deliveries Closed on holidays	-	-
McNair	24-hour access daily	No visitors or deliveries	-	-

Sources: Tetra Tech 2014a, USAG-HI 2014a.
Notes: - = no data; vph = vehicles per hour.

3.6.1.4 Air, Rail, and Public Transportation

The closest airport is Wheeler Army Airfield, adjacent to Schofield Barracks to the east. The closest international airport is Honolulu International (HNL), which is 15 miles away and has 785 operations per day (AirNav 2014).

Passenger rail access to the area is planned, but not yet in service. Passenger rail will be available through Honolulu Rail Transit (HRT) with transfers available from TheBus Route 72 to Waipahu Transit Station #5, approximately 9 miles south of Schofield Barracks (HRT 2014). The agency providing bus transit service to the area surrounding Schofield Barracks is TheBus of the City and County of Honolulu. Commuters must walk from the Route 72 public transit stops through the

entry control facilities to their on-post destination. There are two bus stops at Cadet Sheridan Road and Allentown Road (TheBus 2014).

3.6.1.5 Port and Waterway Transportation

The nearest public harbor is Barbers Point Harbor, about 17 miles to the south. The State of Hawaii's Harbors Division is the port authority for Barbers Point Harbor. Barbers Point Harbor serves a niche market in the Hawaiian port community, and contains several specialized cargo-handling facilities not available in Honolulu Harbor. The entrance to the main channel is 3,100 feet long, 450 feet wide, and 42 feet deep. The main basin of Barbers Point Harbor is 2,300 feet long, 1,800 feet wide, and 38 feet deep. The Barge Basin, basically the original harbor that was built in 1961, is near the entrance channel. The State of Hawaii's Harbors Division owns the Barbers Point Harbor Barge Wharf, operated by the Gas Company. The Gas Company maintains a storage tank for 714 barrels of liquefied petroleum gas and has additional storage at its refinery. The wharf has berthing space of 250 feet with alongside depth of 16 feet. Several additional piers support harbor operations and are used to moor marine vessels and to receive grains, dry bulk cargos, and petroleum products. There are almost 35 acres of paved open storage at the rear of the piers (World Port Source 2014).

3.6.2 Environmental Consequences

This section discusses the potential environmental effects on transportation resources from the Proposed Action. Effects were primarily assessed by reviewing existing traffic conditions of public roadways, the types and frequency of activities that may require use of these roadways, and reviewing the SGSP Traffic Study, prepared as a supporting study for this EIS (Appendix C). Impacts on traffic and transportation would be considered significant if the Proposed Action created appreciable changes in the overall traffic volume or permanently degraded LOS greater than two levels at one of the eight primary study intersections. Table 3.6-3 summarizes impacts for the Proposed Action and No Action Alternative. A detailed analysis of the Proposed Action and the No Action Alternative follows the table.

Table 3.6-3.
Summary of Transportation Impacts

Type of Impact	Proposed Action	No Action Alternative
Temporary increase in roadway traffic	Minor	None
Temporary increase in gate traffic	Minor	None
Permanent increase in roadway traffic	Minor	None
Permanent increase in gate traffic	Minor	None
Increase in transport of hazardous materials	Minor	None
Effects to aviation activities	Beneficial	None
Overall Impacts	**Minor**	**None**

3.6.2.1 Proposed Action

Short-term minor and long-term minor adverse effects would be expected. There would be short-term effects from additional vehicles and day-labor traffic during construction. Long-term effects would be caused by small increases in traffic during operations. The Proposed Action would have long-term minor beneficial effects on air transportation at Wheeler Army Airfield because power

disruptions would be less frequent after the SGSP became operational. There would be no adverse effects on air, rail, or public transportation.

3.6.2.1.1 Construction

Construction would have short-term minor adverse effects on traffic and transportation. These effects would be primarily result from worker commutes and delivery of equipment and materials. During construction, the site would be accessed through a temporary access road off Kunia Road south of the signalized intersection at the Field Station Kunia entrance (Figure 3.6-2).

Construction traffic would consist of noncommercial and commercial vehicles. Noncommercial traffic would primarily be workers commuting to the site and would be heaviest during peak traffic periods (6–8 a.m. and 4–6 p.m., Monday through Friday). Noncommercial traffic would include 79 vehicles per day during peak construction, and 62 during other periods of construction. Portions of the noncommercial traffic would come from the north and south on Kunia Road. Commercial traffic would come from the south on Kunia Road and would include local delivery traffic, heavy loads, and wide and permitted loads for heavy equipment (e.g., modules, generators, radiators). Only the noncommercial traffic from the north would impact the intersections on Kunia Road near the installation.

Table 3.6-4 has a comparison of LOS under the existing conditions, projected 2017 conditions without construction (i.e., future baseline; see section 3.6.2.2 for more information), and conditions during construction. LOS would range from LOS A at Kunia Road and the Field Station Kunia entrance, to LOS F at Kunia Road and the proposed construction access road. The LOS would remain unchanged at all intersections except Kunia Road and Wilikina Drive. At that intersection, the overall traffic delay would increase approximately 4 seconds per signal cycle, incrementally changing the LOS from D to E during the p.m. peak period. The intersection of Kunia Road and the construction access road would operate at LOS F in the p.m. peak period during construction because of the queuing of construction worker vehicles as they left the site at the end of the workday. Because traffic would be confined primarily to the temporary access road, traffic would not change at either Foote Gate or Lyman Gate, and there would be no construction-caused change in the LOS at either of these intersections. Because the LOS at most intersections would not change and the LOS at only one intersection would temporarily decrease incrementally during only the p.m. peak period, these effects would be minor (Tetra Tech 2014a).

Table 3.6-4.
2017 Construction Level of Service on Roadways within Proposed Project Area

	Existing LOS		Projected 2017 LOS Without SGSP		Projected 2017 LOS during SGSP Construction Phase	
Evaluated Intersection	**a.m.**	**p.m.**	**a.m.**	**p.m.**	**a.m.**	**p.m.**
(1) Kunia Road & Wilikina Dr	D	D	E	D	E	E
(2) Kunia Road & Foote Ave	C	C	D	D	D	D
(3) Kunia Road & Lyman Rd	D	D	E	D	E	D
(4) Kunia Road & Field Station Kunia entrance	A	B	A	D	A	D
(8) Kunia Road & Construction Access Road	-	-	-	-	E	F

Source: Tetra Tech 2014a
Notes: LOS = level of service; SGSP = Schofield Generating Station Project

The temporary construction access road would have long delays during the p.m. peak period as workers left for the day. Given the traffic volume along Kunia Road during peak periods, construction traffic from the SGSP would likely experience long queuing along the temporary access road awaiting a break in traffic flow to turn onto Kunia Road (particularly for left-hand turns). Traffic along Kunia Road may experience slight delays as construction vehicles enter or exit from the temporary access road. To the extent practicable, construction traffic would be limited to off- peak periods to reduce delays. The impacts from construction traffic in all other locations would be minimal, because of the low volumes compared to general traffic during the peak hours.

Hawaiian Electric would use the Barbers Point Harbor as the point of entry for major equipment not procured on Oahu. The equipment transport vehicles would leave the port traveling southeast on Malakole Street (HI-95), turn left on Kalaeloa Boulevard (HI-95) and proceed to H-1 East, take exit 5, travel north on Kunia Road (HI-750) for approximately 5 miles, turn left onto the unimproved construction road, and enter the project site on the south end (Figure 3.6-3). This haul route for the delivery of heavy equipment from Barbers Point Harbor would provide access for approximately four heavy loads of 10 tons or more per day (Tetra Tech 2014a). As many as 17 trucks per day would take the route to the installation. There would be incremental long-term changes in traffic; however, these changes would be indistinguishable from existing conditions. These effects would be minor.

Construction of the transmission lines would have short-term minor adverse effects. Transmission line construction would be distributed throughout the transmission line corridor and would typically be limited to daylight hours. Additional traffic and construction activities would cause temporary, localized congestion both on- and off-post, particularly along portions of Kunia Road during peak traffic periods. Some temporary lane closures may occur. On-post, the transmission line poles would be in areas where the roadways are free-flowing and below designed capacity outside of peak periods. Individuals would experience some traffic delays as construction crosses Veteran’s Memorial Freeway.

It is expected that the LOS at all intersections and roadway segments would remain unchanged.

Traffic would increase at varying times from the assembly-line method of construction. Construction activities and associated traffic would not be in one location for long durations but would progress along the right-of-way. Traffic during construction would be temporary and would subside at any particular location as it progresses to subsequent segments of the route. During power line installation, some construction traffic would use Lyman Gate for pole and transmission line installation on-post. Construction at locations where the transmission line would cross the road and utility easements would be accomplished in accordance with applicable crossing permits and approval requirements. These activities would be temporary and the LOS at all intersections and roadway segments would return to existing levels at the end of the construction. These impacts would be minor.

3.6.2.1.2 Operation

Operation of the generating station would have long-term minor effects on transportation and traffic. Long-term effects would be from worker commutes and delivery of fuel. Wheeler Army Airfield would experience long-term minor beneficial effects from increased energy reliability for airfield operations. There would be no effects on public transportation.

Before the beginning of normal operation, the facility fuel tanks would need to be filled. Initial fuel deliveries would include 60 fuel trucks over a 2-week period, three urea containers, and three trucks carrying lube oil. These initial deliveries would be during the workdays during nonpeak

LEGEND

- SGSP Site
- Heavy Equipment Delivery Route
- State Route
- Road

Heavy Equipment Delivery Route

Figure 3.6-3

Source: Schofield Barracks GIS 2014, Hawaii OP GIS 2014, ESRI 2011.

hours, and would have no effect on the LOS at any nearby intersection or roadway. Therefore, these effects would be minor.

All traffic for the operation of the proposed SGSP would use a designated transport route and enter through the Lyman Gate. During full capacity operation, there would be approximately 26 additional trucks per day to and from the SGSP facility. This would average one additional truck every hour, which would be less than one percent of the existing traffic on nearby roadways.

These truck trips would be spread out over a 24-hour period, occurring primarily at nonpeak traffic times with as many as two truck deliveries during both the a.m. and p.m. peak traffic periods. Table 3.6-5 has a comparison of LOS under existing conditions, 2017 conditions without the SGSP (i.e., future baseline; see section 3.6.2.2 for more information), and during plant operation. During operation, the LOS would remain unchanged at all intersections when compared to the future baseline. Because the additional truck traffic would be small compared to existing traffic volumes and LOS would not change, these effects would be minor (Tetra Tech 2014a). This would constitute the reasonable upper bound of effects, and the effects of reduced operation of the SGSP would be less than those shown.

Table 3.6-6 compares future traffic volumes at the gates with and without operational activities. Traffic would not change appreciably at either Foote Gate or Lyman Gate, and there would be no change in LOS at either intersection from operation of the plant. The existing transportation infrastructure would be sufficient to support the increase in vehicle traffic. Therefore, these effects would be minor. Although the effects would be minor, deliveries of fuel could be scheduled at nonpeak traffic hours using designated routes to further minimize traffic impacts.

Table 3.6-5.
2017 Operations Level of Service on Roadways within Proposed Project Area

	Existing		Future Baseline (2017) LOS		Future Baseline plus Operation of SGSP LOS	
Intersection	**a.m.**	**p.m.**	**a.m.**	**p.m.**	**a.m.**	**p.m.**
(1) Kunia Road and Wilikina Drive	D	D	E	D	E	D
(2) Kunia Road and Foote Avenue	C	C	D	D	D	D
(3) Kunia Road and Lyman Road	D	D	E	D	E	D
(4) Kunia Road and Field Station Kunia entrance	A	B	A	D	A	D
(5) Lyman Road and Flagler Road	F	F	C	B	C	B
(6) Lyman Road and Humphreys Road	B	B	C	B	C	B
(7) Lyman Road and Maili Street	B	B	C	B	C	B

Source: Tetra Tech 2014a
Notes: LOS = level of service; SGSP = Schofield Generating Station Project

During operations, there would be no adverse effects on public transportation. Wheeler Army Airfield would experience long-term minor beneficial effects on transportation resources from the increase in energy reliability with the proposed SGSP inland power supply. The National Guard and other emergency management personnel that use that airfield would not be dependent on coastal power stations that could become unreliable during severe weather conditions. This would translate into a net benefit to transportation in the form of reliability and infrastructure.

Table 3.6-6.
Peak Traffic Volumes at Gates During Operation

Gate	Baseline (vhp)		Baseline Plus Operation of SGSP (vhp)	
	a.m.	p.m.	a.m.	p.m.
Foote Gate	1,211	1,646	1,211	1,646
Lyman Gate	1,585	1,341	1,595	1,341
Percent Change From Existing Conditions				
Foote Gate			0%	0%
Lyman Gate			0.6%	0%

Source: Tetra Tech 2014a
Notes: vph = vehicles per hour; SGSP = Schofield Generating Station Project

3.6.2.1.3 Mitigation Measures and BMPs

No mitigation measures for traffic and transportation would be required. The direct, indirect, and cumulative effects would be minor. No activities outside compliance with existing regulations and plans would be required to reduce the level of effect to less than significant.

BMPs would be required for construction and operation of the SGSP. During construction, access to the site would be restricted to the temporary access road to avoid routing traffic through the already busy Lyman Gate. Deliveries of heavy equipment would be strategically scheduled and approach the site from the south so as not to interfere with traffic at intersections adjacent to the installation. All construction vehicles would be equipped with backing alarms, 2-way radios, and Slow Moving Vehicle signs when appropriate. During operations, all deliveries and personnel would access the SGSP using designated routes, and delivery of fuel would be scheduled to minimize traffic impacts.

3.6.2.2 No Action Alternative

There would be no effects from the No Action Alternative because the project would not be implemented and would not contribute to traffic level changes or have effects on rail, port, or public transportation. However, without the project, long-term changes in traffic would occur over time from population increase, Army growth, and other increases in the area.

With and without the Proposed Action, Army growth and other increases in traffic would generate appreciable increases in traffic volumes in the study area over time. Table 3.6-7 compares the existing LOS to the future projected LOS without implementation of the SGSP during peak traffic periods. In 2017, both the Wilikina Drive/Kunia Road and the Lyman Road/Kunia Road intersections would operate at LOS E during the a.m. peak period and LOS D during the p.m. peak period. Long queues would form on all legs of the Wilikina Drive/Kunia Road intersection. The Lyman Road/Kunia Road intersection would have a longer queue; the Kunia Road northbound left-turn queue would be longer than the available space during the a.m. peak hour and spill back onto the through lane. The new traffic signal at Flagler Road and Lyman Road intersection would improve traffic operations. The intersection would operate at LOS C during the a.m. peak period and at LOS B during the p.m. peak period. Other intersections would operate at LOS D or better for both a.m. and p.m. peak hours (Tetra Tech 2014a).

Table 3.6-8 compares existing and future traffic volumes at the gates without the Proposed Action. Traffic would increase approximately 7 percent at Foote Gate and 25 to 30 percent at Lyman Gate. This translates into a reduction in service at the Kunia Road and Lyman Road intersection from LOS D to LOS E in the a.m. peak period. These effects would be minor as they would be isolated, localized, and not measurable on a wider scale.

Table 3.6-7.
Level of Service at Nearby Intersections without SGSP

Intersection	Existing LOS		Projected 2017 LOS Without SGSP	
	a.m.	p.m.	a.m.	p.m.
(1) Kunia Road and Wilikina Drive	D	D	E	D
(2) Kunia Road and Foote Avenue	C	C	D	D
(3)Kunia Road and Lyman Road	D	D	E	D
(4) Kunia Road and Field Station Kunia entrance	A	B	A	D
(5) Lyman Road and Flagler Road	F	F	C	B
(6) Lyman Road and Humphreys Road	B	B	C	B
(7) Lyman Road and Maili Street	B	B	C	B

Source: Tetra Tech 2014a
Notes: LOS = level of service; SGSP = Schofield Generating Station Project

Table 3.6-8.
Peak Traffic Volumes at Gates without SGSP

Gate	Existing Vehicles per Hour		Projected 2017 Vehicles per Hour without SGSP	
	a.m.	p.m.	a.m.	p.m.
Foote Gate	1,126	1,532	1,211	1,646
Lyman Gate	1,249	1,027	1,585	1,341
Percent Change From Existing Conditions				
Foote Gate			7.5%	7.4%
Lyman Gate			26.9%	30.6%

Source: Tetra Tech 2014a
Notes: LOS = level of service; SGSP = Schofield Generating Station Project

3.7 WATER RESOURCES

3.7.1 Affected Environment

The affected environment and ROI for water resources is the Waikele watershed, the Kiikii watershed, the Waikele stream, and groundwater resources beneath the project site.

3.7.1.1 Surface Water Features and Drainage (including Floodplains and Wetlands)

Schofield Barracks lies primarily in the Waikele watershed near the drainage divide between the Kiikii watershed and the Waikele watershed (Parham et al. 2008). These watersheds stretch across the Schofield Plateau, from the ridgeline of the Koolau Mountains to the ridgeline of the Waianae Mountains (Tetra Tech 2014b). Nearly all elements of the proposed project lie within the Waikele watershed. The only portion of the proposed project that lies within the Kiikii watershed is proposed poles 31–41 at the eastern extent of the new 46-kV transmission line.

The principal surface water feature of the Kiikii watershed near the Schofield Barracks is the Wahiawa Reservoir (Lake Wilson), just outside the northeastern boundary of Schofield Barracks, north and east of Highway 99, and about a mile northeast of the generating station parcel. The

North and South Forks of Kaukonahua Stream (which form the Upper Kaukonahua Stream) become impounded within Wahiawa Reservoir. The reservoir receives small amounts of surface drainage from the northeastern portion of Schofield Barracks. The Kiikii watershed drains into the Pacific Ocean at Kaiaka Bay. The Kiikii watershed has a surface area of 58.6 square miles, of which approximately 57 percent is agricultural, 35 percent is conservation land, and 8 percent is urban (Parham et al. 2008).

There are no perennial surface water features or wetlands on the generating station parcel. The Waikele Stream, 100 to 150 feet north of the generating station parcel, is a major feature of the Waikele watershed and is one of the main drainages at Schofield Barracks. The stream flows eastward north of the generating station parcel, then south across the west side of Wheeler Army Airfield, eventually discharging to the West Loch of Pearl Harbor. The segment of Waikele Stream near the generating station parcel is dry most of the year, with intermittent flows after a rain. It is included in the National Wetland Inventory. The generating station parcel is entirely in the Waikele Stream drainage and the interconnection easement is divided between the Waikele Stream and Kaukonahua Stream drainages. The Waikele watershed has a surface area of 48.2 square miles, of which approximately 46 percent is agricultural, 27 percent is conservation land, and 27 percent is urban (Parham et al. 2008).

Several areas along Kaukonahua Stream are included in the National Wetland Inventory. Those nearest the proposed transmission line easement are an island in the middle of Lake Wilson that is approximately 200 feet south of proposed transmission line poles 38 and 39 and a wetland on the southern bank of Kaukonahua Stream that is approximately 350 feet northwest of proposed transmission line pole 31. There are no other surface water features or wetlands on or near the proposed transmission line easement.

The generating station parcel and the interconnection easement and surrounding properties are not in a floodplain designated by FEMA (Hawaii-NFIP 2013). The eastern portion of the interconnection easement, where poles 31-41 are proposed, crosses ~~lies in a~~ flood Zone AE—areas subject to inundation by the 1 percent annual chance flood event; however, no construction is planned within the area designated flood Zone AE. The remainder of the project area, including the generating station parcel, is in a flood zone D—unstudied areas where flood hazards are undetermined but flooding is possible.

3.7.1.2 Surface Water Quality

All Upper Kaukonahua streamflow becomes impounded in Wahiawa Reservoir, where it mixes with urban stormwater from municipal drainage systems; polluted runoff from surrounding agricultural, military, and urban lands; and treated sewage effluent from the Wahiawa Waste Water Treatment Plant (Hawaii DOH 2009). The North and South Forks of Kaukonahua Stream, smaller stream segments above Wahiawa Dam, and the Wahiawa Reservoir have been listed on Hawaii's 303(d) list of impaired waters for excessive nutrients and turbidity since 1996. The Waikele Stream is also listed on Hawaii's 303(d) list for nutrients and turbidity, with stream water quality primarily affected by nonpoint agricultural pollution from pineapple and other croplands adjacent to the stream (USAG–HI 2010).

A TMDL has been prepared for the South Fork of the Kaukonahua Stream to reduce turbidity and nitrogen. A TMDL is being prepared for Waikele Stream, which is expected to identify sources of pollution within the watershed and determine pollutant load reductions required for the stream to meet water quality standards. TMDLs are required for pollutant-impaired water bodies on the state's Clean Water Act (CWA) section 303(d) list (Hawaii DOH 2009). The primary objective of the TMDLs is to stimulate and guide action to control sources of excessive nutrients and

sediment, and to improve the water quality of the streams so that the designated and existing uses of water bodies throughout the Kaiaka Bay watershed will be protected and sustained. Principal responsibility for reducing nonpoint source pollutant loads, improving water quality, and repairing and protecting aquatic ecosystems in the Upper Kaukonahua watershed lies with the major landowners and land operators in the watershed, including the DLNR, the Army, and Dole Foods, Inc. (Hawaii DOH 2009). Once EPA approves a TMDL, the TMDL waste load allocations are immediately effective to be applied in NPDES permits.

The state assures the implementation of approved TMDL wasteload allocations through the enforcement of NPDES permit conditions (HAR §11-55). NPDES permit number HI S000090, issued by the State of Hawaii Department of Health, is the Army's Small Municipal Separate Storm Sewer System (MS4) permit and it addresses stormwater permitting requirements for Schofield Barracks, Wheeler Army Airfield, and other U.S. military installations on Oahu (USAG-HI 2007). As part of the MS4 permit, the Army has established regulatory mechanisms, including enforcement procedures and actions that prohibit non-stormwater discharges into the Army stormwater system.

3.7.1.3 Coastal Zone Management Act

The Hawaii coastal zone management (CZM) area encompasses the entire state. The federal consistency provision of the Coastal Zone Management Act (CZMA) requires federal activities and development projects to be consistent with approved state coastal programs to the maximum extent practicable. Federally permitted, licensed, or assisted activities occurring in or affecting a state's coastal zone also must be in agreement with the state CZM program's objectives and policies.

3.7.1.4 Stormwater

Section 438 of the Energy Independence and Security Act (EISA) establishes strict stormwater runoff requirements for federal development and redevelopment projects. Under the EISA, federal facility development projects of 5,000 square feet or larger must maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of stormwater flow. Additional Army policies enacted in 2010 require the use of low impact development (LID) to manage stormwater on federal property. City and County of Honolulu standards are also relevant to the Proposed Action and include those issued by the Department of Planning and Permitting for drainage.

The following summarizes pertinent regulations and policies for stormwater management:

- EISA section 438 requires maintaining or restoring predevelopment hydrology for developments or redevelopments greater than 5,000 square feet.
- EPA's Technical Guidance on Implementing the Storm Water Runoff Requirements for Federal Projects under section 438 of EISA provides two options to reach EISA compliance by treating stormwater runoff quantity:
    - Option 1 – Retain the 95th percentile rainfall event.
    - Option 2 – Conduct a site-specific hydrologic analysis and apply LID practices that preserve predevelopment runoff conditions.
- Traditional stormwater practices such as retention and detention basins are discouraged by the Army.
- Local flood control standards require that runoff volume from the 10-year design storm be limited to predevelopment values.

- The 10-year, 24-hour storm discharge should be managed without flooding roadways, and the 50-year, 24-hour discharge should be managed without flooding equipment and buildings at the Schofield Generating Station.

The existing storm drainage system on Schofield Barracks consists of a network of piping, catch basins, manholes, trenches, culverts, and swales. Most of the stormwater is discharged into Waikele Stream (USAG – HI 2009). The generating station parcel is undeveloped and relatively flat with a gradual slope to the north and east toward the Waikele Stream to which stormwater from the site flows (Tetra Tech 2014b). Stormwater along the proposed interconnection easements flows along established drainage features such as drainage swales, curb and gutter systems, and culverts.

3.7.1.5 Groundwater

The Schofield High-Level Water Body, located west of the Waianae Mountains, is the major source of water for Schofield Barracks (Tetra Tech 2014b). Groundwater sources near the generating station parcel and the interconnection easement are the Schofield High-Level Groundwater Body, the Oahu Basal Aquifer, and dike-impounded groundwater systems. The Schofield High-Level Groundwater Body is beneath the Schofield Plateau, where groundwater elevations are in the range of 275 feet above mean sea level (msl). Water levels are higher than in the surrounding region because groundwater flow in the center of the plateau is laterally restricted by natural subsurface barriers—possibly dike intrusions or buried volcanic ridges—that block flow to the north and south. Underlying the high-level groundwater body is the Oahu Basal Aquifer, a freshwater lens occupying porous and permeable volcanic rocks beneath the island. The volume of water stored in the basal aquifer depends on the porosity of the rock. The freshwater lens of the basal aquifer floats on denser salt water. The freshwater lens is thickest near the center of the island and tapers off toward the edges of the island. Groundwater elevations in the basal aquifer are likely to be 600 to 800 feet below ground surface.

Groundwater at the generating station parcel would be expected to flow along the topographic gradient north and east toward Waikele Stream, then generally south. Groundwater along the interconnection easement would be expected to flow north toward Upper Kaukonahua Stream and the Wahiawa Reservoir. However, local and seasonal variations may occur.

There are two active Installation Restoration Program (IRP) sites at Schofield Barracks. One is Operable Unit (OU) 2 (groundwater contaminated with tricholoroethylene [TCE]), and the other is OU4 (the former Schofield Barracks landfill) (Tetra Tech 2014b). Groundwater contaminated with TCE (OU2) extends under the generating station parcel and most of the interconnection easement. TCE and carbon tetrachloride are widespread in area groundwater that includes the generating station parcel and most of the interconnection easement. Installationwide groundwater contamination is managed under OU2 that covers groundwater beneath Schofield Barracks, Wheeler Army Airfield, and its surrounding region. Groundwater is between 550 to 650 feet below the ground surface. While OU2 is actively used as the drinking water source, established land use controls prohibit groundwater extraction that interferes with the remedial action system, restricts drinking water well installation, restricts withdrawal or use of groundwater for agricultural and irrigation purposes, and restricts withdrawal or use of groundwater without treatment (Tetra Tech 2014b). Section 3.11 describes OU2 and its associated land use controls in greater detail.

3.7.2 Environmental Consequences

An impact on water resources would be considered significant if the project would cause substantial flooding, erosion, or siltation; would substantially degrade water quality; or would substantially degrade or deplete groundwater resources. A summary of impacts is provided in Table 3.7-1.

3.7.2.1 Proposed Action

Short-term minor adverse effects on surface waters would be expected, and no adverse effects on groundwater, or the coastal zone would be expected. Short-term effects on surface water would result from ground disturbance and vegetation removal and the use of construction equipment. Although there would be a long-term increase in the amount of impervious area on the project site from construction of the SGSP, use of BMPs in accordance with regulatory requirements would ensure that the project would not have any long-term effects on surface water or groundwater. Overall effects on water resources would be minor.

Table 3.7-1.
Summary of Impacts on Water Resources

Type of Impact	Proposed Action	No Action Alternative
Flooding	None	None
Erosion	Minor	None
Siltation	Minor	None
Surface water quality	Minor	None
Groundwater quality	None	None
Overall impacts	**Minor**	**None**

All stormwater on the project site would be collected; directed through trenches, ditches, and drains to an infiltration/detention basin; and released in accordance with federal and state requirements to ensure that the project does not adversely affect surface water quality, that designated uses of surface waters are protected and maintained, and that the postdevelopment hydrology of the site matches predevelopment conditions. Numerous design features of the project would ensure the protection of water quality: an infiltration basin sized to ensure that stormwater flow from the site matches predevelopment rates would be constructed; catch basins would collect surface water and direct it to an underground piping system; roof drains from permanent buildings would discharge directly into a stormwater drain system and not flow over parking lots, ground slabs, or other surfaces; the entrance road, interior roads, and parking areas would be paved asphalt; nonpaved interior areas would be surfaced with crushed rock; and polluted stormwater from the mechanical areas of the plant would be directed to an oil/water separator and treated before release.

3.7.2.1.1 Construction

Prior to beginning construction, Hawaiian Electric would obtain permit ~~Permit~~ coverage for stormwater runoff from the construction site~~would be obtained~~ under the NPDES General Permit Authorizing Discharges of Stormwater Associated with Construction Activity issued by the Department of Health, Clean Water Branch (HAR Chapter 11-55 Appendix C; expires 5 December 2018). The permit requires that a project-specific stormwater pollution prevention plan (SWPPP) be prepared. A SWPPP identifies potential sources of stormwater pollution at the construction site, describes stormwater control measures to reduce or eliminate pollutants in stormwater discharges from the construction site, and identifies procedures the permittee will

implement to comply with the terms and conditions of this general permit. Other provisions of the general permit include:

- Designing, installing, and maintaining erosion and sediment controls that minimize the discharge of pollutants from earth-disturbing activities
- Minimizing the amount of soil exposed during construction
- Completing installation of stormwater controls prior to earth-disturbance
- Ensuring that all erosion and sediment controls remain in effective operating condition during permit coverage and are protected from activities that would reduce their effectiveness
- Stabilizing exposed portions of the site
- Designing, installing, and maintaining effective pollution prevention measures to prevent the discharge of pollutants, including measures to prevent pollution from equipment used on and activities performed at the construction site

With implementation of these measures, erosion and siltation would be very limited and the effects on surface water quality would be negligible. There are no surface water features on the project site. Waikele Stream is north of the site. The proposed transmission corridor would cross the South Fork of the Kaukonahua Stream. Installing poles for the transmission line would cause minimal soil disturbance, and sufficient measures would be taken to ensure the protection of water quality during and after facility installation.

No adverse effects on wetlands would be expected. The nearest wetlands to the site are the Waikele Stream and two areas along Kaukonahua Stream. Each of these wetlands is 200 feet or more from construction activities. Because of the distance from construction activities and the erosion and sediment controls that would be implemented, wetlands would not be adversely affected.

No adverse effects on the coastal zone would be expected from construction of the SGSP. A copy of agency coordination under CZMA is provided as Appendix D.

Construction would not take place in designated flood hazard areas. No adverse effects with regards to flooding would be expected.

No adverse effects on groundwater would be expected during construction. Groundwater depth at the site is between 550 to 650 feet below the ground surface, so the project is not expected to disturb contaminated groundwater. The potential for spills from equipment during construction is always a possibility, and preparation and implementation of an SWPPP would ensure that spills would be minimized and promptly contained and cleaned up if they occurred.

3.7.2.1.2 Operation

Based on the anticipated operation of the SGSP, the generating station would use approximately 1,100 gallons of water per day. If operated at maximum capacity continuously, the generating station would use approximately 8,175 gallons of water per day. For comparison purposes, EPA and the Hawaii DLNR estimate that the average family of four uses 400 gallons of water per day. Therefore, the SGSP's expected water usage of approximately 1,100 gallons of water per day is less than the expected water usage of three average households.

Potable water for the generating station would be drawn from the Schofield Shaft of the central sector of the Central Oahu Aquifer and would be part of the Army's permitted use. The Army's total permitted use is 5.648 million gallons per day (MGD) from the Schofield Shaft. As of March 2015, the Army's actual usage was 3.159 MGD (Bogdanski 2015). Therefore, even though the

plant would use additional potable water, the Army's water use would remain well below its permitted use, so effects would be minor.

The current design for the stormwater system for the Schofield Generating Station would incorporate natural and constructed drainage features. The developed site would follow the natural slope to the east. The perimeter road would slope toward the inside edge. Drainage on the west end of the site would be collected in a ditch west of and parallel to the generator building. East of the generator building site, drainage would be collected and conveyed by a storm sewer system. The storm sewer system would run along the inside edge of the perimeter road and outlet to a dry bottom basin on the eastern end of the site. The basin (described later) would be an infiltration basin (unless infiltration tests show infiltration rates less than 0.5 inch per hour). The LNG storage area would drain to a concrete impoundment basin that would drain to a detention/infiltration basin south of the LNG area, which would drain to the main stormwater basin at the eastern end of the site.

A number of studies were done to determine how best to manage stormwater on the Schofield Generating Station site and they ultimately led to the plan described above. The Army prepared a water characterization study to identify cost-effective solutions to comply with federal and local regulations for the proposed Schofield Generating Station (Tetra Tech 2013). The water characterization study is provided as Appendix E.

With implementation of the measures outlined below, no adverse effects on surface water or groundwater would be expected during the plant's operational phase. Stormwater runoff generated from the Schofield Generating Station site during operation would be contained on-site and ultimately discharged from an infiltration basin sized to ensure that there would be no impact on Waikele Stream or its watershed. Operation of the plant would not result in adverse effects to the coastal zone.

Stormwater drainage system requirements, site use, and the relatively small site area limit the degree to which LID standards can be implemented, so Hawaiian Electric evaluated the feasibility of an infiltration/detention basin (Hawaiian Electric 2014a). Infiltration tests indicated that the site meets the county's minimum recommended rate for infiltration facilities, so the use of an infiltration basin is proposed and will be reevaluated after on-site infiltration test results are completed. Although the final design might change, the preliminary design is for a 4-foot deep, 0.22-acre basin that would limit discharge for a 10-year event to the predevelopment rate.

Spill containment in all areas of the Schofield Generating Station would prevent the release of contaminants to the environment (Hawaiian Electric 2014b). The engines would be cooled by a closed-loop radiator system. The coolant is a solution of water and a rust inhibitor. Because it is a closed-loop system, it uses very little water and produces no discharge. The SCR unit housings would require a urea solution to be injected into the exhaust stream to remove NOx (Hawaiian Electric 2014b). At maximum power, each unit would require approximately 60 gallons per hour of urea solution. The urea solution would be mixed on-site from demineralized water and dry urea pellets. The resultant solution would be stored in tanks until used. Although the solution is not classified as a hazardous material, the urea storage and delivery area would have spill containment. In the engine hall, power would be generated by the six generators at 13.8 kV and then delivered to the switchyard, where it would be stepped up to 46 kV using two 13.8–46-kV generator step-up transformers to support connection to the 46-kV subtransmission line. The transformers would be set on a concrete foundation that includes a secondary containment reservoir to contain the transformer fluid if there is a leak or spill.

Spill containment would be provided in areas designated for fuel deliveries and storage. All fuel would be delivered to the site by truck (Hawaiian Electric 2014b). Biodiesel trucks contain

approximately 5,800 gallons of fuel, diesel trucks up to 9,000 gallons, and LNG isotainer trucks approximately 10,000 gallons. Biodiesel and diesel would be transferred from the delivery truck to two aboveground vertical storage tanks, each one 32 feet in diameter and 40 feet tall. The maximum total storage capacity would be 420,000 gallons. The storage tanks would be contained within a berm, with an impermeable lining to contain fuel if there is a spill or leak. LNG would be delivered to a separate receiving area. The berm would be designed to hold 110 percent of the largest tank's capacity as required by industry and Army regulations. The trailer mounted LNG isotainers themselves would serve as the storage for the fuel, so no permanent LNG storage facility would be constructed on-site. The trailers would be backed into a receiving area, parked, and disconnected from the delivery truck.

Stormwater runoff from the diesel tanks and lubricating oil equipment areas at the Schofield Generating Station would be routed into water collection sumps. These sumps would routinely be checked for contamination from the equipment and would occasionally be pumped through an on-site oil/water separator system. Primary potential contaminants include fuel and oil from the biodiesel engines and their accompanying equipment. Noncontaminated water would be subjected to stormwater management. Trucks would transport any contaminated stormwater for off-site treatment at an appropriate wastewater disposal facility (Hawaiian Electric 2014a).

3.7.2.1.3 Mitigation and BMPs

No mitigation measures for the protection of surface water and groundwater would be necessary before, during, or after construction. The direct, indirect, and cumulative effects associated with water resources would be minor. Compliance with existing regulations, permits, and plans would be sufficient to ensure a less than significant level of effect on water resources.

BMPs approved by the Hawaii Department of Health, Clean Water Branch would be implemented in accordance with a project-specific SWPPP during construction, which would detail the stormwater management measures that would be implemented on the SGSP site during construction. The BMPs would be developed and maintained throughout the duration of the project and would be revised to reflect any changes required. Hawaiian Electric would also comply with USAG-HI's MS4 permit. The final selection of stormwater BMPs and the design of the stormwater system would be determined as the project design is finalized.

3.7.2.2 No Action Alternative

The No Action Alternative would result in no changes to surface waters because the SGSP would not be built. No construction activities would be undertaken, and no changes in operations would take place. Therefore, no adverse effects on surface water or groundwater would be expected.

3.8 GEOLOGY AND SOILS

3.8.1 Affected Environment

The ROI for the geologic, soil, and geologic hazards effects analysis is the project site where ground-disturbing activities would occur under the Proposed Action. There is a brief overview of the regional geologic setting followed by a discussion of the geologic setting of the SGSP project site.

3.8.1.1 Physiography and Topography

The generating station site and transmission line interconnection easement are in the Schofield Plateau geomorphic province, a broad interior highland between the Waianae Range and the

Koolau Range. The generating station site is in the southeast portion of Schofield Barracks in the South Range Acquisition Area (the South Range), south of the cantonment area. The power generating station parcel is about one-third of a mile south of Lyman Road and about a one-half of a mile west of Kunia Road. The 8.13-acre site is part of a large tract of agricultural land that was used for pineapple cultivation before acquisition of the south range.[8]

From the proposed power generating station site, the transmission line interconnection easement crosses the Waikele Stream and proceeds toward developed areas of Schofield Barracks, Wheeler Army Airfield, and commercial properties along Kunia Road and Wilikina Drive. From Wilikina Drive, the transmission line interconnection easement crosses Kamehameha Highway and a narrow section of the Wahiawa Reservoir where the transmission line interconnection easement terminates into the Wahiawa Substation.

The local elevation ranges from less than 660 feet above msl in the Schofield Barracks cantonment area to greater than 3,000 feet above msl in the Waianae Range (USAG-HI 2010). The generating station site and transmission line interconnection easement are on the Leilehua Plateau—or the current Schofield Plateau geomorphic province—between the Waianae Range to the west and the Koolau Range to the east, at elevations ranging from about 800 to 1,000 feet above msl. The generating station site is relatively flat with an elevation of approximately 900 feet above msl, with elevation decreasing gradually to the north and east. Waikele Stream, which forms an incised channel—Waikele Gulch—approximately 100–150 feet north of the project site, with an elevation of about 824 feet above msl in the stream basin. The interconnection easement would be east and north of the power generating station site, at elevations of about 830–840 feet above msl (USACE, Honolulu District 2002).

3.8.1.2 Regional and Site Geology

The Hawaiian Islands are part of the Hawaiian-Emperor Seamount Chain, a vast underwater mountain region of islands and intervening seamounts, atolls, shallows, banks, and reefs that extends approximately 3,600 miles. The islands of the Hawaiian-Emperor Seamount Chain are volcanic and are composed of basalt, a rock relatively rich in iron and magnesium and poor in silica. In the islands of the main Hawaiian archipelago, most volcanoes that formed the islands are now dormant or extinct but have not subsided, forming high-standing islands (Tetra Tech 2011b).

The island of Oahu developed from the formation of two volcanoes 2 to 3 million years ago. Lava from the Koolau volcano on the east created the Leilehua Plateau between Koolau and the older Waianae volcano on the west. The effects of weathering and erosion on these shield volcanoes have created high sea cliffs, deep valleys, and jagged mountainous regions on Oahu (USAG-HI 2010). The last period of active volcanism on Oahu ended about 6,000 years ago (Tetra Tech 2011b).

The generating station site and transmission line interconnection easement are in the Leilehua Plateau, or the current Schofield Plateau geomorphic province. It is underlain by the Koolau basalt lava flows member of the Koolau Volcanic Series (USGS 2007). This member abuts the older eroded surface of the Kamaileunu and Lualualei (lower and middle members of the Waianae Volcanic Series). The Koolau basalt flowed in thin, nearly horizontal layers, on which soils developed and alluvial sediments were deposited between flows during the eruptive history of the Koolau Volcano. The Koolau basalts are overlain by recent alluvial sediments eroded from the Waianae Range (Tetra Tech 2011b).

[8] The Army acquired the South Range Acquisition Area in 2004; it allowed a final pineapple harvest in 2005.

3.8.1.3 Soils

A custom soil resource report for the project area was prepared using the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) web soil survey tool. The surface soils identified in the report included soils from the Wahiawa Series, subgroup symbol of WaA and WaB; the Kunia Series, subgroup symbol of KyA and KyC; the Helemano Series, subgroup symbol of HLMG; the Kawaihapai Series, subgroup symbol of KIB; and the Manana Series, subgroup symbol MoB. These soil series generally consist of well-drained soils that were developed in residuum and old alluvium derived from basic igneous rock (USDA 2014).

The principal soil types on the generating station parcel are the Wahiawa silty clay soils and Kunia silty clay (USDA 2014). The Wahiawa silty clay soils are on slopes that range from 0 to 8 percent. These soils are well drained, about 4 feet thick, and developed on alluvium underlain by weathered basalt. Runoff is slow, and the erosion hazard is slight. The Kunia silty clay soils are on slopes that range from 0 to 15 percent. These are well-drained soils found on nearly level ground in upland terraces and fans. Permeability is moderate, runoff is slow, and erosion hazard is slight (USAEC 2008).

The gully slopes adjacent to Waikele Stream are underlain by Helemano silty clay on 30 to 90 percent slopes. These are well-drained soils formed on alluvial fans or on the colluvium deposited along the walls of gulches. Colluvium is a loose deposit of rock debris accumulated through the action of gravity at the base of a cliff or slope. The soil is developed on soft, highly weathered basalt. Runoff is medium to very rapid, and the erosion hazard is severe to very severe (USAEC 2008). The Kawaihapai clay loam, 2 to 6 percent slopes occur in drainage ways on alluvial fans. These soils are well drained, and the erosion hazard is slight. The Manana silty clay loam, 2 to 6 percent slope is along a gently sloping area of the central transmission line interconnection easement. This well-drained soil has slow runoff and a slight erosion hazard (USDA 2014).

The soil conditions as described in a drilling and laboratory testing report that was prepared for the Proposed Action generally conform to the descriptions in the USDA NRCS Soil Survey. Soil samples from the proposed generating station parcel consisted of Wahiawa Series, WaA; Kunia Series, KyA; and the Helemano Series, HLMG soils. The Wahiawa Series consists of dusky red silty clay about 12 inches thick. The subsoil, about 48 inches thick, is dark reddish-brown silty clay that has subangular blocky structure. The underlying material is weathered basic igneous rock. The surface layer of Kunia Series soil consists of dark reddish-brown silty clay about 22 inches thick. The subsoil, 40–71 inches thick, is dark reddish-brown silty clay and silty clay loam that has a subangular blocky structure. The substratum is dark reddish-brown gravelly silty clay. The surface layer of Helemano soil consists of dark reddish-brown silty clay about 10 inches thick. The subsoil, about 50 inches thick, is dark reddishbrown and dark-red silty clay that has subangular blocky structure. The substratum is soft, highly weathered basic igneous rock (Hirata and Associates 2013).

Prime farmland soils, as defined by the USDA, are soils with the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and are available for agriculture. The conversion of these soils to industrial and other nonagricultural uses essentially precludes farming them in the foreseeable future. The concern that continued conversion of prime farmland to nonagricultural use would deplete the nation's resources of productive farmland prompted enactment of the 1981 Federal Farmland Protection Policy Act (FPPA). This act set guidelines that require all federal agencies to identify prime farmland proposed to be converted to nonagricultural use and evaluate the impact of the conversion. Form AD-1006, Farmland Conversion Impact Rating, is used to determine whether a site is farmland subject to the FPPA.

The 8.13-acre generating station site is a portion of the larger 535-acre South Range that was assessed in the SBCT EIS in 2004. As part of that NEPA process, the Army coordinated the conversion of the land from prime farmland to nonagricultural use with NRCS in light of the objectives and guidelines of the Farmland Protection Policy Act. The estimated 535 acres of what at that time was cultivated pineapple land was 0.67 percent of the total USDA-designated agricultural land on Oahu and 2.8 percent of the total area in pineapple production in the state (Tetra Tech 2004). The SBCT EIS concluded that the conversion of the entire South Range to nonagricultural use would not result in significant impacts. The Form AD-1006 process was initiated with NRCS, but never finalized. The form is now in the process of being finalized by the Army and the NRCS. A copy of the letter sent to NRCS for completion of the AD-1006 process is provided in Appendix B following the NRCS's comment submitted under the EISPN. Because the generating station site was addressed as part of the larger South Range EIS, it does not need to be evaluated again under the FPPA.

These site soils are considered prime farmland soils only if they are irrigated: Kawaihapai clay loam, 2 to 6 percent slopes; Kunia silty clay, 0 to 3 percent slopes; Manana silty clay loam, 2 to 6 percent slopes; and Wahiawa silty clay, 0 to 8 percent slopes (USDA 2014). The power generation station site does consist of Wahiawa silty clay and Kunia silty clay soils, but they are not irrigated. The remaining soils are in areas that have been developed or in undeveloped areas where there will be little disturbance from the Proposed Action.

3.8.1.4 Geologic Hazards

The island of Oahu is in an earthquake zone classified as seismic zone 2A, having a moderate potential for seismic damage. Zone 0 refers to areas with the least seismic activity, whereas zone 4 denotes an area with the greatest seismic activity (USGS 2001). The risk of strong ground shaking at the SGSP site is relatively low from its distance from the south coast of the island of Hawaii, where most earthquakes are centered. The USGS has prepared maps showing the horizontal ground acceleration in firm rock, as a percentage of the acceleration of gravity, for a given probability of exceedance within a given number of years. The severity of ground shaking depends on the local geologic conditions. Soft sediments (alluvium, for example) may amplify seismic waves, while wave energy tends to be transmitted efficiently through hard rock. According to the USGS National Seismic Hazard Mapping Project, there is only about a 10 percent chance that ground accelerations of more than 12 percent of gravity would occur in firm rock areas within the southeastern three quarters of Oahu over the next 50 years (USAEC 2008).

Shearwave testing—seismic survey—in a borehole in the approximate center of the proposed generating station engine hall was done in 2013. Based on the 2009 International Building Code, the test results classified the as Site Class D (Hirata and Associates 2013). A Site Class D classification has soil properties consisting of a stiff soil profile (IBC 2009).

3.8.2 Environmental Consequences

The generating station site is overgrown, fallow agricultural land. To facilitate construction of the generating station, the parcel would need to be cleared of vegetation and graded. During construction, exposed soils would be subjected to the weather and construction activities that could lead to erosion. Impacts related to geology and soil would be considered significant if the project would create a substantial loss of soil through erosional processes, or because of safety issues from geological hazards such as seismicity that could affect human health or constructed structures. Table 3.8-1 summarizes impacts for the Proposed Action and No Action Alternative. A detailed analysis of both the Proposed Action and the No Action Alternative is in the sections following the table.

Table 3.8-1.
Summary of Impacts to Geology and Soils

Type of Impact	Proposed Action	No Action Alternative
Soil erosion	Minor	None
Prime farmland	None	None
Site geology	None	None
Seismicity	None	None
Overall Impacts	**Minor**	**None**

3.8.2.1 Proposed Action

Short-term minor adverse effects on soil would be expected. Short-term effects would result from the potential for soil erosion during site grading and construction. Implementing the proposed Action would require controls to minimize and control erosional processes. These effects would be less than significant. No effects on site geology or from geologic hazards—seismicity—would be expected. No effects on prime farmland soils would be expected because the property was taken out of agricultural use nearly 10 years ago when it was acquired as part of the South Range and because site soils are not irrigated.

3.8.2.1.1 Construction

Construction of the generating station would require removal of vegetation and grading activities that would leave soil exposed and vulnerable to erosion from wind and water. The potential for soil erosion would generally be minor due to the soil type and slight slope that exists on the generating station parcel. Erosional processes would be minimized by implementing BMPs. The proposed transmission line interconnection easement would require minimal ground clearing or soil disturbance, and exposed soil would only be expected during the installation of new poles.

The design and construction of the proposed generating station would incorporate findings from geotechnical investigations and would meet or exceed building code requirements to account for seismic hazards.

3.8.2.1.2 Operation

No impacts to site geology, soils, or geologic hazards would be expected during operations or maintenance activities. Once construction is complete, all ground surfaces would be restored through landscaping or other stabilization methods and stormwater would be diverted to an on-site infiltration basin.

3.8.2.1.3 Mitigation Measures and BMPS

The Proposed Action will disturb more than 1 acre of land, which requires a State of Hawaii Department of Health-issued NPDES permit. Such permitting will involve the preparation of a site-specific SWPPP. The SWPPP would include BMPs to prevent erosion and sedimentation as previously identified in section 3.7.2.1.1.

3.8.2.2 No Action Alternative

Under the No Action Alternative, the use of the site would not change, and no ground-disturbing activities would occur. No adverse impacts would be expected under the No Action Alternative.

3.9 BIOLOGICAL RESOURCES

Biological resources include common vegetation, wildlife, and habitat, threatened and endangered species, other special status species, and sensitive habitats. The ROI for biological resources is the project site, where plants and animals could be physically impacted, and a surrounding 0.5-mile buffer where species could be affected by noise, lighting, and increased human activity.

3.9.1 Affected Environment

The generating station site and portions of the interconnection easement are on Schofield Barracks, home to 59 rare plant species, 28 special status wildlife species, 2 rare vegetation communities, and large expanses of biologically significant areas. Most of these species and communities occur in less disturbed portions of the installation more than 2 miles west of the project site including the Honouliuli Forest Reserve. The remaining portions of the interconnection easement are on the northern boundary of Wheeler Army Airfield or state-owned land. The state-owned land includes the Waikele Stream gulch, road rights-of-way, and a portion of the Wahiawa Reservoir (Lake Wilson) and Wahiawa Freshwater State Park.

3.9.1.1 Regulatory Setting

3.9.1.1.1 Endangered Species Act

The Endangered Species Act of 1973 (ESA) (16 USC §§ 1531-1544) protects plant and animal species listed under the act as threatened or endangered. The ESA also protects designated critical habitat for listed species. Critical habitat is an area where the physical or biological features essential to the conservation of the species are found. Critical habitat areas may require special management considerations. Listed species and their critical habitat are protected from “take.” A “take” of a listed species is defined in the ESA to include “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” Species that are not listed under the ESA but are of concern are referred to as candidate, proposed, or species of concern. The ESA also protects against degrading designated critical habitat. The regulatory agencies responsible for enforcing the ESA are the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (commonly known as NOAA Fisheries) for marine species and the USFWS for terrestrial and some aquatic species. Consultation with the applicable agencies is required before initiating any action if a project would be likely to result in a take or otherwise adversely affect federally listed species.

3.9.1.1.2 Migratory Birds

The Migratory Bird Treaty Act of 1918 (MBTA) (16 USC §§ 703–712) is domestic legislation implementing international agreements made among the United States, England, Mexico, the former Soviet Union, and Japan to protect migratory bird populations. The MBTA makes it illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit. The USFWS is responsible for enforcing the MBTA and consultation with this agency would be required if a project would likely result in a violation of the MBTA. In addition, EO 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds, 10 January 2001) directs federal agencies to take certain action to further implementation of the MBTA.

3.9.1.1.3 Invasive Species

EO 13112 (Invasive Species, 3 February 1999) builds on NEPA, the ESA, and the Federal Noxious Weed Act of 1974 and requires all federal agencies to prevent the introduction of invasive species, provide for their control, and take measures to minimize the economic, ecologic, and human health impacts that invasive species may cause.

3.9.1.1.4 Hawaii State Laws

The State of Hawaii has established laws and administrative rules to protect indigenous wildlife and plants. HRS § 195-1 recognizes the importance of Hawaii's indigenous species and native ecosystems and states that the state should take positive actions to protect them. HAR Chapters 13-107 and 13-124 lists activities that are prohibited in order to conserve threatened and endangered species, indigenous wildlife, and introduced wild birds. The state list of threatened and endangered species includes by reference species on the ESA, and some additional species.

3.9.1.2 Vegetation, Wildlife, and Habitat

Based on aerial photographs dating back to 1944, the land proposed for the SGSP was primarily used for agriculture. Beginning in 1954 and continuing until 2002 when the Army leased the property, the land was leased for pineapple cultivation. During this time, the soil between 4 and 14 inches was regularly injected with pesticides (USACE, Honolulu District 2002).

The generating station site consists primarily of old agricultural fields converted into lowland dry shrubland guinea grass- (*Megathyrsus maximus*-) dominated ecosystems (Litton 2011), while molasses grass (*Melinis minutiflora*) and sourgrass (*Digitaria insularis*) add to this grassland ecosystem. The flora is limited in diversity and dominated by nonnative species and species habituated to human disturbance that do not provide high-quality forage or habitat for wildlife species. Much of the low-lying, drier woody areas, including those adjacent to and on the state lands of the project site, are composed of invasive flora, including single-species stands of the flame tree (*Spathodea campanulata*), ironwood (*Casuarina equisetifolia*), Christmas berry (*Schinus terebinthifolius*), and strawberry guava (*Psidium cattleianum*) (Litton 2011). The *Integrated Natural Resources Management Plan* (INRMP) identifies the vegetation community at the generating station site as agriculture (USAG-HI 2010). On Army land, vegetation is managed in accordance with the INRMP, primarily to control pests, to maintain or increase the acreage of native ground cover, to control wildfire, and to maintain the military training mission.

The proposed site for the placement of three new transmission line poles (poles 1 to 3), the Waikele Stream gulch, occurs in State of Hawaii conservation district lands, and will cross a small area designated as freshwater forested/shrub wetland. This area is dominated by nonnative hardwoods, including the Norfolk pine (*Araucaria heterophylla*), and a variety of nonnative shrubs and grasses. The Waikele Stream is also a designated wetland included in the National Wetland Inventory. Wetlands are discussed with water resources in section 3.7.

The DoD Legacy Program noted that, between 1950 and 2011, invasive grassland cover increased in heavily used areas at Schofield Barracks (745 hectares) at a rate of 1.83 hectares per year, with more rapid rates of conversion before active fire management practices were implemented in the early 1990s (Litton 2011).

Wildlife primarily consists of birds, with the greatest diversity being found in the installation's forested areas. The highly disturbed areas of the generating station site and interconnection easement support mostly birds and invertebrates. Wildlife is managed at Schofield Barracks in accordance with the INRMP. Management priorities include controlling introduced species,

maintaining native species populations, and protecting sensitive species and their habitat (USAG-HI 2010).

3.9.1.3 Invasive Species

Invasive species are defined as undesirable nonnative species that adversely affect human health, the environment, or the economy. This includes any part of a species that is capable of propagating the species such as seeds, eggs, or spores. Invasive species can be introduced and spread by human actions, animals (e.g., a seed transported by adhering to an animal's fur), wind, and water. Invasive species most likely to be present in the ROI include several species of noxious weeds and rats.

USAG-HI has also been directed to take specific actions to combat and control invasive species by USFWS's 2003 and 2007 biological opinions (USFWS 2003, 2007). To comply with these and other requirements, USAG-HI developed an invasive species program to detect and manage invasive species and to minimize their effect on sensitive species and their habitats. The program includes periodic surveys for invasive species and documentation of their locations and extent and developing and implementing a management plan that would include methods for preventing further spread of invasive species (USAG-HI 2010). USAG-HI and Hawaiian Electric would implement protocols for cleaning construction equipment and using fill-like material (e.g., gravel) to prevent introducing new invasive species to the project site and minimizing the spread of invasive species.

3.9.1.4 Threatened and Endangered Species, Sensitive Species, Sensitive Habitat

Six animal species protected by the ESA—five birds and one bat—have the potential to occur in the project area. They are the Hawaiian goose, or nēnē, (*Branta sandvicensis*), Hawaiian stilt (*Himantopus mexicanus knudseni*), Hawaiian coot (*Fulica americana alai*), Hawaiian common moorhen (*Gallinula chloropus sandvicensis*), Hawaiian duck (*Anas wyvilliana*), and Hawaiian hoary bat (*Lasiurus cinereus semotus*) (USAG-HI 2010; Mansker 2014; Kawelo 2014). Based on recent observations and sightings, it is likely that the nēnē and the Hawaiian hoary bat occur in the project area. The Hawaiian hoary bat is known from Schofield Barracks and nēnē geese are known from Wheeler Army Airfield (Kawelo 2014).

No listed plant species are likely to occur in the project area because of its disturbed nature. Critical habitat was designated for listed plant species on Oahu in 2003; however, all plant critical habitat designations have since been removed from USAG-HI lands (USAG-HI 2010).

3.9.1.4.1 Nēnē

The nēnē, or Hawaiian goose, is listed as endangered by the federal government and the State of Hawaii. Their statewide distribution has been determined largely by the locations of release sites of captive-bred birds. Nēnē are adaptable and currently found at elevations ranging from sea level to approximately 8,000 feet in a variety of habitats including nonnative grasslands; sparsely vegetated, high-elevation lava flows; cinder deserts; native alpine grasslands and shrublands; open native and nonnative alpine shrubland-woodland community interfaces, mid-elevation (approximately 2,300 to 3,900 feet) native and nonnative shrubland; and early successional cinderfall (USFWS 2004). Nēnē are ground-nesters and nests consist of a shallow scrape, moderately lined with plant material and down, that is usually well-hidden in the shade of a shrub or other vegetation. Nest site habitats range from beach strand, shrubland, and grassland to lava rock. The nēnē has an extended breeding season with eggs reported from all months except May, June, and July, although the majority of birds in the wild nest between October and March

(USFWS 2004). Nesting peaks in December and most goslings hatch from December to January. The nēnē has been observed at Wheeler Army Airfield as recently as August 2014. Some geese (four individuals) have been sighted frequently enough that they might need to be considered resident Oahu geese (Kawelo 2014). While nēnē have been sighted in small numbers (four geese), it is possible that more could occur. Since the sighting locations at Wheeler Army Airfield are near the SGSP, they could occur in the project area.

3.9.1.4.2 Hawaiian Stilt

The Hawaiian stilt is listed as endangered by the federal government and the State of Hawaii. Critical habitat has not been designated for this species. Stilt numbers have varied between 1,100 and 1,783 individuals between 1997 and 2007, according to state biannual waterbird survey data. Oahu supports the largest number of stilts in the Hawaiian Islands (DLNR 1976-2003). Large concentrations of stilts are found along the southern coast at the Honouliuli and Waiawa units of the Pearl Harbor National Wildlife Refuge, Chevron Kapolei Refinery, and the fishponds Salt Lake District Park (USFWS 2005). The Hawaiian stilt uses a variety of aquatic habitats but is limited by water depth and vegetation cover (USFWS 2012a). Specific water depths of 5 inches (13 centimeters) are required for optimal foraging. Nest sites are frequently separated from feeding sites and stilts move between these areas daily during the breeding season. Nesting sites are usually adjacent to or on low islands within bodies of fresh, brackish, or salt water (USFWS 2012a). Feeding habitats are shallow bodies of water that provide a wide variety of invertebrates and other aquatic organisms such as worms, crabs, and fish (USFWS 2012a). The Hawaiian stilt loafs in open mudflats, sparsely vegetated pickleweed mats, and open pasture lands (USFWS 2012a). Although it is unlikely that the Hawaiian stilt would be found on the project site, it could be attracted to the proposed stormwater detention basin at the SGSP site following significant rain events.

3.9.1.4.3 Hawaiian Coot

The Hawaiian coot is primarily found on Oahu's coastal wetlands, but can be expected on virtually any body of water including estuaries, marshes, and golf course wetlands (USFWS 2005). Breeding sites are characterized by robust emergent plants interspersed with open, fresh, or brackish water that is usually less than 3.3 feet (1 meter) deep. The Hawaiian coot may nest in any month of the year (USFWS 2005). Although it is unlikely that the Hawaiian coot would be found on the project site, it could be attracted to the proposed stormwater detention basin at the SGSP site following significant rain events.

3.9.1.4.4 Hawaiian Common Moorhen

The Hawaiian common moorhen occurs in freshwater marshes, taro patches, irrigation ditches, reservoirs, and wet pastures. It favors dense emergent vegetation near open water, floating or barely emergent mats of vegetation, water depths of less than 3.3 feet (1 meter), and fresh water as opposed to saline or brackish water (USFWS 2012b). The Oahu population is widespread but is most prevalent on the northern and eastern coasts between Haleiwa and Waimanalo (USFWS 2005). Small numbers exist in Pearl Harbor, where foraging occurs in semibrackish water (USFWS 2005). Although it is unlikely that the Hawaiian common moorhen would be found on the project site, it could be attracted to the proposed stormwater detention basin at the SGSP site following significant rain events.

3.9.1.4.5 Hawaiian Duck

About 300 Hawaiian ducks are thought to remain on Oahu (USFWS 2005). The species inhabits wetlands, including coastal ponds, lakes, swamps, flooded grasslands, mountain streams, manmade waterbodies, and occasionally boggy forests (Todd 1996). The Hawaiian duck does not typically co-occur with the mallard (*Anas platyrhynchos*) and some hybrids may exist (Hawaii Audubon Society 2014). Although it is unlikely that the Hawaiian duck would be found on the project site, it could be attracted to the proposed detention basin at the SGSP site following significant rain events.

3.9.1.4.6 Hawaiian Hoary Bat

The endangered Hawaiian hoary bat is a medium-sized, nocturnal, insectivorous bat most often observed in open areas and river mouths near wet forests on the Islands of Kauai and Hawaii (USFWS 1998). The bat is believed to roost in trees adjacent to these habitats, foraging for insects from dusk until midnight or later (USFWS 1998). Although it is thought to be most common on Kauai and Hawaii, it has also been documented on Maui, Oahu, and Molokai. Sightings on Oahu have been relatively rare; however, recent data indicate it is more prevalent on Oahu than previously thought and is present at Schofield Barracks (Mansker 2014). It roosts in native and nonnative trees but has no strong preference for any single species (USFWS 2011). They are thought to prefer trees at the edges of clearings though they have been found in a variety of tree locations including in heavy forest, open wooded glades, and urban areas (Anderson 2002). Data collected from populations on Hawaii Island over a recent 4-year period indicate that the bat is widespread at all elevations sampled from 10 to 2000 meters. The bat has also been observed in coastal areas, above wetlands and streams, and in rainforest and dry habitats. The bats may occupy different habitat types seasonally. Lowland sites are generally most important during the pupping season (summer) and upland sites are used frequently during winter and spring (Anderson 2002). Hawaiian hoary bats typically forage at night (Leonard 2013). They are thought to depart the roost shortly before sunset to forage and return before midnight (Anderson 2002). Recent data indicate that Hawaiian hoary bats forage in multiple discontinuous areas across a wide range of habitat and elevations. The bat often ranges over very fragmented habitats in Hawaii and likely adapted to using widely dispersed multiple core-use areas within a home range since the arrival of humans and agro-ecosystems (USFWS 2011). Threats to this species and observed mortality sources include loss of trees that provide roost sites, entanglement in barbed wire fences, and use of pesticides (Leonard 2013). Entanglement in barbed wire fences is the greatest documented cause of mortality (Leonard 2013). No critical habitat has been designated for this species. Based on the habitat requirements of the Hawaiian hoary bat and its presence at Schofield Barracks, it is possible that the bat may occur at the project site.

3.9.1.4.7 Migratory Birds

MBTA-protected bird species are a type of sensitive wildlife. At least 80 migratory bird species that are protected by the MBTA and EO 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds, 10 January 2001) have been documented on Oahu (USAG-HI 2008).

In 2006, DoD and USFWS entered into a Memorandum of Understanding (MOU) to promote the conservation of migratory birds in accordance with EO 13186. The MOU describes how USFWS and DoD will work together to advance migratory bird conservation, avoid or minimize take, and ensure DoD operations are consistent with the MBTA. In 2007, USFWS finalized a rule (Migratory Bird Permits, Take of Migratory Birds by the Armed Forces, 72 FR 8931) allowing the Armed Forces to “take” migratory birds in the course of military readiness activities, as directed by the 2003 National Defense Authorization Act (2 December 2002). In 2008, a second

Interim Memorandum addressed unintentional take of migratory birds for actions other than military readiness. There is no authorization or permitting process in place for the unintentional take of a migratory bird during non-military readiness activities. These activities include routine installation operations, maintenance, and construction.

The generating station site provides suitable habitat for one bird protected under the MBTA, the Pacific golden plover (*Pluvialis fulva*). This highly territorial bird is common in urban areas and has been documented on Schofield Barracks (USAG-HI 2010). It is common on Oahu from approximately August through May. In Hawaii, the plover forages in grassy areas and feeds on invertebrates. In spring, they migrate 2,200 miles from Hawaii to the Arctic to their summer nesting grounds in tundra habitat. They winter in Hawaii but do not nest in Hawaii (USFWS 2013b). The interconnection easement may also provide suitable habitat for this or other MBTA-protected bird species.

3.9.1.5 Wildfire

Wildfire can be a threat to biological resources because it can result in direct mortality of sensitive and nonsensitive species and adversely modify habitat. Wildfires on military installations are most commonly inadvertently started by training activities, although they can be caused by other human actions such as improper management of flammable materials or natural processes such as lightning. The 25th Infantry Division and Army, Hawaii have developed an integrated wildland fire management plan (IWFMP) for training areas on Oahu [25th ID (L) & USARHAW 2003]. The IWFMP documents the wildfire potential on the installations and guides actions to reduce the frequency of wildfires and minimize the damage they cause. The generating station site and much of the South Range have been designated as having a moderate risk of wildfire. The IWFMP does not address the interconnection easement area because it would not be in a training area.

3.9.2 Environmental Consequences

Direct and indirect impacts on biological resources were analyzed for general vegetation, wildlife, and habitat, along with threatened or endangered and other sensitive species and any biologically sensitive areas or designated critical habitat. Specific potential impacts on biological resources were assessed by comparing the location and quality of biological resources to the location, types, and intensity of the proposed actions. A resource's relative quality takes into account its legal status, relative abundance, sensitivity to the proposed action, and other factors such as its commercial, recreational, ecological, and scientific importance.

Impacts on general vegetation and habitat (nonsensitive species) would be significant if the project would result in substantial loss of any vegetation community, habitat type, or species, including vegetation communities that are restricted at a regional scale, serve as concentrated breeding or foraging areas and are limited in availability, or support substantial concentrations of one or more special status species. Impacts on general wildlife (nonsensitive species) would be significant if the project would result in the loss of a substantial number of individuals of any species that could affect abundance or diversity of that species beyond normal variability. Impacts would be significant if the project would introduce or substantially increase the prevalence of invasive species or the risk of wildfire. Impacts on threatened and endangered and sensitive species would be significant if the project would result in the unlawful take of a listed species, substantially reduce the population of a species, or result in the adverse modification of designated critical habitat or other sensitive habitat. Impacts on birds protected under the MBTA would be significant if the project would result in unlawful loss of these species or their nests.

Table 3.9-1 summarizes impacts for the proposed action and No Action Alternative. A detailed analysis of these alternatives follows the table.

3.9.2.1 Proposed Action

Short- and long-term minor adverse and beneficial effects would be expected from implementing the Proposed Action. Adverse effects on general vegetation, wildlife, and habitat and migratory birds would be minor. Construction could have beneficial effects because vegetation removal could remove invasive species or places they could establish. Specific design elements activities as described in sections 2.2.2.5, Construction, and 2.2.3, Operation, have been committed to by Hawaiian Electric as part of the Proposed Action to ensure that the potential for adverse effects to the six endangered species that could enter the project area (i.e., the Hawaiian hoary bat, nēnē, Hawaiian stilt, Hawaiian coot, Hawaiian common moorhen, and Hawaiian duck) would be minor. Effects on threatened and endangered species would be less than significant.

Table 3.9-1.
Summary of Impacts to Biological Resources

Type of Impact	Proposed Action	No Action Alternative
Substantial loss of nonsensitive vegetation community, habitat type, or species	Minor	None
Introduce or substantially increase the prevalence of invasive species	None, Beneficial	None
Unlawful take of sensitive species resulting in population-level effect	None	None
Adverse modification of designated critical habitat or other sensitive habitat	None	None
Unlawful take of migratory birds or their nests	Minor	None
Increase risk of wildfire	Minor	None
Overall Impacts	**Minor adverse and beneficial**	**None**

3.9.2.1.1 Construction

3.9.2.1.1.1 General Vegetation, Wildlife, and Habitat

During construction, all vegetation would be removed from the generating station parcel, the temporary construction access road footprint, and the footprints of the new transmission line poles. At the generating station site, vegetation removal would be done on the entire 8.13-acre project site. Along the temporary construction access road, vegetation would be removed several feet on either side of the road so the road does not become overgrown. Vegetation would also be removed and disturbed around the footprints of the new transmission line poles in areas where construction vehicles and equipment must operate to construct the poles. This would include removal of trees. Wildlife that use these areas, primarily common introduced bird species, invertebrates, and small mammals that are adapted to disturbed human-influenced landscapes, would be displaced when the vegetation was removed.

Vegetation removal would have a minor effect on general vegetation, wildlife, and habitat because the species in the affected areas are limited in diversity, dominated by nonnative species, and are comprised of common species habituated to human disturbance. Vegetation in the affected areas does not provide high-quality habitat for plants or animals, or high-quality forage,

nesting, or cover habitat for wildlife. Most wildlife would respond to vegetation removal by relocating a short distance from the affected areas, where similar or higher quality habitat exists. The construction access road would be restored to its pre-project condition when construction is complete, so impacts on vegetation, wildlife, and habitat would be temporary.

Construction activities would result in additional short-term truck traffic and noise that could disturb common wildlife. Noise levels would not be high enough to cause temporary or permanent hearing damage and wildlife would respond to these activities by relocating a short distance from the affected areas. Since these effects would be temporary and there is adjacent available habitat, impacts on wildlife would be minor.

3.9.2.1.1.2 Invasive Species

Construction would involve the removal of vegetation from the generating station site and along the interconnection easement. Vegetation removal would result in minor beneficial effects by removing any invasive species that were present. Vegetation along the construction access road would be maintained so that it did not interfere with site access during construction and restored to its pre-project condition when construction was complete, so invasive species would not have an opportunity to establish themselves in this area. Construction equipment and materials would be sourced locally or, if imported, would be subject to USDA regulations and inspections to minimize the risk of introducing invasive species. USAG-HI and Hawaiian Electric would implement protocols for cleaning construction equipment and using fill-like material (e.g., gravel) to prevent introducing new invasive species to the project site and minimizing the spread of invasive species.

3.9.2.1.1.3 Threatened and Endangered Species, Sensitive Species, and Sensitive Habitat

The Army and Hawaiian Electric met with UFSWS in November 2014 to discuss appropriate project design measures to minimize the potential for adverse effects on threatened and endangered species. The Army informally consulted with USFWS under section 7 of the ESA, providing USFWS with a letter documenting the conclusions presented in this EIS that effects on threatened and endangered species would be less than significant as a result of specific project design elements and activities (see sections 2.2.2.5, Construction, and 2.2.3, Operation). Hawaiian Electric has corresponded with USFWS and the NOAA Fisheries Pacific Islands Regional Office regarding potential effects on critical habitat and essential fish habitat. Copies of relevant coordination with USFWS are provided in Appendix F.

Hawaiian hoary bats roost and breed in trees over 15 feet tall and individuals, their roosts or pupping sites, and young could be taken when trees of this size are trimmed or removed during construction. To avoid impacts to the Hawaiian hoary bat, removal or trimming of woody vegetation and trees taller than 15 feet will be done between 16 September and 31 May, the period of time outside the bat pupping season. If tree trimming or removal were to become necessary between 1 June and 15 September, the Army would ensure that Hawaiian Electric has submitted protocols to the USFWS and the USFWS has approved such protocols to survey for potential roosting bats using thermal imaging equipment, prior to any tree removal or tree trimming between 1 June and 15 September.

As stated in section 2.2.1, Hawaiian Electric's security fence design does not include the use of barbed-wire, as it is an unnecessary project cost given then facility's location within a secured military installation. Therefore, mortality or injury to the hoary bat through entanglement or entrapment would not result from implementation of the Proposed Action. The potential effects

on Hawaiian hoary bats from implementing the Proposed Action would be minor adverse (less than significant).

It is unlikely that the nēnē, Hawaiian stilt, Hawaiian coot, Hawaiian moorhen, or Hawaiian duck would be impacted from project construction. There is limited suitable habitat for these species in the project area, they are mobile (capable of flying in and out of the project area), and there is other habitat available adjacent to the project area. Therefore, these species are unlikely to be impacted by construction to any degree outside of their normal variability for mortality.

Construction activities are not expected to disturb nesting, foraging, or resting birds protected by the MBTA. The generating station site provides suitable habitat for the Pacific golden plover, which is known to occur on Schofield Barracks. The less disturbed portions of the interconnection easement (Waikele Stream gulch and Wahiawa Freshwater State Park) may provide suitable habitat for the plover or other MBTA-protected birds. However, the project site does not provide high-quality habitat and is already subject to high levels of human activity. Because construction would not adversely modify critical or high-quality habitat for MBTA-protected birds, and no nesting is known to occur either on or near the project site, and because there is ample habitat for the Pacific golden plover in other areas of Schofield Barracks and throughout the island of Oahu, potential impacts on the Pacific golden plover and other MBTA-protected birds would be less than significant.

Operation of the project would produce air emissions that, if they exceeded federal or state ambient air quality standards, could affect listed species and critical habitat units Oahu-Lowland Mesic-Unit 1 and 2 (USFWS 2014a). A detailed air dispersion modeling effort was done for PM10, PM2.5, and NO2 to demonstrate that concentrations of these plant emissions would not exceed the NAAQS or SAAQS. The analysis included all nearby existing sources of air emissions and ambient background concentrations. The results showed that the SGSP would not cause or contribute to a violation of the NAAQS or SAAQS (Hawaiian Electric 2015). Therefore, it is not expected that local changes in the concentrations of these pollutants would have adverse effects on species or critical habitat in the area. Additional information on the effects to local and regional air quality are in section 3.4, Air Quality.

3.9.2.1.1.4 Wildfire

One of the first construction activities would be to clear the site of flammable grasses and other plants, thereby reducing the chances of a wildfire. Some hazardous materials and petroleum products that would be used during construction are flammable, so there would be some risk that these materials could start a fire. If the fire was not contained on-site and spread to adjacent areas, it could adversely affect general vegetation, habitats, and wildlife species and sensitive species in those areas by causing direct mortality and adversely modifying their habitat. Fire extinguishing systems would be maintained on the construction site. While not in use, flammable materials would be stored in cabinets specifically designed for flammable materials. Flammable materials would be used with care as described in the *Hazardous Materials Management Plan* (HMMP) (see section 3.11). If there were a fire, construction personnel would be able to call upon the Honolulu or Federal Fire Department for assistance. These systems would be sufficient to contain and control a fire should it occur, so the risk of adverse effects from a wildfire would be minor.

3.9.2.1.2 Operation

3.9.2.1.2.1 General Vegetation, Wildlife, and Habitat

During operation, the majority of the generating station site would be paved or covered with gravel, so the project would provide minimal habitat for invasive species of flora or fauna. Any plantings would comply with USAG-HI Policy 63, Landscaping with Native Plants, and the IDG (Fromm 2014; USAG-HI 2004), and maintained by Hawaiian Electric. The landscaping would be maintained manually (e.g., mowing, trimming, and weeding) and the use of pesticides or herbicides is not anticipated. Along the interconnection easement, vegetation in areas disturbed by construction would be expected to recover or be restored by Hawaiian Electric to resemble the surrounding vegetation. Vegetation would be managed in accordance with the INRMP on Army land. Vegetation would be managed in a manner similar to current conditions on state land. On the state land portion of the project, vegetation is generally unmaintained in the Waikele Stream gulch and near the banks of the Wahiawa Reservoir; vegetation on the rest of the state-owned land is primarily manicured short-cut grass with occasional shrubs and trees. Vegetation in each portion of the project site would recover or be restored to be similar to pre-project vegetation and would not provide high-quality forage or habitat for wildlife species, so effects would be minor.

Implementing the project would introduce new structures to the environment, including transmission lines and poles, exhaust stacks, an engine hall, and fuel and water storage tanks. The only reflective surfaces that could result in bird strikes are a few small windows in the engine hall building. Birds may temporarily alight on the transmission line and poles but would not likely be harmed. Wildlife would not be likely to forage or nest on the transmission or generating station equipment because the equipment does not provide suitable places for these activities. Nearby areas provide less disturbed habitat that wildlife would likely preferentially inhabit. Because project equipment would not be attractive to wildlife for foraging and nesting and would be unlikely to harm wildlife, particularly birds, by strike or electrocution, the equipment itself could have a negligible adverse impact on wildlife.

Implementing the project would also introduce new sources of outdoor lighting. Equipment at the generating station parcel would be equipped with nighttime lighting and perimeter lights would be installed, although the transmission lines and poles would not be lighted. Outdoor nighttime lighting is known to disorient birds and result in birds colliding with structures (Fatal Light Awareness Program 2014b). All outdoor lighting at the SGSP facility would be fully shielded with full cut-off luminary lights to minimize effects on migratory birds. With implementation of these measures, the adverse effects of outdoor lighting on birds would be minor.

The project would also introduce a stormwater detention basin to the site. To avoid impacts to the Hawaiian goose, stilt, moorhen, coot, and duck (hereinafter collectively referred to as "Hawaiian water birds"), the Army would ensure that the power plant facility includes the installation of netting, floating bird deterrent balls, or an equivalent system to prevent Hawaiian water birds from landing or nesting at the power plant facility stormwater detention basin.

Operation of the generating station would introduce a new noise source. Noise levels outside the boundary fence would be 70 dBA or less, with noise levels decreasing as distance from the facility increases (see section 3.5 for more information about noise). Species highly sensitive to noise disturbance could respond to these noise levels by moving away to adjacent habitat. These noise levels are typical of urban areas and well below the threshold for temporary or permanent hearing damage, so adverse effects would be minor.

3.9.2.1.2.2 Invasive Species

During operation and maintenance, only minor amounts of landscaping would be present at the generating station site. This vegetation would conform to landscaping provisions of the USAG-HI Policy 63 and the IDG (Fromm 2014; USAG-HI 2004), and would be periodically maintained. Vegetation along the interconnection easement would be sparse (typically low grasses) and maintained so that it did not interfere with the transmission line. The minimal and sparse vegetation would not be expected to provide habitat for invasive wildlife species. Vegetation maintenance would minimize the opportunity for invasive species to establish themselves in the area. Vegetation maintenance would follow an integrated pest management approach, which could include the application of pesticides as a last resort if necessary to remove invasive species. Because operation and maintenance would provide minimal opportunity for invasive species to establish and would, if necessary, include controls to remove these species, the project would have no effect on invasive species.

3.9.2.1.2.3 Threatened and Endangered Species, Sensitive Species, and Sensitive Habitat

Operation effects on the Hawaiian hoary bat are not expected. Tree trimming would occur intermittently throughout project operations; however, effects would be minimized by avoiding trimming or removing woody plants or trees more than 15 feet tall during the pupping season of 1 June to 15 September, or if the pupping season could not be avoided, conducting a survey for roosting bats prior to any vegetation disturbance as described in section 3.9.2.1.2. Security fencing would not include barbed wire and, therefore, would pose little to no threat to bats from entanglement. Effects on Hawaiian hoary bats would be minor adverse.

Operation effects on Hawaiian water birds are not expected. Hawaiian Electric would include netting or bird balls in the design of the stormwater detention basin to deter nesting by endangered bird species and waterfowl.

Operation effects on the Pacific golden plover and potentially other MBTA-protected birds would be minor. Project structures (such as the engine hall, exhaust stacks, fuel tanks, and transmission line and poles) would not be attractive to migratory birds for foraging and nesting and would not likely harm migratory birds by strike or electrocution. All outdoor lighting at the SGSP facility would be fully shielded with full cut-off luminary lights to minimize effects on migratory birds. Noise levels outside the plant boundary fence would be 70 dBA or less, which is typical of urban areas and well below the threshold for temporary or permanent hearing damage, so there would be no impact on wildlife. Migratory birds would be deterred from being attracted to the stormwater detention basin by bird balls or netting. For these reasons, operation and maintenance impacts on the Pacific golden plover and potentially other MBTA-protected birds from new structures, outdoor lighting, and noise would be minor.

No other threatened or endangered species or other sensitive species are likely to occur in the project footprint and no portion of the project footprint is designated as sensitive habitat or adjacent to sensitive habitat, so operation would not impact these resources.

3.9.2.1.2.4 Wildfire

The petroleum products, LNG, and other flammable materials would be at the site, so there would be some risk that these materials could start a fire. If the fire was not contained on-site and spread to adjacent areas, it could adversely affect general vegetation, habitats, and wildlife species and sensitive species in those areas by causing direct mortality and adversely modifying their habitat. As described in section 2.2, the project would comply with the Honolulu Fire Code (Chapter 20,

HRS). The generating station would be equipped with an automatic fire detection and suppression system and fire extinguishers. An on-site fire-water tank would store enough water to fight a fire for 8 hours. In the event of a fire, the plant personnel would be able to call upon the Honolulu or Federal Fire Department for assistance. These systems would be sufficient to contain and control a fire should it occur, so the risk of starting a wildfire would be minor.

3.9.2.1.3 Mitigation Measures and BMPs

The adverse effects of implementing the Proposed Action would be minor, so no mitigation measures for biological resources would be required.

One BMP would be implemented during construction to minimize the potential for invasive species to spread via construction equipment and use of fill-like materials:

- USAG-HI and Hawaiian Electric would implement protocols for cleaning construction equipment and using fill-like material (e.g., gravel) to prevent introduction of new invasive species to the project site and minimize the spread of invasive species.

Design measures that constitute BMPs would also be implemented to minimize the potential for adverse effects on threatened and endangered species. They are presented in section 2.2.2.5 for construction and section 2.2.3 for operation and summarized here:

- To avoid impacts to Hawaiian water birds, the Army would ensure that the power plant facility includes the installation of netting, floating bird deterrent balls, or an equivalent system to prevent Hawaiian Water birds from landing or nesting at the power plant facility stormwater detention basin.
- To avoid impacts to the Hawaiian hoary bat, removal or trimming of woody vegetation and trees taller than 15 feet would be done between 16 September and 31 May, the period of time outside the bat pupping season. If tree trimming or removal were to become necessary between 1 June and 15 September, the Army would ensure that Hawaiian Electric has submitted protocols to the USFWS and the USFWS has approved such protocols to survey for potential roosting bats using thermal imaging equipment, prior to any tree removal or tree trimming between 1 June and 15 September.
- All outdoor lighting at the SGSP facility would be fully shielded with full cut-off luminary lights to minimize effects on migratory birds.

The Army informally consulted with USFWS under section 7 of the ESA, providing USFWS a letter documenting their conclusion that, with implementation of these design measures, effects on threatened and endangered species would be less than significant.

3.9.2.2 No Action Alternative

No effects on biological resources would be expected under the No Action Alternative. No ground would be disturbed or vegetation removed, so no vegetation, wildlife, threatened or endangered or special status species, or sensitive habitats would be disturbed. The Army-owned portions of the project site would continue to be managed in accordance with applicable guidance documents including the INRMP (USAG-HI 2010), the 2003 biological opinions (USFWS 2003), and the *Oahu Implementation Plan* (USAG-HI 2008). The state-owned portions of the project site would continue to be managed as they are currently. Because there would be no changes that would alter the baseline of biological resources in the project area, there would be no impacts on biological resources.

3.10 ARCHAEOLOGICAL, HISTORIC ARCHITECTURE, AND TRADITIONAL CULTURAL RESOURCES

3.10.1 Affected Environment

This section examines the archaeological, historic architecture, and traditional cultural resources in the footprint of the proposed project. The section begins with a review of the historic context of the broader project area, defined as the lower elevations of Oahu's central plateau. This is followed by a description of the cultural resources directly in the footprint. This information is a summary of the detailed data in the *Archaeological Inventory Survey for the Schofield Generating Station Project*—provided as Appendix G—and the *Cultural Impact Assessment (CIA)*—provided as Appendix H (Sims et al. 2014; Liston 2014).

In the western segment of Oahu's central plateau, the proposed SGSP is in Honouliuli Ahupuaa in Ewa District (Figure 3.10-1). In the same district, a small segment of the transmission line extends across Waikele Ahupuaa with the majority of the line in the lower elevations of Waianae Uka Ahupuaa in Waianae District. Traditional history, along with archaeological evidence, indicates that Oahu's central plateau is politically and culturally important. The ancient lands of Līhue—south of Schofield Barracks on the eastern slopes of the Waianae Range—and portions of Wahiawa overlap in the lower reaches of the central plateau to encompass the entire project area.

3.10.1.1 Regulatory Setting

The NHPA establishes the national policy for the preservation of cultural and historic properties. Section 106 of the NHPA (36 CFR Part 800) requires federal agencies to take into account the potential effects of their undertakings on cultural and historic resources by identifying resources in the area of potential effect, evaluating the significance of the resources, and developing ways to avoid or mitigate adverse effects in consultation with local organizations and interested parties.

Evaluation of impacts to cultural and historic resources for SGSP is also required by the Army's implementing regulations (32 CFR Part 651, Environmental Analysis of Army Actions) of the National Environmental Policy Act [42 USC sections 4321–4370 (f)] and NEPA regulations (40 CFR Parts 1500–1508).

The archaeological inventory survey (AIS) for the SGSP was designed in consultation with the Hawaii SHPD and is intended to support both section 106 and NEPA requirements, in accordance with the CEQ and Advisory Council on Historic Preservation's *NEPA and NHPA: A Handbook for Integrating NEPA and Section 106* (CEQ and ACHP 2013). Section 106 of the NHPA consultation is conducted by the federal agency with the SHPD and other interested parties. Chapter 6E, HRS, Historic Preservation, is also implemented by SHPD, and requires evaluation of any project that is funded or permitted by the state. USAG-HI is conducting section 106 requirements in conjunction with the current EIS. Correspondence regarding coordination of this project with the SHPD under section 106 is provided in Appendix G, along with the AIS.

Consideration of archaeological and cultural resources is also mandated by the HEPA, as codified in Chapter 343, HRS, Environmental Impact Statements. Under both NEPA and HEPA regulations, an EIS must consider the effects of the proposed action on the human environment, which 40 CFR Part 1508.14 defines as "the natural and physical environment and the relationship of people with that environment." The human environment includes important scientific, archaeological, and other tangible and intangible cultural resources, including historic properties listed or eligible for the National Register of Historic Places (NRHP) and sacred sites (Executive Order 13007).

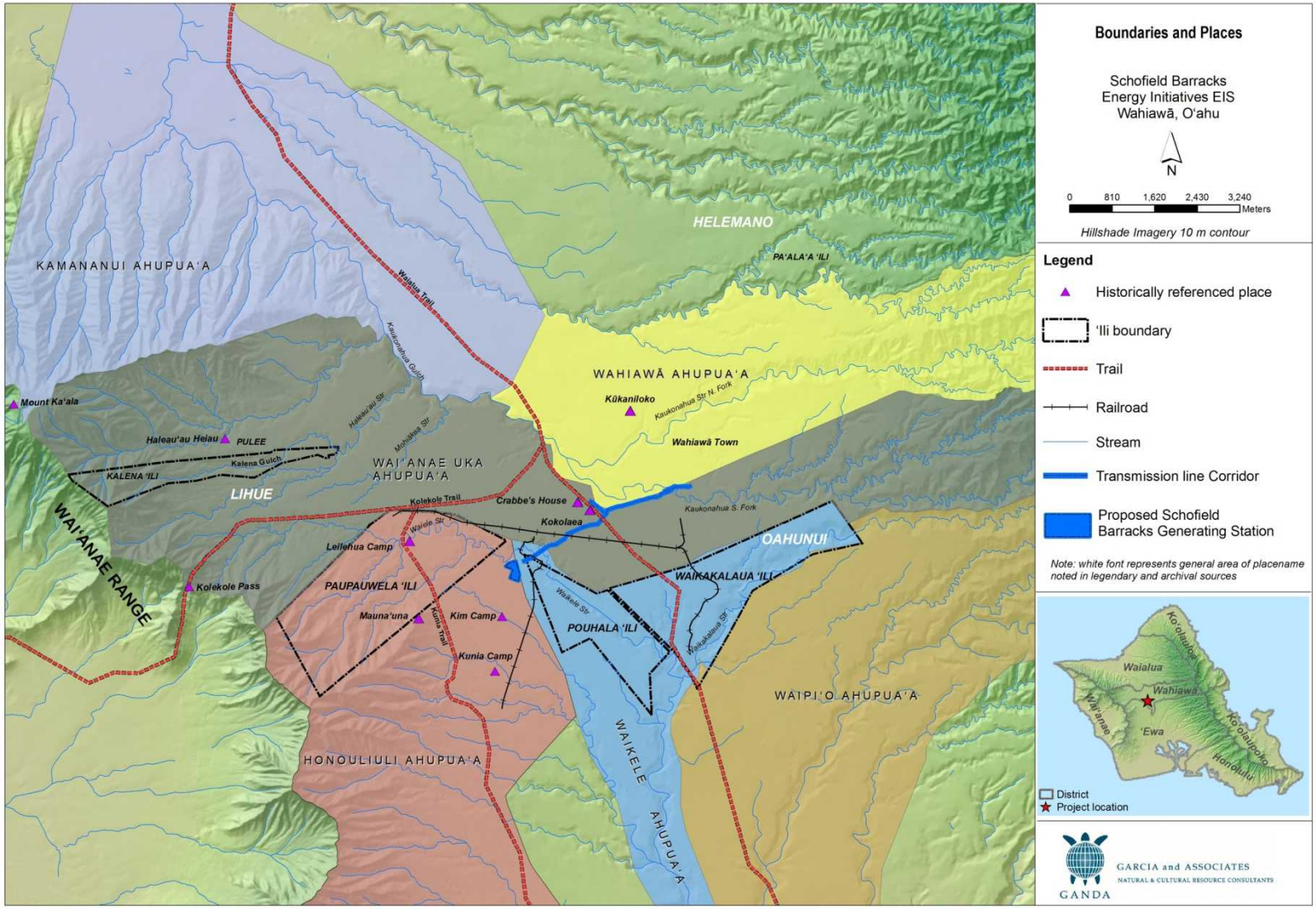


Figure 3.10-1. Traditional and Historic Boundaries and Place Names near the SGSP

Chapter 343, HRS, also requires consideration of a proposed action's effects on the cultural practices of the community and the state. The CIA (Appendix H) was done in accordance with the State of Hawaii Office of Environmental Quality Control's *Guidelines for Assessing Cultural Impacts* (1997).

3.10.1.2 Historic Context

3.10.1.2.1 Traditional History

Honouliuli Ahupuaa is Oahu's largest *ahupuaa*, encompassing most of the western half of the Ewa District (Figure 3.10-1). Honouliuli is known as the first place where human beings landed on Oahu (Beckwith 1970) and a place where *ulu* (breadfruit; *Artocarpus altilis*) was first introduced to Hawaii (Burgett and Rosendahl 1992).

Traditionally, Honouliuli Ahupuaa contained a large permanent settlement around what is now the West Loch with scattered fishing encampments and small permanent settlements and associated agricultural plots elsewhere on the coast (Tuggle 1995). Initial settlement on the eastern slopes of the Waianae Mountains and the central plains was likely mainly temporary and might have been related to the collection of forest and inland resources.

Permanent Hawaiian settlement of Waianae Uka might have started as early as AD 1250, as populations expanded into central Oahu (Roberts et al. 2004). By about the 13th century, irrigated pondfields were developed along Waieli Stream and in other major stream valleys (Robins and Spear 1997b). Although a variety of ceremonial, habitation, burial, and agricultural sites have been identified in the uplands west of the project area, the distribution of sites suggest that intensive agriculture in the stream valleys was the focus of Hawaiian activity. Despite the lack of direct archaeological evidence, traditional Hawaiian land use in the neighboring tablelands of Honouliuli, Waianae Uka, and Waikele is presumed to have followed the same pattern of cultivation and associated permanent habitation.

Handy et al. (1972) refer to a famous traditional place named Kukui-o-Lono, where the high chief Kukaniloko is said to have made the first *loi*. Kukui-o-Lono might correspond to one of the cultivated watersheds in western Waianae Uka (such as Kalena, Mohiakea, or Haleauau Streams) because the location is described as "above and west" of the present Wahiawa Town.

Traditional access to the settlement areas in central Oahu was provided by the three main travel routes recorded by mid-18th century Hawaiian scholar John Papa ʻĪʻī (1959) (Figure 3.10-1). One of the routes, Kolekole Trail, passed through western Waianae Uka across the Waianae Range at Kolekole Pass. The other two trails extended in northerly directions from the south coast of the island to Waialua (Waialua Trail) and Waianae Uka (Kunia Trail). On its way to Kukaniloko, Waialua Trail passed under the transmission line just west of the intersection of Kunia Road and Wilikina Drive.

Oahu's central plateau has long been an important Hawaiian religious center with the establishment of an *alii* birthplace at Kukaniloko, Haleauau and Kalena Heiau in western Waianae Uka, and the Maunauna site in Waikele Ahupuaa east of the project parcel (Figure 3.10-1). The *lo alii*, in conjunction with Kukaniloko, are central to the traditional Hawaiian lore of the Lihue-Wahiawa region of the central plateau and its mountainous periphery. The *lo alii* were a specific class of *alii* tied by birth and practice of strict *kapu* to the Lihue-Wahiawa-Helemano region of Oahu's central plateau.

The emergence of the *lo alii* in central Oahu probably has its origin in the sacred birthing site of Kukaniloko on the Waialua side of Kaukonahua Gulch. Kukaniloko was one of two sacred places

in the Hawaiian Islands where *kapu* chiefesses went to give birth (Handy et al. 1972; McAllister 1933). According to Kamakau (1991), "Chiefs born at Kukaniloko were the *akua* [gods, spirits] of the land and were *alii kapu* as well." The sacred drums of Opuku and Hawea, which announced the birth of an *alii*, were stored in the nearby Hoolonopahu Heiau.

During the long period of islandwide rule by Lihue chiefs, and continuing into the succeeding years, birth at Kukaniloko remained a powerful status symbol. Kukaniloko also served as a *puuhonua*, or place of refuge. According to 'Ī'ī (1959), ". . . Kukaniloko in Wahiawa, Oahu; and Holoholoku in Wailua, Kauai, were places to which one who had killed could run swiftly and be saved." Another story of the central plateau's traditional importance is set in Helemano, at Oahunui (east of the project area), said to have been a residence of high chiefs.

The region surrounding the project area contains a number of traditional Hawaiian battlefields. Paupauwela, Kalena, Pulee, and Malamanui were noted places of battle between the island chief Kualii and rival island chiefs from the Ewa and Waialua districts (Fornander 1996). The chiefly residents of Lihue were recognized for their skills in spear throwing and were known as excellent teachers of the skill (Kamakau 1991). According to the Legend of Kualii (Beckwith 1970), it was after the battles in Malamanui, Pulee, and Paupauwela that Kualii "subdues the whole island" and reestablishes paramount rule between around AD 1720 and 1740 (Cordy 2002).

3.10.1.2.2 Post-Contact History

By western contact, Oahu's central plateau was dotted with villages, although much of the plateau was still undeveloped and devoid of forestland. Not long after western contact (ca. 1815-1826), *iliahi*, or sandalwood, was extensively harvested from the Hawaiian Islands, resulting in the decimation of much of the native forests, particularly in the lower, more accessible elevations. Central Oahu was undoubtedly affected by the over-harvesting of sandalwood because Wahiawa was famous for its large sandalwood trees (Kamakau 1992).

In the mid-1800s Mahele, all of Waianae Uka Ahupuaa, with the exclusion of Kalena Ili, was designated as Crown Land. Honouliuli Ahupuaa was awarded to Kekauohoni, grandchild of Kamehameha I. Upon her death in 1851, her husband, Levi Haalelea, inherited the majority of the land, and later (1864) passed it on to his wife at the time, Amoe Haalelea. Haalelea sold it to her brother-in-law, John Harvey Coney.

3.10.1.2.2.1 Ranching

In 1851, Kalena Ili in Waianae Uka was conveyed to John Meek for cattle ranching by Reverend Bishop (Bureau of Conveyances, Book 17). By 1875, his heirs leased the entire ahupuaa of Waianae Uka. A ranch house once likely occupied by Meek's daughter, Elizabeth Meek Crabbe, and husband, Horation Crabbe, is shown on a late 19th century map as "Crabbe" (Hawaiian Government Survey 1881) (Figure 3.10-1). In 1877, James Campbell purchased the portion of Honouliuli retained by John Harvey Coney (about 43,640 acres) and established a cattle ranch under the namesake of Honouliuli Ranch. By 1881, Honouliuli Ranch was a successful ranch with 10,000 acres devoted to agriculture. Some of the cultivated land may have encompassed the project area.

In 1882, King Kalakaua and C.H. Judd purchased two-thirds of Waianae Uka, under whom the lands were named Leilehua Ranch (Tomonari-Tuggle and Bouthillier 1994) (Figure 3.10-1). In 1889, James Dowsett purchased the lease and Leilehua Ranch assets. Waianae Uka remained under Dowsett Ranch until the U.S. military took over in the early 1900s.

3.10.1.2.2.2 Commercial Agriculture and Railroads

In 1897, the Oahu Sugar Company was established on the Ewa Plains by the predecessor of Amfac, H. Hackfield & Co. (Wilcox 1996). In 1898, a group of homesteaders began settling the Wahiawa Colony Tract, which the Land Act of 1895 designated as a homestead land (Nedbalek 1984). James B. Dole began growing pineapple in the Wahiawa Tract in 1900 for his canning operation, the Hawaiian Pineapple Company. The Wahiawa Water Company built a network of flumes, ditches, and tunnels to provide water to the homesteads and cultivated fields (Nedbalek 1984). They constructed a dam across Kaukonahua Gulch in 1906 to form the reservoir now known as Lake Wilson (Haile 1976). Within a decade, thousands of acres of pineapple fields were being cultivated in central Oahu.

In 1906, the Oahu Rail and Land Company (OR&L) extended their railway from Waipahu to Wahiawa, through what would become Wheeler Army Airfield, so that pineapples could be transported from the fields to the new Dole cannery at Iwilei in Honolulu. These rail lines expanded over the decades to keep up with the commercial growth of the central plateau (Figure 3.10-1). Large corporations, including Dole and Hawaiian Islands Packing Company, established labor camps near the fields, including the Kim and Kunia Camps southeast of the current study area. Pineapple cultivation continued in and around the area under various companies (Roberts et al. 2004) until Del Monte Pineapple Company abruptly shut down operations in November 2006.

3.10.1.2.2.3 U.S. Military

Following annexation of the Hawaiian Islands by the United States, former Crown Lands, including Waianae Uka, became the property of the federal government. In 1899, Waianae Uka (excluding Kalena Ili) was set aside as a military reservation. The military reservation was not occupied until a 1909 executive order when it was mandated to be the base for Oahu's mobile defense troops because of its strategic central location.

Initially called either Leilehua Barracks or Castner Village, Schofield Barracks was first occupied by 473 Soldiers from the 5th Cavalry Regiment (Alvarez 1982). Although World War I halted construction, most barracks and offices quarters were finished in the early 1920s (Robins and Spear 1997a). Schofield Barracks was used as a major training camp during the Pacific campaign of World War II with the opening of the Ranger Combat Training School intended to train troops for jungle warfare (Alvarez 1982). The reservation continues to be important as a training center and post for the Army's 25th Infantry Division.

Wheeler Army Airfield was established as a military installation in 1922 on land included in the 1909 executive order. Initially used for mounted cavalry training, the airfield was constructed in the 1920s and upgraded during the 1930s with the addition of houses, hangars, and a fire station. In 1947, Wheeler Army Airfield was moved to U.S. Air Force control and then put in caretaker status from 1948 until 1951, when the Korean War began. Wheeler Army Airfield remained in U.S. Air Force control until 1993, when it was returned to the Army.

In 2005, the Army purchased 1,402 acres south of the Schofield Barracks cantonment and east of the South Range from the Campbell estate. The northernmost of the three parcels, composing the South Range, would become the Kunia Training Area (KUNTA). At the time of purchase, the lands, including broad ridges and stream floors, were still under pineapple cultivation as they had been for almost a century.

3.10.1.3 Archaeological Resources

Previous archaeological investigations have encountered no remaining surface or subsurface pre-Contact sites and very few 19th or early 20th century cultural properties in the lowland areas around and on the military installations, and none specifically in the generating station project area. Although not yet thoroughly investigated, even the lower gulches and drainages show no evidence of traditional Hawaiian modification for agricultural use or occupation. This may be due to broader gulch bottoms also being planted in pineapple, destroying any features that might have once been present. The few identified archaeological sites all appear to relate to military development, with a substantial number of historic structures in the cantonment and in Wheeler Army Airfield.

Previous archaeological findings near the project indicate that the area has a very low probability for archaeological resources. The 8.13-acre generating station site, in particular, is on former pineapple fields where long-term cultivation has likely destroyed most, if not all, cultural deposits. The upper plateaus used for pineapple were generally not preferred by pre-Contact Hawaiians of the Lihue area for habitation or subsistence. Most of the known traditional Hawaiian sites in the region are found in gulch bottoms or on high-elevation ridges. The transmission line corridor likewise has a very low probability for archaeological deposits. The corridor, while less studied archaeologically, is largely within a heavily used right-of-way that has been subject to a great deal of modern disturbance.

Archaeological testing in support of this EIS confirms the findings of the background research and previous archaeological investigations. Excavation of eight test trenches and 13 test pits produced no evidence of traditional Hawaiian or early historic cultural deposition. Stratigraphic data from the generating station test trenches clearly indicate the presence of an extensive pineapple cultivation, or “plowzone,” layer consisting of a weathered reddish-brown silty clay with charcoal flecking (presumably from field burns) and decomposing black plastic fragments representing the remnants of plastic sheeting used in commercial pineapple cultivation. The cultivation layer lies directly on intact basal soil that shows no signs of anthropogenic disturbance. Similarly, test pit excavation at the new pole locations produced only construction fill overlying undisturbed volcanic soil. In some cases the intact soil was quite shallow, between 10 and 14 centimeters below surface. It is reasonable to surmise that some degree of cutting, filling, and grading has occurred in this semi-urban corridor, and that we might, therefore, be observing truncated basal soils.

Importantly, test pits 1, 2, and 3, intentionally selected because of their location on the edge of Waieli Gulch, also contained no cultural deposits. Project activities along edges of Waieli Gulch were raised as a special concern by USAG-HI archaeologists and community members during coordination and consultation meetings. Since pre-Contact and early historic habitation and subsistence in the region tended to be focused on the rich gulch bottomlands, it was felt that these locales had a higher probability for archaeological resources relative to the rest of the project area. All new pole locations along the edges of Waieli Gulch were tested and produced negative results.

3.10.1.4 Historic Architecture

Two historic architectural districts, Schofield Barracks Historic District and Wheeler Historic District, are near the project area (Figure 3.10-2). Schofield Barracks Historic District is listed on the NRHP (NRHP Register No. 98000889) and Wheeler Historic District is NRHP-eligible, although not yet listed.

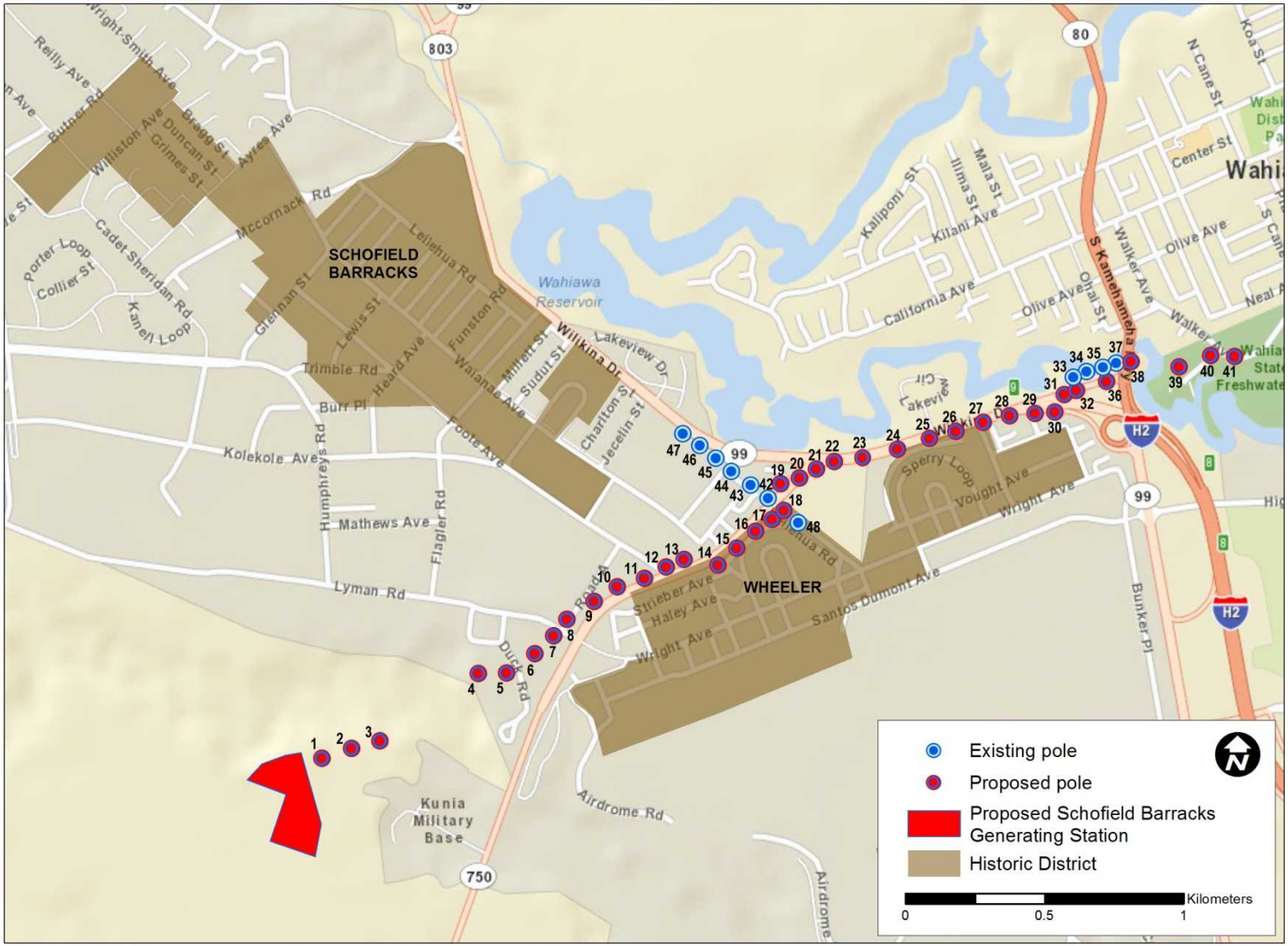


Figure 3.10-2. Historic Districts in Schofield Barracks and Wheeler Army Airfield

3.10.1.4.1 Schofield Barracks Historic District

Schofield Barracks Historic District is listed on the NRHP for its significance in the areas of military history and architecture. Schofield Barracks played an important role in training troops for Pacific military operations during World War II and the Korean and Vietnam conflicts. The installation also serves as an example of the physical development of a permanent military post and typifies early Army base planning. Base construction has evolved from the Second Renaissance Revival style and early-1920s housing of the Tropical Bungalow/Craftsman style to 1930s housing built in the Spanish Colonial Revival or Mission style. World War II-era construction consists mostly of temporary wood buildings built from standardized plans. Schofield Barracks Historic District includes 176 contributing buildings and 10 other contributing sites, structures, and objects. The district contains such structures as the quadrangle (Quad) barracks, Macomb and Funston Gates, the Sergeant E.R. Smith Theater, the post gymnasium, Soldiers' Chapel, and the former bowling alley. A number of additional buildings constructed more than 50 years ago have also been recommended as eligible for inclusion in the district.

Schofield Barracks Historic District is not in the project area, but the transmission line does run within 825 feet of it along Kunia Road (Figure 3.10-2).

3.10.1.4.2 Wheeler Historic District

Wheeler Army Airfield is a National Historic Landmark. The installation also has a NRHP-eligible district adjacent to the landmark district that incorporates the Garden City neighborhoods that were constructed in the early 1930s by the New Deal programs of the Franklin D. Roosevelt administration.

The historic district is the site for many first flights across the Pacific by Amelia Earhart, Sir Kingsford Smith, and Army Air Corps pilots Maitland and Hegenberger. Wheeler Army Airfield is also the site of the Dole Derby race across the Pacific in 1927.

The Wheeler Historic District is also nominated for its designed and constructed Garden City landscape within which many of the 1930s homes and administrative buildings are sited. The building stock at Wheeler Army Airfield is one-, two-, and three-story buildings, mostly of the Spanish Colonial-Mission style. The circulation patterns, the trees and other plants, and underground power lines were part of the original design to create a park-like environment for the Army community to live and work in. Many of the original trees are still there.

Wheeler Army Airfield was made a National Historic Landmark as one of the sites attacked by the Japanese on 7 December 1941. The base took heavy bombardment and machine gun strafing. Many of the buildings extant today still have the strafing and shrapnel scars from the attack.

Under the NHPA, NRHP-eligible properties must receive the same treatment, review, and protection as properties listed in the NRHP when any federal undertaking is initiated. Although the NRHP-eligible district is not in the project area, the Kunia Road transmission line runs directly adjacent to it for approximately 0.43 mile (Figure 3.10-2). Farther to the east, the Wilikina Drive transmission line closely parallels the district for approximately 0.25 mile.

3.10.1.5 Traditional Cultural Resources

Ethnographic consultation and ethnohistoric background research for a CIA (Appendix H) indicate that the lower elevations of Oahu's central plateau contained important traditional transportation routes, centers for martial training, and key battlefields. Most significantly, the

Lihue-Wahiawa region is associated with a specific class of high chiefs, the *lo alii*, tied by birth and practice of strict *kapu* to the uplands.

Desilets et al. (2011) describe the sociopolitical and cultural importance of Oahu's central plateau:

> Around AD 1300, district (*moku*) level organization appears to have arisen on Oʻahu. By about AD 1320 to 1340, the *moku* of ʻEwa, Kona, and Koʻolaupoko were ruled by the sons of Maweke (Cordy 2002). ʻEwa, including not only ʻEwa proper, but Waiʻanae and Waiʻalua as well, was ruled by the Maweke-Kumuhonua line. It is possible that Maweke's grandson, Kumuhonua, ruled the entirety of Oʻahu between AD 1340 and 1360 from his seat of power in Līhuʻe on the central plateau. Kumuhonua's ʻEwa lands would have included the sacred birthing place Kūkaniloko and it is likely that Līhuʻe was the primary ruling center for all of Oʻahu. Although most chiefly classes were not regionally based, Līhuʻe was exceptional and was home to chiefs with the specific designation of *lō aliʻi* during this time. This class of chiefs populated the Central Plateau between the Koʻolau and Waiʻanae ranges, including all of what is today referred to as Waiʻanae Uka Ahupuaʻa. The high status of the *lō aliʻi* chiefs was likely derived from birthing at Kūkaniloko, interbreeding, and strict *kapu* observance.

The only remnants of this significant traditional cultural complex are the Kukaniloko birthing stones, located well outside the project area, and a large number of archaeological sites in the upland reaches of Schofield Barracks, also distant from the project area.

The CIA data indicate that historic period growth and development has effectively terminated any traditional cultural practices that might have once occurred in or adjacent to the project area. There is no tangible or intangible evidence of any former or ongoing resource procurement through hunting or gathering, transportation routes, burials, or other ceremonial activities occurring in the project area. More than a century of commercial agriculture, military development, and urban growth appear to have eliminated most, if not all, evidence of traditional cultural activity in the footprint of the project area.

Although it lacks specific traditional cultural practices, *moʻolelo*, or cultural properties, the lower elevations of the central plateau are still considered traditionally significant by modern Hawaiians. This is due to its inclusion in the larger Lihue-Wahiawa geographic region and its highly important Kukaniloko cultural complex.

3.10.2 Environmental Consequences

Potential impacts on archaeological resources were assessed by conducting an AIS, while potential impacts on traditional cultural resources are evaluated by conducting a CIA. Although the footprint of the SGSP does not contain any historic architectural resources, the NRHP-listed Schofield Barracks Historic District and the eligible Wheeler Historic District are nearby. A photo simulation analysis was done to assess the impacts of the proposed action on the visual quality of the viewshed from within Schofield Barracks Historic District and the eligible Wheeler Historic District.

Significant archaeological and historic properties are districts, sites, structures, or objects listed in or eligible for listing in the NRHP, and cultural resources are places, practices, or beliefs important to native Hawaiians and other ethnic groups. The threshold for significant impacts to the archaeological, historic, and traditional cultural resources is any loss or destruction of the current or future integrity of the property or belief by impacting the property's ability to convey

its demonstrated historical significance through location, design, setting, materials, workmanship, feeling, and association.

Impacts on an area's unique tangible and intangible cultural resources can be direct or indirect. Negative impacts can result from physical alteration, damage, or destruction of the site or traditional place, alteration of the surrounding environment by introducing visual, audible, or atmospheric elements, instituting other elements out of character with the resource; or reduction of access to traditional places.

Table 3.10-1 summarizes impacts for the Proposed Action and No Action Alternative. A detailed analysis of these alternatives follows the table.

Table 3.10-1.
Summary of Impacts to Archaeological, Historic Architecture, and Traditional Cultural Resources

Type of Impact	Proposed Action	No Action Alternative
Impact archaeological sites	None	None
Disturb traditional cultural practices, beliefs, resources	None	None
Disturb historic architecture – physical	None	None
Disturb historic architecture – visual	Minor	None
Overall Impacts	**Minor**	**None**

3.10.2.1 Proposed Action

Construction, operation, and maintenance of the SGSP will not impact archaeological or traditional cultural resources. Although the historic structures in the nearby Schofield Barracks and Wheeler Historic Districts would not be directly impacted by construction, operation, or maintenance, Wheeler Army Airfield Historic District would receive minor indirect impacts from new poles and associated transmission lines being in the view of some of the buildings in the district. The Army initiated consultation with the SHPD and other consulting parties on the SGSP on 9 October 2014, under section 106 of the NHPA. The letter, found in Appendix G, discusses potential visual impacts to historic districts on Schofield Barracks and Wheeler Army Airfield, and it also submits a draft report in which it is determined that there are no impacts to archaeological or traditional cultural resources from the SGSP. In December 2014, representatives of USAG-HI, Hawaiian Electric, and Historic Hawaii Foundation met with the SHPD to further discuss the project details. During the meeting, the particpants agreed verbally that a No Adverse Effect determination under section 106 of the NHPA would be appropriate for the project based on the following project design commitments as identified in section 2.2.2.2:

- Planting vegetation to screen the view of the poles or to lessen the visual dominance of the tramsmission line, particularly in the vicinity of Sperry Loop (Wheeler Army Airfield Historic District)
- Painting power poles to minimize their visual obtrusiveness

A copy of the No Adverse Effect determination letter sent to SHPD is provided in Appendix G, following the initial consultation letter.

In a letter dated 27 April 2015, which is provided in Appendix G, the ~~The Army anticipates a positive response from~~ SHPD concurred that the project would have No Adverse Effect under section 106 of the NHPA provided that the Army submit to SHPD detailed plans and

specifications of the proposed tree location plan once it has been developed. The Army accepts this condition and will submit a tree location plan to SHPD once it has been developed.

3.10.2.1.1 Construction

Archival and field data collected during the AIS indicate that the SGSP would not likely disturb archaeological sites and would have no impact on archaeological resources. Previous archaeological investigations (summarized in the AIS report) encountered no surface or subsurface pre-Contact or 19th century cultural properties in the lowland areas in the Schofield Barracks cantonment, Wheeler Army Airfield, the lower elevations of the South and East ranges, and KUNTA. The recent archaeological test excavations confirmed that the project area has a very low probability for containing archaeological deposits. Extensive land modifications associated with a century of commercial cultivation, ranching, U.S. military activity, and urbanization have destroyed most of the tangible evidence of the traditional Hawaiian and early historic past in this area. The SGSP would have no effect on archaeological resources. If, during construction, any previously unidentified archaeological or historic site is identified, construction activities would be halted in the vicinity and SHPD would be immediately notified.

As there are no historic structures in the footprint of the SGSP, construction would not impact the nearby Schofield Barracks or Wheeler historic districts.

Traditional Hawaiian land use in the project area terminated more than a century ago with any potential tangible remains long lost to commercial agricultural endeavors, military activities, and urban development. Along with this loss of cultural properties in the project area, the *mo'olelo* once held by traditional community members appears to have been forgotten. The project area is highly urbanized or was under intensive pineapple cultivation and is no longer used for any traditional cultural practices. Based on the findings of the CIA, the SGSP would have no impact on cultural resources, cultural practices, and traditional beliefs. However, should iwi küpuna or Native Hawaiian cultural deposits be identified during any ground-altering activities, all work would immediately cease and the required agencies would be contacted pursuant to applicable law. In addition, the State of Hawaii Office of Hawaiian Affairs would be notified.

3.10.2.1.2 Operation

The operation and maintenance of the Schofield Generating Station would not impact archaeological or traditional cultural resources, cultural practices, or traditional beliefs. The presence of new power poles and transmission lines would be a visual change to the viewshed from certain vantage points within the Wheeler Army Airfield Historic District. The new power poles would not be visible from the Schofield Barracks Historic District. Details of the impact analysis are provided below.

Landscaping and open spaces are an essential element of both Schofield Barracks and Wheeler's historic character and make an important contribution to their significance. For views from the military structures toward the adjacent four-lane divided roads of Kunia and Wilikina, the perceived aesthetic value is low. Even with green fabric screening covering much of the chain-link fence that lines the roadways, the passing cars and infrastructure are clearly visible. Electric poles hung with transmission line currently extend the length of the roadways.

A photo simulation analysis was done to assess the impacts of the Proposed Action on the visual quality of the view shed from within Schofield Barracks Historic District and the eligible Wheeler Historic District. Photo simulations were produced using computer-modeling techniques to depict the view with the new poles and transmission lines in place.

Illustrations of the appearance of the new electric poles and the overhead transmission lines were prepared from three key observation points (KOP) inside the historic districts. KOPs were selected based on feedback from the USAG-HI architectural historian and included views from Sperry Loop and Eastman Road in the eligible Wheeler Historic District and General Loop in Schofield Historic District. The two KOPs on the Wheeler Army Airfield loop roads were selected because they had the best view of the new utility poles and overhead cable. In most locations, the poles and cable will be entirely screened from view by vegetation and structures. The KOP in the Schofield Barracks loop road was chosen as the optimal point of view toward the new utility lines in that area.

Photo simulations of the proposed project were prepared for each KOP. The results of the visual simulations are shown on Figure 3.10-3 through Figure 3.10-8. The observation points include:

- Sperry Loop, Wheeler Historic District (Figure 3.10-3, Figure 3.10-4)
- Eastman Road, Wheeler Historic District (Figure 3.10-5, Figure 3.10-6)
- General Loop, Schofield Barracks Historic District (Figure 3.10-7, Figure 3.10-8)

Each of these figures shows the existing view and the simulated view from the same location. In general, the degree of utility pole visibility from the historic districts is dependent on the extent of obstruction by existing vegetation and structures and the scale of the pre-existing infrastructure on the visible landscape. New poles 26 and 27 on Wilikina Drive are clearly visible from the northeast corner of Sperry Loop on the northeast border of the proposed Wheeler Historic District. New poles 17 and 18 on Kunia Drive are also visible from Eastman Loop on the north-central edge of the Wheeler Historic District. As shown in the photo simulations, these features are visually consistent with the existing infrastructure bordering the historic district, so visual impacts to the proposed Wheeler Historic District are expected to be minor.

The new electric poles and transmission lines are not visible from General Loop in Schofield Barracks Historic District due to tall vegetation blocking the view. Pole 47, the northernmost pole on Wilikina Drive and the last pole on the transmission corridor, is already there and would not be modified. There is no expected effect to the viewshed of the Schofield Barracks Historic District from construction of the SGSP.

As shown in the visual simulations, while several electric poles planned for installation during the SGSP would be visible from the proposed Wheeler Historic District, the majority of the poles and lines are obstructed by the existing vegetation and houses composing the district. The new poles that could be seen from different viewpoints in the district would cause only a minor adverse effect to the viewshed because they would blend in with pre-existing infrastructure.

The landscaping and open spaces that are an integral element of the significance of the Schofield Barracks and Wheeler Historic Districts are either not impacted at all (Schofield Barracks) or are integrated into current urban development (Wheeler Army Airfield) to result in a minor impact to the viewshed. The visual character of the Schofield Barracks Historic District landscape would remain unchanged while the visual impacts associated with the additional infrastructure on the edge of the eligible Wheeler Historic District would be minor. The impact would be further minimized through design measures including planting additional vegetation to screen the view of the poles or to lessen the visual dominance of the transmission line and painting power poles to minimize their visual obtrusiveness. The visual quality of the landscape would be little changed with the addition of the SGSP transmission line to the existing infrastructure.

View from Sperry Loop looking north/northeast at Wilikina Drive. Photo represents landscape without proposed project.
Photo taken 6/6/14.

View from Sperry Loop looking north/northeast at Wilikina Drive. Photo represents landscape with proposed project.
Photo taken 6/6/14.

Figure 3.10-3. View from Sperry Loop Inside the Proposed Wheeler Historic District

Location map of Sperry Loop photo point.

Figure 3.10-4. Location Map of Sperry Loop Photo Simulation Point

View from Eastman Road looking north/northeast at Kunia Road. Photo represents landscape without proposed project.
Photo taken 6/16/14.

View from Eastman Road looking north/northeast at Kunia Road. Photo represents landscape with proposed project.
Photo taken 6/16/14.

Figure 3.10-5. View from Eastman Road Inside the Proposed Wheeler Historic District

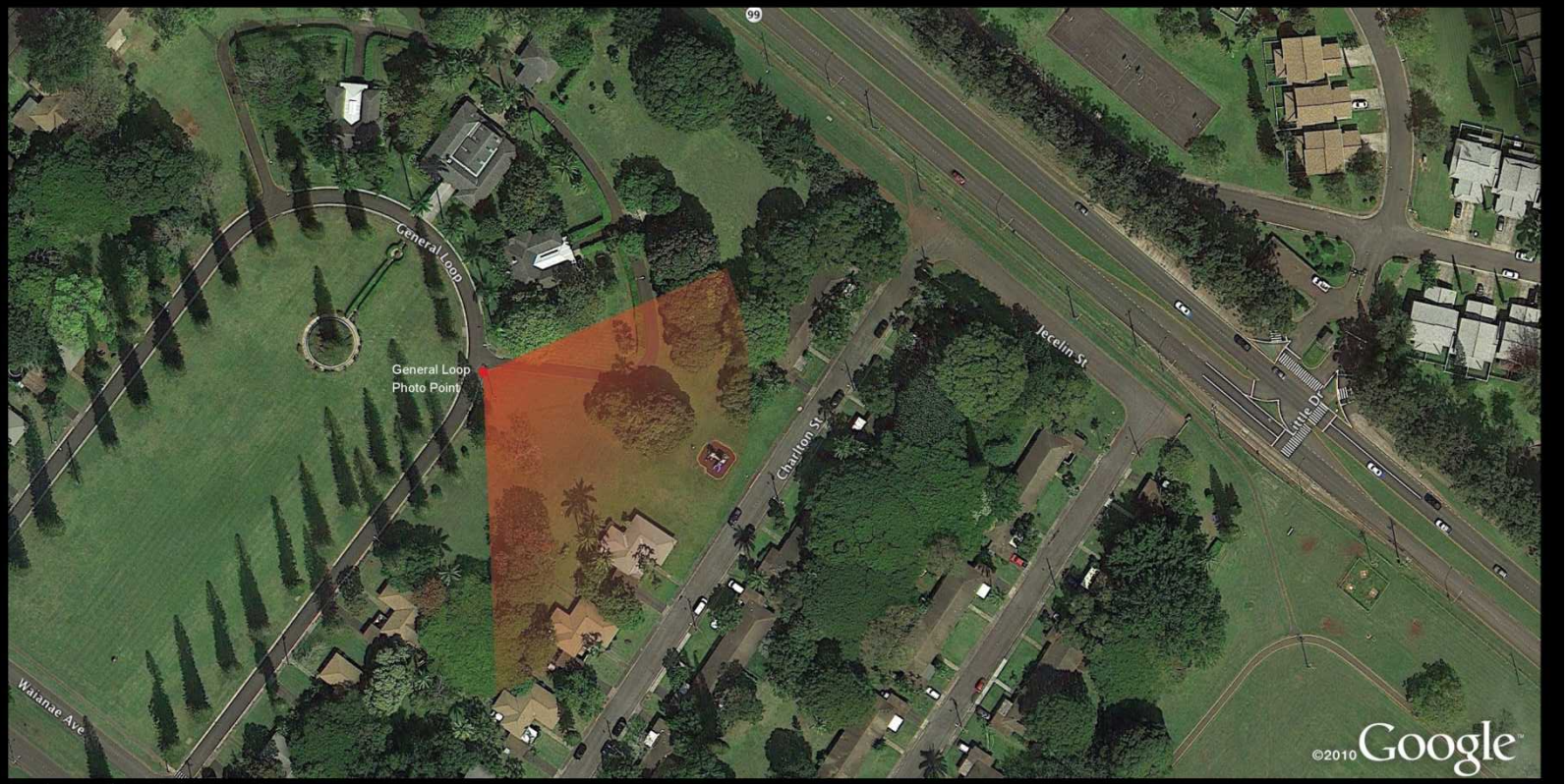
Location map of Eastman Road photo point.

Figure 3.10-6. Location Map of Eastman Road Photo Simulation Point

View from General Loop looking southeast. Photo represents landscape without proposed project.
Photo taken 6/16/14.

View from General Loop looking southeast. Photo represents landscape with proposed project. Project not visible from this photo point.
Photo taken 6/16/14.

Figure 3.10-7 .View from General Loop Inside the Schofield Historic District



Location map of General Loop photo point.

Figure 3.10-8. Location Map of General Loop Photo Simulation Point

3.10.2.1.3 Mitigation Measures and BMPs

Construction, operation, and maintenance of the SGSP would have no impact on any known archaeological sites, historic architecture, or traditional cultural sites, beliefs, or practices. The installation of the new poles and transmission lines would have a minor impact on the viewshed for the Wheeler Army Airfield Historic District. Hawaiian Electric has made the following project design commitments as identified in section 2.2.2.2 to further reduce the minor impacts:

- Planting vegetation to screen the view of the poles or to lessen the visual dominance of the transmission line, particularly in the vicinity of Sperry Loop (Wheeler Army Airfield Historic District)
- Painting power poles to minimize their visual obtrusiveness

The Army is currently in consultation with the SHPD under section 106 of the NHPA. Initial meetings among the Army, Hawaiian Electric, Historic Hawaii Foundation, and SHPD have indicated that given the design elements that have been incorporated into the project (as described above), the project would result in No Adverse Effect under section 106. The EIS will be updated to reflect the SHPD response to the No Adverse Effect letter upon receipt.

3.10.2.2 No Action Alternative

Under this alternative, there would be no earthmoving and no change to the archaeological resources, historic architecture, or traditional cultural resources, so there would be no adverse effects.

3.11 HAZARDOUS MATERIALS AND WASTE

3.11.1 Affected Environment

The generation, use, storage, transport, and disposal of hazardous materials and waste are regulated at the federal, state, and local levels. For this analysis, the terms hazardous waste, hazardous materials, and hazardous substances include those substances defined as hazardous by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA), and the Toxic Substances Control Act (TSCA). In general, they include substances that, because of their quantity, concentration, or physical, chemical, or toxic characteristics, could present substantial danger to public health or welfare, or the environment, when released. Petroleum products are also addressed in this section. The ROI for hazardous materials and waste is the SGSP project site, adjacent sites, and areas within approximately 1 mile of where releases have occurred that could migrate to the project site.

3.11.1.1 Regulatory Setting

Among the primary federal agencies with regulatory responsibility for hazardous materials and waste and associated safety management are (1) EPA for management and cleanup of hazardous materials and waste, (2) the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) for occupational safety and health, and (3) the DOT for transportation of hazardous materials and waste.

Under the federal RCRA, EPA regulates the generation, treatment, storage, and disposal of hazardous waste, and the investigation and remediation of hazardous waste sites. Individual states may apply to EPA to be authorized to implement their own hazardous waste programs in lieu of

RCRA, if the state program is at least as stringent as federal RCRA requirements. EPA delegated Hawaii to implement its own hazardous waste program.

Hawaii state law generally mirrors or is more restrictive than federal law, and enforcement of many federal laws has been delegated to the appropriate state agency. The primary responsible agencies in Hawaii are the Hawaii DOH and the Hawaii Department of Labor and Industrial Relations Occupational Safety and Health Division. Within Hawaii DOH, the Department of Hazard Evaluation and Emergency Response is responsible for site assessment and cleanup, spill reporting and emergency response, and Hawaii's Emergency Planning and Community Right-to-Know Act (EPCRA) compliance. Hawaii DOH's Solid and Hazardous Waste Branch regulates the generation, transportation, treatment, storage, and disposal of hazardous waste; the management of solid waste; waste storage, treatment and disposal facilities; and underground storage tanks (UST).

Federal and state laws require detailed planning to ensure that hazardous materials are properly handled, used, stored, and disposed of, and if they are accidentally released, to prevent or mitigate injury to public health or the environment. These laws require hazardous materials users to prepare written plans detailing the types and quantities of hazardous materials used on site and emergency response and training procedures.

Occupational safety standards established in federal and state laws minimize worker safety risks from physical and chemical hazards in the workplace. The federal OSHA is generally responsible for assuring worker safety in the workplace. In Hawaii, the federal OSHA currently has responsibility for the occupational worker safety and health program. OSHA is expected to transfer the program to the Hawaii Department of Labor and Industrial Relations Occupational Safety and Health Division in 2015. Federal and state occupational safety regulations contain requirements concerning the use of hazardous materials in the workplace and during construction that mandate employee safety training, safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, emergency action and fire prevention plan preparation, and a hazard communication program.

The DOT regulates the transportation of hazardous materials between states. The State of Hawaii DOT Hazardous Materials Program administers the regulations relating to the transporting of hazardous materials through areas under Hawaii DOT's control.

3.11.1.2 Army Property

To identify areas on or near the Army-owned portion of the project site where possible storage, release, or disposal of hazardous substances or petroleum products or their derivatives could have occurred, the Army prepared an environmental condition of property (ECP) report (Tetra Tech 2014b). The ECP covers hazardous and toxic substances as defined in CERCLA, RCRA, and TSCA, and other materials that could affect human health and safety and the environment, such as munitions and explosives of concern (MEC). The scope of the ECP was limited to areas on Army property. See Figures 2.2-1 and 2.2-2 for the general areas of the ROI that are under control of the Army.

The ECP identified two existing conditions related to hazardous materials and toxic substances at the Army-owned portion of the project site: (1) the potential presence of TCE and carbon tetrachloride in groundwater 550 to 650 feet below the site (with the exception of poles 28-30, that are outside the affected area) based on widespread groundwater contamination associated with the Del Monte Corporation's Oahu Plantation Superfund site, and (2) historic pesticide applications to soil at the generating station parcel associated with pineapple cultivation. Each of these conditions and the associated remedy to protect human health and the environment is

described below. No hazardous materials are currently used or stored on the Army-owned portion of the project site; it is also believed that no hazardous materials are currently used or stored on the other portions of the project site.

MEC, which contain hazardous materials, are used and stored at Schofield Barracks and Wheeler Army Airfield. No ordnance has been used or stored on the generating station site, and no future ordnance use is expected at this site. The generating station site was historically used for agriculture and did not become part of Schofield Barracks until recently, so there is minimal possibility of finding stray MEC on the site.

No other concerns regarding the use, storage, transport, or disposal of hazardous and toxic substances, petroleum products, or solid waste have been identified on the Army-owned portion of the site.

3.11.1.2.1 Groundwater Contamination

TCE and carbon tetrachloride are widespread in groundwater at and around the project site from historical releases at Del Monte Corporation's Oahu Plantation. The area of groundwater contamination includes the generating station parcel and most of the interconnection easement. Only poles 28-30 fall outside the contamination area, as defined by the installation geographic information system (GIS) maintained by the Army. Installationwide groundwater contamination is managed under OU2 that covers groundwater beneath Schofield Barracks, Wheeler Army Airfield, and the surrounding region. Groundwater is between 550 to 650 feet below the ground surface. The water supply extracted from installation wells is treated by air stripping at the Schofield Barracks Water Treatment Plant. Groundwater is treated to achieve concentrations below one-half the drinking water maximum contaminant levels for carbon tetrachloride and TCE before being distributed for human use. Established land use controls prohibit groundwater extraction that interferes with the remedial action system, restrict drinking water well installation, restrict withdrawal or use of groundwater for agricultural and irrigation purposes, and restrict withdrawal or use of groundwater without treatment. These restrictions are protective of human health and the environment.

3.11.1.2.2 Historical Pesticide Applications

The generating station parcel was historically used for pineapple cultivation, and fumigants were applied to the soil to control pests. Before 1981, fumigants were commonly mixed with petroleum products (e.g., diesel, naphtha, paint thinner) to achieve the proper dilution before application. In 2009, the generating station parcel was included in an environmental site characterization of former pineapple cultivation fields in the South Range. Multi-increment soil samples were collected and analyzed for organochlorine pesticides, carbamates, semivolatile organic compounds (SVOC), and arsenic. Soil samples indicated that low levels of organochlorine pesticides, carbamates, and other SVOC pesticides are in the surface and subsurface soils, and are likely from the application of pesticides during pineapple cultivation. The levels of organochlorine pesticides, carbamates, and other SVOC pesticides were all below the EPA Industrial Regional Screening Level and Hawaii DOH commercial/industrial land use environmental action levels. Arsenic detected in soil was below the Hawaii DOH-accepted naturally occurring background concentration. Therefore, soil removal and remediation are not warranted.

3.11.1.3 State-Owned Property

To identify areas on or near the state-owned portion of the SGSP project site (the area between the generating station parcel and pole 4 and between poles 17-22 and poles 31-38; see Figures 2.2-1 and 2.2-2) where possible storage, release, or disposal of hazardous substances or petroleum products or their derivatives could have occurred, a public database search was performed (Environmental Data Resources, Inc. 2014). Environmental Data Resources, Inc. prepared a report summarizing the results of a computerized search of federal, state, local, and proprietary environmental databases for areas up to a mile from the project site for the purpose of identifying documented potential sources of contamination.

Ten listings in the database report are on or near the state-owned portion of the interconnection easement. The listings are (1) a spill of 20 gallons of transformer oil at a Hawaiian Electric transformer, (2) a spill of 3 gallons of wastewater at a residence, (3) a citizen complaint of rats and roaches in a residence, (4) a listing for the Lakeview wastewater pump station, (5) a 550-gallon UST containing diesel fuel at the Lakeview wastewater pump station and temporarily out of service, (6) a historical automobile repair shop, (7) an unspecified hazard at an elderly care housing facility, (8) a 500-gallon UST containing gasoline at the King's Gospel Center that is permanently out of service, (9) a citizen complaint of dirt and dust in a residence, and (10) a listing for Wheeler Middle School.

The only listing that is on the interconnection easement property is the spill at the Hawaiian Electric transformer. The spill occurred in 2011 and was cleaned up, and no further corrective action is needed at the site (Environmental Data Resources, Inc. 2014).

The other nine listings are on property adjacent to or near the interconnection easement. Of these, five do not involve situations that could contaminate the interconnection easement property: (3 and 9) the citizen complaints, (4) the Lakeview pump station listing, (7) the unspecified hazard at the elderly housing, and (10) the listing for Wheeler Middle School. The pump station and school are informational listings and no release has been documented at these facilities. The spill at the residence (1) occurred in 1994, and the responsible agency has determined that no further corrective action is needed at the site. There is no indication of a release at the two UST sites (5 and 8). The historical automobile repair shop (6) is listed because it may have a higher risk of site contamination because of the type of activities that occurred there, but no contamination has been reported (Environmental Data Resources, Inc. 2014).

Because these listings do not involve a documented release or a release that could affect the interconnection ease, or, where a release has occurred or has not been responded to, these conditions do not appear to have affected the interconnection easement site.

3.11.2 Environmental Consequences

Construction and operation of the project would require the generation, use, storage, transport, and disposal of petroleum products, solid waste, and hazardous substances and waste. To ensure that these substances would be managed properly, Hawaiian Electric would prepare an HMMP and a spill prevention control and countermeasures (SPCC) plan. To ensure protection of human health and safety for site workers and the public, Hawaiian Electric would prepare a site-specific health and safety plan (HASP). Construction debris, solid waste, and petroleum products would be addressed in the HMMP. Separate HMMPs would be prepared to address construction and operation.

Impacts related to hazardous materials and waste would be significant if the project would create a substantial hazard to the public or the environment through the routine generation, use, storage,

transport, or disposal of hazardous materials or waste, or if the project would create a substantial hazard to the public or the environment through reasonably foreseeable accident conditions involving the release of hazardous materials into the environment.

3.11.2.1 Proposed Action

Short- and long-term minor adverse effects would be expected. In the short- and long-term, the routine use, storage, generation, transport, and disposal of hazardous materials and petroleum products would carry some risk compared to situations not involving these materials. Risks to human health and safety and the environment would be minimized by preparing and implementing a HASP, SPCC, and HMMP detailing legal requirements and applicable industry standard BMPs. Project activities would be in accordance with these plans and in compliance with all relevant federal, state, and municipal laws, ordinances, and regulations. The project would not contact contaminated groundwater beneath the site or interfere with the current process used by the Army to remediate groundwater contamination. Table 3.11-1 summarizes impacts for the Proposed Action and No Action Alternative. A detailed analysis of these alternatives is in the sections following the table.

Table 3.11-1.
Summary of Impacts from Hazardous and Toxic Substances

Type of Impact	Proposed Action	No Action Alternative
Create a substantial hazard to the public or the environment through the routine generation, use, storage, transport, or disposal of hazardous materials or waste	Minor	None
Create a substantial hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment	Minor	None
Disturb areas of existing contamination or interfere with a site remediation effort	Beneficial	None
Overall Impacts	**Minor**	**None**

3.11.2.1.1 Construction

Construction would require petroleum, oil, lubricants, paint, asphalt, and other potentially hazardous materials to be transported to, temporarily stored on, and used at the project site, and would generate debris such as scrap wood and metal. Hawaiian Electric would be responsible for the proper handling, storage, use, transport, disposal, and cleanup of hazardous substances, petroleum products, solid waste, and construction debris. Hawaiian Electric would be responsible for appropriately and accurately characterizing waste to determine whether it meets the criteria for hazardous waste. Safety Data Sheets (formerly known as Material Safety Data Sheets) for all relevant chemicals would be kept on-site and available for review by all site personnel, and all hazardous materials would be used and stored in accordance with the manufacturer's instructions and applicable regulations.

To ensure the proper management of these materials and to protect people and the environment from associated hazards, Hawaiian Electric's contractor would develop a construction-specific HMMP and a site-specific HASP before the start of construction.

The construction-specific HMMP would contain these elements, at a minimum:

- Responsible personnel and clearly defined roles and responsibilities, including employee training requirements
- Emergency preparedness and prevention, including emergency contacts, emergency response equipment and procedures, procedures for responding to unanticipated soil contamination or other findings such as MEC, contingency plans, spill prevention and containment, and spill response equipment and procedures
- Hazardous materials and petroleum products management including inventory, inventory control procedures, storage details, hazard communication requirements, and reporting requirements
- Waste management procedures including anticipated waste streams, waste minimization practices, criteria and process for characterizing hazardous waste, and waste storage, transport, and disposal procedures
- BMPs to be employed to reduce the risks associated with petroleum, oil, lubricants, paint, asphalt, and other potentially hazardous materials transport, storage, and use

The HASP would contain these elements, at a minimum:

- Responsible personnel and clearly defined roles and responsibilities, including a description of the work to be done
- Emergency contacts and emergency response procedures, including the address and contact information for the nearest hospital and a map showing the location of the nearest hospital and the route to it
- Types of safety issues that could be encountered (e.g., slips, trips, falls, heat) and description of safe work practices
- List of chemicals used or stored on the site
- Employee training and personal protective equipment requirements
- Health and safety tailgate documentation form

The plans would be reviewed for adequacy and completeness and approved by Hawaiian Electric before construction. The plans would adhere to federal, state, and municipal laws, ordinances, and regulations and detail relevant BMPs. They would be implemented for the duration of the construction. Because Hawaiian Electric and its subcontractor would prepare a HMMP and HASP and implement them for the duration of the construction, effects associated with the use, storage, transport, disposal, and potential accidental release of hazardous materials or waste would be less than significant.

Construction would involve soil disturbance. Soil at the generating station parcel was historically used for agriculture, and pesticides were regularly applied. The soil has been tested and pesticide levels are low enough that the soil can be left in place. Once the soil is disturbed, it may require special handling and disposal, and there is a slight possibility that undiscovered contamination or buried materials associated with historical agriculture could be encountered. The HMMP would include procedures for (1) determining if disturbed soil with low levels of contaminants requires special handling and disposal and, if so, for handling and disposing of it properly; and (2) responding to unanticipated discoveries of contamination or hazardous materials in accordance with applicable regulations and in a manner that protects human health and the environment. Although groundwater below the site might be contaminated, it is deep enough that it would not be encountered during construction. A minor beneficial effect would result if contaminated soil were removed from the site. Construction would have no effect on contaminated groundwater.

Overall, the impacts of construction to the public or the environment would be minor.

3.11.2.1.2 Operation

All operation-related hazardous materials and waste, petroleum products, and solid waste would comply with federal, state, and municipal laws, ordinances, and regulations and follow BMPs related to hazardous materials management. Hawaiian Electric would develop and implement a HMMP, SPCC plan, and HASP specific to facility operation (including commissioning) that would detail hazardous materials management, compliance, and spill and emergency response procedures. The HMMP and HASP would contain the elements described in the construction phase description; however, the plans would describe operation activities instead of construction.

Because Hawaiian Electric would prepare a HMMP, SPCC, and HASP and implement them for the duration of operations, risks to the public and environment associated with the use, storage, transport, disposal, and potential accidental release of hazardous materials or waste would be minimized. Impacts from the operation of the project facilities would be less than significant.

Operation would begin with filling the fuel tanks and linking and using the generating station's systems and all associated hazardous materials and fuels for the first time. Hawaiian Electric and its contractor would include detailed written procedures for this phase in the HMMP in order to minimize risks associated with the first-time use of the equipment. These procedures would include steps for initial filling, draining, valve lineups, placing each system into service, initial operating conditions, precautions, safety parameters, limits, expected indications, materials and tools required, and interlocks for all systems. By detailing the procedures to place each system into service in the HMMP and implementing them, effects would be less than significant.

Operation of the project would require storing and using hazardous materials and petroleum products at the generating station, and would generate hazardous and nonhazardous waste that would require transport off-site and appropriate disposal. Two aboveground storage tanks would hold up to 420,000 gallons of biofuel and diesel. The design for these tanks includes numerous features to minimize the chance of fuel escaping into the surrounding environment, such as (1) containment walls and berms around the fuel storage tanks with capacity to hold 110 percent of the largest tank, (2) impermeable membranes placed beneath fuel storage areas, (3) containment pads beneath equipment and work areas where leaks or spills of fuel or other contaminants could occur, and (4) an oil/water separator at the downstream end of that portion of the storm sewer system that receives rainwater runoff and wash-down water from fuel handling areas.

The SCR system would use urea as a reagent, in the presence of a catalyst bed, to reduce NOx emissions in engine flue gases. A maximum of 20 tons of dry pelletized urea and ~~or~~ 64,000 ~~32,000~~ gallons of a 40% liquid urea solution could be stored on-site. Urea does not meet the criteria for classification as a hazardous material or waste. Rather, it is an irritant that requires handling precautions but generally presents minimal danger to humans and the environment. The urea solution would be injected into the exhaust stream of the generating units, and the resultant chemical reaction, in the presence of the catalyst bed of the SCR, would convert the nitrogen oxides in the exhaust to nitrogen and water vapor. The gaseous nitrogen and water vapor would be released through the exhaust stacks (see section 3.4 for more information about air emissions).

Up to 60,000 gallons of LNG could be stored on-site. LNG would be stored in the delivery containers. LNG is a liquid form of natural gas and is stored at low cryogenic temperatures to keep it in liquid form. If a leak were to occur, the LNG would quickly warm and vaporize, entering the air. LNG is primarily methane plus small amounts of other gases. Methane gas detectors would be placed in the LNG storage area to detect any releases. Air emissions are addressed in section 3.4.

Operating the generating station would require smaller amounts of other hazardous and otherwise regulated substances such as oils and lubricants, batteries, and cleaning supplies. Plant processes would produce wastes including process and sanitary wastewater, nonhazardous waste, hazardous waste, and small amounts of municipal solid waste. Hawaiian Electric would be required by law to determine whether their waste streams meet the criteria for hazardous waste and ensure the proper transport and disposal of all waste.

Wastes that require special transport and disposal (e.g., hazardous waste, mixed waste, universal waste) would be packaged, labeled, and categorized for transport to appropriate permitted and licensed off-site treatment, storage, and disposal facilities. On-site waste collection areas equipped with all required safety features would be designated to accommodate these wastes. Waste separation would be provided as needed.

Hawaiian Electric would contract for waste transport and disposal and for fuel delivery (biofuel, diesel, and LNG). Transporters would be subject to regulation and certification by the Federal Motor Carrier Safety Administration, DOT, and the Hawaii DOT. Transport and delivery would require adherence to all safety measures outlined in Army Regulation 385-10, The Army Safety Program, and applicable National Fire Protection Association standards, including standard 59A, Production, Storage, and Handling of LNG. Materials would be properly manifested and disposed of only at appropriately licensed and permitted facilities.

A single dumpster placed on-site would be sufficient to accommodate municipal solid waste. A private solid waste management company would periodically (weekly, or as appropriate) collect the contents of the dumpster and transport it to an appropriately permitted disposal facility. No hazardous material would be placed in the municipal solid waste dumpster.

During operation, no hazardous materials, petroleum products, or solid waste would be stored or generated along the interconnection easement. Small amounts of common products, such as oils and lubricants, would be used intermittently for transmission line maintenance activities. Activities involving these substances would be in accordance with the HMMP and the substances would be removed by the maintenance staff at the end of each workday. Any spills would be responded to in accordance with the SPCC plan.

All operational activities related hazardous materials and waste, petroleum products, and solid waste would comply with federal, state, and municipal laws, ordinances, and regulations and follow BMPs related to hazardous materials management. Hawaiian Electric would develop and implement a HMMP, SPCC plan, and HASP specific to facility operation that would detail hazardous materials management, compliance, and spill and emergency response procedures. The HMMP and HASP would contain the elements described in the construction phase description; however, the plans would describe operations instead of construction.

Because the generating station would have a storage capacity of more than 1,320 gallons of petroleum products, the facility would be subject to federal Oil Pollution Act SPCC Planning per 40 CFR Part 112 and would be require to prepare and maintain an SPCC plan. The SPCC plan would contain these elements, at a minimum:

- Federal (40 CFR §110 and §112) and state (HAR, Title 11, Chapter 451) rules and regulations compliance procedures
- Identification of all areas and equipment with the potential for fuel or lube oil spills, leaks, or other releases
- For each identified potential release point, identification and description of the containment system, possible spill routes, contingency actions and spill response and

notification procedures, and procedures to maximize compliance with federal and state rules and regulations

- Description of prevention and control procedures, including maintenance, monitoring, personnel training, and regular inspections and testing

Because Hawaiian Electric would prepare a HMMP, SPCC, and HASP and implement them for the duration of facility operations, risks to the public and environment associated with the use, storage, transport, disposal, and potential accidental release of hazardous materials or waste during operation would be minimized, so impacts from the operation of the project facilities would be minor.

3.11.2.1.3 Mitigation Measures and BMPs

Effects would be minor and no mitigation measures would be required. Hawaiian Electric would prepare a HMMP, SPCC, and HASP and implement them for the duration of the project. Separate documents would be prepared for the construction and operation phases. These documents would detail legal compliance requirements and BMPs related to human health and safety and storage, use, generation, transport and disposal of regulated materials and waste.

3.11.2.2 No Action Alternative

Under the No Action Alternative there would be no adverse effects regarding hazardous materials and waste, petroleum products, or solid waste because no such materials would be used, generated, stored, transported, or disposed of at the project site.

3.12 SOCIOECONOMIC RESOURCES

3.12.1 Affected Environment

This section describes the socioeconomic environment (labor force, demographics, public services) of the ROI, which for socioeconomics is the City and County of Honolulu, Hawaii (which includes the entire island of Oahu). Socioeconomic data are provided for the county, with data for the State of Hawaii and the United States presented for comparison. The City and County of Honolulu is the center of business and government for the State of Hawaii. Downtown Honolulu is Hawaii's financial center while Waikiki, the world famous tourist destination, is only a few miles away (Hawaii DBEDT 2011). Recent years showed strong tourism gains for Oahu as the county continues to recover from the economic recession. Economic growth is predicted to quicken with an increase in construction activity and hotel occupancy rates (University of Hawaii Economic Research Organization 2013). The location of Oahu also makes it strategically important in the defense of the United States; consequently, federal government expenditures are an important variable in the county's economy. The island is home to a number of military installations, training areas, and medical facilities. In addition to Schofield Barracks, other installations are on Oahu include Bellows Air Force Station, Dillingham Military Reservation, Field Station Kunia, Fort Shafter, Joint Base Pearl Harbor-Hickam, Kahuku Training Area, Aliamanu Military Reservation, Helemano Military Reservation, Makua Military Reservation, Marine Corps Base Hawaii, Tripler Army Medical Center, and Wheeler Army Airfield.

3.12.1.1 Employment, Income, and Industry

Between 2003 and 2013, the City and County of Honolulu's labor force increased by 5 percent. Hawaii's labor force also increased by 5 percent and the nation's labor force increased by 6 percent. The county's 2013 annual average unemployment rate was 4 percent, lower than

Hawaii's unemployment rate of 5 percent and the national unemployment rate of 7 percent. The City and County of Honolulu consistently had a lower annual unemployment rate than the state and nation from 2003 through 2013 (Bureau of Labor Statistics 2014).

City and County of Honolulu income levels were higher than state and national levels. The county's median household income of $71,404 was 108 percent of the State of Hawaii's median household income of $66,259 and 139 percent of the national median household income of $51,371. The county's per capita personal income of $29,187 was 104 percent of the state per capita income of $28,099 and 107 percent of the national per capita income of $27,319 (U.S. Census Bureau 2014a).

The leading City and County of Honolulu industries (on the basis of earnings by industry) were government and government enterprises (including federal civilian, military, and state and local government); health care and social assistance; construction; professional, scientific, and technical services; and accommodation and food services. Together those five industry sectors accounted for two-thirds of the county's industry earnings. The government and government enterprises sector was the largest sector, accounting for 36 percent of the total industry earnings for the county. Schofield Barracks, part of the government industry sector, is one of the county's largest employers, providing about 18,000 jobs (about 4 percent of the county's total employment) (BEA 2013; USACE, Honolulu District 2010).

3.12.1.1.1 Electric Utilities Industry

Hawaiian Electric is part of the utilities industry, which accounted for about one percent of total industry earnings for the City and County of Honolulu (BEA 2013). Hawaiian Electric (and its subsidiaries) serves 95 percent of the state's 1.4 million residents on the islands of Oahu, Maui, Hawaii, Lanai, and Molokai (Hawaiian Electric 2013a). On Oahu, DoD loads represent 16.2 percent of all Hawaiian Electric sales (the next largest customer is the State of Hawaii with 4.4 percent of sales) (Division of Consumer Advocacy 2012). The cost of electricity in Hawaii is generally higher than on the U.S. mainland because the electric systems on each island are independent, so Hawaiian Electric must build additional backup capabilities into the systems, and Hawaii's remote location adds to the cost of doing business (Hawaiian Electric 2013a).

The rates customers are billed for electricity are established through a regulatory process administered by the State of Hawaii PUC. The largest contributor to these rates is the cost of the fuel used to generate electricity. These fuel costs, and the mechanism to adjust them as fuel prices fluctuate, are approved by the PUC. Fuel costs are passed through to the customer with no markup.

To stabilize and lower customer bills, Hawaiian Electric would develop and implement plans to reduce fuel costs in the generation portfolio. A critical step in this strategy would be replacing high-cost oil-based fuel with cleaner, lower-cost LNG. Renewable energy, while increasingly cost effective in Hawaii, can replace much, but not all, of the fossil fuel-based generation because of its intermittent nature. LNG, however, is a firm generation fuel source that is cheaper, cleaner, and potentially more stable in price than the current fuel mix (Hawaiian Electric 2014c). When LNG becomes available, it would be a fuel option for the SGSP, subject to the biofuel requirements of the project (Shriver 2014).

3.12.1.2 Population and Housing

3.12.1.2.1 Population

Population trends are in Table 3.12-1. The City and County of Honolulu is home to 70 percent of the state's population. The county's population increased by 12 percent between 2000 and 2013.

This was the same as the national population growth but lower than the State population growth of 16 percent. Projections estimate a 20 percent growth in the City and County of Honolulu's population between 2000 and 2030, very close to the 21 percent growth projected for the State but lower than the 29 percent population increase projected for the United States.

Table 3.12-1.
Population – County, State, and Nation

Jurisdiction	2000 Population[a]	2013 Population	Change in Population, 2000–2013	2030 Projected Population[b,c]	Projected Change in Population, 2000-–2030
City and County of Honolulu	876,156	983,429	12%	1,052,100	20%
Hawaii	1,211,537	1,404,054	16%	1,466,046	21%
United States	281,421,906	316,128,839	12%	363,584,435	29%

Source: U.S. Census Bureau 2014b unless otherwise noted.
Notes:
[a] U.S. Census Bureau 2000.
[b] Source for the City and County of Honolulu 2030 projected population is Hawaii DBEDT 2012.
[c] Source for Hawaii and United States 2030 projected populations is U.S. Census Bureau 2005.

Table 3.12-2 has decennial census population data for the communities surrounding the proposed SGSP.

Table 3.12-2.
Population – Local Communities

Jurisdiction	2000 Population[a]	2010 Population[b]	Change in Population, 2000–2010
Kunia Census Tract (includes Kunia village)	9,882	8,232	-17%
Mililani CDP	28,608	27,629	-3%
Schofield Barracks CDP	14,428	16,370	13%
Wahiawa CDP	16,151	17,821	10%
Wheeler Army Airfield CDP	2,829	1,634	-42%

Sources:
a U.S. Census Bureau 2000
b U.S. Census Bureau 2010
Note:
CDP = Census Designated Place

3.12.1.2.2 Housing

Regional housing data are in Table 3.12-3. Almost two-thirds of Hawaii's housing units are in the City and County of Honolulu. The county's housing costs (median monthly mortgage and rent) are higher than the state of Hawaii and U.S. housing costs. The City and County of Honolulu's vacancy rate was lower than the state and national vacancy rates.

Schofield Barracks' housing was privatized in 2005 under the Military Housing Privatization Initiative. The installation's family housing units are now owned and operated by Island Palm Communities, LLC. The Schofield Barracks' Kalakaua neighborhood is about one-third of a mile north of the project site. A planned expansion of this neighborhood by about 155 family housing units is under construction on an approximately 42-acre parcel south of Lyman Road and north of Waikele Stream (Tetra Tech 2011a).

Table 3.12-3.
Housing Data, 2008 – 2012 5-Year Average

	Number of Housing Units	Occupied	Vacant	Median Monthly Mortgage	Median Gross Rent
Kunia Census Tract (includes Kunia village)	2,603	96%	4%	$2,818	$1,663
Mililani CDP	9,401	98%	2%	$2,303	$1,945
Schofield Barracks CDP	3,705	93%	7%	---[a]	---[a]
Wahiawa CDP	6,168	91%	9%	$2,278	$1,076
Wheeler Army Airfield CDP	809	86%	14%	---[a]	---[a]
City and County of Honolulu	337,389	91%	9%	$2,450	$1,433
Hawaii	519,811	86%	14%	$2,335	$1,354
United States	131,642,457	88%	12%	$1,559	$889

Source: U.S. Census Bureau 2014c
Notes:
[a] Military housing.
CDP = Census Designated Place

3.12.1.3 Schools

The State of Hawaii Department of Education administers the public school system statewide (NCES 2013). The public school district that accommodates Schofield Barracks' children is the Central Oahu District. These schools in this district serve the Schofield Barracks on-post community: Solomon Elementary, Hale Kula Elementary, Wheeler Middle, and Leilehua High School (USACE, Honolulu District 2010). The Solomon and Hale Kula elementary schools are on the Schofield Barracks Main Post and the Wheeler Middle School is on Wheeler Army Airfield. The project site is about 1 mile southeast of Solomon Elementary; about 1.5 miles south of Hale Kula Elementary; and about 1.3 miles southwest of Wheeler Middle. Leilehua High School is off-post, about 5 miles east of Schofield Barracks in Wahiawa.

3.12.1.4 Environmental Justice

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations, was issued by President Clinton on 11 February 1994. The EO requires that federal agencies take into consideration disproportionately high and adverse environmental effects of governmental decisions, policies, projects, and programs on minority and low-income populations, and to identify alternatives that could mitigate such impacts.

Minority populations are identified by the U.S. Census Bureau as Black or African American; American Indian and Alaska Native; Asian; Native Hawaiian and other Pacific Islander; Hispanic or Latino; and persons of two or more races. Minority populations should be identified where either the minority population of the affected area exceeds 50 percent, or the minority population percentage of the affected area is meaningfully greater than that of the general population or other appropriate unit of geographic analysis (CEQ 1997). Minority population percentages for the City and County of Honolulu, Hawaii, and the United States, and Schofield Barracks and other communities adjacent to or near the project site (Wheeler Army Airfield, Wahiawa, Mililani, and village of Kunia) are listed in Table 3.12-4. Minority populations composed about 81 percent of the City and County of Honolulu's total population, higher than Hawaii's statewide minority population rate of 77 percent and notably higher than the national minority population rate of 36 percent. The largest minority populations in the City and County of Honolulu are Asian, Native

Hawaiian and other Pacific Islander, and persons of two or more races (U.S. Census Bureau 2014c).

Poverty thresholds established by the U.S. Census Bureau are used to identify low-income populations (CEQ 1997). Poverty status is reported as the number of persons or families with income below a defined threshold level. The U.S. Census Bureau defines the 2012 poverty level thresholds as $11,720 of annual income, or less, for an individual and $23,283 of annual income, or less, for a family of four (U.S. Census Bureau 2013). Table 3.12-4 lists the percentage of population below poverty for the City and County of Honolulu, Hawaii, the U.S., and Schofield Barracks and other communities adjacent to or near the project site. The City and County of Honolulu's poverty rate was 10 percent, lower than the State of Hawaii's poverty rate of 11 percent and U.S. poverty rate of 15 percent (U.S. Census Bureau 2014c).

Per NEPA requirements, public outreach to foster public participation in this project, including low-income and minority populations, was completed through direct mailings, publication of notifications in the *Honolulu Star-Advertiser*, and a media release from USAG-HI Public Affairs Office. The mailing list for recipients of information about the proposed project, how to participate and comment, and when and where the public scoping meetings would be, included native Hawaiian organizations (e.g., Native Hawaiian Advisory Council, Association of Hawaiians for Homestead Lands), neighborhood boards, community associations, civic clubs, libraries, schools, and local governments. See section 1.5, Public Involvement, for more information.

Table 3.12-4.
Environmental Justice Data

Jurisdiction	Percent Minority Population	Percent Below Poverty Level
Kunia Census Tract (includes Kunia village)	84	3
Mililani CDP	84	4
Schofield Barracks CDP	51	17
Wahiawa CDP	90	14
Wheeler Army Airfield CDP	44	17
City and County of Honolulu	81	10
Hawaii	77	11
United States	36	15

Source: U.S. Census Bureau 2014c
Notes: CDP = Census Designated Place

3.12.1.5 Protection of Children

On 17 April 1997, President Clinton issued EO 13045, Protection of Children from Environmental Health Risks and Safety Risks. This EO seeks to protect children from disproportionately incurring environmental health or safety risks that might arise as a result of federal policies, programs, activities, and standards. The EO recognizes a growing body of scientific knowledge that demonstrates that children might suffer disproportionately from environmental health risks and safety risks. These risks arise because children's bodily systems are not fully developed; children eat, drink, and breathe more in proportion to their body weight; their size and weight may diminish protection from standard safety features; and their behavior patterns might make them more susceptible to accidents.

Children are present on Schofield Barracks as residents or as visitors. The Army takes precautions for their safety through a number of means, including requiring adult supervision and restricting access to off-limits areas. The project site is not immediately adjacent to homes or facilities where children typically are present (such as schools, day care centers, or playgrounds). Three elementary schools and one middle school are within 1.5 miles of the project site (see section 3.12.1.3, Schools). The Schofield Barracks' Kalakaua military family residential neighborhood and a Child Development Center are about one-third of a mile north of the project site, north of Lyman Road. An addition to the Kalakaua neighborhood is under construction on an approximately 42-acre parcel that is south of Lyman Road but north of Waikele Stream (the stream and associated wooded area are north of the project site).

In Hawaii, asthma is one of the most common chronic diseases among children. Indoor and outdoor allergens and irritants (such as particulate matter, sulfur dioxide, and other air pollutants) can trigger an asthma attack. About 11 percent, or 31,000, of Hawaii's children have been diagnosed with asthma by a health professional and still have asthma (current asthma prevalence). The City and County of Honolulu has the lowest percent (about 10 percent) of children with current asthma prevalence in comparison to the state and other Hawaii counties. Between 2002 and 2010, the percent of children with asthma increased in the state and in each Hawaiian county (Table 3.12-5). The State of Hawaii established the Hawaii Asthma Initiative (a statewide community collaborative) that, along with the Hawaii DOH, prepared and implemented the *Hawaii Asthma Plan* to increase awareness and reduce the burden of asthma in the state (Hawaii Asthma Initiative and Hawaii DOH 2005, 2010).

Table 3.12-5.
Percent of Children with Asthma

Year	State of Hawaii	City and County of Honolulu	Hawaii County	Kauai County	Maui County
2002[a]	9.7	9.5	12.2	8.5	8.6
2010[b]	10.7	9.9	13.8	10.2	12.4

Sources:
a. Hawaii Asthma Initiative and Hawaii DOH 2005.
b. Hawaii Asthma Initiative and Hawaii DOH 2010.

3.12.1.6 Public Services

3.12.1.6.1 Police

The USAG-HI Directorate of Emergency Services provides 24-hour force protection, law enforcement, fire protection, and community assistance to the Soldiers, civilians, and family members of USAG-HI installations (which includes Schofield Barracks); maintains liaison with federal, state, and local law enforcement agencies; and supports installation contingency operations (USAG-HI 2014b). The Schofield Barracks Provost Marshall's Office and the Military Police respond to law enforcement emergencies on the installation. The Provost Marshall's Office provides general range security, directly controls access for hunting at USAG-HI lands, and also supports (but is not responsible for) the enforcement of laws related to natural resources uses (e.g., the enforcement of the external agency laws and regulations) on Oahu installations (USAG-HI 2010). The Military Police enforce laws, regulations, and directives; administer physical security programs, investigations, crime prevention program, absent without leave apprehension,

vehicle and weapons registration; and act as liaisons with civil law enforcement agencies (USACE, Honolulu District 2010). Schofield Barracks has five security controlled access gates, four of which are manned and used on a regular basis. Commercial and visitor traffic enter Schofield Barracks from the Lyman Gate off of Kunia Road. The Kunia Road and Lyman Gate intersection has long delays and queues during morning and afternoon peak hours from large traffic demands and long signal cycles. The security check at the gate entrance also increases the delays and queues at this intersection (see section 3.6, Traffic and Transportation, for more information on traffic) (Tetra Tech 2014a).

3.12.1.6.2 Fire

Schofield Barracks has 24-hour fire and emergency service. The Federal Fire Department, under the jurisdiction of USAG-HI Directorate of Emergency Services, provides fire protection and prevention, services (USAG-HI 2010). The Federal Fire Department has 13 fire stations on Oahu (USFA 2014). The Schofield Barracks Main Post fire station is less than a mile north of the project site and there is a station on Wheeler Army Airfield.

The Honolulu Fire Department, which has a policy of co-response to fires on military installations, sends pumper trucks and firefighting personnel to assist the Federal Fire Department if needed (USACE, Honolulu District 2010). The Honolulu Fire Department has 45 stations on Oahu. The nearest station to Schofield Barracks is about 2 miles east in the town of Wahiawa. There is also a station in Mililani about five miles to the southeast, stations in Waipahu and Waimalu about 13 miles to the south, and a number of departments in the city of Honolulu. The Honolulu Fire Department has an extensive array of apparatuses and equipment to fulfill its mission, including fire engines, ladder trucks, and hazardous materials response units that are all capable of responding to fires and hazardous materials incidents. Hazardous materials response units have in-depth abilities and equipment to support incidents involving petroleum, radioactive substances, or toxic chemicals (Honolulu Fire Department 2014).

3.12.1.6.3 Medical

Tripler Army Medical Center in Honolulu provides medical care for active duty and retired military personnel on Oahu and their eligible family members. The medical center offers a broad range of medical and surgical specialties. The Tripler Army Medical Center Emergency Room operates 24 hours per day, 7 days per week. In addition to this emergency service, there is a DoD medical facility with an acute care clinic at each of the major military installations on Oahu. Schofield Barracks has an Acute Care Center available to see most minor emergencies (USAG-HI 2014b). Wahiawa General Hospital, a nonprofit community hospital, is about two miles east of Schofield Barracks. Wahiawa General Hospital has 53 beds in the acute facility and 107 beds in the long-term care facility, equipped for all levels of patient care (WGH 2001).

3.12.2 Environmental Consequences

Impacts on socioeconomic resources from implementation of the Proposed Action or alternatives would be considered significant if one or more of these occurs:

- Substantial gains or losses in population or employment
- Disequilibrium in the housing market such as severe housing shortages or surpluses
- Project-related demands on public infrastructure or services triggering the need for expanded capacity or resulting in discernible reductions in the level of service provided
- Activities or operations substantially altering lifestyles or quality-of-life of Schofield Barracks employees and their families or civilian households

- Disproportionately high and adverse environmental or human health impacts to an identified minority or low-income population, which appreciably exceed those to the general population around the project area
- Disproportionately high and adverse environmental health or safety risks to an identified population of children, such as the increase in a child's risk of exposure to an environmental hazard (through contact, ingestion, or inhalation) or the risk of potential substantial harm to the safety of children during construction or operation activities

Table 3.12-6 summarizes impacts for the Proposed Action and No Action Alternative. A detailed analysis of both the Proposed Action and the No Action Alternative follows the table.

Table 3.12-6.
Summary of Impacts to Socioeconomics

Type of Impact	Proposed Action	No Action Alternative
Population change	None	None
Employment change	Beneficial	None
Housing market change	None	None
Change in level of public services	None	None
Disproportionate impacts on minority or low-income populations	None	None
Disproportionate impacts on children	None	None
Overall Impacts	**Beneficial**	**None**

A quantitative projection of economic effects on the region of influence (i.e., the City and County of Honolulu) from the proposed action was developed using the Impact Analysis for Planning (IMPLAN) model. IMPLAN is an economic model, originally developed in 1976 by the U.S. Forest Service for natural resource planning, but later updated and adapted by other government agencies and private sector analysts for use in economic impact analysis. It is now owned by the IMPLAN Group, LLC. IMPLAN is a regional input-output model that is derived by using local data combined with national input-output accounts. The model uses the most currently available data obtained from the Department of Commerce, Bureau of Labor Statistics, and other federal and state agencies. IMPLAN uses trade flow characteristics to trace economic changes in a regional economy arising from changes in the level of activity in one or more identified industry sectors.

IMPLAN estimates economic changes (direct, indirect, and induced) for a defined region. Direct effects are the initial production changes or expenditures made by producers/consumers as a result of an activity or policy; indirect effects are secondary effects of local industries buying goods and services from other local industries (business-to-business transactions); and induced effects are the tertiary effects from spending of labor income (consumer spending by the workforce). The IMPLAN model estimates changes in regional employment, labor income, value added, and output as a result of a proposed action. Employment is the annual average of monthly jobs in an industry (full-time or part-time). Labor income is all forms of employment income, including employee compensation (wages and benefits) and proprietor's income. Value added is the difference between an industry's or an establishment's total output and the cost of its intermediate inputs. Output is the value of industry production (i.e., business sales dollars) (IMPLAN 2013).

For the Proposed Action, impacts were estimated on an annual basis for the approximately 2-year design and construction period, and then for the first year when full build-out and employment levels are expected to be reached. The input variables for the IMPLAN model are listed in Table 3.12-7. Construction includes site clearing and actual construction of the proposed generating station, and installation of transmission poles and lines. For modeling, the estimated total construction cost of $69.7 million was divided evenly across the approximately 2-year build-out period, as the IMPLAN model is designed to evaluate on an annual basis. Operations employment of 10 jobs (5 supervisors and 5 operators) represents the number of direct jobs generated by the proposed SGSP facility. It is assumed that these workers are already residing in the study region and do not represent a net change in the population.

Table 3.12-7.
IMPLAN Model Input

Input Variable	Year 1	Year 2	Year 3	Total
Construction expenditures	$34,850,000	$34,850,000	$0	$69,700,000
Operation employment	0	0	10	10

3.12.2.1 Proposed Action

3.12.2.1.1 Construction

3.12.2.1.1.1 Employment, Industry, Income

Short-term beneficial economic effects would be expected. The annual expenditures associated with the proposed construction of facility and transmission line interconnection would result in an increase in regional employment, income, value added, and output, as determined by the IMPLAN model (Table 3.12-8). The IMPLAN model estimates the total multiplier effect to the county's economy from increased expenditures associated with the Proposed Action. The economic benefits of construction would be temporary and diminish as the project reaches completion at the end of the second year. The project is estimated to employ about 165 direct workers during peak construction and generate additional indirect and induced employment in associated sectors. The direct employment numbers were derived from the anticipated annual expenditures and IMPLAN's estimate of construction workers employed per dollar of expenditure. Total annual employment (direct, indirect, and induced) created during the construction is estimated to be about 315 jobs per year, with the food services, architectural and engineering services, and wholesale trade businesses generating most of the indirect jobs, and food, retail, and health services generating most of the induced jobs. The increase in employment and labor income would be small relative to the size of the City and County of Honolulu's economy and workforce. Total annual employment for the county in 2013 was about 436,500; the estimated construction-generated total employment of 315 would be less than 0.1 percent of this total. The county's total labor income was about $46.7 billion, and construction generated income of about $22 million would be 0.05 percent of this total.

3.12.2.1.1.2 Population, Housing, Schools

No effects on population, housing, or schools would be expected. The Proposed Action would not increase local population and so would not affect the demand for housing or for public school services. Construction jobs associated with the Proposed Action would be temporary and would be expected to be filled by persons already residing on Oahu.

Table 3.12-8.
IMPLAN Model Output, Annual Construction Economic Impacts

Impact Type	Employment	Labor Income	Value Added	Output
Direct effect	165	$14,884,456	$19,178,207	$34,849,998
Indirect effect	61	$3,593,094	$5,587,510	$10,603,168
Induced effect	92	$4,309,546	$7,952,812	$12,550,090
Total effect	317	$22,787,096	$32,718,530	$58,003,257

Source: IMPLAN model

3.12.2.1.1.3 Environmental Justice and Protection of Children

No disproportionate effects on environmental justice or the protection of children would be expected. Implementing the Proposed Action to construct the SGSP would not result in disproportionately adverse environmental or health effects on low-income or minority populations or the health and safety of children. It is not an action with the potential to substantially affect human health or the environment by excluding persons, denying persons benefits, or subjecting persons to discrimination or disproportionately high environmental health or safety risks. The construction of the SGSP would be in compliance with applicable federal and state air quality, water quality, and noise regulations. Short-term noise effects from the construction of the SGSP would not effect on- or off-post neighborhoods or schools (see section 3.5, Noise*)*. Air quality effects during construction would be minor, temporary, and localized (e.g., dust during site grading and combustion of diesel fuel and gasoline from construction equipment) and would be minimized with BMPs. Construction would be accomplished in full compliance with Hawaii regulatory requirements using compliant practices or products as stated in HAR 11-60.1, Air Pollution Control. Stormwater runoff control requirements and BMPs would be applied during construction to control run-off from the construction site. Construction effects on air and stormwater would not be expected to adversely affect the health or welfare of residents in the surrounding areas (see section 3.4, Air Quality, and section 3.7, Water Resources). SGSP commercial construction traffic (delivery trucks, heavy loads, and wide loads) would approach the site from the south (via HI-95 and HI-750) and a temporary access road from Kunia Road to the site, and would not travel through residential areas of Schofield Barracks or surrounding communities (see section 3.6, Traffic and Transportation). Drivers would be expected to adhere to all safety regulations when transporting equipment and materials to the SGSP site.

3.12.2.1.1.4 Public Services

No effects on police, fire, or medical public services would be expected. Construction traffic would not adversely affect Schofield Barracks or civilian police operations. Construction workers would use a temporary access road from Kunia Road directly to the project site, approaching the site from the south and avoiding major streets (including Lyman Road) in the residential and commercial areas of Wahiawa, Schofield Barracks, Wheeler Army Airfield, and Mililani. See section 3.6, Traffic and Transportation, for a discussion of effects on traffic.

If there was a fire or medical emergency during construction, the Schofield Barracks Main Post fire station (which is less than a mile north of the site) would respond, and there is a policy of co-response on military installations with the civilian fire departments if additional assistance is needed. The nearest off-post fire station is about 2 miles east in the town of Wahiawa. For medical emergencies, Wahiawa General Hospital is about two miles east of Schofield Barracks.

3.12.2.1.2 Operation

3.12.2.1.2.1 Employment, Industry, Income

Long-term beneficial economic effects would be expected. The operation and maintenance of the facility and transmission line would result in an increase in regional employment, income, value added, and output. IMPLAN's estimated increase in these economic variables (see Table 3.12-9) would be small relative to the City and County of Honolulu's baseline economy. It is estimated that the proposed generating station would create 10 direct jobs, and this operations workforce would consist of a mix of shift supervisors and operating technicians. As shown in Table 3.12-9, the operation of the proposed generating station would create almost 30 jobs (direct, indirect, and induced). The majority of the indirect and induced jobs would be in the maintenance and repair, food, health, and retail service sectors. Labor income would increase by about $2.3 million, or less than 0.1 percent of the county's baseline labor income of about $46.7 billion.

Table 3.12-9.
IMPLAN Model Output, Annual Operation Economic Impacts

Impact Type	Employment	Labor Income	Value Added	Output
Direct effect	10	$1,401,079	$6,466,376	$9,419,681
Indirect effect	8	$475,186	$723,772	$1,278,961
Induced effect	9	$439,310	$810,984	$1,279,822
Total effect	27	$2,315,575	$8,001,132	$11,978,464

Source: IMPLAN model

Per Hawaiian Electric, the overall cost effect on customers from operating the SGSP is dependent on initial capital cost, net system operations and maintenance costs, and net system fuel costs. Hawaiian Electric would own, operate, and maintain the SGSP. The initial capital cost would be the dominant factor that determines overall cost to customers. Total operations and maintenance costs for the SGSP would be anticipated to be partially offset from the operations and maintenance costs savings from a corresponding reduction in steam unit operations; however, the net effect of operations and maintenance costs would result in an increased cost to customers. System fuel costs would be lower with the SGSP in operation and would fully offset the higher net operations and maintenance costs and partially offset the initial capital cost impact. The amount of the fuel cost savings will vary depending on the combination of fuels used and other peaking generating assets. Approximately 27 to 36 percent of the customer cost impact associated with adding the SGSP would be reduced through more efficient use of fuel in the engines compared to existing peaking units. Overall, the net effect of the initial capital cost, operations and maintenance costs, and fuel costs would result in an increase in a customer's monthly electric bill. Hawaiian Electric estimated the cost increase would be between $1.95 and $2.65 per month for the average utility customer in the year 2018, dependent upon fuel combination (e.g., biodiesel and LNG, biodiesel and diesel, or all biodiesel) (Hawaiian Electric 2014b). Any change

in Hawaiian Electric utility rates would be set through the PUC; the Army has no part in or influence on Hawaiian Electric's rate application or rate setting process with the PUC.

3.12.2.1.2.2 Population, Housing, Schools

No effects on population, housing, or schools would be expected. The Proposed Action to operate the SGSP would not increase local population and would not affect the demand for housing or for public schools services. The operation of the SGSP would require a staff of 10 and it is anticipated that these jobs would be filled by people already residing on Oahu.

No adverse effects from SGSP operational noise on off-post property values would be expected. SGSP operational noise would not affect noise-sensitive receptors, such as residential areas, in the surrounding communities. See figures and analysis in section 3.5, Noise, for additional information.

3.12.2.1.2.3 Environmental Justice and Protection of Children

No disproportionate effects on environmental justice or the protection of children would be expected. Operation of the SGSP would not result in disproportionately adverse environmental or health effects on low-income or minority populations or the health and safety of children. It is not an action with the potential to substantially affect human health or the environment by excluding persons, denying persons benefits, or subjecting persons to discrimination or disproportionately high environmental health or safety risks. The SGSP would comply with applicable federal, state, and local air quality, water quality, and noise regulations. In the long-term, minor noise from the operation of the SGSP might be audible as a faint, far-off hum during periods of quiet (such as at night) in the Schofield Barracks Kalakaua neighborhood, but would not affect off-post residential neighborhoods or on- or off-post schools (see section 3.5, Noise). The operation of the proposed SGSP would not cause or contribute to the violation of any NAAQS or SAAQS (including irritants such as PM and SO_2 that can trigger asthma attacks) and would not be expected to adversely affect the health of residents in the surrounding areas (see section 3.4, Air Quality). Operation of the SGSP would not adversely affect surface or ground water quality and the facility would be designed to meet stormwater runoff requirements (see section 3.7, Water Resources).

SGSP operational traffic would result in a minor increase in traffic volume (see section 3.6, Traffic and Transportation, for a discussion of traffic impacts). SGSP personnel and commercial deliveries to the facility would enter through the Schofield Barracks Lyman Gate, and commercial deliveries would not enter residential areas of Schofield Barracks or surrounding communities. Fuel would be transported to the SGSP in trucks designed for the material (biodiesel, diesel, or LNG) and drivers would be trained and expected to adhere to all safety regulations when transporting fuel to the SGSP site (the State of Hawaii Department of Transportation's Hazardous Materials Program administers the regulations relating to the transporting of hazardous materials through areas under the state's control and delivery trucks would be subject to regulation by the Federal Motor Carrier Safety Administration). Delivery and storage of SGSP equipment and materials would require adherence to all safety measures outlined in Army Regulation 385-10; NFPA 31, Standard for the Installation of Oil-Burning Equipment; and NFPA 59A. SGSP staff would undergo training and implement safety measures required by the Federal Energy Regulatory Commission (FERC) and other agency regulations for transporting and storing SGSP fuel. The SGSP site would be a restricted access area with a perimeter fence.

3.12.2.1.2.4 Public Services

No adverse effects on police, fire, or medical public services would be expected. SGSP operation traffic would not adversely affect security at the Schofield Barracks Lyman Gate. Upon completion of the SGSP, all operation workers and fuel deliveries would access the project site through the Schofield Barracks Lyman Gate. Normal SGSP facility operations would have a total staff of approximately 10 people distributed over three shifts per day, and an estimated 15 fuel delivery truck trips per day. This increase in personal vehicles and delivery trucks per day entering or exiting the Lyman Gate would have no adverse effect on Schofield Barracks physical security programs and would not require additional security personnel or equipment. See section 3.6, Traffic and Transportation, for a discussion of traffic effects.

SGSP buildings would be equipped with automatic fire detection and suppression systems. The SGSP fire protection system would be designed to protect personnel and limit property loss and plant downtime if there was a fire. Fire water would be supplied through an underground loop piping system from an on-site firewater storage tank. The fire water supply and pumping system would provide fire-fighting water to yard hydrants, hose stations, and water spray and sprinkler systems. The system would be capable of supplying maximum water demand for any automatic sprinkler system, plus water for fire hydrants and hose stations. The fire protection system would include a backup diesel fire pump. Sprinkler systems would be installed in the control room building, and fire pump enclosure as required by NFPA and local code requirements. Portable CO_2 and dry chemical extinguishers would be throughout the power plant sites (including switchgear rooms), with size, rating, and spacing in accordance with NFPA 10, Standard for Portable Fire Extinguishers (USAEC 2012). See section 2.2.1.12, Fire Protection System, for additional fire protection information.

If there was a fire or medical emergency at the SGSP, the Schofield Barracks Main Post fire station (which is less than a mile north of the site) would respond, and there is a policy of co-response on military installations with the civilian fire departments if additional assistance if needed. The nearest off-post fire station is about 2 miles east in the town of Wahiawa. For medical emergencies, the Wahiawa General Hospital is about two miles east of Schofield Barracks.

There would be potential beneficial effects to emergency services from energy security benefits from the operation of the SGSP facility. The SGSP would provide the energy security benefit of a reduced electricity restoration time from the start of an outage, which would extend to the surrounding community of Wahiawa. The military can be a responder in times of emergency (e.g., civil emergency or natural disaster) in the communities in which they serve. Consequently, the SGSP would benefit Hawaiian Electric's customers by providing energy security to support the DoD's and National Guard's capabilities in times of emergency, and energy security for critical local community infrastructure.

3.12.2.1.3 Mitigation Measures and BMPs

No mitigation or BMPs would be required for socioeconomic resources.

3.12.2.2 No Action Alternative

No effects would be expected if the No Action Alternative was implemented. The No Action Alternative would not affect regional socioeconomic activity by generating new employment or income, increasing or decreasing population, or creating demand for housing or for public services (schools, police and fire protection services, medical services). Implementing the No Action Alternative would not result in disproportionate adverse environmental or health effects

on low-income or minority populations or children. It does not have the potential to substantially affect human health or the environment by excluding persons, denying persons benefits, or subjecting persons to discrimination or health or safety risks.

Not implementing the Proposed Action would be a potential lost economic opportunity and opportunity to improve energy security, and therefore to provide a potential benefit to emergency services. As discussed above under Public Services, these services could benefit from reduced electricity restoration time from the start of an outage during a civil emergency or natural disaster. If there was a power outage, SGSP operations would be able to be restored in about 30 minutes without relying on electricity from the external power grid. The SGSP then would have the capability and capacity to provide the electrical power necessary to start up the Waiau Power Plant (Units 9 and 10), expediting grid restoration while simultaneously providing power to local Army and Wahiawa community loads. Through this capability, the SGSP could be used to restore power to the rest of the Hawaiian Electric grid (see section 1.4.1, Increased Energy Security for the Army and Oahu, for more detail). The lost economic opportunity would be the jobs, income, and business revenue from the construction and operation of the SGSP facility, as discussed under Employment, Industry, and Income.

3.13 UTILITIES AND INFRASTRUCTURE

Utilities and infrastructure refer to the physical systems and structures that are available near the SGSP that support its construction and operation. The relevant systems and associated infrastructure include electricity, potable water, wastewater, solid waste management, natural gas, and communications.

3.13.1 Affected Environment

The ROI for utilities and infrastructure include the SGSP and the existing infrastructure and systems servicing Schofield Barracks.

3.13.1.1 Regulatory Setting

The construction and operation of the SGSP would require numerous approvals and permits relating to utilities and infrastructure (Table 3.13-1). Approving agencies include the PUC, EPA, Hawaii DOT, Hawaii DOH, and New Cingular Wireless PCS, LLC. This is not an all-inclusive listing. Hawaiian Electric, the Army, and any contractors would comply with all applicable Hawaii regulations pertaining to utilities and infrastructure.

Table 3.13-1.
Approvals and Permits Related to Utilities and Infrastructure

Approvals/Permits	Agency
Public Utilities Commission (PUC) Approval	Hawaii PUC
Spill Prevention Control and Countermeasures (SPCC)	U.S. Environmental Protection Agency
Equipment and Materials Handling, including Materials Disposal	Hawaii Department of Transportation
Energy Information Administration Registration	Energy Information Administration
NPDES Permit	Hawaii Department of Health
Telecommunications License	New Cingular Wireless PCS, LLC

3.13.1.2 Electricity

Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia receive electrical power from Hawaiian Electric through multiple circuits to USAG-HI-owned substations. For reference purposes, the 2010 islandwide firm power generating capacity of 1,817 MW was generated at four Hawaiian Electric and three independently owned power plants (Hawaiian Electric 2010). All the major power generation facilities on Oahu are on or near the shoreline, and although designed to be resistant to ocean effects such as storms and tsunamis, their locations near the coast have inherent risks.

The three installations combined require approximately 32 MW of peak power. Distribution is accomplished using a combination of overhead and underground transmission lines and circuits. The substation transformers and switchgear downstream of the primary electricity meters for the installation are owned and maintained by USAG-HI, whereas Hawaiian Electric owns and maintains all components upstream of the primary meters. Various upgrades and modifications have been completed to improve the capacity of the local substations and to address problems in the distribution system's ability to supply electric power. Construction of a new substation to supply power to the GTA facilities at South Range is in progress that ties into the existing Hawaiian Electric lines. This substation steps the power down to the proposed GTA facilities and is not capable of delivering power to the overall grid from the SGSP (USACE, Honolulu District 2010).

Currently, there is limited redundancy in the existing power generating and distribution system. Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia are at risk for power supply outages because of their remote location with respect to the main electrical transmission system on the island. There are diesel backup generators for key services and buildings on the installations.

On 26 August 2014, Hawaiian Electric filed a power supply improvement plan (PSIP) with the Hawaii PUC for their consideration in Docket 2011-0206. The PSIP proposes a preferred plan which, if approved and executed, would result in 61 percent of Oahu's energy being derived from renewable sources by 2030.

Achieving this goal would require the installation of significant amounts of new renewable resources. However, it would also require integration of those new resources into the grid in such a way that they can be operated safely, reliably, and with very limited curtailment. The critical enabling elements of the PSIP that must be executed to integrate the high levels of renewable resources include replacing current firm generating units with "future thermal generation resources that have a high degree of operational flexibility" (Hawaiian Electric 2014c), such as the units that are proposed for the SGSP. Without these critical enablers, the renewable resources called for in the PSIP would not be integrated in such a way that would ensure grid safety and reliability or, in industry terms, "system security" (Hawaiian Electric 2014c). System security requirements, including having highly flexible thermal units with high ramp rate capabilities, are described in detail in the PSIP (Hawaiian Electric 2014c).

3.13.1.3 Potable Water

Potable water is supplied to the installations by four deep wells, and a water treatment facility on Schofield Barracks East Range between the H-2 Freeway and Kamehameha Highway, across from the Kawamura Gate. This facility treats and supplies 4.0 to 9.0 MGD. The DLNR permit, which allows the installation to withdraw from the aquifer, allocates a 12-month moving average of 5.65 MGD to the Army from the groundwater aquifer. The monthly average demand on these facilities ranges from a low of 3.85 MGD in January to a high of 6.95 MGD in September. The annual average was 5.23 MGD, which is well below capacity (USACE, Honolulu District 2010).

The water is pumped from the deep wells by four pumps at a rate of 2.9 MGD and is chlorinated before flowing into five air stripper towers, where organic contaminants are removed. The water is then chlorinated a second time and injected with a fluoride solution before it enters a 200,000-gallon UST. This tank contains seven booster pumps that transmit water into the distribution systems and storage tanks at the installations. Five of the booster pumps have a capacity of 2.0 MGD. Two of the booster pumps with capacity of 1.5 MGD, installed in 1993, serve the Schofield Barracks East Range exclusively (USACE, Honolulu District 2010).

The Schofield Barracks distribution and storage system consists of a 24-inch main, and the water treatment facility receives water through a 12-inch submain connected to the 24-inch main. The distribution system is divided into a low zone that runs north and east to serve the eastern portion of Schofield Barracks, and a high zone that extends to the western portions. Two 2-million-gallon steel tanks store water for the low zone, and three booster pumps send water to the two 1-million-gallon concrete tanks in the high zone (USACE, Honolulu District 2010).

The potable water system supplies the water to support fire suppression systems throughout the installations. The minimum required supply is for two flows of 1,000 gallons per minute (2.4 MGD) for two hours or one flow of 2,000 gallons per minute (2.9 MGD) for 3 hours (USACE, Honolulu District 2010).

~~The State Commission on Water Resource Management estimates the total sustainable yield of the Pearl Harbor Aquifer Sector Area (where the project site is) to be 165 MGD. The Pearl Harbor Aquifer Sector Area contains three aquifer system areas, one of which is the Waipahu-Waiawa aquifer system, where project site is, and that has an estimated sustained yield of 104 MGD. Water use permits have been issued for a total of about 178 MGD in the Central Oahu Watershed. The primary source of water in the Central Oahu Watershed is the Waipahu-Waiawa Aquifer System Area. The average annual pumpage within the Central Oahu Watershed is significantly less than the total permitted use and the sustainable yield (according to the 2007 Central Oahu Watershed Study, the average annual amount in 2004 was 82 MGD less than the sustainable yield). The Honolulu Board of Water Supply expects the central Oahu area's urban potable water demand to increase by 33.6 MGD between the years 2000 and 2030, and though it is expected that the water demand in the next 25 years will be met, it also estimates that groundwater withdrawals will approach sustainable yield estimates in that time (Dashiell 2007).~~

Schofield Barracks' groundwater comes from the Schofield Shaft in the central sector of the Central Oahu watershed (Dashiell 2007). The Army is the second largest federal potable water user in the Central Oahu watershed (first being the Navy). The Army's total permitted use is 5.648 MGD from the Schofield Shaft. As of March 2015, the Army's actual usage was 3.159 MGD (Bogdanski 2015). The generating station would use approximately 1,100 gallons of water per day; however, even with this addition, the Army's water use would remain well below its permitted use, so effects would be minor.

3.13.1.4 Sanitary Wastewater

Discharge and treatment of wastewater is regulated by EPA under the NPDES permit program as authorized by the CWA. The Army privatized the sanitary wastewater system, now owned and operated by AQUA Engineering. The Schofield Barracks Wastewater Treatment Plant is on the west end of Wheeler Army Airfield. It was constructed in 1976, and has been upgraded several times. The current treatment level is advanced tertiary and the average design flow capacity is 4.2 MGD (Aqua Engineers 2014; DLNR 2012). Wastewater is conveyed from Schofield Barracks to

the treatment plant by gravity, with pipes ranging in diameter from 4 to 21 inches (USACE, Honolulu District 2010).

The treatment plant processes an average daily flow of 1.9 MGD from Schofield Barracks, Wheeler Army Airfield, Camp Stover, Field Station Kunia, Leilehua Golf Course, and Helemanō Military Reservation. The maximum daily flow is 2.8 MGD during periods of minimal or no deployment. During extreme storm events untreated and partially treated sewage have overflowed or were discharged into the stormwater system. As part of infrastructure improvements to the South Range, a sewage lift station and sewer line is currently is being installed. This new sewer infrastructure just north of the generating station site would accommodate an estimated total demand of 0.86 MGD (USACE, Honolulu District 2010).

3.13.1.5 Solid Waste Management

Due to deployments, ongoing infrastructure upgrades, and housing privatizations, recent years solid waste streams amounts are not representative of historical waste generation. However, in 2002, Schofield Barracks generated an estimated 1,720 tons of solid waste, which represents about 50 percent of the total solid waste generated by Army installations in Hawaii (USACE, Honolulu District 2010). Only a small portion of waste goes to Waimanalo Gulch Landfill because the Army diverts 90 percent of the waste to HPower, a waste-to-energy system that converts municipal waste to power, and only the ash produced would be deposited at the landfill. The HPower facility is capable of processing 2,160 tons per day of municipal solid waste while generating up to 73 MW of energy (Hawaiian Electric 2013b; USACE, Honolulu District 2010). Schofield Barracks has a recycling facility at Building 1087B. There are two off-post landfills on Oahu that accept construction debris, one in Kaneohe and one in Waianae (Hawaii DOH 2013b).

3.13.1.6 Natural Gas and Syngas

Hawaii produces no natural gas and has no proven gas reserves. Hawaii produces a synthetic natural gas in an Oahu processing plant, typically by using naphtha feedstock from a local refinery. Hawaii Gas provides utility service regulated by the Hawaii PUC to a limited service area in Oahu that does not extend to the Schofield Barracks area. In addition, Hawaii Gas currently does not have the capacity or infrastructure to provide gas supplies on the scale that is required for power generation. It is anticipated that the gas utility will diversify its supply with both LNG and renewables-based synthetic natural gas. Hawaii Gas provides a container-based propane delivery service to customers who are not connected to their distribution system. As Hawaiian Electric converts its existing plants to LNG, it is anticipated that LNG will become readily available for use at the SGSP.

3.13.1.7 Communications

Verizon Hawaii provides commercial telephone service on official government cable to housing areas on Schofield Barracks, mainly from direct-buried cable lines. AT&T/Hawaiian Information Transfer System provides official phone service to the Army in duct lines. The Army is responsible for repairing and maintaining the official phone lines and for providing underground ducts for the commercial phone lines (C. H. Guernsey & Company 2001). Buried telephone lines supplying telecommunications to the housing areas at Schofield Barracks are already in poor condition and are scheduled for maintenance or replacement in the 5-year plan. There are no existing land telephone services; however telephone infrastructure and service is being developed at the South Range as part of GTA/SBCT efforts. Cellular coverage is adequate at the site (USACE, Honolulu District 2010).

Hawaiian Electric's existing facilities require redundant telecommunication paths to ensure two-way communications between the facilities and the main control center at their Ward Avenue facility. The primary communication route is fiber optic line tied into the existing gridwide communication system. In addition, microwave towers are installed at Hawaiian Electric's facilities and their signals are directed to receiving stations and subsequently tied into the existing gridwide communication system.

3.13.2 Environmental Consequences

This section provides a discussion of the potential environmental effects on utility resources that would result from the Proposed Action. Effects were primarily assessed by reviewing existing conditions of public utilities and the types and frequency of activities that may interrupt, disrupt, or relocate permanent service. Effects to utilities would be considered significant if the Proposed Action created an appreciable increase in usage beyond the capacity of the existing utilities infrastructure. Table 3.13-2 summarizes impacts for the Proposed Action and No Action Alternative. A detailed analysis of both the Proposed Action and the No Action Alternative follows the table.

Table 3.13-2.
Summary of Impacts to Utilities and Infrastructure

Type of Impact	Proposed Action	No Action Alternative
Effects to electrical utilities	Overall beneficial with some minor adverse	None
Effects to potable water utilities	Minor	None
Effects to wastewater utilities	Minor	None
Effects to solid waste utilities	Minor	None
Effects to natural gas utilities	Overall beneficial with some minor adverse	None
Effects to communications utilities	Minor	None
Overall Impacts	**Overall beneficial with some minor adverse**	**None**

3.13.2.1 Proposed Action

Short-term minor adverse and long-term significant beneficial effects would be expected. Short-term effects would be from generating debris, and increases in water and electricity needs during construction. Long-term beneficial effects would be from the increases in energy capacity, security, and infrastructure associated with the SGSP; however, there would be long-term minor increased demand for potable water, wastewater generation and treatment, and electricity. The existing infrastructure for all utilities would be reasonably accessible and have the capacity for projected demands from the generating station.

3.13.2.1.1 Construction

Because the project site is currently without utility service, utility infrastructure would be extended to the site as part of the construction. Small amounts of electricity would be required during construction. Temporary power would be obtained from the existing Schofield Barrack electrical infrastructure, from the existing power lines south of the site, or from portable generators. These electricity needs would be small and be within the existing capacity of the

power grid in the area. The proposed facilities would be constructed and operated in accordance with all applicable laws, with approval of the Hawaii PUC. These effects would be minor.

Small amounts of potable water would be trucked in for use during construction. As soon as reasonably possible, water would be obtained from the existing Schofield Barracks potable water system, which has adequate capacity to meet the expected need. Portable toilets would be used until permanent sewage connections became available. These effects would be minor.

Because the generating station would be constructed at a currently undeveloped site, no demolition or associated waste is anticipated. Construction wastes would include soil, scrap wood, excess concrete, empty containers, scrap metal, and insulation. Hawaiian Electric would contract with a private solid waste management company for the collection and disposal of construction debris. The contractor would pick up the debris and haul it to a permitted off-post landfill or to the waste-to-energy facility for disposal. These effects would be minor.

3.13.2.1.2 Operation

During operation, there would be long-term minor increase in demand for potable water, wastewater treatment services, and solid waste management. The existing infrastructure for all utilities would be reasonably accessible and have the capacity for projected demands from operation of the generating station. A detailed description of the generating station, reciprocating engine-generators, major electrical equipment, fuel system, water supply and use, and waste management is in section 2.2.1. A detailed description of the transmission line, route, poles, and substation/switchyard interface is in section 2.2.2. This section focuses on the potential environmental effects on utilities resources that would result from operating the generating station and associate transmission infrastructure.

In general, the direct power generation from the generating station and its benefits to the Army and Hawaiian Electric customers would be appreciably greater than any identified adverse effects to electricity, potable water, wastewater, solid waste management, natural gas, or communications. Therefore, the overall effects to utilities and infrastructure are considered beneficial.

3.13.2.1.2.1 Electricity

Increases in energy capacity, security, and infrastructure would have long-term significant beneficial effects to energy-based utilities. The operation of the power station would generate as much as 50 MW of firm on-demand power to the electrical grid of Oahu. The bulk of the electric power produced by the facility would be transmitted to the power grid through a direct connection with a proposed 46-kilovolt transmission line. The specific benefits the generating station would provide are:

- The SGSP would enhance Hawaiian Electric's ability to meet anticipated energy requirements, emergency demands, integrate intermittent sources into the grid, and meet daily peaking and cycling requirements.
- The SGSP would meet the energy needs of Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia (approximately 32 MW) during power outages.
- The SGSP would provide the capability to reduce the time required to restore islandwide power during a power outage.
- The SGSP would provide blackstart and quickstart capabilities to help maintain grid stability.

A small amount of electric power (approximately 1.0 MW) would be used on-site to power auxiliaries such as pumps, radiator fans, control systems, and general facility loads including lighting, heating, and air conditioning. Electrical infrastructure would be constructed and installed to meet the internal demands of the generating station. Infrastructure would be put in place for the generating station to be back fed electricity from the grid if there was a power failure. In addition to its core electrical equipment, the generating station would have an uninterruptible power supply for essential instrumentation, critical equipment loads, and unit protection and safety systems. The generating station would also have a 300-kilowatt back-up diesel generator that could provide power to all equipment necessary to start and operate the plant if there was a complete plant and grid outage. The use of on-site power and associated energy infrastructure would have minor effects.

The transmission line would constitute a substantial energy infrastructure upgrade; however, it would not in and of itself use or have any effect on any other utilities or utilities infrastructure (e.g., potable water, wastewater). The overall effects of the transmission lines to utilities and infrastructure would be beneficial, and they have not been carried forward for additional analysis in this section.

3.13.2.1.2.2 Potable Water

There would be a long-term minor increase in demand for potable water from the operation of the generating station. The SGSP would use very little potable water as it would have a closed loop design. Potable water would be used for the engine hall, control building, water treatment facility, sinks, men's and women's lavatories, showers, water fountains and emergency eyewash and shower stations. The source of all facility water would be the Schofield Barracks wells and water treatment facility through a connection to the Army's potable water infrastructure that is currently being installed on the South Range. Table 3.13-3 has the maximum, average, and minimum potable water requirements for the SGSP. The maximum demand of 0.26 MGD would be well within the capacity of the existing Schofield Barracks potable water system. The average demand of less than 0.01 MGD would be well within the capacity of the existing Schofield Barracks potable water system. This is equivalent to the average daily water use of approximately 50 people (USGS 2014). This additional demand on water supply would be constant; it would not increase over time. These effects would be minor.

Table 3.13-3.
Potable Water Requirements for the SGSP

Water Demand	Fire Suppression	Potable Water	Oil/Water Separator	Cooling Water	Service Water	Compressor Wash	Turbo Wash	Reverse Osmosis / Urea	Total Water Usage (GPD)	Total Water Usage (MGD)
Maximum with fire suppression	240,000	312	25	100	7,210	5	285	8,175	**256,112**	**0.26**
Maximum without fire suppression	0	312	25	100	7,210	5	285	8,175	**16,112**	**0.02**
Average	0	267	25	0	242	2	43	3,847	**4,426**	**<0.01**
Minimum	0	156	0	0	10	0	0	0	**166**	**<0.01**

Source: Quanta Power Generation 2014.

During normal operation, the largest potential water load would be to make the urea solution needed to operate the SCR emissions control system which would account for 86 percent of total water usage. The SCR system would use a maximum of 372 gallons per hour of 40 percent urea solution. Potable water would be demineralized and mixed with dry urea pellets on-site requiring approximately 57–340 gallons of potable water per hour. The system would require a maximum of 8,175 gallons per day (GPD) to operate. Water used for the SCR system would ultimately become water vapor emitted to the atmosphere through the stacks.

The generating station would have a fire protection system designed to protect personnel and limit property loss and downtime if there was a fire. The fire water supply and pumping system would provide fire-fighting water to yard hydrants, hose stations, and water spray and sprinkler systems. During a fire, the system would require a maximum of 167 gallons per minute (0.24 MGD) to operate. Any discharge from the fire prevention system would enter the stormwater system directly.

3.13.2.1.2.3 Wastewater

There would be long-term minor increase in wastewater from operating the generating station. All wastewater from the generating station would be discharged into the Schofield Barracks sanitary sewer system through a connection to the to the Army's wastewater lift station just north of the generating station site. Potable water would be ultimately discharged into the sanitary sewer, the stormwater system, or the atmosphere through air emissions or evaporation. Table 3.13-4 has the maximum, average, and minimum water transport scenarios for the generating station. Because the maximum discharge of 9,696 GPD (0.0097 MGD) to the sanitary sewer would be well within the capacity of the existing Schofield Barracks wastewater system, these effects would be minor.

The domestic wastewater system would collect sanitary wastewater from sinks, toilets, showers, and other sanitary facilities, and discharge to a sanitary sewer pipeline. The process wastewater collection system would collect area wash down, sample drains, and drainage from facility equipment areas. Facility water (the water supplied to lube oil separators, maintenance water tanks, service water system, engine compressor wash, and the reverse osmosis system) would discharge into the sanitary sewer system after passing through an oil/water separator. Table 3.13-5 outlines the maximum, average, and minimum water flows for all discharge streams for the generating station. During normal operation, the largest potential wastewater discharge would be from the floor drains and water rejected from the reverse osmosis system as unsuitable to make the urea solution for the SCR units. Notably, the total water discharged equals the total potable water requirements (Tables 3.13-3 and Table 3.13-5).

Table 3.13-4.
Overview of Water Usage for the SGSP

	Water Discharge [gallons per day (million gallons per day)]			
	Wastewater to Sanitary Sewer	**Water Vapor to Atmosphere**	**Water to Storm Water System**	**Total Water Usage**
Maximum with fire suppression	9,696 (0.0097)	6,416 (0.0064)	240,000 (0.240)	256,112 (0.2561)
Maximum without fire suppression	9,696 (0.0097)	6,416 (0.0064)	-	16,112 (0.0161)
Average	1,498 (0.0015)	2,928 (0.0029)	-	4,426 (0.0044)
Minimum	166 (0.0002)	-	-	166 (0.0002)

Source: Quanta Power Generation 2014.

Table 3.13-5.
Water Discharge Streams for the SGSP

	Sanitary Sewer						Atmosphere		Storm-water	Total	
Water Discharge	**Oil/Water Separator**	**Maintenance Water Tank Drains**	**Floor Drains**	**Compressor Wash**	**Reverse Osmosis Rejected Water**	**Used Potable Water**	**Engine Turbo Wash**	**Selective Catalytic Reduction System**	**Fire Suppression Water**	**Total Water Usage (gallons per day)**	**Total Water Usage (million gallons per day)**
Maximum with fire suppression	25	100	7,210	5	2,044	312	285	6,131	240,000	**256,112**	**0.26**
Maximum without fire suppression	25	100	7,210	5	2,044	312	285	6,131	0	**16,112**	**0.02**
Average	25	0	242	2	962	267	43	2,885	0	**4,426**	**<0.01**
Minimum	0	0	10	0	0	156	0	0	0	**166**	**<0.01**

Source: Quanta Power Generation 2014.

3.13.2.1.2.4 Solid Waste Management

The SGSP would produce small amounts of solid wastes typical of power generation operations. While no exact estimate is available, the generating station would maintain a small dumpster on-site to collect all nonhazardous solid waste. Hawaiian Electric would contract with a private solid waste management company for the collection and disposal of this refuse. The contractor would pick up the refuse and haul it to a permitted off-post landfill or to the waste-to-energy facility for disposal. These effects would be minor.

3.13.2.1.2.5 Fuel Related Infrastructure

Establishing infrastructure for the storage, handling and combustion of biofuel, diesel fuel, and LNG at the site would have long-term minor beneficial effects to utilities and infrastructure. As discussed in section 2.2.1, the generating station would be multifuel capable and able to run on a wide range of fuel types and the reciprocating engines would primarily use a liquid biofuel blend and natural gas derived from LNG. The generating station and site improvements would include associated infrastructure for the storage, handling and combustion of biofuel, diesel fuel, and LNG at the site.

Infrastructure required to store liquid fuel would include two 32-foot-diameter by 40-foot-high aboveground fuel storage tanks. Combined, these tanks would have the capability of storing up to 420,000 gallons of fuel. Biodiesel would be delivered to the site in fuel trucks with approximate capacities of 5,800 gallons and diesel delivered in fuel trucks with approximate 9,000 gallon capacities. The systems and infrastructure associated with liquid fuels would have long-term minor beneficial effects.

When LNG becomes available, it would be delivered to a separate receiving area at the site in ISO container trucks holding approximately 10,000 gallons. The trailer-mounted LNG ISO containers would be disconnected from the delivery trucks and serve as the on-site LNG storage. The containers would be connected to a LNG manifold, so that the LNG flows from the containers to a bank of vaporizers converting it to gaseous form and piping to the engine hall. The

receiving area and manifold system would be built to accommodate up to six LNG ISO containers at one time. Assuming that the LNG containers arrive with 10,000 gallons of fuel, each one could support approximately 2 hours of full-power operation of the entire SGS. When empty, the ISO containers would be trucked away and replaced with full ones. The systems and infrastructure associated with LNG would have long-term minor beneficial effects.

3.13.2.1.2.6 Communications

Establishing telecommunications infrastructure at the site would have long-term beneficial effects. Redundant telecommunication paths would be required to ensure 2-way communications between the generating station and Hawaiian Electric's main control center at its Ward Avenue facility. The primary communication route would be a fiber optic line installed along the 46-kV line to the Wahiawa Substation where it would tie into the existing gridwide communication system. In addition to fiber optics, a microwave tower at the generating station would be installed and its signal would be directed to Mauna Kapu, then to the Waiau Power plant, and subsequently tied into the existing gridwide communication system. The microwave communications route from the generating station to Mauna Kapu tower would require a telecomm license from New Cingular Wireless PCS, LLC. These effects would be minor.

3.13.2.1.3 Mitigation Measures and BMPs

No mitigation measures for utilities and infrastructure would be required. The direct, indirect, and cumulative effects associated with utilities and infrastructure would be less than significant. No activities outside compliance with existing regulations, permits, and plans would be required.

3.13.2.1.3.1 Potable Water BMPs

The generating station would be designed to minimize water use. The engines would be cooled by a closed-loop radiator system. Hot water from the engines would be circulated through radiators, having tubes with fins to remove the heat from the water. The cooled water would then be returned to the engine to be used again. Since it would be a closed loop system, it would use a minimal amount of water. As opposed to being discharged, process water would be purified using two on-site reverse osmosis treatment units. Some of the water would be stored in a tank for use in the urea mixing system.

3.13.2.1.3.2 Stormwater and Wastewater BMPs

Stormwater runoff from area drains in the lubricating oil and diesel tank areas would be collected in sumps. This sump water would be checked routinely for level and contamination (oil sheen or physical contamination) and contaminated water would be pumped to the oil/water separator. Clean effluent from the oil/water separator would be discharged to the sanitary sewer system, and any accumulated sludge would be removed and taken to a permitted recycling facility or required hazardous waste disposal site. Water containing any cleaning chemicals or collected spills would be trucked off-site for disposal at an approved wastewater disposal facility.

3.13.2.2 No Action Alternative

The No Action Alternative would result in no changes to utilities and infrastructure. There would be no construction and no SGSP operations, so there would be no effects. In the absence of the project, the islandwide grid would remain vulnerable to coastal effects and other outages, and the islandwide energy grid would experience greater instability compared to existing conditions. If

the No Action Alternative were ultimately selected, the overall net benefit to utilities and infrastructure from the SGSP would not be realized.

3.14 CONCLUSION

The environmental consequences of the Proposed Action and No Action Alternative, as discussed in the resources, are summarized in Table 3.14-1

Potential impacts were analyzed assuming full-time operation of the generating facility (24 hours a day, 365 days a year). Under a full-time operation scenario, minor adverse effects could be expected with regard to land use, airspace, traffic and transportation, water resources, geology and soils, biological resources, cultural resources, hazardous and toxic substances, and utilities and infrastructure. Moderate adverse effects could be expected for visual resources, air quality, and noise. In addition, some beneficial effects could also be expected for air quality, traffic and transportation, biological resources, hazardous and toxic substances, socioeconomics, and utilities and infrastructure. Under normal conditions, the facility would likely operate less than full time, so projected impacts could be less than the levels projected. Because there is the potential for some endangered species (i.e., Hawaiian hoary bat and Hawaiian water birds) to enter the project area during construction or operation, Hawaiian Electric has incorporated several design elements and BMPs into the project to minimize the potential for those species to be adversely affected by the project. None of the effects from construction or operation of the SGSP, either individually or cumulatively, would rise to the level of significant under NEPA.

Implementing the No Action Alternative would have no direct or indirect adverse or beneficial impacts.

Table 3-14.1.
Environmental Consequences

Resource Area	Proposed Action	No Action Alternative
Land use	Minor adverse	None
Airspace	Minor adverse	None
Visual resources	Moderate adverse	None
Air quality	Moderate adverse and beneficial	None
Noise	Moderate adverse	None
Traffic and transportation	Minor adverse and beneficial	None
Water resources	Minor adverse	None
Geology and soils	Minor adverse	None
Biological resources	Minor adverse and beneficial	None
Cultural resources	Minor adverse	None
Hazardous and toxic substances	Minor adverse and beneficial	None
Socioeconomics	None or beneficial	None
Utilities and infrastructure	Minor adverse and beneficial	None
Overall Environmental Consequences	**Minor to moderate adverse and beneficial**	**None**

SECTION 4
CONSISTENCY WITH EXISTING LAND USE PLANS, POLICIES, AND CONTROLS

4.1 OVERVIEW

In accordance with the requirements of HAR §11-200-17(h), this section discusses the relationship of the proposed SGSP to land use plans, policies, and controls applicable to the project area. The discussion identifies the extent to which the Proposed Action would conform or conflict with the objectives and specific terms of approved or proposed land use plans, policies, and controls. It also discusses major federal regulations. The section is organized by jurisdiction—federal, state, and county—and by specific ordinance, regulation, or law.

The SGSP would be subject to two types of land use controls.

- *Army Land Use Regulations*. The generating station site, the area over which the Army would grant road access easements, and portions of the transmission line route are on Army property. These portions of the project site are governed by the applicable provisions of Army regulations, primarily Army Regulation 210-20 ~~the Real Property Master Plan~~, which regulates land use on property administered by the Army. These regulations do not limit land use per se, but they do require that the uses be in accordance with Army installation land use planning procedures and regulations.
- *Off-Post Land Use Regulations*. The parts of the SGSP that would not be on Army property (e.g., portions of the interconnection easement and the Wahiawa Substation) would be subject to both State of Hawaii and City and County of Honolulu land use regulations in Chapter 205, HRS, and Chapter 21, Revised Ordinances of Honolulu.

Both types of land use plans and regulations guide the type and extent of allowable land use to achieve specified planning objectives. Examples of these include (1) controlling growth; (2) maintaining and improving social, cultural, and physical amenities; (3) promoting a stable economy; (4) preserving agricultural lands; (5) maintaining scenic areas; (6) supplying adequate housing; (7) ensuring the availability of necessary public services and utilities; (8) protecting specially designated or environmentally sensitive areas; and (9) ensuring compatible land uses. The one significant difference between the civilian and the Army master planning systems is that the Army, as described in Army Regulation 210-20, does not plan for economic growth.

4.2 ARMY REAL PROPERTY MASTER PLANNING

Army real property is defined as real estate owned by the United States under the control of the Army. It includes the land, right, title, and interest therein and improvements thereon. Rights and interest include leaseholds, easements, rights-of-way, water rights, air rights, and rights to lateral and subjacent support. Installed building equipment is considered real estate until severed. Equipment-in-place is considered personal property.

Master planning for Army installations uses the 12 general land use classifications shown in Table 4.2-1, below. These classifications identify the principal kinds of facilities and activities found in particular areas of an Army installation. The Army master planning purposes outlined in Army Regulation 210-20 that are relevant to the SGSP are (1) establishing a framework for allocation of limited resources that affect, or are affected by, the use of real property assets, including leasing and public/private ventures; (2) identifying sustainability issues, activities, and

actions that may have significant mission or environmental impacts; and (3) ensuring that installations have the capacity to support their assigned missions.

Table 4.2-1.
Army Land Use Classification System

Category	Land Use
Airfield	Landing and takeoff area, aircraft maintenance, airfield operational and training facilities, and navigational and traffic aids.
Maintenance	Depot maintenance, installation maintenance, Table of Organization and Equipment unit maintenance.
Industrial	Production; research, development, and test facilities; potable water supply, treatment, and storage; electric power source, transmission, distribution, substations, and switching stations; heat sources, transmission lines, and distribution lines; sewage and industrial waste treatment and disposal; sewage and industrial waste collection; and parking areas.
Supply/Storage	Installation ammunition storage, depot ammunition storage, cold storage, general-purpose warehouse, controlled-humidity warehouse, flammable materials storehouse, fuel storage, engineer material storage, medical warehouse, unit storage, and salvage and surplus property storage.
Administration	Installation command and control, directorates, tenants, organizational, and special.
Training/Ranges	Training facilities, buildings; training grounds and facilities other than buildings; firing ranges, training; and firing ranges, research, development, testing, and evaluation.
Unaccompanied Personnel Housing	Officer unaccompanied personnel housing, enlisted unaccompanied housing, and visiting Officers and Soldiers quarters.
Family Housing	Family housing.
Community	Commercial and services.
Medical	Hospital, dental clinic, clinic without beds, electric power source, heat source, parking areas.
Outdoor Recreation	Recreation building, outdoor swimming pool, tennis courts, multiple court areas, baseball field, softball field, football field, and soccer field.
Open Space	Unoccupied land, buffer and easement, and greenbelt.

Source: U.S. Army 2005

Army Regulation 210-20 and the master planning process ~~The master plan~~ for USAG-HI that addresses Schofield Barracks and Wheeler Army Airfield are organized into five components.

1. The *Real Property Master Plan Digest* provides the vision, goals, and objectives for the management and development of Schofield Barracks and summarizes the most important master planning concepts, details, and facts of USAG-HI's master planning process ~~plan~~. It describes the thrust of the installation's real property development, its constraints and opportunities, and the path to achieving the long-range goals for the community. It ~~is not merely a summary of the master plan but also~~ provides analyses and can serve as a decision-support document (U.S. Army 2005).
2. The *Long Range Component* establishes the environmental baseline, basic framework, and specific options for developing and managing real property at Schofield Barracks. This includes an integrated strategy for infrastructure assurance

to support mission requirements and sustainable development, as well as a land use analysis and plan that shows the relationships and use of installation land by generalized areas, including family housing, troop housing, range and training, retail, parks and recreation, schools, transportation, industrial, and natural and cultural environmental sites.

3. The *Installation Design Guide* (IDG) provides specific guidance on the architectural character of, and exterior and interior design parameters for Schofield Barracks. All improvements, renovation projects, and new construction must comply with the IDG. The purpose of the IDG is to promote visual order, enhance the natural and manmade environments through consistent architectural themes and standards, and improve the functional aspects of the garrison (U.S. Army 2005).
4. The *Capital Investment Strategy* is the garrison commander's overall strategy for using and investing in real property to support Schofield Barracks missions and Army objectives. It describes permanent comprehensive/holistic solutions, and short-term actions necessary to correct deficiencies, and to meet real property requirements in a manner that assures infrastructure reliability and contributes to sustainable development (U.S. Army 2005).
5. The *Short-Range Component* integrates the real property master planning into the Army's budgetary and operational planning processes through the current budgetary planning period. More specifically, the short-range component incorporates recommended real property master planning activities into the Army's resource management process (U.S. Army 2005).

The development or updating of a master plan is required to embody the goals and objectives of the NEPA, as amended, with emphasis on environmental awareness, public review of planning proposals that do not compromise security, sustainable design and development, historic sites and buildings, and archaeological and natural resources. All planning proposals ~~that are reflected in the USAG-HI master plan~~ should be analyzed for potential environmental effects in accordance with NEPA. ~~Optimally, planning proposals should be tiered, under the master plan NEPA documentation~~. A related EA/EIS could serve as the basis for all subsequent EA/EIS documents for the installation (U.S. Army 2005).

Currently, no master plan NEPA document has been prepared; however, Schofield Barracks has been the subject of at least three recent NEPA environmental review documents:

- *Final Environmental Impact Statement Permanent Stationing of the 2/25th Stryker Brigade Combat Team*, issued by the U.S. Army Environmental Command in February 2008
- *Environmental Assessment for Construction of Four Projects to Support the Army Growth Stationing Action at Schofield Barracks Military Reservation*, Oahu, Hawaii, prepared for the U.S. Army Garrison, Hawaii in January 2010
- *Programmatic Environmental Assessment for Army 2020 Force Structure Realignment*, prepared for the U.S. Army Environmental Command in January 2013

The generating station site and much of the interconnection easement would be in the Training Area zone. The existing and proposed land use map from the 2010 report shows that the SGSP site has not been identified for any other use and would be consistent with the Army's land use classifications in the project area. The proposed project would not have direct, secondary or cumulative adverse impacts on existing or planned land used in adjacent areas.

4.3 FEDERAL

4.3.1 National Environmental Policy Act

Implementing the proposed SGSP is a federal action subject to compliance with the procedural requirements of NEPA [42 USC §§4321 to 4370 (f)] and NEPA regulations (40 CFR Parts 1500-1508), along with CEQ implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions. The Army has prepared and provided for public review this EIS to evaluate the potential environmental impacts of constructing and operating the SGSP. The Army will not make a decision on implementing the proposed SGSP until after the NEPA process is complete.

4.3.2 Federal Aviation Administration

Part 77 of the FAA Federal Aviation Regulations (14 CFR Part 77) applies to objects that may obstruct navigable airspace. The regulations require notifying the FAA at least 45 days prior to the start of construction or the date an application for a construction permit is filed, whichever is earliest, for certain types of construction near certain airports and heliports. The FAA should be notified using FAA Form 7460-1, Notice of Proposed Construction or Alteration. FAA Form 7460-2, Supplemental Notice, is used to notify the FAA of progress on or abandonment of projects requiring notice using FAA Form 7460-1. Hawaiian Electric will file a Notice of Proposed Construction or Alteration after the generating station site layout is final and prior to the initiation of construction.

4.3.3 Clean Air Act

Under the authority of the CAA, EPA established nationwide air quality standards to protect public health and welfare (42 USC 7409). These federal standards, known as NAAQS, represent the maximum allowable atmospheric concentrations for six criteria pollutants: ozone, nitrogen dioxide, carbon monoxide, sulfur dioxide, lead, and PM_{10} and $PM_{2.5}$. The Clean Air Branch of the Hawaii DOH is responsible for implementing air pollution control in the state and has established the Hawaii SAAQS.

Based on measurements of ambient criteria pollutant data, EPA designates areas of the United States as having air quality equal to or better than NAAQS (attainment) or worse than NAAQS (nonattainment). The CAA general conformity rule requires that projects in nonattainment and maintenance areas be consistent with the applicable SIP.

Because the project is completely in an area designated as attainment or unclassifiable for which NAAQS designations have been issued, no formal conformity determination is required. The SGSP would be exempt from the general conformity requirements because it includes stationary sources that would require a permit under the PSD program [40 CFR §93.153(d)(1)]. Predictive dispersion modeling and an ambient air quality analysis were done that demonstrated the proposed SGSP would not cause or contribute to the violation of any NAAQS or Hawaii AAQS, PSD Class II increment, or have adverse effects to nearby Class I areas. The necessary air permit(s), as required by HAR §11-60.1, would be obtained prior to construction.

4.3.4 Clean Water Act

The purpose of the CWA is to “restore and maintain the chemical, physical and biological integrity of the nation’s waters” (33 USC §1251[a]). Section 402 of the CWA establishes the NPDES permit program to regulate point source discharges into waters of the United States. For construction, Hawaiian Electric would obtain permit coverage for stormwater runoff from the

construction site under the NPDES General Permit Authorizing Discharges of Stormwater Associated with Construction Activity (HAR Chapter 11-55 Appendix C; expires 5 December 2018), issued by the Hawaii DOH Clean Water Branch. For operation, the SGSP would be included in USAG-HI's NPDES permit number HI S000090, the Army's MS4 permit that addresses storm water permitting requirements for Schofield Barracks, Wheeler Army Airfield, and other U.S. military installations on Oahu (USAG-HI 2007). As part of the MS4 permit, the Army has established regulatory mechanisms, including enforcement procedures and actions that prohibit nonstormwater discharges into the Army stormwater system.

Section 404 of the CWA prohibits the discharge of dredged or fill material into "waters of the United States" without a permit from the U.S. Army Corps of Engineers (USACE). USACE regulations under the section 404 program define "waters of the United States" to include (1) interstate waters; (2) waters that are or could be used in interstate commerce; (3) waters such as wetlands, which use or degradation could affect interstate commerce; (4) tributaries of the waters identified above; and (5) wetlands adjacent to these waters. Anyone planning to conduct activities in these waters must obtain a permit. Substantial impacts to waters of the United States might require an individual permit. Projects that only minimally affect jurisdictional waters might meet the conditions of one of the existing nationwide permits. The proposed SGSP would not discharge dredged or fill material into "waters of the United States" that are subject to jurisdiction under section 404 of the CWA. Therefore, a USACE section 404 permit will not be required.

4.3.5 Endangered Species Act

The purpose of the ESA (16 USC §§1531-1544), as amended, is to conserve threatened and endangered plant and animal species and their habitats, specifically those areas that have been designated as critical habitat. The ESA defines an endangered species as one that is "in danger of extinction throughout all or a significant portion of its range" and a threatened species as one that "is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." Critical habitat includes areas containing essential habitat features, regardless of whether those areas are currently occupied by the listed species. ESA-listed species and their critical habitat are protected from "take." A "take" of a listed species is defined in the ESA to include "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Species that are not listed under the ESA but are of concern are referred to as candidate, proposed, or species of concern. The ESA also protects against degrading designated critical habitat.

Under section 7 of the ESA, federal agencies must consult with the USFWS and/or NOAA Fisheries, depending on the species under review, to ensure that their actions are not likely to jeopardize the continued existence of endangered and threatened species or destroy or adversely modify critical habitat for endangered and threatened species. The Army met with UFSWS in November 2014 to discuss appropriate project design measures to minimize impacts to threatened and endangered species. The Army informally consulted with USFWS under section 7 of the ESA, providing USFWS a letter documenting the conclusions presented in this EIS that effects on threatened and endangered species (as described in section 3.9) would be less than significant with implementation of appropriate project design measures (see sections 2.2.2.5, Construction, and 2.2.3, Operation). USFWS responded and concurred with the Army's determination. Hawaiian Electric has corresponded with USFWS and the NOAA Fisheries Pacific Islands Regional Office regarding potential effects on critical habitat and essential fish habitat.

4.3.6 Migratory Bird Treaty Act

Under the MBTA (16 USC §§703-712), taking, killing, or possessing migratory birds is unlawful. Unless permitted by regulations, under the MBTA it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried, or received any migratory bird, part, nest, egg, or product. The MBTA provides no process for authorizing incidental take of MBTA-protected birds.

The generating station site provides suitable habitat for the Pacific golden plover, which is known to occur on Schofield Barracks. The less disturbed portions of the interconnection easement (Waikele Stream gulch and Wahiawa Freshwater State Park) may provide suitable habitat for the plover or other MBTA-protected birds. However, as described in section 3.9, potential impacts on the Pacific golden plover and other MBTA-protected birds would be less than significant.

4.3.7 National Historic Preservation Act

The NHPA of 1966, as amended (Public Law 102-575), requires federal agencies to assure preservation or mitigation of effects to historic properties that are eligible for inclusion on the NRHP. The proposed SGSP is a federal undertaking subject to section 106 of the NHPA. Cultural and archeological resources surveys have been conducted for the Project. The Army is consulting with the SHPD. The Army, Hawaiian Electric, Historic Hawaii Foundation, and the SHPD discussed the project and verbally agreed that the project as designed would have no adverse effect under section 106 of the NHPA. The Army sent a letter to the SHPD to that effect and is awaiting a reply.

4.3.8 Resource Conservation and Recovery Act

The RCRA (42 USC §6962) regulates solid and hazardous waste. Its goals are 1) to protect human health and the environment from the hazards posed by waste disposal; 2) to conserve energy and natural resources through waste recycling and recovery; 3) to reduce or eliminate, as expeditiously as possible, the amount of waste generated, including hazardous waste; and 4) to ensure that wastes are managed in a manner that is protective of human health and the environment. Hawaiian Electric will comply with all RCRA requirements for the generation, characterization, treatment, and disposal of solid and hazardous waste. Additional information about hazardous waste is in section 3.11 and solid waste is in section 3.13.

4.3.9 Emergency Planning and Community Right-to-Know Act

The EPCRA (42 USC §11001, et seq.), also known as Title III of the Superfund Amendments and Reauthorization Act (SARA), was enacted by Congress as the national legislation on community safety. The purpose of EPCRA is to help local communities protect public health, safety, and the environment from chemical hazards.

Under EPCRA Tier II reporting requirements, any facility that uses or stores hazardous materials in quantities greater than 10,000 pounds (or 500 pounds for extremely hazardous chemicals) must report the types and quantities of chemicals stored to the Hawaii DOH and Honolulu Fire Department annually. Hawaiian Electric anticipates that EPCRA reporting requirements will apply to the generating station site for fuel and ammonia. Annual EPCRA reports for the facility will be available to the public upon written request to Honolulu Fire Department or the Hawaii DOH.

Under the toxic release inventory reporting section of the EPCRA, Hawaiian Electric is required to complete a toxic chemical release form for each toxic chemical that was manufactured, processed, or otherwise used in quantities exceeding the toxic chemical threshold quantity (i.e., 10,000 pounds per year for chemicals used at the facility and 25,000 pounds per year of chemicals manufactured at the facility) once each calendar year. Chemicals to be used at the proposed generating facility that could be subject to this requirement include polyaromatic compounds and naphthalene, which are organic byproducts of the fuel burning process. Hawaiian Electric will coordinate with the Hawaii DOH once it has finalized the potential chemical inventory for the facility, to ensure that it complies with all provisions of the EPCRA.

4.3.10 Energy Independence and Security Act

The EISA (Public Law 110-140) was signed into law in 2007. The EISA aims to move the United States toward greater energy independence and security; increase the production of clean renewable fuels; protect consumers; increase the efficiency of products, buildings, and vehicles; promote research on and deploy greenhouse gas capture and storage options; and improve the energy performance of the federal government.

Compliance with EISA is part of purpose of and need for the Proposed Action. Section 3.7.1.4 discusses how project will comply with the water conservation aspects of the act.

4.4 STATE OF HAWAII

4.4.1 Hawaii State Plan

The *Hawaii State Plan* (codified in Chapter 226, HRS) is intended to guide long-range development in Hawaii by:

- Identifying goals, objectives, and policies for the state and its residents
- Establishing a basis for determining priorities and allocating resources
- Providing a unifying vision for the state to enable coordination between the various counties' plans, programs, policies, projects and regulatory activities to assist them in developing their county plans, programs, and projects and the state's long-range development objectives.

The *Hawaii State Plan* is a policy document. It depends on implementing laws and regulations to achieve its goals. The sections of the *Hawaii State Plan* relevant to the SGSP are sections 226-18(a) and (b), which establish objectives and policies for energy facilities and systems. These sections are reproduced below, and the Proposed Action's consistency with them is discussed.

Several *Hawaii State Plan* policies concerning energy systems are related to the SGSP.

> *§226-18(a) Planning for the State's facility systems with regard to energy shall be directed toward the achievement of the following objectives, giving due consideration to all:*
>
> *Dependable, efficient, and economical statewide energy systems capable of supporting the needs of the people.*

The objectives of the SGSP, as stated in section 1.3 of this EIS, are to:

1. Provide improved energy security to the USAG-HI at Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia

2. To provide new secure, firm, dispatchable, flexible, and renewable energy generation to the grid on Oahu, Hawaii

The electrical power generating capacity the project would provide is a necessary and important component of Hawaiian Electric's generation portfolio. The characteristics of the proposed generating units make them particularly well-suited for use with the multiple highly variable renewable energy generating facilities that Hawaiian Electric is integrating into its system. The SGSP would contribute to a flexible, dependable, and efficient islandwide electrical system that includes distributed generation such as roof-top solar, purchase of electrical power from solar and wind farm facilities, energy-efficiency/energy-conservation measures, and other activities are crafted to reduce energy consumption and develop alternative energy resources, all of which would contribute to the efficiency and sustainability of the islandwide system.

§226-18(a)(2) Increased energy self-sufficiency where the ratio of indigenous to imported energy use is increased.

The SGSP, in and of itself, would not guarantee an improvement in the ratio of indigenous to imported fuel use. However, because it would be capable of using several types of fuels, including locally produced biofuels, if and when they become available, it creates an opportunity for that to occur. The project would support increased energy self-sufficiency by providing a substantial opportunity for biofuel use that would support the local market for their production and is thus consistent with this policy.

§226-18(a)(3) Greater energy security in the face of threats to Hawaii energy supplies and systems.

As discussed in section 1.3, the SGSP would enhance energy security because of the following reasons:

- The project would locate electrical generation capacity away from the coastline, where all of Hawaiian Electric's generation capacity is currently located, helping to reduce susceptibility to storm- and tsunami-related damage.
- The project would place generation capacity on a secure military installation where it would be protected from the threat of sabotage and terrorism.
- The generating station would be flexible and could react quickly to changes in energy use on the grid, thereby contributing to grid-stability and helping to avoid system crashes (i.e., blackouts). This flexibility also extends to the variety of fuels which it can use, reducing its susceptibility to threats on the island's fuel supply.
- Its geographic location in the central part of the island would contribute to grid stabilization.

§226-18(a)(4) Reduction, avoidance, or sequestration of greenhouse gas emissions from energy supply and use.

There would be long-term beneficial effects from reductions in the use of other power stations currently supplying power to the island because the emissions from more modern power stations are generally lower than those generated by older ones. Biodiesel, diesel, and natural gas have lower sulfur content when compared to other fuel sources such as coal.

§226-18(b) To achieve the energy objectives, it shall be the policy of this State to ensure the provision of adequate, reasonably priced, and dependable energy services to accommodate demand.

Section 1.4 discusses how the SGSP would help Hawaiian Electric meet present and forecasted demand for electrical power and why the transmission lines would enhance electrical service and avoid costly disruptions to the islandwide electrical grid.

> *§226-108 Priority guidelines and principles to promote sustainability shall include:*
> *(2) Encouraging planning that respects and promotes living within the natural resources and limits of the State;*

The SGSP's requirement to use biofuels would provide a steady commercial biofuel demand that could encourage investment in local biofuel production capacity. In addition, the high fuel efficiency of the proposed engines compared to existing generating facilities would mean that, when the SGSP is placed in service, less total fuel would be required to meet state energy demands. Combined, these two aspects demonstrate that the SGSP supports the goal of living within the natural resource limits of the state.

4.4.2 State Sustainability Plan 2050

In the years since the *Hawaii State Plan* was issued, both it and the "functional plans" that helped guide its implementation have become dated.[9]

The *State Sustainability Plan 2050* is intended to build on the foundation of these previous documents, developing a strategic approach to achieving Hawaii's preferred future.[10] While the *State Sustainability Plan 2050* has not been enacted into law the way its predecessors were, it does contain guidance relevant to the project. The plan prioritizes a series of steps toward sustainability to be achieved by 2020, one of which calls upon the state to "*reduce reliance on fossil (carbon-based) fuels*" and is relevant to the SGSP (Hawaii 2050 Sustainability Taskforce 2008).

The sustainability plan observes that energy use pervades all aspects of contemporary life and that about 95 percent of Hawaii's primary energy supply is imported fossil fuel that contributes to global warming and the deterioration of our environment. It notes that there are other sources of energy that can be produced locally and calls on the people of the state to reduce their reliance on fossil fuels by expanding renewable energy opportunities, improving energy efficiencies in all that we do, and encouraging the production and use of locally produced bio-fuels (Hawaii 2050 Sustainability Taskforce 2008).

In keeping with this, the generating units would be capable of using several types of fuels, including locally produced biofuels, as they become available. The SGSP would not, in and of itself, guarantee an improvement in the ratio of indigenous to imported fuel use, but it would provide a substantial opportunity for biofuel use, which would support the local market for production.

[9] The last comprehensive review and revision of the *Hawaii State Plan* occurred in 1986, and the *State Functional Plans* were last updated in 1991.

[10] In 2005, the Hawaii State Legislature created the Hawaii 2050 Sustainability Task Force, a group of 25 citizens with a diverse range of experience in planning, community, business, the environment, and government. They were charged with developing the Hawaii 2050 Sustainability Plan, the state's first long-range plan in 30 years. A 2-year planning process engaged more than 10,000 participants and led to a final report that the task force submitted to the Legislature in January 2008.

4.4.3 Chapter 205, Hawaii Revised Statutes – Land Use Law

Chapter 205, HRS, grants legal authority to the State Land Use Commission to place all lands in the state into one of four land use districts: (1) urban, (2) rural, (3) agriculture, or (4) conservation. The counties make all land use decisions in the urban districts in accordance with their respective county general plans, development plans, and zoning ordinances. The counties also regulate land use in the state rural and agriculture districts, but within the limits imposed by Chapter 205, HRS.

As can be seen in Figure 3.1-3, Land Use Districts of this report, the generating station site and the portion of the transmission line closest to it would be in the agriculture district. Nearly all of the remainder of the transmission line would be in the urban district, except the final four poles and line connecting to the Wahiawa Substation that would be in the conservation district. Utility installations are permitted uses in the agriculture and urban districts; however, the SGSP will need a conservation district use permit for the portion of the project located in the conservation district (see Table 2.2-2).

4.4.4 Coastal Zone Management Program

The Hawaii CZM program was established in accordance with the CZMA that requires direct federal activities and development projects to be consistent with approved state coastal programs to the maximum extent practicable. Federally permitted, licensed, or assisted activities occurring in, or affecting, the state's coastal zone must be in agreement with the Hawaii CZM program's objectives and policies. Federal agencies cannot act without regard for, or in conflict with, state policies and related resource management programs that have been officially incorporated into state CZM programs (15 CFR Part 930).

The objectives of the Hawaii CZM program are in Chapter 205A, HRS (also referred to as the Hawaii CZM Act). The program promotes the protection and maintenance of valuable coastal resources. The Hawaii CZM area encompasses the entire state. The State Office of Planning has the lead role in administering Hawaii's CZM program. A discussion of the project's consistency with the objectives of Hawaii's CZM program follows.

4.4.4.1 Recreational Resources

Objective**:** *Provide coastal recreational opportunities accessible to the public.*

The SGSP would be far from the shoreline and the nearest coastal recreational resources, so it would not adversely impact coastal recreational opportunities or disrupt public access.

4.4.4.2 Historic Resources

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

No archaeological or historic site would be subject to significant adverse impacts from construction or operation of the SGSP. SHPD will be provided with the draft EIS for review, and comments, if any, will be reproduced in the Final EIS. Some transmission poles and portions of the transmission line would be visible from the Schofield Barracks and Wheeler Army Airfield historic districts. The Army will consult with SHPD regarding these visual effects. If, during construction, any previously unidentified archaeological or historic site is identified, construction activities would be halted in the vicinity and SHPD would be immediately notified (see section 3.10.2.1).

4.4.4.3 Scenic and Open Space Resources

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

The SGSP would be far from the shoreline and would not affect the quality of coastal scenic or open space resources. It would not have the potential to have a significant adverse effect on important scenic or open space resources.

4.4.4.4 Coastal Ecosystems

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

The SGSP would be in Central Oahu, far from the coastline. It would have no effect on coastal ecosystems or the marine environment.

4.4.4.5 Economic Uses

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

Because the SGSP would make positive contributions to Hawaii's economy in two ways: (1) through the capital expenditures necessary to construct and operate the project, and (2) by improving the accessibility and reliability of the electrical supply on Oahu, the project would be consistent with this provision of the CZM program.

4.4.4.6 Coastal Hazards

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

By siting electrical generation capacity in Central Oahu, well away from coastal areas where all of Hawaiian Electric's current generating facilities are located, the SGSP project would support this objective.

4.4.4.7 Managing Development

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

Hawaiian Electric and the Army have initiated contact, and continue to work cooperatively with, federal, state, and local government agencies with oversight responsibilities to facilitate efficient processing of permits and informed decision making by the responsible parties.

4.4.4.8 Public Participation

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

Pursuant to the requirements of NEPA and HAR §11-200, the public has multiple opportunities to learn about the project and provide comments, so the project would be consistent with this objective. Public involvement is discussed further in section 1.5.

4.4.4.9 Beach Protection

Objective: *Protect beaches for public use and recreation.*

The SGSP would be many miles from the nearest beach and would not involve any components with the ability to affect public beaches or coastal recreational areas, so it would be consistent with this objective.

4.4.4.10 Marine Resources

> ***Objective:*** *Promote the protection, use, and development of marine and coastal resources to assure their sustainability.*

This project would not affect implementation of the State of Hawaii ocean resources management plan or otherwise interfere with the protection, use, and development of marine and coastal resources, so it would be consistent with this objective.

4.5 CITY AND COUNTY OF HONOLULU

4.5.1 Oahu General Plan

The *General Plan for the City and County of Honolulu* was first adopted in 1977 and was most recently amended in 2002. The *Oahu General Plan* is a comprehensive statement of the long-range social, economic, environmental, and design objectives for the general welfare and prosperity for the people of Oahu and of the broad policies intended to facilitate attainment of the Plan's objectives. As envisioned in the plan, Central Oahu is designated as an urban-fringe area, with residential, commercial, and employment development targeted for this region intended to relieve developmental pressures elsewhere on the island. This section discusses the SGSP's consistency with the relevant general plan objectives, policies and programs.

<u>*Population Goals*</u>. Objective C of the general plan's population goal calls for a pattern of population distribution that will allow the people of Oahu to live and work in harmony. To achieve this goal, it establishes several policies, including two that are relevant to the SGSP.

> *Policy 2: Encourage development within the secondary urban center at Kapolei and the Ewa and Central Oahu urban-fringe areas to relieve developmental pressures in the remaining urban-fringe and rural areas and to meet housing needs not readily provided in the Primary Urban Center.*
>
> *Policy 4: Direct growth according to Policies 1, 2, and 3 above by providing land development capacity and needed infrastructure to support a future distribution of Oahu's residential population that is consistent with the following table* (see Table 4.4-1).

The SGSP would provide electrical generating capacity in Central Oahu, where very little exists. The project is not intended to foster or promote growth but is intended to serve a population that is now largely dependent on outside sources of power. Because the SGSP would provide improved electrical energy security, it is supportive of the *Oahu General Plan's* call for future development of that region as an urban-fringe area for the island, directing population growth there. In addition to relieving urban development pressures elsewhere on the island, the SGSP would contribute infrastructure that would support a future distribution of Oahu's residential population consistent with Table 4.4-1. The SGSP would be consistent with the *Oahu General Plan*'s population goals and policies.

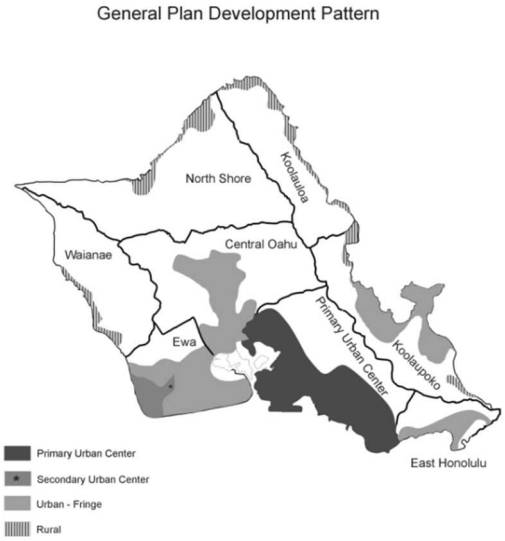
<u>*Economic Goals*</u>. The general plan makes the City and County of Honolulu's objective to increase the amount of federal spending on Oahu by establishing two policies related to the proposed project.

Policy 1: Take full advantage of Federal programs and grants which will contribute to the economic and social well-being of Oahu's residents.

Policy 4: Encourage the military to purchase locally all needed services and supplies which are available on Oahu.

Table 4.4-1. Distribution of Residential Population

Distribution of Residential Population	
District	**Percent (%) Distribution of 2025 Islandwide Population**
Primary Urban Center	46.0
Ewa	13.0
Central Oahu	17.0
East Honolulu	5.3
Koolau Poko	11.6
Koolau Loa	1.4
North Shore	1.7
Waianae	4.0
TOTAL	**100.0**



Source: HDPP 2002b

The SGSP would allow the use of federal land for a needed public facility in return for giving the military first call on the electrical power in an emergency. The arrangement is advantageous for military and civilian interests, particularly in view of the support role Army assets could perform in the event of natural disasters and other emergencies. The project would contribute to the economic and social well-being of Oahu's residents and would be consistent with the *Oahu General Plan's* economic goals and policies.

<u>*Natural Environment Goals*</u>. The *Oahu General Plan* makes it the City and County of Honolulu's policy to preserve and protect the natural environment. It establishes a number of policies relevant to the SGSP project, including:

Policy 1: Protect Oahu's natural environment, especially the shoreline, valleys, and ridges, from incompatible development.

Policy 4: Require development projects to give due consideration to natural features such as slope, flood and erosion hazards, water- recharge areas, distinctive land forms, and existing vegetation.

Policy 7: Protect the natural environment from damaging levels of air, water and noise pollution.

The SGSP would fully support these policies. It would be in an area that has been substantially altered by decades of military and civilian development. It is not on, or near, sensitive shoreline, valleys, ridges, or other natural areas except for short portions of the transmission line that would pass over the Wahiawa Fresh Water Park; in that area existing transmission lines would be upgraded rather than introducing new lines. The project would be a "major source" of pollutants

by air permit definitions. However, the net effect of the project on pollutants is that it will reduce pollution, when compared to the same 50 MW of capacity at an existing power station.

Transportation and Utilities Goals. An important objective of the *Oahu General Plan* is maintaining transportation and utility systems that provide a high level of service, thereby helping Oahu continue to be a desirable place to live and visit. To that end, it makes it the policy of the City and County of Honolulu to plan for the timely and orderly expansion of utility systems while considering the social, economic, and environmental impact of additions to utility systems before they are constructed.

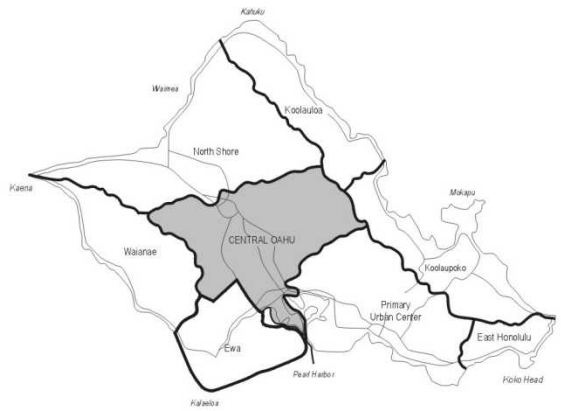
The purpose of the SGSP is to maintain an efficient and reliable power supply for Oahu. The intent of this EIS document is to carefully fulfill the planning requirements of NEPA and HEPA to evaluate potential impacts to the natural and human environment, so the SGSP would be consistent with these objectives.

Energy Goals. The *Oahu General Plan* has two energy-related policies and objectives relevant to the SGSP. One is to maintain an adequate, dependable, and economical supply of energy for Oahu residents by working closely with state and federal governments in the formulation and implementation of all city and county energy-related programs. A second is to secure state and federal support of city and county efforts to develop and apply new, locally available energy resources.

The SGSP would help ensure an adequate supply of efficient and reliable electrical power. It is the result of a partnership between the Army and Hawaiian Electric, the local, PUC-regulated electrical utility. The generating station would be capable of using either conventional fossil fuels or biofuel to produce electrical power. The SGSP would support the *Oahu General Plan*'s policy of developing new, locally available renewable energy resources because it would substantially increase the local opportunity for biofuel use.

4.5.2 Central Oahu Sustainable Community Plan

The *Central Oahu Sustainable Community Plan* (COSCP) prepared in accordance with the city charter and adopted into law pursuant to Chapter 24, Revised Ordinances of Honolulu, is one of a set of eight plans for different planning regions on Oahu. It is intended to implement the *Oahu General Plan*. The COSCP calls for development to be encouraged in Central Oahu and the Ewa urban-fringe (i.e., suburban residential) areas and in the Kapolei secondary urban center to relieve development pressures elsewhere (see Figure 4.4-1). The sections of the COSCP discussed below are the ones relevant to the SGSP.



Source: HDPP 2002a

Figure 4.4-1. COSCP Districts

Military Areas. Section 3.12 of the COSCP deals with "military areas" and provides the following guidance:

§3.12.1.1 Schofield Barracks/Wheeler Army Airfield

Schofield Barracks/Wheeler Army Airfield supports the 25th Infantry Division and consequently has large areas committed to residential use, including commercial and recreational facilities. The bases also support quasi-industrial uses including operation and maintenance of heavy equipment and helicopter airfield operations and maintenance.

In general, the COSCP recognizes the need for industrial and quasi-industrial uses on military areas in Central Oahu. With regard to Schofield Barracks, this is in part due to the need for heavy industrial applications to support its missions (e.g., airfield operations and maintenance), but also in acknowledgement of the military's special need for autonomous infrastructure that can be operated independent of normal civil infrastructure. The COSCP calls for planning principles typically reserved for industrial areas to apply to lands designated for military use. While the COSCP generally identifies the island's primary urban center of metropolitan Honolulu and the secondary urban center of Ewa as the appropriate areas for utility plants, it acknowledges the need for some limited development of this nature in Central Oahu. Thus, the SGSP would be consistent with these provisions of the COSCP.

Section 3.12.3 of the COSCP stipulates that its recommendations be applied "where appropriate" to development in military areas. Section 3.12.3.1, which addresses Schofield Barracks/Wheeler Army Airfield, calls upon the Army to minimize the visibility of security fencing and utilitarian military facilities from off-post through the planting of "a landscape screen, consisting of trees and hedges, along highway frontages." The public thoroughfare closest to the generating station site and most of the transmission line is Kunia Road (Hawaii Route 750). The generating station would be set back more than 1,800 feet from Kunia Road, obviating the need for a landscaping screen, while still conforming to these guidelines.

Electrical Power Development. Section 4.4.1 of the COSCP makes it the official policy of the City and County of Honolulu to consider several factors when siting electrical power plants. It provides that:

Major system improvements—such as development of a new power generating plant and/or major new transmission lines—should be analyzed and approved based on island wide studies and siting evaluations. Strong consideration should be given to placing any new transmission lines underground where possible under criteria specified in State law.

Electrical power plants should generally be located in areas shown as planned for Industrial use and away from residential areas shown on the Urban Land Use Map in Appendix A. Any proposed major new electrical power plant should be considered through a City review and approval process which provides public notification and opportunity to comment and public agency analysis of impacts and mitigations.

The Army and Hawaiian Electric have considered multiple alternatives that would meet the project's objectives; see section 2.4 for more information. They concluded that no other alternative technology, fuel, or location would satisfy the purpose and need of the proposed project.

With regard to the transmission line component of the project, HRS section 269-27.6(a) requires that any electrical utility applying to construct a 46-kV or greater transmission line, "either above or below the surface of the ground" must ask the PUC for a determination of whether or not the line must be underground. Exhibit 3 of Hawaiian Electric's application to the PUC includes the

following reasons why Hawaiian Electric believes that overhead (rather than underground) lines would be appropriate:

- The benefits, if any, of placing sections of the 46-kV lines underground would not outweigh the costs. Hawaiian Electric estimates that it would cost approximately three times more to put the new line and line extension underground ($23.8 million) than to construct both sections overhead ($8.3 million).
- The visual impacts of the proposed 46 line and line extension would not be significantly increased, as there is an existing 46-kV overhead line along Wilikina Drive and a 12-kV overhead line along Kunia Road (i.e., the Wahiawa-Mikiula 46-kV line), and the rest of the Wahiawa-Mikiula 46-kV line would remain overhead. In accordance with the requirements of the State PUC, Hawaiian Electric would conduct a community hearing to discuss any potential effects the overhead transmission line might have on adjacent residential areas.
- The estimated incremental rate impact for Hawaiian Electric customers for placing the lines underground instead of overhead was analyzed and found to be an unjustified increase in customer cost.

4.5.3 City and County of Honolulu Land Use Ordinance

The purpose of the Honolulu land use ordinance is to regulate land use in a manner that will encourage orderly development. It does this by establishing zoning districts and specifying the kinds of development and development standards that must be adhered to in each zoning district. The land use ordinance is applicable only to the portions of the SGSP that are not on federal land, so it doesnot apply to the generating station site or to the portions of the transmission line corridor that are on-post.

Generating Station Site. The land use ordinance classifies facilities like the generating station as a type B utility installation. Type B utility installations are those with "*…potential major impact, by virtue of their appearance, noise, size, traffic generation, or other operational characteristics*". The generating station site is zoned Ag-1 (restricted agriculture). Type B utility installations are permitted uses in this zone, subject to the design standards in Article 5, §21-5.650. The generating station would conform to the applicable provisions of these design standards.

Transmission Lines and Poles. The transmission line is classified as a type A utility installations. The transmission lines and poles would pass through the following zoning districts: (1) AG-1 restricted agriculture; (2) F-1 federal and military; (3) R-5 residential; (4) P-1 restricted preservation; and (5) P-2 general preservation. Type A utility installations are an approved use in all of these zones according to the land use ordinance. The one exception to this is the P-1 restricted preservation zone; §21-3.40-1 of the land use ordinance states that, "*Within the P-1 restricted preservation district, all uses, structures and development standards shall be governed by the appropriate state agencies.*" In this case, the zoning designation of P-1 restricted preservation is a result of the overlying state designation for this area as being in the state conservation district (resource subzone).

SECTION 5
CUMULATIVE IMPACTS

A "cumulative impact" is defined in 40 CFR Part 1508.7 and HAR 11-200-2[11] as:

> the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

5.1 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS

Past, present, and reasonably foreseeable future actions include those actions or projects identified in the area of the SGSP that could result in impacts to one or more of the environmental resource areas discussed in section 3. Projects too geographically distant from the project area or otherwise not considered likely to produce adverse effects are not included. Projects that are considered for analysis of the cumulative impacts associated with the SGSP are in Table 5.1-1.

5.2 CUMULATIVE IMPACTS BY RESOURCE AREA

This section describes the cumulative impacts for each resource area. Cumulative impacts for the SGSP were determined by combining the impacts of the proposed action with other past, present, and reasonably foreseeable future actions in the geographic setting.

5.2.1 Land Use

The Army has planned, and is currently constructing, new facilities in the South Range adjacent to the generating station site. The effects of these developments were addressed in the *Final Environmental Impact Statement, Permanent Stationing of the 2/25th Stryker Brigade Combat Team* and the *Environmental Assessment for Construction of Four Projects to Support the Army Growth Stationing Action at Schofield Barracks Military Reservation Oahu, Hawaii* (USAEC 2008; USACE, Honolulu District 2010). The land use impacts of these projects would include beneficial impacts because the facilities would be near other Army support facilities and less than significant adverse effects because of potential incompatibility with the USAG-HI master planning and the conversion of agricultural land to military uses. No significant and unmitigable land use impacts were identified. The SGSP would have minor adverse impacts on land use, so its contribution to cumulative effects would be minor. The cumulative effects of the SGSP on land use, when combined with the identified past, present, and reasonably foreseeable future actions, would remain less than significant.

5.2.2 Airspace

Past, present, and reasonably foreseeable future actions affecting airspace would be primarily the modified and additional air operations from evolving training requirements at Schofield Barracks and Wheeler Army Airfield and development on lands near the APZs. These changes would have the potential to obstruct air navigation, reduce airspace, limit air operations, or increase safety

[11] The definition in HAR 11-200-2 is the same as the definition in 40 CFR Part 1508.7, except that it does not include the parenthetical phrase "federal or nonfederal."

Table 5.1-1.
Past, Present, and Reasonably Foreseeable Future Actions

Action	Description	Timeframe	Location	Extent/Size
Construction of Four Projects to Support the Army Growth Stationing Action at Schofield Barracks	Construction of an engineer brigade complex, explosive ordnance disposal (EOD) battalion complex, military police (MP) battalion complex, and associated infrastructure.	2014-ongoing	South Range Acquisition Area	230 acres
Army Residential Communities Initiative	Add 42 acres to an existing 50-year ground lease, and construct 230 units of multifamily housing as part of the Kalakaua phase 3 housing development.	2011-ongoing	South Range Acquisition Area	42 acres
USAG-HI Real Property Master Planning	Installationwide facilities construction and associated infrastructure improvements.	2009-ongoing	USAG-HI including Schofield Barracks and Wheeler Army Airfield	Variable
Army 2020 Force Structure Realignment	Armywide force and realignment, including reductions up to 8,000 Soldiers and Army civilians at Schofield Barracks.	2013-ongoing	Armywide including Schofield Barracks and Wheeler Army Airfield	Variable
Army Wildland Fire Management Program	Implement a prescribed burn program to manage the timing and location of wildfires so as to protect valued resources.	2003-ongoing	• Schofield Barracks • South Range Acquisition Area • Schofield East Range • Dillingham Military Barracks • Kahuku Training Area • Kawailoa Training Area • Makua Military Reservation • Pohakuloa Training Area	Area (acres) • Schofield Barracks (8,663) • South Range (2,000) • Schofield East Range (5,154) • Dillingham (664) • Kahuku (9,409) • Kawailoa (23,348) • Makua (4,190) • Pohakuloa (108,792)
Army Military Munitions Response Program	The compliance, restoration, and closeout activities for Schofield Barracks munitions ranges.	1985-ongoing	Schofield Barracks (installationwide)	Range and training lands

Table 5.1-1. (continued)

Action	Description	Timeframe	Location	Extent/Size
Permanent Stationing of the 2/25th Stryker Brigade Combat Team	Army transformation of the 2nd Brigade, 25th Infantry Division including 28 construction projects and five land acquisitions.	2004-ongoing	Oahu and Hawaii including Schofield Barracks and Wheeler Army Airfield	Variable
Army Implementation Plan of Oahu Training Areas	Continued use and modernization of training areas and ranges to meet evolving training standards, use of ammunition, and other expendables; maintenance and repair of training infrastructure; and construction of additional facilities at existing training areas and ranges.	2010-ongoing	• Schofield Barracks • Schofield East Range • Dillingham Military Barracks • Kahuku Training Area • Kawailoa Training Area • Makua Military Reservation	Range and training lands
Army Growth and Force Structure Realignment to Support Operations in the Pacific Theater	Army activities including stationing Combat Aviation Brigade (CAB) including up to 2,800 Soldiers at Schofield Barracks.	2008-ongoing	Army Pacific Theater including Schofield Barracks and Wheeler Army Airfield	Variable
Hawaiian Electric Wahiawa Substation Control House Expansion	Expand control house, add a separate battery room, and house batteries in the battery room.	Late 2014	Wahiawa Substation	Within footprint of Wahiawa Substation
Hawaiian Electric Transmission Pole Re-placement	Re-place 12 existing transmission poles from Wahiawa Substation to approximately 1 mile east.	2014-2015	East of Wahiawa Substation	Transmission pole footprints

risks to aviators or persons on the ground. None of the identified projects involve development in the APZs. However, air operations are projected to change substantially. The supplemental programmatic EIS *Army Growth and Force Structure Realignment to Support Operations in the Pacific Theater* (USAEC 2008) anticipates that helicopter operations at Wheeler Army Airfield would double, which would have a significant, but mitigable, effect on airspace. The increased air operations would be mitigated to less than significant by scheduling aviation activities to accommodate the additional air traffic. Other projects that would restructure Army training at Schofield Barracks and Wheeler Army Airfield would have no effects or minor adverse effects on airspace. The effects of the SGSP would be minor, and the SGSP's contribution to overall cumulative impacts would be less than significant.

5.2.3 Visual Resources

Trends affecting visual resources at Schofield Barracks, Wheeler Army Airfield, and Central Oahu have been and would be toward a more urbanized visual character. Development in the area has reduced the amount of unobstructed views of distant areas, increased the amount of man-made features in many views, and introduced new sources of glare and nighttime lighting. These trends would be expected to continue as Central Oahu undergoes additional residential development to reduce housing pressures closer to downtown Honolulu and Schofield Barracks and Wheeler Army Airfield undergo growth and realignment projects.

Many of the identified past, present, and reasonably foreseeable future actions involve development on- and off-post that would result in less than significant adverse impacts on visual resources, including increasing the urban visual character, reducing the amount of naturally-vegetated areas, altering views, and introducing new sources of glare and nighttime lighting. Off-post, areas zoned for agricultural use would be likely to remain so for the foreseeable future due to Hawaii's policy to protect productive agricultural land.

The past, present, and reasonably foreseeable future actions would also result in beneficial visual impacts. On-post, in accordance with the visual guidelines in the IDG and the USAG-HI master ~~plan~~ planning process, developments and buildings would be laid out in an orderly fashion, be visually harmonious with surrounding structures and landscape, and have consistent design. Landscaping would conserve open space, preserve mature trees, and create a landscape that inspires pride of ownership. Beneficial cumulative effects would be realized on- and off-post by replacing older structures that show signs of wear or are not well oriented or designed with new structures that are more visually harmonious with the surrounding area.

The past, present, and reasonably foreseeable future actions would have less than significant effects on visual resources, primarily resulting from altering views and introducing new sources of light and glare. The SGSP's contribution to cumulative effects would be less than significant and overall cumulative effects on visual resources would remain less than significant.

5.2.4 Air Quality

The SGSP, when combined with past, present, and reasonbly foreseeable future actions, would have long-term moderate beneficial cumulative effects on air quality. By directly inventorying all emissions in a nonattainment region and monitoring concentrations of criteria pollutants in attainment regions, the State of Hawaii takes into account the effects of all past and present emissions in their state. This is done by putting a regulatory structure in place designed to prevent air quality deterioration for attainment areas. This structure of rules and regulations is contained in the SIP (EPA 2014c). The SIP process applies either specifically or indirectly to all activities in the region. Effects of the past, present, and reasonably foreseeable future actions would range from none to moderate. All future actions would have to comply with the SIP. No large-scale projects or proposals have been identified that, when combined with the SGSP, would threaten

the region's attainment status; would have substantial GHG emissions; or would lead to a violation of any federal, state, or local air regulation.

Estimated emissions from the SGSP would be appreciable. Although there would be an increase in emissions associated with the SGSP, the project would constitute an overall net decrease in both criteria pollutants and GHGs in the ROI due to reduction in the use of existing older power generating stations and existing diesel back-up generators at the installation. These indirect reductions in emissions for some pollutants would be appreciably greater than operational emissions from the proposed plant. Therefore, in the context of regional air quality or GHG emissions, the cumulative effects would be beneficial.

5.2.5 Noise

Long-term moderate cumulative effects would be expected. Noise effects would be primarily due to operational noise from the proposed SGSP. Noise from the generating station would constitute incremental increases in the overall noise environment and would be in addition to the existing aviation noise from Wheeler Army Airfield and other training noise from Schofield Barracks. Noise generated by the Proposed Action would be moderate and concentrated in areas adjacent to the Kalakaua neighborhood on South Post. No projects have been identified that when combined with the Proposed Action would have greater than significant effects.

5.2.6 Traffic and Transportation

Construction and operation of the Grow the Army (GTA) facilities and all associated traffic would occur at the same time as the development of the proposed power station. The traffic study for this EIS accounted for incremental increases in background traffic over time and from the GTA initiative; therefore, the traffic impacts shown for the Proposed Action take into consideration the effects of past, present, and reasonably foreseeable future actions. The size and scope of the changes in the transportation systems associated with the Proposed Action would be extremely small when compared to past, present, and reasonably foreseeable traffic in the area. As a result, the effects on traffic from the Proposed Action would not contribute appreciably to cumulative effects and are considered minor.

5.2.7 Water Resources

Less than significant short-term cumulative effects on water resources would be expected. Construction projects disturb soils and remove vegetation that holds soil in place and minimizes erosion and deposition into surface waters. Use of construction equipment also causes compaction of soils. Combined with the installation of facilities, which increases the amount of area impervious to stormwater infiltration, stormwater runoff is increased in both intensity and quantity by development projects. Construction equipment can release minor quantities of petroleum products during normal use that could enter stormwater runoff or ground water.

Construction projects planned or ongoing on Oahu with the potential to affect water resources include the Army Growth Stationing Action at Schofield Barracks, Kalakaua phase 3 housing development, construction of installationwide facilities and associated infrastructure improvements at Schofield Barracks, Schofield Barracks munitions response program, construction projects associated with Army transformation of the 2nd Brigade, 25th Infantry Division, and construction of additional facilities at existing training areas and ranges.

Each of these construction projects would be required to minimize stormwater runoff in compliance with the NPDES General Permit Authorizing Discharges of Storm Water Associated with Construction Activity, which requires implementing a SWPPP and limiting the post-development discharge of stormwater from a 10-year event to the predevelopment rate.

Compliance with these requirements would ensure that each project would have only minor effects on water resources and that any cumulative effect of the projects would also be minor.

5.2.8 Geology and Soils

Minor cumulative effects on soil would be expected. Construction projects planned or ongoing in the area will require a Hawaii DOH-issued NPDES permit. Such permitting involves the preparation of a site-specific SWPPP that would include BMPs to prevent erosion and sedimentation. Compliance with these requirements would ensure that each project would have only minor effects on soil and that any cumulative effect of the projects would also be minor.

5.2.9 Biological Resources

Effects of the past, present, and reasonably foreseeable future actions in the ROI range from beneficial to significant and unavoidable. Construction of many of these actions results in increased human presence, noise, and dust and reduced natural habitat. Operation of these actions involves increased human presence, decreased habitat, structural hazards (e.g., buildings and fences), nighttime lighting, and training activities including live-fire. These activities put pressure on biological resources and combine to transform native landscapes and forests to human-dominated ones.

Military training activities increase the probability and intensity of wildfires. Wildfires that burn into native communities or sensitive habitats would destroy listed plant and animal species and sensitive habitats. Although mitigation measures would be implemented, the *Final EIS Army Transformation of the 2nd Brigade, 25th Infantry Division (L) to a Stryker Brigade Combat Team In Hawaii* provided that the increased risk of wildfires and their effects on biological resources were considered not mitigable to less than significant (Tetra Tech 2004). Other effects of the actions include the spread of noxious weeds resulting from movement of troops and equipment and from fires, habitat loss, increased noise, and threats to migratory birds (USAEC 2008, 2013; Tetra Tech 2004).

One action in the ROI would have significant and unavoidable effects on biological resources. However, the effects from the SGSP would be minor adverse, and the project's contribution to cumulative effects on biological resources would be less than significant.

5.2.10 Cultural Resources

Historic land use practices resulted in the loss of all archaeological and traditional cultural resources in the project area. The effects of the SGSP on cultural resources is not significant, because the parcel of land has been previously disturbed and no traditional memory of any resources exists.

Mid-20th century views were not distinctive or of high quality. However, modern infrastructure projects have introduced visual elements to the viewsheds of the Schofield Barracks Historic District and the eligible Wheeler Historic District that are out of character with the views from the districts that existed when district structures were constructed (1920s to the 1940s). The SGSP would not contribute to the cumulative effect of the modern transformation of the viewshed from the Schofield Barracks Historic District because no new poles would be placed near the district.

The SGSP would have a minor contribution to the cumulative effects of modern infrastructure projects on the viewshed from the eligible Wheeler Historic District. Individually, each of the past, present, and reasonably forseeable future infrastructure projects, such as SGSP, contributes minor impacts to the quality of the view from the historic district; however, the cumulative effects to the viewshed are significant. These effects have been historically mitigated by blocking the

views from the historic structures with landscaping, fencing, and screening across fences, which is assumed for future concurrent projects.

5.2.11 Hazardous and Toxic Substances

Minor long-term, cumulative effects from hazardous materials and waste would be expected from this project when combined with past, present, and reasonably foreseeable future actions. Most construction or demolition activities involve the use, storage, generation, transport, and disposal of hazardous materials and waste, petroleum products, and solid and municipal waste. Operations would involve installation of aboveground storage tanks, use of pesticides, and routine use of hazardous materials such as petroleum, oils, lubricants, and paints. Each activity involving these materials entails some risk to human health and safety and the environment due to the potential for misuse or an accident. This risk increases incrementally with the number of activities taking place in the project ROI at a given time. However, all handlers of these materials are subject to strict federal, state, and local regulations that minimizes the risk of spills, leaks, and accidents that could adversely affect human health and safety or the environment.

State and federal agencies provide compliance oversight, such as construction and compliance inspections. The state and federal agencies also have enforcement mechanisms in place, such as the authorization to issue legally binding cleanup orders or violation correction orders. Of the projects in the ROI, the SGSP would involve the greatest amount of these materials, particularly during operation. Despite the anticipated usage, the effects from the operation of the SGSP would be minor adverse. The other projects within the ROI would use minor to moderate amounts of these materials with less than significant effects. Collectively, the cumulative effects of all projects in the ROI would remain less than significant.

5.2.12 Socioeconomics

The Proposed Action would have beneficial economic effects on the regional economy. This benefit, in combination with economic benefits from other military construction projects on Schofield Barracks (i.e., an engineer brigade complex, EOD and MP battalion complexes, family housing, other installationwide facilities, and associated facilities construction improvements) and ongoing and planned development projects on Oahu (e.g., road and utility improvements, residential and commercial building development), would result in beneficial cumulative economic effects. Implementing the Proposed Action to construct and operate the SGSP would not result in disproportionately adverse environmental or health effects on low-income or minority populations or the health and safety of children. No cumulative environmental justice effects would be expected.

5.2.13 Utilities and Infrastructure

The Proposed Action, in combination with ongoing and proposed projects, would have beneficial cumulative effects on public services and utilities. Utility infrastructure constructed in support of the generating station, in addition to the other infrastructure and fire service improvement projects on and around Schofield Barracks, would improve public services and utilities in the region. The Proposed Action would have long-term minor increased demand for potable water, wastewater generation and treatment, and electricity. The existing infrastructure for all utilities would be reasonably accessible and have the capacity for projected demands from the generating station. No projects have been identified that, when combined with the Proposed Action, would have significant effects. In light of historic, ongoing, and reasonably foreseeable actions, the Proposed Action would have beneficial cumulative impacts to utilities or utilities infrastructure.

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SECTION 6
OTHER REQUIRED CONSIDERATIONS

6.1 SIGNIFICANT UNAVOIDABLE ADVERSE EFFECTS

An EIS must include a description of any significant unavoidable impacts for which no mitigation, or only partial mitigation, is feasible. The Proposed Action would not result in any significant unavoidable impacts for which no mitigation, or only partial mitigation, is feasible; all impacts would be less than significant.

6.2 RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

NEPA requires that an EIS consider the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity.

Short-term uses of the environment associated with the SGSP would generally be the same as the environmental impacts described for each environmental resource in section 3. These impacts would include use of the physical environment (i.e., land, water) and use of energy resources (i.e., fossil fuel, biofuel, LNG) during project construction and operation. Four types of long-term productivity were considered for the effect of these uses on long-term productivity: soil productivity, hydrological productivity, biological productivity, and economic productivity.

Soil Productivity. Maintenance of long-term soil productivity is mainly a concern in agricultural areas, although this can also be a concern where soils provide other economic or ecological benefits. Construction of the project would affect soil productivity through land clearing, grading, and occupation by project facilities. At the generating station site, project construction would have a long-term negative effect on soil productivity because these soils would be taken out of use for the life of the project. Where poles are installed along the interconnection easement, the Proposed Action would have a minor effect on long-term soil productivity because the footprint of the poles is limited and the surrounding soil would be restored to general preproject conditions soon after disturbance. The overall effect on soil productivity would be minimal because the project site is not used for agriculture, and the amount of land dedicated to the project would be a small fraction of potentially agriculturally productive land in Hawaii.

Hydrological Productivity. Water bodies, floodplains, and watersheds would lose measurable productivity in the short-term from increased sedimentation from erosion during construction and increased amounts of pollutants that could enter groundwater and surface water resources from construction equipment and soil-disturbing activities. All soils would be stabilized after construction and impacts on water bodies would cease. Water would be consumed during construction and operation; however, the long-term impact on productivity of aquifers in the project area would be minimal because groundwater resources are expected to be replenished by rainwater.

Biological Productivity. Plant communities and wildlife contribute to biological productivity, and their long-term productivity provides ecological and recreational benefits. Project construction would affect biological resources through land clearing, grading, and occupation by project components. During construction, all vegetation on the project site would be permanently removed. After construction, vegetation would be restored or would recover naturally in areas not occupied by project components. The project site does not contain critical, sensitive, or high-value habitat for any protected species. The land was formerly in agricultural production and is primarily open, disturbed grassland habitat of little biological value. Aquatic habitats would be

minimally degraded because of minor increases in erosion and sedimentation during installation of poles along the transmission line near water bodies. No measureable decrease in biological productivity would be expected to result from implementing the Proposed Action.

Economic Productivity. The proposed project would contribute to long-term revenue potential in sectors that benefit from a reliable energy source. The project could create a long-term increase to economic productivity by providing a renewable, reliable source of electricity for Oahu. It could benefit existing businesses that rely on electric service for production output and attract new business to the area, which would provide a long-term increase in economic productivity through increased revenue and jobs. During man made and natural emergencies, a secure and reliable energy source would be provided to the Army on Oahu that would also benefit the remainder of the island by providing a method for rapid recovery of other power generation stations. These factors would have a positive effect on long-term economic productivity.

6.3 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that this use could have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource that could not be replaced within a reasonable time frame (e.g., fossil fuels, minerals). Irretrievable resource commitments involve the loss in value of an affected resource that could not be restored as a result of the action (e.g., the extinction of a threatened or endangered species, disturbance of a cultural resource).

The project would result in an irreversible commitment of nonrenewable and slowly renewable resources, primarily diesel, LNG, and water that would be consumed to produce electricity. Consumption of these resources during operation would not represent an unnecessary, inefficient, or wasteful use of resources, nor would it prevent sustainable development. The project would consume at least 3.5 million gallons of biofuel annually. Because the facility is multifuel capable, it would create additional opportunity for renewable energy production on Oahu, which over time could replace some amount of fossil fuel consumption. The project would result in a net decrease in regional air emissions of some criteria pollutants and GHGs because older less efficient power plants on the island would be used less frequently.

Construction of the project would use fossil fuels and water; however, the amounts used during construction would be much less compared to operation. Construction of the project would require a commitment of a variety of other nonrenewable or slowly renewable natural resources. These resources include lumber, sand, gravel, asphalt, metals, and paint. The consumption of these resources would not represent an unnecessary, inefficient, or wasteful use of resources, nor would it prevent sustainable development.

6.4 MITIGATION MEASURES

Impacts would be less than significant for all resources, so no mitigation measures are proposed. No activities outside compliance with existing regulations, permits, and plans would be required. Best management practices and design measures that would minimize adverse effects would be implemented for the following resources: visual, air quality, noise, traffic and transportation, water, geology and soils, biological resources, cultural resources, and hazardous and toxic substances.

6.5 UNRESOLVED ISSUES

No unresolved issues associated with implementing the proposed action have been identified.

6.6 RATIONALE FOR PROCEEDING

Notwithstanding the less than significant adverse effects that would result from the project (see section 3), the Army and Hawaiian Electric may implement the Proposed Action after successfully completing the NEPA and HEPA processes (see section 1.5), completing agency consultations (see section 9), and obtaining all necessary permits and approvals (see section 2.2.4). The Proposed Action is the only alternative that satisfies the purpose and need, all adverse effects would be less than significant, and the project would result in substantial beneficial effects of increased energy security, gridwide stability, and renewable energy generation that would benefit the Army, Hawaiian Electric, and the citizens of Oahu. Therefore, the Army and Hawaiian Electric conclude that it is appropriate to proceed with the Proposed Action once the environmental review process is completed.

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SECTION 7
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- City and County of Honolulu, Police Department Federal Aviation Administration
- Hawaii Department of Health
- Hawaii Department of Labor
- Hawaii Department of Transportation
- Hawaii Department Land and Natural Resources—Office of Conservation and Coastal Lands
- Hawaii Department of Business, Economic Development and Tourism
- State of Hawaii Office of Planning—Coastal Zone Management Program
- Historic Hawaii Foundation
- Hawaii Renewable Resources, LLC
- Honolulu Department of Planning and Permitting
- Honolulu Fire Department
- National Marine Fisheries Service Pacific Islands Regional Office
- New Cingular Wireless PCS, LLC
- Public Utilities Commission
- State Historic Preservation Division
- U.S. Army Corps of Engineers—Honolulu District
- U.S. Army Corps of Engineers—Mobile District
- U.S. Army Garrison—Hawaii
- U.S. Army Office of Energy Initiatives

- U.S. Army Environmental Command
- U.S. Army Environmental Law Division
- U.S. Department of Agriculture—Natural Resources Conservation Service
- U.S. Energy Information Administration
- U.S. Environmental Protection Agency—Region 9
- U.S. Fish and Wildlife Service

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Hon. Mark Takai	U.S. House of Representatives	Washington, DC
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Ms. Kathleen Pahinui, Chair	North Shore Neighborhood Board No. 27,	Honolulu
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Librarian	Mililani Public Library	Mililani
Librarian	Wahiawa Public Library	Wahiawa
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SECTION 11
ACRONYMS AND ABBREVIATIONS

AC	alternating current
ADNL	A-weighted day-night average sound level
ACP	access control point
AESIS	Army's Energy Security Implementation Strategy
AICUZ	Air Installations Compatible Use Zone
AIS	Archaeological Inventory Survey
APZ	accident potential zone
AQCR	Air Quality Control Region
Army	United States Department of the Army
BACT	Best Available Control Technology
BEA	Bureau of Economic Analysis
BMP	best management practice
CAA	Clean Air Act
CDNL	C-weighted day-night average sound level
CDP	Census Designated Place
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
CH_4	methane
CIA	Cultural Impact Assessment
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COSCP	Central Oahu Sustainable Communities Plan
CSP	Covered Source Permit
CWA	Clean Water Act
CZM	coastal zone management
CZMA	Coastal Zone Management Act
DC	direct current
dB	decibels
dBA	A-weighted decibel
dBC	C-weighted decibel
dBP	P-weighted decibels
DLNR	Hawaii Department of Land and Natural Resources
DoD	U.S. Department of Defense
DOH	Department of Health
DOT	Department of Transportation
DNL	day-night average sound level
DBEDT	Department of Business, Economic Development and Tourism
EA	Environmental Assessment
ECP	environmental condition of property
EIS	environmental impact statement
EISA	Energy Independence and Security Act
EISPN	environmental impact statement preparation notice

EO	Executive Order
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FERC	Federal Energy Regulatory Commission
FPPA	Farmland Protection Policy Act
FY	fiscal year
GHG	greenhouse gas
GIS	geographic information system
GPD	gallons per day
GTA	Grow the Army
GW	gigawatt
HAR	Hawaii Administrative Rules
HAP	hazardous air pollutant
HASP	health and safety plan
Hawaiian Electric	Hawaiian Electric Company, Incorporated
HDPP	Honolulu Department of Planning and Permitting
HEPA	Hawaii Environmental Policy Act
HMMP	Hazardous Materials Management Plan
HRS	Hawaii Revised Statutes
HRT	Honolulu Rail Transit
HUD	Department of Housing and Urban Development
IBC	International Building Code
IBCT	Infantry Brigade Combat Team
IDG	Installation Design Guide
IMPLAN	Impact Analysis for Planning (model)
INRMP	Integrated Natural Resources Management Plan
IRP	Installation Restoration Program
IWFMP	Integrated Wildland Fire Management Plan
ISO	International Standards Organization
KMTA	Kunia Maneuver Training Area
KOP	key observation point
kV	kilovolt
LID	low impact development
L_{max}	maximum sound level limit
LNG	liquefied natural gas
LOS	level of service
MBTA	Migratory Bird Treaty Act
MCC	motor control center
MEC	munitions and explosives of concern
MGD	million gallons per day
MMR	Mandatory Reporting Rule
MS4	Municipal Separate Storm Sewer System
MW	megawatt
MWhr	megawatts per hour
NAAQS	National Ambient Air Quality Standards
NCES	National Center for Education Statistics
NE	not established

NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFPA	National Fire Protection Association
NHPA	National Historic Preservation Act
NNSR	Nonattainment New Source Review
NOA	Notice of Availability
NOI	notice of intent
NOx	nitrogen oxide
NO_2	nitrogen dioxide
N_2O	nitrous oxide
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSA	noise sensitive area
NSPS	New Source Performance Standards
O_3	ozone
OR&L	Oahu Rail and Land Company
OSHA	Occupational Safety and Health Administration
OU	operable unit
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
PM_{10}	particulate matter less than 10 microns in diameter
ppb	parts per billion
ppm	parts per million
PSD	Prevention of Significant Deterioration
PTE	potential to emit
PUC	Public Utilities Commission
RCRA	Resource Conservation and Recovery Act
REC	renewable energy credit
ROD	Record of Decision
ROI	region of influence
RPS	Renewable Portfolio Standard
SAAQS	State Ambient Air Quality Standards
SARA	Superfund Amendments and Reauthorization Act
SBCT	Stryker Brigade Combat Team
SCR	selective catalytic reduction
SGSP	Schofield Generating Station Project
SHPD	State Historic Preservation Division
SIL	significance impact levels
SIP	State Implementation Plan
SO_2	sulfur dioxide
SPCC	Spill Prevention Control and Countermeasures
SVOC	semivolatile organic compounds
SWPPP	Storm Water Pollution Prevention Plan
TCE	tricholoroethylene
TMDL	Total Maximum Daily Load
tpy	tons per year
TSCA	Toxic Substances Control Act
UFC	Uniform Facilities Criteria

UHERO	University of Hawaii Economic Research Organization
USC	*United States Code*
UPS	uninterruptible power supply
USAEC	U.S. Army Environmental Command
USAG-HI	U.S. Army Garrison-Hawaii
USDA	U.S. Department of Agriculture
USFWS	US Fish and Wildlife Service
UST	underground storage tank
VAC	volt AC
VOC	volatile organic compound
vph	vehicles per hour
WGH	Wahiawa General Hospital
$\mu g/m^3$	micrograms per cubic meter

SECTION 12
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Appendix A
Public Notices, Comments, and Responses

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Appendix A-1
EIS Preparation Notices

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their issue during an open portion of this meeting or at a future meeting. The Director, in consultation with the Panel Chairperson, may allot time for members of the public to present their issues for review and discussion by the Panel.

Dated: January 14, 2014.

Aaron Siegel,

Alternate OSD Federal Register Liaison Officer, Department of Defense.

[FR Doc. 2014–00867 Filed 1–16–14; 8:45 am]

BILLING CODE 5001–06–P

DEPARTMENT OF DEFENSE

Department of the Air Force

[Docket ID: USAF–2014–0001]

Proposed Collection; Comment Request

AGENCY: Department of Defense/ Department of the Air Force/ Headquarters, HQ AFPC/DPFF, Airman & Family Division.

ACTION: Notice.

SUMMARY: In compliance with Section 3506(c)(2)(A) of the *Paperwork Reduction Act of 1995,* the Department of the Air Force announces a proposed public information collection and seeks public comment on the provisions thereof. Comments are invited on: Whether the proposed collection of information is necessary for the proper performance of the functions of the agency, including whether the information shall have practical utility; the accuracy of the agency's estimate of the burden of the proposed information collection; ways to enhance the quality, utility, and clarity of the information to be collected; and ways to minimize the burden of the information collection on respondents, including through the use of automated collection techniques or other forms of information technology.

DATES: Consideration will be given to all comments received by March 18, 2014.

ADDRESSES: You may submit comments, identified by docket number and title, by any of the following methods:

- Federal eRulemaking Portal: *http://www.regulations.gov.* Follow the instructions for submitting comments.
- Mail: Federal Docket Management System Office, 4800 Mark Center Drive, East Tower, Suite 02G09, Alexandria, VA 22350–3100.

Instructions: All submissions received must include the agency name, docket number and title for this **Federal Register** document. The general policy for comments and other submissions from members of the public is to make these submissions available for public viewing on the Internet at *http://www.regulations.gov* as they are received without change, including any personal identifiers or contact information.

Any associated form(s) for this collection may be located within this same electronic docket and downloaded for review/testing. Follow the instructions at *http://www.regulations.gov* for submitting comments. Please submit comments on any given form identified by docket number, form number, and title.

FOR FURTHER INFORMATION CONTACT: To request more information on this proposed information collection or to obtain a copy of the proposal and associated collection instruments, please write to the HQ AFPC/DPFF, Airman & Family Division, 550 C Street West, JBSA Randolph AFB, TX 78150, ATTN: Mr. Patrick Woodworth or call 210–565–3280.

SUPPLEMENTARY INFORMATION: *Title; Associated Form; and OMB Number:* Air Force Family Integrated Results & Statistical Tracking (AFFIRST) automated system; OMB Control Number 0701–0070.

Needs and Uses: The information collection requirement is necessary to record demographic information on Airman & Family Readiness Center (A&FRC) customers, results of the customer's visits, determine customer needs, service plan, referrals, workshop attendance and other related A&FRC activities and services accessed by the customer. Data is used to determine the effectiveness of A&FRC activities and services (results management) as well as collect and provide return on investment data to leadership. Information is compiled for statistical reporting to base, major commands, Headquarters United States Air Force, Department of Defense and Congress.

Affected Public: Individuals or households.

Annual Burden Hours: 15.

Number of Respondents: 60.

Responses per Respondent: 1.

Average Burden per Response: 15 minutes.

Frequency: On occasion.

Respondents are A&FRC customers who seek services from A&FRC. A&FRC employees enter customer demographic/ service delivery information into AFFIRST per Air Force Instruction 36–3009, Airman and Family Readiness Centers, paragraphs 3.13.1–3.13.3.

Dated: January 14, 2014.

Aaron Siegel,

Alternate OSD Federal Register, Liaison Officer, Department of Defense.

[FR Doc. 2014–00848 Filed 1–16–14; 8:45 am]

BILLING CODE 5001–05–P

DEPARTMENT OF DEFENSE

Department of the Army

Preparation of Environmental Impact Statement for the Lease of Army Land at Schofield Barracks, Oahu, Hawaii for the Construction and Operation of a Biofuel-Capable Power Generation Plant

AGENCY: Department of the Army, DoD.

ACTION: Notice of intent.

SUMMARY: The Department of the Army notifies interested parties of its intent to prepare a Joint Environmental Impact Statement (EIS) for the proposed lease of Army land at Schofield Barracks to the Hawaiian Electric Company (''Hawaiian Electric'') for the construction and operation on that land of a 50-megawatt (MW) biofuel-capable power generation plant. This EIS is designed to meet the requirements of both the National Environmental Policy Act (NEPA) and the Hawaii Environmental Policy Act (HEPA) as a matter of efficiency and cooperation with the State's decision-making process. The decision makers, the Department of the Army and the Hawaii Department of Land and Natural Resources, will use the analysis in the EIS to determine the potential effects of implementing the proposed action and alternatives. The Army also intends to integrate this NEPA process with the consultation and public participation requirements of Section 106 of the National Historic Preservation Act.

ADDRESSES: Written comments on the scope of the EIS or a request to be added to the EIS distribution list may be submitted as follows: Email to *sgspcomments@tetratech.com;* Facsimile (fax) to 703–385–6007 (Attention: SGSP EIS); U.S. mail to Melissa DeSantis, Tetra Tech, Inc. (Attention: SGSP EIS, 10306 Eaton Place, Suite 340, Fairfax VA 22030).

FOR FURTHER INFORMATION CONTACT: For more information on the Army's proposed action, please contact Mr. Doug Waters, Army Energy Initiatives Task Force. Mr. Waters can be reached by phone at 703–601–0511, Monday through Friday from 8:00 a.m. to 5:00 p.m. eastern, or by email at *douglas.s.waters.civ@mail.mil.* For general information about the Army NEPA process, please contact the Public

Affairs Office of the Army Environmental Command at 210–466–1590 or 1–855–846–3940 (toll free), or by email at *usarmy.jbsa.aex.mbx@mail.mil.*

SUPPLEMENTARY INFORMATION: The Army's proposed action, referred to as the Schofield Generating Station Project (SGSP), is a lease of 10.3 acres of land and a related 2.5 acre interconnection easement on Schofield Barracks to Hawaiian Electric, as well Hawaiian Electric's construction, ownership, operation, and maintenance of a 50 MW biofuel-capable power generation plant and 46-kilovolt subtransmission line.

The SGSP would be a source of renewable power that would provide an energy security service to Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia if loss of service occurs from the normal sources of electricity supporting these installations. Any electricity produced from renewable biofuels would also help achieve the Army goals of producing renewable energy on Army-owned real property.

The SGSP would benefit Hawaiian Electric and the residents of Oahu. It would provide a quick-starting facility to help maintain grid stability; provide a facility at a higher elevation and away from coastlines; provide a physically secure facility on a military installation; and makes progress toward the Hawaii Renewable Portfolio Standard.

The SGSP would operate on a mix of biofuel and diesel, as required to meet Hawaiian Electric's Renewable Portfolio Standard and the Army's renewable energy goals, and may help sustain a local demand for biofuels. Since the SGSP would be multi-fuel capable, it would be able to run on a combination of fuels as necessary to ensure operations are economically viable and can continue under adverse operating conditions.

The EIS will assess the potential for direct, indirect, and cumulative effects on the human, natural, and cultural environment and identify mitigation measures for any adverse effects.

The EIS will examine two alternative operating scenarios for the proposed action. Under the first scenario, the SGSP would run approximately six hours per day, and consume up to eight million gallons of fuel per year. Under the second scenario, the SGSP would operate seven days a week and 24 hours per day, and would consume up to 31.5 million gallons of fuel per year.

The EIS will analyze a No Action Alternative, as prescribed by the Council on Environmental Quality (CEQ) regulations, to serve as the baseline against which the proposed action and alternatives are compared. Under this alternative, the SGSP would not be built. The EIS process will also examine whether there are additional reasonable alternatives that could meet the needs of both the Army and Hawaiian Electric.

Key resources of concern, for which potentially significant impacts could occur, include air quality, traffic, and stormwater. The Army is preparing supporting studies for those resources.

The Department of the Army encourages all interested members of the public, as well as federal, state, and local agencies to participate in the scoping process for the preparation of this EIS. Interested members may participate in scoping meetings, submit written comments, or both. Written comments will be accepted within a 45-day period following the publication of the Notice of Intent (NOI) in the **Federal Register**. Scoping meetings will be held on the Island of Oahu, Hawaii during the first week of February 2014. Notification of the locations and times for the meetings will be published in the *Honolulu Star-Advertiser.*

Brenda S. Bowen,

Army Federal Register Liaison Officer.

[FR Doc. 2014–00888 Filed 1–16–14; 8:45 am]

BILLING CODE 3710–08–P

DEPARTMENT OF DEFENSE

Department of the Navy

Reopening and Extending the Public Comment Period for the Notice of Intent To Prepare an Environmental Impact Statement for EA–18G Growler Airfield Operations at Naval Air Station Whidbey Island, Washington

AGENCY: Department of the Navy, DoD.

ACTION: Notice.

SUMMARY: The Department of the Navy (DoN) is reopening and extending the public scoping period for the notice of intent to prepare an Environmental Impact Statement (EIS) for EA–18G Growler Airfield Operations at Naval Air Station (NAS) Whidbey Island, Washington. This notice announces an extension of the public scoping period until January 31, 2014.

FOR FURTHER INFORMATION CONTACT: EA–18G EIS Project Manager (Code EV21/SS); Naval Facilities Engineering Command (NAVFAC) Atlantic, 6506 Hampton Boulevard, Norfolk, Virginia 23508.

SUPPLEMENTARY INFORMATION: On September 5, 2013 (78 FR 54635), the DoN published a notice of intent to prepare an EIS for EA–18G Growler Airfield Operations at NAS Whidbey Island, Washington and also announced public scoping meetings. DoN provided a 120-day public scoping period which ended on January 3, 2014. The original public scoping period was intended to avoid any complications or delays that could result from government shutdowns and the end of the calendar year.

This notice announces an extension of the public scoping period until January 31, 2014. Scoping comments may be submitted in writing to the EA–18G EIS Project Manager (Code EV21/SS); Naval Facilities Engineering Command (NAVFAC) Atlantic, 6506 Hampton Boulevard, Norfolk, Virginia 23508, or electronically via the project Web site (*http://www.whidbeyeis.com*). All written comments must be postmarked or received (online) by January 31, 2014, to ensure they become part of the official record.

Dated: January 14, 2014.

N.A. Hagerty-Ford,

Commander, Office of the Judge Advocate General, U.S. Navy, Federal Register Liaison Officer.

[FR Doc. 2014–00876 Filed 1–16–14; 8:45 am]

BILLING CODE 3810–FF–P

DEPARTMENT OF EDUCATION

National Board for Education Sciences; Meeting

AGENCY: Institute of Education Sciences, U.S. Department of Education.

ACTION: Notice of an open meeting.

SUMMARY: This notice sets forth the schedule and proposed agenda of an upcoming meeting of the National Board for Education Sciences (NBES). The notice also describes the functions of the Committee. Notice of this meeting is required by Section 10(a) (2) of the Federal Advisory Committee Act and is intended to notify the public of their opportunity to attend the meeting.

DATES: January 31, 2014.

Time: 8:30 a.m. to 4:30 p.m. Eastern Standard Time

ADDRESSES: 80 F Street NW., Large Board Room, Washington, DC 20001

FOR FURTHER INFORMATION CONTACT: Ellie Pelaez, 555 New Jersey Avenue NW., Room 600 E, Washington, DC 20208; phone: (202) 219–0644; fax: (202) 219–1402; email: *Ellie.Pelaez@ed.gov.*

SUPPLEMENTARY INFORMATION: The National Board for Education Sciences is authorized by Section 116 of the Education Sciences Reform Act of 2002

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

ESTHER KIA'AINA
FIRST DEPUTY

WILLIAM M. TAM
DEPUTY DIRECTOR - WATER

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HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

OFFICE OF CONSERVATION AND COASTAL LANDS
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

REF: OCCL: AJR

Schofield Generating Station Project

DEC 23 2013
DEC 23 P1:56
FILE COPY
JAN 08 2014

Herman Tuiolosega, Acting Director
Office of Environmental Quality Control
Department of Health, State of Hawai'i
235 S. Beretania St., Rm. 702
Honolulu, HI 96813

SUBJECT: **ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE (EISPN) FOR THE PROPOSED SCHOFIELD GENERATING STATION PROJECT**
Wahiawā District, Island of Oahu
TMKs: (1) 77001001, 002; (1) 73001001, 002, 006, 007, 008, 009, 011, 012, 013, 019, 022 & 024; (1) 76001001 & 006; (1) 94012001, 003 & 011

Dear Mr. Tuiolosega,

With this letter, the Department of Land and Natural Resources (DLNR) hereby transmits the environmental impact statement preparation notice (EISPN) for the proposed Schofield Generating Station Project (SGSP) situated on TMK(s): *(1) 77001001, 002; (1) 73001001, 002, 006, 007, 008, 009, 011, 012, 013, 019, 022 & 024; (1) 76001001 & 006; (1) 94012001, 003 & 011*, in the Wahiawā District on the Island of Oahu for publication in the next available edition of the Office of Environmental Quality Control (OEQC) Environmental Notice (EN).

We understand that publication of the EISPN in the Environmental Notice will initiate a 30-day public consultation period for parties to comment on the action and to request to become consulted parties in the preparation of the Draft Environmental Impact Statement (DEIS).

Enclosed is a completed OEQC publication form, two (2) copies of the EISPN, and 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 proposed land use in a text file by electronic mail to your office.

If there are any questions please contact Alex J. Roy, M.Sc. of the Office of Conservation and Coastal Lands at 808-587-0316.

Sincerely,

William J. Aila, Jr., Chairperson
Department of Land and Natural Resources

CC: *Ian C. Hirokawa - DLNR*
Hawaiian Electric Company, Attn: Jack Shriver
Tetra Tech, Inc., Attn: John Bock

Attachments: *OEQC Publication form (1 hard copy)*
EISPN (2 hard copies)
1 CD/R w/ PDF of EISPN and MSWord Document of OEQC Publication Form

APPLICANT ACTIONS

SECTION 343-5(C), HRS

PUBLICATION FORM (JANUARY 2013 REVISION)

Project Name: Schofield Generating Station Project (SGSP)

Island: O'ahu

District: Wahiawā

TMK: (1) 77001001, 002; (1) 73001001, 002, 006, 007, 008, 009, 011, 012, 013, 019, 022 & 024; (1) 76001001 & 006; (1) 94012001, 003 & 011

'13 DEC 23 P1:57

Permits/Approvals:

a. Easements for use of State lands - DLNR
b. Conservation District authorization - OCCL
c. Air Permit (Covered Source and Prevention of Significant Deterioration) – EPA/DOH
d. Notice of Proposed Construction or Alteration - FAA
e. Decision and Order - PUC
f. Excavation Permit - Army
g. Site Plan Review - Army
h. Hazardous Waste Generator ID number (construction and operation)
i. Spill Prevention, Control, and Countermeasure Plan (construction and operation)
j. Equipment and Materials Handling, including materials disposal - DOT
k. Energy Information Administration registration
l. NPDES for storm water (construction and operation)
m. Variance for noise during construction
n. Emergency and Hazardous Chemical Inventory
o. Airport Hazard Area Zone Permit
p. Pressure Vessel Installation Permit
q. Street Usage Permit - DOT
r. Use and Occupancy Agreement (UOA) – DOT
s. Approval to Cross State Water – Army Corps of Engineers
t. Building Permit

Approving Agency: State of Hawai'i Department of Land and Natural Resources
1151 Punchbowl St., Room 131, Honolulu, HI 96813
Attn: William Aila, Chairperson
(808) 587-0400

Applicant: Hawaiian Electric Company
820 Ward Ave
Honolulu, HI 96814
Attn: Jack Shriver
(808) 543-4088

Consultant: Tetra Tech, Inc.
1999 Harrison St. Ste. 500, Oakland, CA 94612
Attn: John Bock
(510) 302-6249

Status (check one only):

__DEA-AFNSI — Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of DEA, a completed OEQC publication form, along with an electronic word processing summary and a PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov); a 30-day comment period ensues upon publication in the periodic bulletin.

__FEA-FONSI — Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and a PDF copy (send both summary and PDF to oeqchawaii@doh.hawaii.gov); no comment period ensues upon publication in the periodic bulletin.

__FEA-EISPN — Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov); a 30-day consultation period ensues upon publication in the periodic bulletin.

X Act 172-12 EISPN — Submit the proposing agency notice of determination on agency letterhead, an OEQC publication form, and an electronic word processing summary (you may send the summary to oeqchawaii@doh.hawaii.gov). NO environmental assessment is required and a 30-day consultation period upon publication in the periodic bulletin.

__DEIS — The proposing agency simultaneously transmits to both the OEQC and the accepting authority, a hard copy of the DEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the DEIS (you may send both the summary and PDF to oeqchawaii@doh.hawaii.gov); a 45-day comment period ensues upon publication in the periodic bulletin.

__FEIS — The proposing agency simultaneously transmits to both the OEQC and the accepting authority, a hard copy of the FEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the FEIS (you may send both the summary and PDF to oeqchawaii@doh.hawaii.gov); no comment period ensues upon publication in the periodic bulletin.

__ Section 11-200-23 Determination — The accepting authority simultaneously transmits its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS to both OEQC and the proposing agency. No comment period ensues upon publication in the periodic bulletin.

__Section 11-200-27 Determination — The accepting authority simultaneously transmits its notice to both the proposing agency and the OEQC that it has reviewed (pursuant to Section 11-200-27, HAR) the previously accepted FEIS and determines that a supplemental EIS is not required. No EA is required and no comment period ensues upon publication in the periodic bulletin.

__Withdrawal (explain)

Summary (Provide proposed action and purpose/need in less than 200 words. Please keep the summary brief and on this one page):

The proposed action is the granting of a lease and easement of Army land on Schofield Barracks, and granting of an easement and conservation district authorization to cross state land, to Hawaiian Electric for the construction, ownership, operation, and maintenance of a 50 MW biofuel-capable power generation plant (the Schofield Generating Station or SGS) and sub-transmission line to connect the plant to the Hawaiian Electric grid.

For Hawaiian Electric, the SGSP would provide a quick-starting facility to help maintain grid stability and compensate for increasing network penetration by variable power generation, such as wind and solar; provide a facility at a higher elevation and away from coastlines, which contributes to grid reliability and continuity if a natural disaster occurs; provide a physically secure facility on a military installation, contributing to grid continuity of operation in cases of a manmade threat; and make progress towards the State Renewable Portfolio Standards.

For the Army the SGSP would provide energy security for its three installations if loss of service occurs from the normal sources of electricity supporting these installations. It would also to help achieve the Army goals of producing renewable energy on Army-owned real property and increasing installation use of electricity from renewable energy sources.

Notice of Intent to Prepare an Environmental Impact Statement for the Schofield Generating Station Project (SGSP)

APPLICANT:
Hawaiian Electric Company, Inc.
P.O. Box 3978
Honolulu, HI 96812-3978
Contact: Jack Shriver, (808) 543-4088

APPROVING AGENCY:
Department of Land and Natural Resources
1151 Punchbowl St., Room 131
Honolulu, HI 96813
Contact: William Aila, Chairperson (808) 587-0400

DATES:

All comments on this notice will be considered if received or postmarked on or before February 22, 2014.

All comments received are a part of the public record. All personal identifying information (for example, name, address, etc.) voluntarily submitted by the commenter may be publicly accessible. Do not submit confidential business information or otherwise sensitive or protected information.

ADDRESSES:

Please submit copies of your comments to both DLNR and the EIS Consultant (Tetra Tech, Inc). Please send comments with the subject line of *SGSP EISPN* and include your email address if possible. Transmission of comments to DLNR must be via U.S. Mail to DLNR at the address below, as DLNR will only accept comments via mail:

Department of Land and Natural Resources
1151 Punchbowl St., Room 131
Honolulu, HI 96813
Attention: William Aila, Chairperson

Transmission of comments to Tetra Tech, Inc may be via any of the means listed below (email, fax, or U.S. Mail). However, attachments to electronic comments will be accepted in Microsoft Word, Excel, WordPerfect, or Adobe PDF file formats only:

Email: sgspcomments@tetratech.com.

Facsimile (fax): 703-385-6007 (Attention: SGSP EISPN).

U.S. Mail: Melissa DeSantis, Tetra Tech, Inc. (Attention: SGSP EISPN, 10306 Eaton Place, Suite 340, Fairfax VA 22030).

Your comments will be forwarded to the Applicant (Hawaiian Electric).

FOR FURTHER INFORMATION CONTACT:

For more information on the project, please contact Mr. Jack Shriver, Senior Engineer, Generation Project Development, Hawaiian Electric Company. Mr. Shriver can be reached by phone at (808) 543-4088, Monday through Friday from 8:00 a.m. to 5:00 p.m. (Hawai'i Standard Time), or by email at jack.shriver@hawaiianelectric.com.

BRIEF DESCRIPTION OF PROPOSED ACTION

Overview of the Proposed Action

The proposed action, referred to as the Schofield Generating Station Project (SGSP) consists of the following:

- The U.S. Army's lease of 10.3 acres of land, and the related granting of a 2.5 acre interconnection easement, on Schofield Barracks and Wheeler Army Airfield to the Hawaiian Electric Company, Inc. (Hawaiian Electric).

- The State of Hawaiʻi Department of Land and Natural Resources granting of a 1.28 acre easement and a 0.7 acre conservation district authorization allowing for the construction of a 46 kV electrical power transmission line between the SGSP site and the existing Wahiawa Substation.

- Hawaiian Electric's construction, ownership, operation, and maintenance of a 50 megawatt capacity biofuel-capable power generation plant and 46 kilovolt sub-transmission line required to connect the Schofield Generating Station to the Hawaiian Electric grid. Hawaiian Electric would be the sole owner of the plant and the electrical power transmission facilities.

Figure 1 shows the location of the SGSP site relative to other existing uses in the region. The drawing reproduced in Figure 2 depicts the conceptual layout of facilities that comprise the SGSP. Figure 3 depicts the conceptual alignment of the electrical power transmission facilities that would link the proposed project to Hawaiian Electric's existing electrical power transmission and distribution system.

The lease of federal property would be under the authority of 10 United States Code (USC) 2667, "Leases: non-excess property of military departments." The easement on federal property would be under the authority of 10 USC 2668, "Easements for rights-of-way." The easement over State land would be as provided for under §171-95, Hawaiʻi Revised Statutes (HRS). The conservations district use authorization would be pursuant to Chapter 183C, HRS, and related regulations. The proposed facilities would be constructed and operated in accordance with all applicable laws and regulations.

Purpose of and Need for the Proposed Action

The purpose of the project is to meet the common needs of Hawaiian Electric and the U.S. Army Garrison—Hawaii for secure, reliable, and renewable power generation.

Hawaiian Electric would operate the SGSP as a peaking/cycling unit to meet load and reliability requirements of the Oʻahu grid; as such, under normal conditions, it would serve all Hawaiian Electric customers. The SGSP would benefit Hawaiian Electric and the residents of Oʻahu in a number of ways. The six biofuel-capable reciprocating engine-generator sets would add 50 MW of firm, utility-owned renewable energy capacity to the Oʻahu electrical grid. These load-following/peaking/cycling generating units are quick starting, which makes them particularly helpful for maintaining grid stability as the amount of power from variable renewable sources (wind and solar) increases over time. In short, they complement, rather than compete with, other existing and anticipated renewable energy sources in the system. The SGSP would benefit Hawaiian Electric's system in other ways as well: (i) its location away from the coastline protects it from natural disasters that could affect many of the electrical power sources on the island; (ii) its

ability to provide power directly to Wheeler Army Airfield (a FEMA designated relief airfield and Hawaii National Guard site) will enhance disaster relief capacity on Oahu; (iii) its central Oʻahu location places it closer to users who are now relatively far from generating sources, thereby enhancing grid stability and reducing power restoration times for the Wahiawa community in the event of an outage; (iv) its position within a guarded military installation reduces its exposure to man-made threats.; and (v) its use of renewable biofuels will contribute to State Renewable Portfolio Standard goals.

The proposed action meets two needs for the Army. The SGSP would be a source of renewable power that would enhance energy security for Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia if loss of service occurs from the normal sources of electricity supporting these installations. It would also help achieve the Army goals of producing renewable energy on Army-owned real property.

The Schofield Generating Station would operate on a mix of biofuel and diesel as required to meet Hawaiian Electric's Renewable Portfolio Standards and the US Army's renewable energy goals, as well as sustain a local demand for biofuels. Being multi-fuel capable, it would be able to run on a combination of fuels as necessary to ensure operations are economically viable and can continue under adverse operating conditions.

As the penetration of as-available energy resources, particularly solar photovotaics, increases on Hawaiian Electric's grid, the load curve is expected to change in two ways. Firstly, during daylight hours when photovoltaic production is high total energy demand served by the grid's firm generation sources is likely to be reduced. This effect is expected to create a short morning peak (before the sun rises) for the firm generation sources, and a more pronounced evening peak (after sunset and coincident with peak total demand) for the firm generation sources. Secondly, as the proportion of power and energy provided by wind and solar increases, the effects of clouds and wind variability will have a correspondingly larger impact on grid stability throughout the day.

Schofield Generating Station's combination of quick-starting, flexible, and high efficiency capabilities would combine traditional definitions of "cycling" and "peaking" units, and would instead meet both of these needs as a peaking/cycling station. As such, it would allow the grid to accommodate more fluctuating renewable energy than would otherwise be the case. Accordingly, the EIS will analyze an intermittent operating scenario in which the facility would operate at loads that vary between maximum continuous output (all six engines operating at full load) and minimum load (one engine operating at roughly 50 percent load), for up to 2,200 hours per year (approximately six (6) hours/day). If it were operated in such a fashion, it would consume up to eight (8) million gallons of fuel per year.

If demand increases, operations of other generating facilities decline, and/or future renewable resources do not develop, full-time (rather than intermittent) operation could become a viable operating scenario. As the SGSP would be permitted to operate 7 days a week and 24 hours per day, this EIS will also analyze the impacts of full (100%) operation as a reasonably foreseeable upper bound of effects. Under full operation, each engine would operate 8,760 hours per year, and the SGS would use up to 31.5 million gallons of fuel (a combination of biofuels and fossil fuels) per year.

The agreement under which the SGSP would be constructed and operated would, under certain conditions such as sustained outages or security threats, give the Army "first call" on the electrical energy it produces, and the included transmission facilities would allow the power it produces to be "islanded" to give priority to the Army facilities. SGSP will also shorten the time required to restore

power to the Wahiawa community, and have the capability and capacity to start up other Hawaiian Electric generation units at Waiau Power Plant, expediting the restoration of the grid in the event of an island-wide outage. The 50 MW firm power capacity of the SGSP is sufficient to meet the three Army installations' peak electrical power requirements for all operational needs, administrative functions, logistics, and quality of life functions, thereby providing energy security for the installations if power from the normal source of electricity supporting these Army installations (i.e., the Hawaiian Electric island-wide grid) is interrupted. Thus, the proposed action would help to ensure that the Army's critical national security and first response missions can be carried on even when the island wide utility grid has been compromised.

DETERMINATION & REASONS SUPPORTING DETERMINATION:

The Department of the Army has determined that the SGSP is an action that is subject to the National Environmental Policy Act (NEPA), as amended, the Council on Environmental Quality (CEQ) NEPA regulations (40 CFR Parts 1500 through 1508), and the Department of the Army's NEPA implementing procedures (32 CFR Part 651). It has further determined that it will prepare an environmental impact statement for the proposed undertaking.

The Department of Land and Natural Resources has determined that the SGSP is an action subject to Chapter 343 and has further determined that an environmental impact statement should be prepared. Hawaiian Electric's proposal calls for construction of a new 6-mile long overhead 46 kV sub-transmission line that would allow power from the SGSP to be delivered to the existing Hawaiian Electric 46 kV system. A segment of that route passes over State lands. The granting of the easement for that land constitutes use of State land that is subject to Chapter 343, and Hawai'i Administrative Rules §11-200.

In accordance with § 343-5(h), HRS, because this action is subject to both the NEPA and to Chapter 343, the Army, the Department of Land and Natural Resources and Hawaiian Electric are cooperating to reduce duplication between federal and state requirements by preparing joint environmental impact statement documents with concurrent public review.

In 2012, the State Legislature enacted Act 172, allowing the Chapter 343 process to begin with preparation of an environmental impact statement preparation notice (EISPN) rather than a draft environmental assessment (DEA) in cases where the agency determines that an EIS is likely to be required. This brings the law into alignment with NEPA, which has always allowed for the preparation of an EIS if a Federal agency believes that the action may have a significant impact on the environment.

It is the Army's and DLNR's experience that actions with the size and scope of the SGSP have the potential to have significant environmental effects and benefit from the public review that is provided by the EIS process; therefore, they have decided to prepare an EIS without the preparation of an EA. The Army expects to initiate the EIS scoping process in January 2014 with publication of a Notice of Intent in the Federal Register coinciding with publication of the EISPN.

The Joint Federal/State EIS will examine in detail the potential beneficial and adverse effects of implementing the proposed lease/easement action and the construction/operation of the SGSP. The EIS will assess the potential for direct, indirect, and cumulative effects on the human, natural, and cultural environment and identify mitigation measures for adverse effects.

The EIS will also report the effects of a No Action Alternative as prescribed by federal and state regulations to serve as the baseline against which the proposed action and alternatives are analyzed. Under the No Action Alternative, the Army would not execute the lease/easement, DLNR

would not grant the easement, and Hawaiian Electric would not construct the electrical power generation and transmission facilities. Under normal conditions, Hawaiian Electric would continue to use existing electrical generation facilities, fuels, and grid assets to supply power to its customers, including the Army. During periods when the grid is unable to provide power to the three Army installations, they would rely on their existing fossil fuel-powered backup generators. Because those existing units are able to provide less than 10 percent of the amount needed, the vast majority of the activities on the installations would be interrupted until normal power is restored.

Finally, in accordance with NEPA and Chapter 343 requirements, the EIS will also discuss whether or not there are additional reasonable alternatives that could meet the purpose of the project and the needs of both the Army and Hawaiian Electric. If such alternatives are found to exist through the scoping process, they will be considered in the EIS.

The EIS will evaluate the full range of potential environmental, cultural, and socioeconomic impacts associated with implementing the proposed action and alternatives, including short-term impacts associated with construction. The following impact categories have been tentatively identified for consideration in the EIS:

- Cultural and historical resources (including Native Hawaiian resources).
- Air quality (including climate change and greenhouse gas emissions).
- Water resources (including floodplain, wetlands, and stormwater management).
- Geology and soils.
- Land use.
- Biological resources (including threatened and endangered species, special status species, and related sensitive resources).
- Traffic and transportation.
- Airspace management.
- Public health and safety.
- Noise.
- Hazardous materials and waste management.
- Visual resources.
- Socioeconomics.
- Environmental justice (disproportionately high and adverse impacts to minority and low-income populations).
- Protection of children (from environmental health risks and safety hazards).
- Utilities and infrastructure.

The Army and Hawaiian Electric anticipate that they will conduct several studies in support of the environmental impact statement. These include:

(i) a traffic study to analyze the potential impacts to traffic flow during construction and operation along Kunia Road and within Schofield Barracks;
(ii) an air quality impact study evaluating the effects of constructing and operating the SGSP;
(iii) a stormwater characterization study for the SGSP site;
(iv) a Phase I cultural resources survey on the SGSP and transmission line properties; and
(v) a separate Cultural Impact Assessment (CIA) as required by HRS Chapter 343.

GOVERNMENT AGENCIES RESPONSIBLE FOR APPROVALS:

The EIS will be jointly approved by the Commander of the US Army Garrison—Hawaii and the Department of Land and Natural Resources.

Figure 1 Location of the Proposed Action.

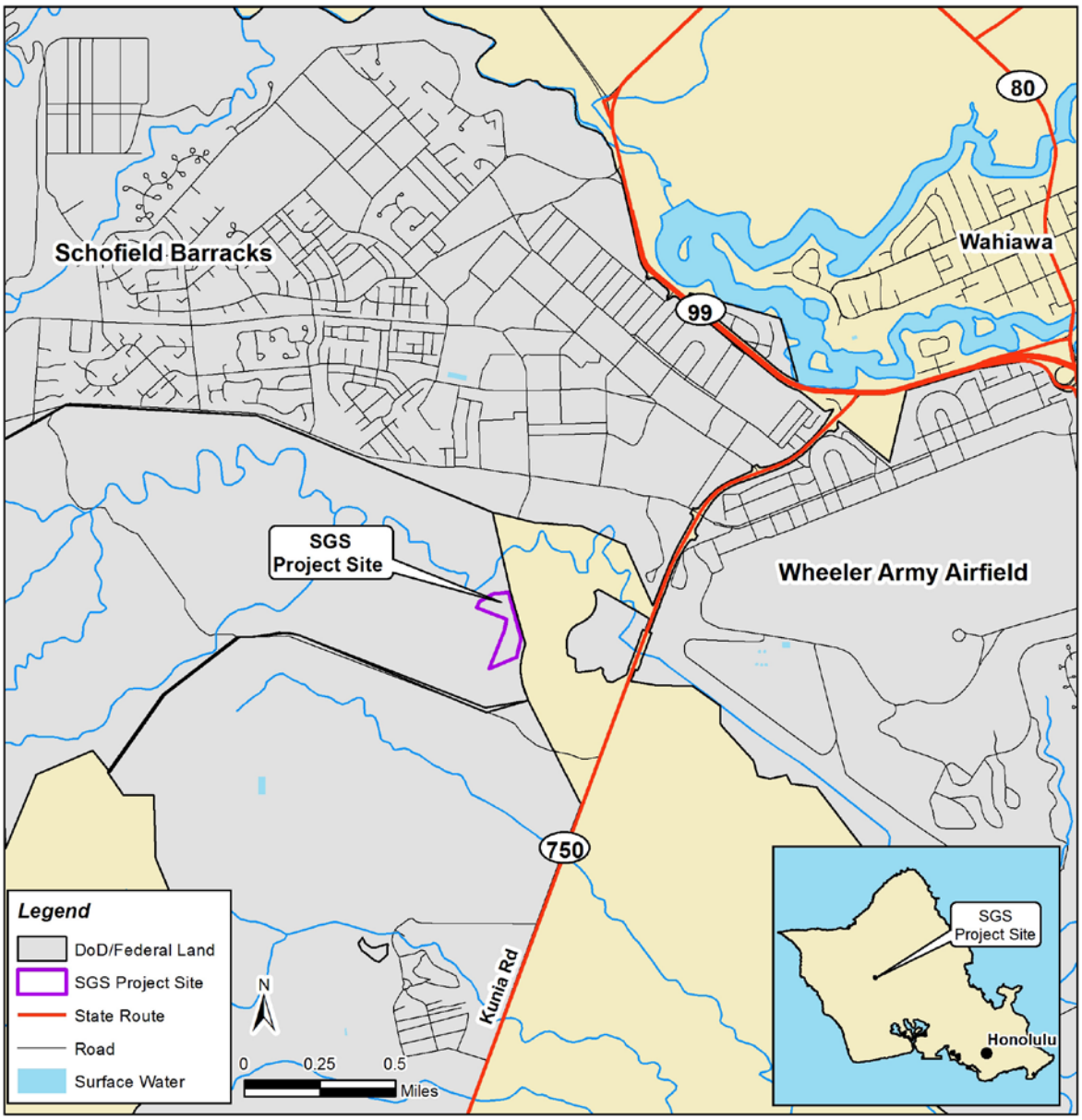


Figure 2 Conceptual Layout of the Proposed Schofield Generating Station.

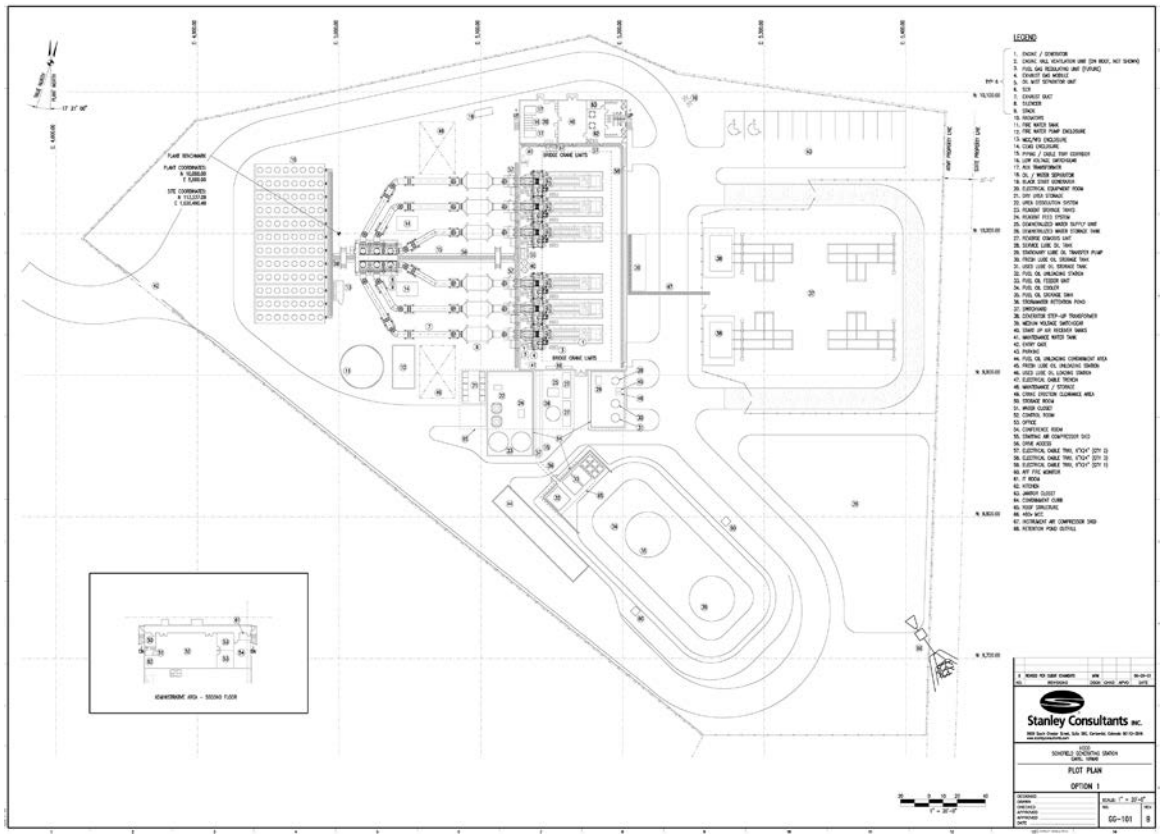
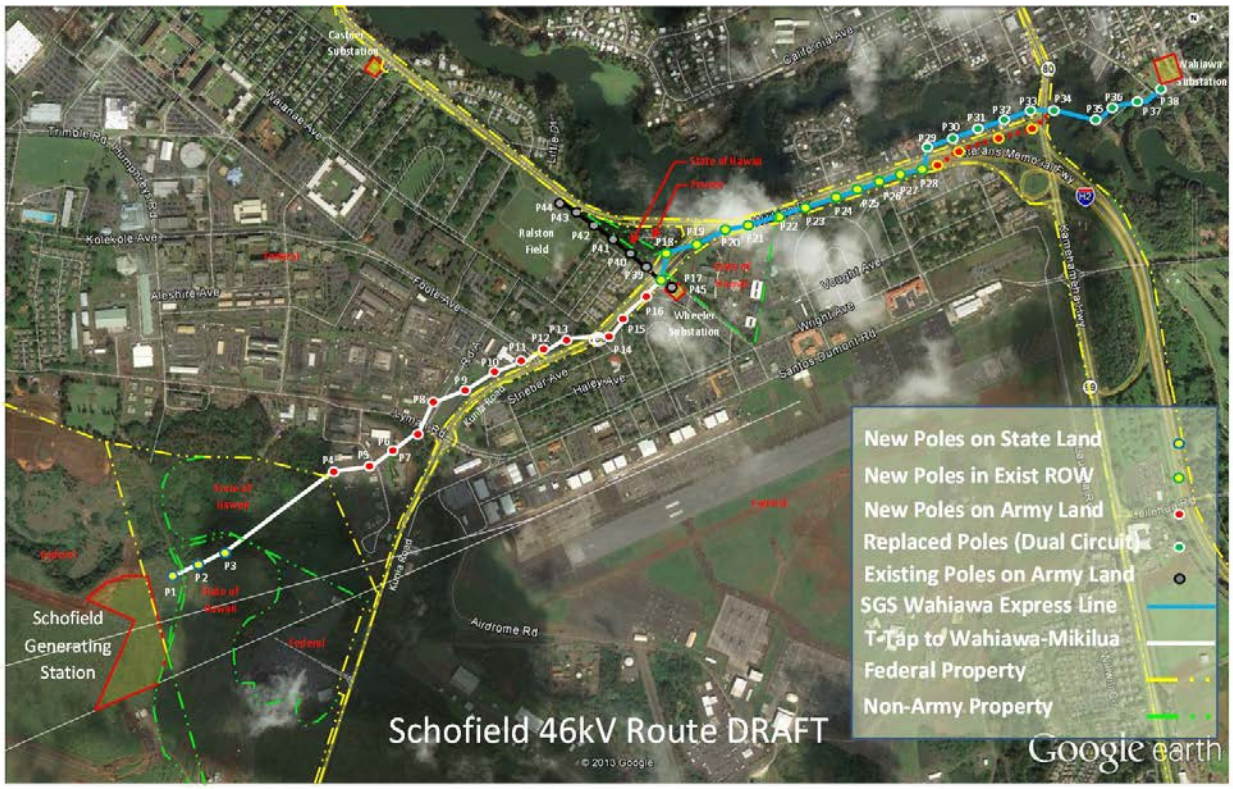


Figure 3 Conceptual Alignment of the Proposed 46 kV Transmission Facilities



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Ad Details

Provided By: Honolulu Star-Advertiser

Category: Legal Notices - Meetings

Description

Public Scoping Meetings for Schofield Generating Station Project Environmental Impact Statement The Department of the Army and Hawaiian Electric Company, Inc. seek public input on the scope of topics to be studied in a joint federal and state Environmental Impact Statement for the construction and operation of a biofuel-capable power plant at Schofield Barracks, City and County of Honolulu, Oahu. Hawaiian Electric would build the proposed Schofield Generating Station Project on land at Schofield Barracks that the Army would make available under a lease. Public meetings will be held on the island of Oahu: February 5, 2014 6:30-9:00 p.m. Mililani Mauka Elementary School Cafeteria 95-1111 Makaikai Street Mililani, HI 96789 February 6, 2014 6:30-9:00 p.m. Wahiawa District Park Recreation Center 1129 Kilani Avenue Wahiawa, HI 96786 The presentation will begin at 7:00 p.m. Public comments will be taken immediately following the presentation. If you require a sign language or Native Hawaiian language interpreter at either meeting, please contact Amber Siegel at 703-385-2597 no later than January 27, 2014. Please leave a message if you reach her voicemail. Comments submitted during a 45-day period beginning January 17 and ending March 2, 2014, will be used to help define the scope of the EIS. For more information on the comment process, the EIS, and the proposed project please visit http://www.garrison.hawaii.army.mil/schofieldplant/default.html. For questions regarding the public information process and meetings, please contact U.S. Army Garrison- Hawaii Public Affairs at 808-656-3152. (SA591962 1/17/14)

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Media Release

Public Affairs Office
U.S. Army Garrison, Hawaii
(808)656-3160
"Malama na Koa"

Release number: 2014-01-01
Jan. 17, 2014

FOR IMMEDIATE RELEASE

Army to study potential biofuel-capable power plant on Schofield

SCHOFIELD BARRACKS, Hawaii — The Army invites the public to provide input on the scope of a future Environmental Impact Statement (EIS) for the construction and operation of a 50-megawatt biofuel-capable power generation plant, here.

The Schofield Generating Station Project (SGSP) would be a source of renewable power that would benefit the Hawaiian Electric Company ("Hawaiian Electric") and Oahu residents by supplying power to the islandwide grid during normal operations.

The SGSP would also provide an energy security service for Schofield Barracks, Wheeler Army Airfield and Field Station Kunia by serving as a backup source of power, should loss of service occur from the normal electricity sources supporting these installations. Electricity produced from renewable biofuels at the SGSP would help the Army achieve its renewable energy goals.

The EIS will study the impacts of developing the SGSP on existing land at Schofield Barracks. The Army would lease 10.3 acres to Hawaiian Electric and grant a related 2.5 acre interconnection easement on Schofield's South Range, west of Kunia Road. Hawaiian Electric would construct, own, operate and maintain the power generation plant. A 46-kilovolt subtransmission line would be built to connect the SGSP to the Hawaiian Electric grid. Air quality, traffic and storm water are among the key resources that will be studied. More information is available in the Notice of Intent published in the *Federal Register* or online at www.garrison.hawaii.army.mil/schofieldplant/.

Interested members of the public, as well as federal, state and local agencies, are invited to participate in the scoping process by helping to identify possible alternatives, potential environmental impacts, and key issues of concern to be analyzed in the EIS.

During the 45-day scoping period, which runs Jan. 17 to March 2, the community can participate in public scoping meetings; submit written comments; or both. The scoping meetings will be held the first week of February, as follows:

Feb. 5
6:30–9 p.m.
Mililani Mauka Elementary School Cafeteria
95-1111 Makaikai St.
Mililani, HI 96789

Feb. 6
6:30–9 p.m.
Wahiawa District Park Recreation Center
1129 Kilani Ave.
Wahiawa, HI 96786

- MORE -

PLANT 2-2-2

The meetings will start with informational display viewing at 6:30 p.m., followed by an overview presentation at 7 p.m., and an oral comment period from 7:30-9 p.m.

In addition to the meetings, individuals can submit written comments via the following: 1) Email sgspcomments@tetratech.com; 2) Fax 703-385-6007 (Attention: SGSP EIS); 3) Mail to Melissa DeSantis, Tetra Tech, Inc. (Attention SGSP EIS, 10306 Eaton Place, Suite 340, Fairfax, VA 22030). Written comments should be sent or postmarked no later than March 2.

For questions regarding the scoping process and meetings, please contact U.S. Army Garrison-Hawaii Public Affairs at (808) 656-3152.

– 30 –

Appendix A-2

Scoping Comments

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NOI COMMENTS

PUBLIC SCOPING MEETING

FOR THE

PROPOSED SCHOFIELD GENERATING STATION PROJECT

ENVIRONMENTAL IMPACT STATEMENT

Thursday, February 6, 2014

Wahiawa District Park Recreation Center

1129 Kilani Avenue

Wahiawa, Hawaii 96786

7:00 - 9:30 p.m.

REPORTER'S TRANSCRIPT

OF PUBLIC COMMENTS

BEFORE: ELSIE TERADA, CSR NO. 437

Certified Shorthand Reporter

WALTER BENAVITZ: On behalf of the Wahiawa Community and Business Association, the WCBA, and myself and with my background, we support and I support the Schofield Generating Station Project for all the reasons stated in the Project Fact Sheet that was provided to us. We support the military's wisdom and their experience with Wahiawa Community and protecting the environment, protecting the ohana. This project is going to help Wahiawa and it will help Hawaii. So, again, on behalf of the WCBA, we support, we officially support this project.

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C E R T I F I C A T E

STATE OF HAWAII)
) SS.
CITY AND COUNTY OF HONOLULU)

I, Elsie Terada, Certified Shorthand Reporter, Certificate No. 437, for the State of Hawaii, hereby certify:

The foregoing transcript is a true and correct copy of the original transcript of the proceedings taken before me as therein stated.

Dated this 28th day of February, 2014, in Honolulu, Hawaii.

_____

ELSIE TERADA, CSR NO. 437

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

February 27, 2014

Mr. Doug Waters
Army Energy Initiatives Task Force – 8th Floor
Department of the Army
2530 Crystal Drive
Arlington, VA 22202

Ms. Melissa DeSantis
Tetra Tech, Inc.
ATTN: SGSP EIS
10306 Eaton Place, Suite 340
Fairfax, VA 22030

Subject: Notice of Intent to Prepare a Joint Environmental Impact Statement for the Lease of Army Land at Schofield Barracks, Oahu, Hawaii for the Construction and Operation of a Biofuel-Capable Power Generation Plant

Dear Mr. Waters and Ms. DeSantis:

The U.S. Environmental Protection Agency has reviewed the Notice of Intent to Prepare a Joint Environmental Impact Statement for the lease of Army land at Schofield Barracks for the Construction and Operation of a Biofuel-Capable Power Generation Plant, Oahu, Hawaii. Our comments are provided pursuant to the National Environmental Policy Act, Council on Environmental Quality regulations (40 CFR Parts 1500-1508) and our NEPA review authority under Section 309 of the Clean Air Act.

To assist in the scoping process for this project, we have identified several issues for your attention in the preparation of the Joint EIS. We appreciate the opportunity to review this NOI and are available to discuss our comments. Please send one hard copy of the Draft EIS and one CD ROM copy to this office at the same time it is officially filed with our Washington D.C. Office. If you have any questions, please contact me at (415) 972-3545.

Sincerely,

Ann McPherson
Environmental Review Section, ENF-4-2

Enclosure: EPA's Detailed Comments

US EPA DETAILED COMMENTS ON THE NOTICE OF INTENT TO PREPARE A JOINT ENVIRONMENTAL IMPACT STATEMENT FOR THE LEASE OF ARMY LAND AT SCHOFIELD BARRACKS FOR THE CONSTRUCTION AND OPERATION OF A BIOFUEL-CAPABLE POWER GENERATION PLANT, OAHU, HAWAII, FEBRUARY 27, 2014

Project Description

The U.S. Department of the Army intends to prepare a Joint Environmental Impact Statement for the lease of Army land at Schofield Barracks for the construction and operations of a 50-megawatt biofuel-capable power generation plant. The proposed Schofield Generating Station Project (SGSP) will be a source of renewable power that would provide energy security service to Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia in the event that service is loss from normal sources supporting these facilities. In addition, the SGSP would provide Hawaiian Electric Company with a quick-starting facility to help maintain grid stability that would be located in a secure location at a higher elevation and away from coastlines. The SGSP would operate on a mix of biofuel and diesel and be able to run on a combination of fuels, as necessary. The proposed action will include the lease of 10.3 acres of land and the granting of a 2.5 acre interconnection easement for the 46-kilovolt subtransmission line.

Purpose and Need

The Draft Environmental Impact Statement should include a clear description of the project purpose and need, including why the Army is undertaking the proposed action and what objectives are intended to be met (40 CFR 1502.13). The purpose and need statement should clearly define the scope of proposed actions that the DEIS will describe and assess for environmental effects.

> *Recommendation:*
> The purpose and need should be a clear, objective statement of the rationale for the proposed project. The DEIS should discuss the proposed project in the context of the larger energy market that this project would serve and discuss how the project will assist the state and the Army in meeting their renewable energy portfolio standards and goals.

Alternatives Analysis

The National Environmental Policy Act requires evaluation of reasonable alternatives, including those that may not be within the jurisdiction of the lead agency (40 CFR Section 1502.14(c)). A robust range of alternatives will include options for avoiding significant environmental impacts. The DEIS should provide a clear discussion of the reasons for the elimination of alternatives which were not evaluated in detail. Reasonable alternatives should include, but are not necessarily limited to, alternative sites, capacities, and technologies. The alternatives analysis should describe the approach used to identify environmentally sensitive areas and the process that was used to designate them in terms of sensitivity.

The environmental impacts of the proposal and alternatives should be presented in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision maker and the public (40 CFR 1502.14). The potential environmental impacts of each alternative should be quantified to the greatest extent possible (e.g., acres of wetlands impacted, tons per year of emissions produced).

The U. S. Environmental Protection Agency strongly encourages the Army and other interested parties to pursue the siting of renewable energy projects on disturbed, degraded, and contaminated sites, including permanently fallow or abandoned agricultural lands.

Recommendations:
The DEIS should describe how each alternative was developed, how it addresses each project objective, and how it will be implemented.

The alternatives analysis should include a discussion of potential sites, capacities, and generating technologies and describe the benefits associated with the proposed technology.

The DEIS should identify the type, source, and quantity of biofuel that will be utilized in the SGSP.

The DEIS should describe the potential direct, indirect and cumulative impacts of the alternatives on all environmental resources in the project area.

The DEIS should clearly describe the rationale used to determine whether impacts of an alternative are significant or not. Thresholds of significance should be determined by considering the context and intensity of an action and its effects (40 CFR 1508.27).

The DEIS should provide a clear discussion of the reasons for the elimination of alternatives which were not evaluated in detail.

The DEIS should describe the current condition of the land selected for the proposed project, discuss whether the land is classified as disturbed, and describe to what extent that land could be used for other purposes, including agricultural use, into the future.

Air Quality

The DEIS should provide a detailed discussion of ambient air conditions (baseline or existing conditions), National Ambient Air Quality Standards, criteria pollutant nonattainment areas, and potential air quality impacts of the project for each fully evaluated alternative. A description of current and proposed activities and their impacts on air quality, including indirect and cumulative impacts, should be included. The DEIS should provide the estimated air emissions (tons per year) from the proposed project for criteria pollutants, including emissions from all construction, operation, and maintenance activities and vehicle traffic. Such an evaluation is necessary to assure compliance with State and Federal air quality regulations, and to disclose the potential impacts from temporary or cumulative degradation of air quality.

Recommendations:
The DEIS should provide a detailed discussion of ambient air conditions, NAAQS, and criteria pollutant nonattainment areas in the vicinity of the project.

The DEIS should estimate emissions of criteria pollutants from the proposed project and discuss the timeframe for release of these emissions over the lifespan of the project. The DEIS should describe and estimate emissions from potential construction activities, as well as proposed mitigation measures to minimize these emissions.

The DEIS should specify emission sources by pollutant from mobile sources, stationary sources, and ground disturbance. This source specific information should be used to identify appropriate mitigation measures and areas in need of the greatest attention.

Below are specific recommendations on New Source Review, Title V Operating Permits, and Construction Emissions.

New Source Review (NSR) Construction Permit Program

New major stationary sources of air pollution and major modifications to sources are required by the Clean Air Act to obtain an air pollution permit before commencing construction. This process is called New Source Review and is required whether the major source or modification is planned for an area where the NAAQS are exceeded (nonattainment areas) or an area where air quality is acceptable (attainment and unclassifiable areas).

Permits for sources in attainment areas are referred to as Prevention of Significant Deterioration air quality permits, while permits for sources located in nonattainment areas are referred to as nonattainment permits. The entire program, including both PSD and NAA permit reviews, is referred to as the NSR program and is established in Parts C and D of Title I of the CAA. Based upon an area's attainment/nonattainment designations and a proposed project's anticipated criteria pollutant emission rates, a project may require both a PSD and NAA permit.

Recommendation:
The DEIS should discuss if NSR program permits will be required for the biofuel-capable power generation plant proposed for construction in the leased areas. The DEIS should describe the permitting process and the information that must be addressed in the permits.

Title V Operating Permit

Title V of the CAA requires all new major sources and some minor sources of air pollution to apply for an operating permit within 12 months of commencing operation. When granted, the permit includes all air pollution requirements that apply to the source, including emissions limits and monitoring, record keeping, and reporting requirements. It also requires that the source report its compliance status with respect to permit conditions to the agency that issued the permit, and if the permit is issued by a state or local agency, reports should also be submitted to the EPA.

Recommendation:
The DEIS should indicate if Title V operating permits will be required for the biofuel-capable power plant proposed to be constructed in the leased areas. If so, it should describe which agency will issue the operating permit and should describe the permitting process, including opportunities for public involvement.

Construction Emissions Mitigation

The DEIS should describe and estimate air emissions from potential construction and maintenance activities, as well as proposed mitigation measures to minimize those emissions. The EPA recommends an evaluation of the following measures to reduce emissions of criteria air pollutants and hazardous air pollutants (air toxics).

Recommendations:

- *Specify Emission Sources* – The DEIS should specify the emission sources by pollutant from mobile sources, stationary sources, and ground disturbance. This source specific information should be used to identify appropriate mitigation measures and areas in need of the greatest attention.

- *Construction Emissions Mitigation Plan* – The DEIS should include a Construction Emissions Mitigation Plan. In addition to all applicable local, state, or federal requirements, the EPA recommends that the following mitigation measures be included in the Construction Emissions Mitigation Plan in order to reduce impacts associated with emissions of particulate matter and other toxics from construction-related activities:

  - *Fugitive Dust Source Controls:* The DEIS should identify the need for a Fugitive Dust Control Plan and how that plan will comply with Hawaii requirements for control of fugitive dust emissions. We recommend that the plan include these general commitments:
    - Stabilize heavily used unpaved construction roads with a non-toxic soil stabilizer or soil weighting agent that will not result in loss of vegetation, or increase other environmental impacts.
    - During grading use water, as necessary, on disturbed areas in construction sites to control visible plumes.
    - Limit speeds to 25 miles per hour on stabilized unpaved roads as long as such speeds do not create visible dust emissions. Limit speeds to 10 miles per hour or less on unpaved areas within construction sites on unstabilized (and unpaved) roads. Post visible speed limit signs at construction site entrances.
    - Inspect and wash construction equipment vehicle tires, as necessary, so they are free of dirt before entering paved roadways, if applicable.
    - Provide gravel ramps of at least 20 feet in length at tire washing/cleaning stations, and ensure construction vehicles exit construction sites through treated entrance roadways, unless an alternative route has been approved by appropriate lead agencies, if applicable.
    - Use sandbags or equivalent effective measures to prevent run-off to roadways in construction areas adjacent to paved roadways. Ensure consistency with the project's Storm Water Pollution Prevention Plan, if such a plan is required for the project.
    - Sweep the first 500 feet of paved roads exiting construction sites, other unpaved roads en route from the construction site, or construction staging areas whenever dirt or runoff from construction activity is visible on paved roads, or at least twice daily (less during periods of precipitation).

- Stabilize disturbed soils (after active construction activities are completed) with a non-toxic soil stabilizer, soil weighting agent, or other approved soil stabilizing method.
- Cover or treat soil storage piles with appropriate dust suppressant compounds and disturbed areas that remain inactive for longer than 10 days. Provide vehicles (used to transport solid bulk material on public roadways and that have potential to cause visible emissions) with covers. Alternatively, sufficiently wet and load materials onto the trucks in a manner to provide at least one foot of freeboard.
- Use wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) where soils are disturbed in construction, access and maintenance routes, and materials stock pile areas. Keep related windbreaks in place until the soil is stabilized or permanently covered with vegetation.

- *Mobile and Stationary Source Controls:*
  - If practicable, lease new, clean equipment meeting the most stringent of applicable Federal[1] or State Standards. In general, commit to the best available emissions control technology. Tier 4 engines should be used for project construction equipment to the maximum extent feasible.[2]
  - Where Tier 4 engines are not available, use construction diesel engines with a rating of 50 hp or higher that meet, at a minimum, the Tier 3 California Emission Standards for Off-Road Compression-Ignition Engines,[3] unless such engines are not available.
  - Where Tier 3 engine is not available for off-road equipment larger than 100 hp, use a Tier 2 engine, or an engine equipped with retrofit controls to reduce exhaust emissions of nitrogen oxides and diesel particulate matter to no more than Tier 2 levels.
  - Consider using electric vehicles, natural gas, biodiesel, or other alternative fuels during construction and operation phases to reduce the project's criteria and greenhouse gas emissions.
  - Plan construction scheduling to minimize vehicle trips.
  - Limit idling of heavy equipment to less than 5 minutes and verify through unscheduled inspections.
  - Maintain and tune engines per manufacturer's specifications to perform at EPA certification levels, prevent tampering, and conduct unscheduled inspections to ensure these measures are followed.

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[1] EPA's website for nonroad mobile sources is http://www.epa.gov/nonroad/.

[2] Diesel engines < 25 hp rated power started phasing in Tier 4 Model Years in 2008. Larger Tier 4 diesel engines will be phased in depending on the rated power (e.g., 25 hp - <75 hp: 2013; 75 hp - < 175 hp: 2012-2013; 175 hp - < 750 hp: 2011 - 2013; and ≥ 750 hp 2011- 2015).

[3] as specified in California Code of Regulations, Title 13, section 2423(b)(1)

- *Administrative controls:*
    - Develop construction traffic and parking management plan that maintains traffic flow and plan construction to minimize vehicle trips.
    - Identify any sensitive receptors in the project area, such as children, elderly, and infirmed, and specify the means by which you will minimize impacts to these populations (e.g. locate construction equipment and staging zones away from sensitive receptors and building air intakes).
    - Include provisions for monitoring fugitive dust in the fugitive dust control plan and initiate increased mitigation measures to abate any visible dust plumes.

Greenhouse Gases and Climate Change

Scientific evidence supports the concern that continued increases in greenhouse gas emissions resulting from human activities will contribute to climate change. Global warming is caused by emissions of carbon dioxide and other heat-trapping gases. On December 7, 2009, the EPA determined that emissions of GHGs contribute to air pollution that "endangers public health and welfare" within the meaning of the CAA. Potential impacts from climate change could include the following changes: poor air quality; more severe heat; increased wildfires; shifting vegetation; declining forest productivity; water shortages; agricultural damage from heat, pests, pathogens, and weeds; and rising sea levels resulting in shrinking beaches and increased coastal flooding.

Recommendations:
The DEIS should describe the type and annual amount (in tons per year) of GHG gas emissions that will be emitted from the Proposed project.

The DEIS should consider how climate change could potentially influence the proposed project and assess how the projected impacts could be exacerbated by climate change.

The DEIS should quantify and disclose the anticipated climate change *benefits* of bio-fuel-capable power generation. We suggest quantifying GHG emissions from different types of generating facilities and comparing these values.

The DEIS should describe how GHG emissions could be reduced for the proposed Project.

<u>Emergency Planning and Community Right-to-Know Act and CAA §112(r)</u>

The DEIS should evaluate the need for compliance with CAA §112(r) and, as applicable, Emergency Planning and Community Right-to-Know Act § 303, 311, & 312.

Recommendation:
The DEIS should discuss compliance with CAA §112(r), EPCRA §§ 303, 311, and 312.

Water Resources

Geographic Extent of Waters of the United States

The Army should coordinate with the U.S. Army Corps of Engineers to determine if the proposed project requires a Section 404 permit under the Clean Water Act. Section 404 regulates the discharge of dredged or fill material into waters of the United States (WUS), including wetlands and other *special aquatic sites*. The DEIS should describe all WUS that could be affected by the project alternatives, and include maps that clearly identify all such waters within the project area. The discussion should include acreages and channel lengths, habitat types, values and functions of these waters. The EPA recommends that the Army include a jurisdictional delineation for all WUS in accordance with the 1987 *Corps of Engineers Wetlands Delineation Manual* and the December 2006 *Arid West Region Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region*. A jurisdictional delineation will confirm the presence or absence of WUS in the project area and help determine whether or not the proposed project would require a Section 404 permit.

If a permit is required, the EPA will review the project for compliance with *Federal Guidelines for Specification of Disposal Sites for Dredged or Fill Materials* (40 CFR 230), promulgated pursuant to Section 404(b)(1) of the CWA. Pursuant to 40 CFR 230, any permitted discharge into WUS must be the *least environmentally damaging practicable alternative* available to achieve the project purpose. The DEIS should include an evaluation of the project alternatives in this context in order to demonstrate the project's compliance with the 404(b)(1) Guidelines. If, under the proposed project, dredged or fill material would be discharged into WUS, the DEIS should discuss alternatives to avoid those discharges.

> *Recommendation:*
> The Army should consult with the USACE to determine if there are jurisdictional waters of the U.S present at the project site. If jurisdictional waters of the U.S. are determined to be on the project site, the DEIS should include a final determination of the extent of waters of the United States at the project site and address any other relevant requirements, pursuant to the CWA Section 404 (b)(1).

Clean Water Act Section 303(d)
The CWA requires States to develop a list of impaired waters that do not meet water quality standards, establish priority rankings, and develop action plans, called Total Maximum Daily Loads, to improve water quality.

> *Recommendation:*
> The DEIS should provide information on CWA Section 303(d) impaired waters in the project area, if any, and efforts to develop and revise TMDLs. The DEIS should describe existing restoration and enhancement efforts for those waters, how the proposed project will coordinate with on-going protection efforts, and any mitigation measures that will be implemented to avoid further degradation of impaired waters.

Water Supply and Water Quality

Public drinking water supplies and/or their source areas often exist in many watersheds. Source water is water from streams, rivers, lakes, springs, and aquifers that is used as a supply of drinking water. Source water areas are delineated and mapped by the state for each federally-regulated public water system. The 1996 amendments to the Safe Drinking Water Act require federal agencies to protect sources of drinking water for communities. Therefore, the EPA recommends that the DEIS identify:

> *Recommendations:*
> The DEIS should discuss the amount of water needed for construction and operations of the proposed Project, describe where this water will be obtained, and fully evaluate the environmental impacts associated with using the selected water supply.
>
> The DEIS should describe surface water features in the project area, and address the effects of project construction on hydrologic features in the project study area.
>
> The DEIS should address the potential effects of project discharges, if any, on surface water quality. Specific discharges should be identified and potential effects of discharges on designated beneficial uses of affected waters should be analyzed. If the facility is a zero discharge facility, the DEIS should disclose the amount of process water that would be disposed of onsite and explain methods of onsite containment.
>
> The DEIS should include a description of all water conservation measures that will be implemented to reduce water demands. Project designs should maximize conservation measures.
>
> The DEIS should fully disclose potential beneficial and/or adverse direct, indirect and cumulative effects to surface and groundwater quality and quantity, wetlands, and aquatic ecosystems.

Stormwater Considerations

The DEIS should describe the original (natural) drainage patterns in the project locale, as well as the drainage patterns of the area during project operations. Also, the DEIS should identify whether any components of the proposed project are within a 50 or 100-year floodplain. The DEIS should note that, under the CWA, any construction project disturbing a land area of one or more acres requires a construction stormwater discharge permit.

> *Recommendations:*
> The DEIS should document the project's consistency with applicable stormwater permitting requirements. Requirements of a stormwater pollution prevention plan should be reflected, as appropriate, in the DEIS.
>
> The DEIS should discuss specific mitigation measures that may be necessary or beneficial in reducing adverse impacts to water quality and aquatic resources.

Biological Resources, Habitat and Wildlife

The DEIS should clearly describe direct, indirect, and cumulative impacts to wildlife and habitat and measures to avoid, minimize, and mitigate for these impacts. The DEIS should identify all petitioned and listed threatened and endangered species and critical habitat that might occur within the project area. The document should identify and quantify which species or critical habitat might be directly, indirectly, or cumulatively affected by each alternative and mitigate impacts to these species. Emphasis should be placed on the protection and recovery of species due to their status or potential status under the federal or state Endangered Species Act.

Recommendations:
Identify all petitioned and listed threatened and endangered species and critical habitat that might occur within the project area. Identify and quantify which species or critical habitat might be directly, indirectly, or cumulatively affected by each alternative.

Discuss design and management measures to minimize adverse impacts to wildlife and native and rare plants.

Discuss how the proposed action would comply with ESA requirements, including any necessary ESA Section 7 consultation efforts with the U.S. Fish and Wildlife Service. Any relevant documents associated with the ESA Section 7 consultation process, including Biological Assessments and Biological Opinions, should be summarized and included in an appendix.

Analysis of impacts and mitigation on covered species should include baseline conditions of habitats and populations of the covered species.

If the applicant is to acquire compensation lands, the location(s) and management plans for these lands should be discussed in the DEIS. Specify, in the DEIS, provisions that will ensure habitat selected for compensatory mitigation will be protected in perpetuity.

The DEIS should describe the ROW vegetation management techniques to be used and potential associated environmental impacts, especially if mechanical methods or herbicides are to be used.

The DEIS should provide detailed information on any proposed fencing design and placement, and its potential effects on drainage systems on the project site. Fencing proposed for this project should meet appropriate hydrologic, wildlife protection and movement, and security performance standards.

Invasive Species

Executive Order 13112, *Invasive Species* (February 3, 1999), mandates that federal agencies take actions to prevent the introduction of invasive species, provide for their control, and minimize the economic, ecological, and human health impacts that invasive species cause. Executive Order 13112 also calls for the restoration of native plants and tree species. We encourage alternative management practices that limit herbicide use.

Recommendations:
The DEIS should include an invasive plant management plan to monitor and control noxious weeds. If herbicides or pesticides will be used to manage vegetation, the DEIS should disclose the projected quantities and types of chemicals.

If the proposed project will entail new landscaping, the DEIS should describe how the project will meet the requirements of Executive Order 13112.

Section 106 of the National Historic Preservation Act

Section 106 of the National Historic Preservation Act, 16 U.S.C. § 470f, requires federal agencies to take into account the effects of their undertakings on historic properties and provide the Advisory Council on Historic Preservation a reasonable opportunity to comment on those undertakings. The ACHP has issued the regulations implementing Section 106, 36 CFR Part 800, "Protection of Historic Properties." The NHPA requires that, in carrying out the requirements of Section 106, each federal agency must consult with any Native Hawaiian organization that attaches religious and cultural significance to historic properties that may be affected by the agency's undertakings.

Recommendation:
The DEIS should describe the process and outcome of Section 106 consultation between the Army and any Native Hawaiian organization that has shown an interest in the covered activities within the project area, issues that were raised (if any), and how those issues were addressed in the selection of the proposed alternative.

Environmental Justice and Impacted Communities

The interagency Memorandum of Understanding on Environmental Justice and Executive Order 12898 (August 4, 2011) and the Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (February 11, 1994) directs federal agencies to identify and address disproportionately high and adverse human health or environmental effects on minority and low-income populations, allowing those populations a meaningful opportunity to participate in the decision-making process. Guidance[4] by CEQ clarifies the terms low-income and minority population (which includes American Indians) and describes the factors to consider when evaluating disproportionately high and adverse human health effects.

Recommendation:
The DEIS should include an evaluation of environmental justice populations within the geographic scope of the project. If such populations exist, the DEIS should address the potential for disproportionate adverse impacts to minority and low-income populations, and the approaches used to foster public participation by these populations. Assessment of the projects

[4] Environmental Justice Guidance under the National Environmental Policy Act, Appendix A (Guidance for Federal Agencies on Key Terms in Executive Order 12898), CEQ, December 10, 1997.

impact on minority and low-income populations should reflect coordination with those affected populations.

Document existing human health and environmental risks to which people in the project area are exposed under the "affected environment."

Health Impacts/Children's Health

The DEIS should include a discussion of any health impacts associated with the project. Executive Order (EO) 13045, *Protection of Children from Environmental Health Risks and Safety Risks* (April 21, 1997), directs each Federal agency, to the extent permitted by law and appropriate, to make it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children, and to ensure that its policies, programs, activities, and standards address these risks. The EO recognizes that some physiological and behavioral traits of children render them more susceptible and vulnerable than adults to environmental health and safety risks. Children may have a higher exposure level to contaminants because they generally eat more food, drink more water, and have higher inhalation rates relative to their size. Children also exhibit behaviors such as spending extensive amounts of time in contact with the ground and frequently putting their hands and objects in their mouths that can also lead to much higher exposure levels to environmental contaminants. In addition, a child's neurological, immunological, digestive, and other bodily systems are also potentially more susceptible to exposure related health effects. It has been well established that lower levels of exposure can have a negative toxicological effect in children as compared to adults, and childhood exposures to contaminants can have long-term negative health effects. Examples include life-long neurological deficits resulting from exposure to lead, mercury and other metals, and the increased susceptibility to particulate matter and other asthma triggers in the environment.

We recommend that the DEIS assess children's potential exposures and susceptibilities to pollutants of concern. When identifying pollutants, consider whether they pose a particular hazard to children's health (for example, PM_{10}, dust, heavy metals, or air pollution from near construction or roadway exposures). Describe the relevant demographics of affected populations and focus exposure assessments on children who are likely to be present in the project area. Discuss baseline health conditions by obtaining and discussing relevant, publicly available health data/records for the populations of concern, including data on existing asthma rates and asthma severity among children in the project area. If relevant, discuss impacts and consider exposure to children from mobile source air pollutants from project construction and operations. Children are believed to be especially vulnerable due to higher relative doses of air pollution, smaller diameter airways, and more active time spent outdoors and closer to ground-level sources of vehicle exhaust. Identify children's proximity to project emission sources, including transportation corridors and construction sites.

Noise Impacts

The DEIS should include an assessment of noise levels from construction, maintenance and operation of the proposed Project. Decibel levels should be evaluated as should the effects of noise levels on a variety of species, as well as effects on sensitive receptors, residences, recreational users and property values.

Hazardous Materials/Hazardous Waste/Solid Waste

The DEIS should address potential direct, indirect and cumulative impacts of hazardous waste from construction and operation. The document should identify projected hazardous waste types and volumes, and expected storage, disposal, and management plans. It should address the applicability of state and federal hazardous waste requirements. Appropriate mitigation should be evaluated, including measures to minimize the generation of hazardous waste (i.e., hazardous waste minimization). Alternate industrial processes using less toxic materials should be evaluated as mitigation. This potentially reduces the volume or toxicity of hazardous materials requiring management and disposal as hazardous waste.

Cumulative and Indirect Impacts

The cumulative impacts analysis should provide the context for understanding the magnitude of the impacts of the alternatives by analyzing the impacts of other past, present, and reasonably foreseeable projects or actions and then considering those cumulative impacts in their entirety (CEQ's Forty Questions, #18). The DEIS should clearly identify the resources that may be cumulatively impacted, the time over which impacts are going to occur, and the geographic area that will be impacted by the proposed projects. The DEIS should focus on resources of concern – those resources that are "at risk" and/or are significantly impacted by the proposed projects, before mitigation. In the introduction to the *Cumulative Impacts Section*, identify which resources are analyzed, which ones are not, and why. For each resource analyzed, the DEIS should:

- Identify the current condition of the resource as a measure of past impacts.
- Identify the trend in the condition of the resource as a measure of present impacts.
- Identify all on-going, planned, and reasonably foreseeable projects in the study area that may contribute to cumulative impacts.
- Identify the future condition of the resource based on an analysis of impacts from reasonably foreseeable projects or actions added to existing conditions and current trends.
- Assess the cumulative impacts contribution of the proposed alternatives to the long-term health of the resource.
- Identify opportunities to avoid and minimize impacts, including working with other entities.

As an indirect result of providing additional power, it can be anticipated that these projects will allow for development and population growth to occur in those areas that receive the generated electricity.

Recommendations:
The DEIS should describe the reasonably foreseeable future land use and associated impacts that will result from the additional power supply. The document should provide an estimate of the amount and likely location of growth, and the biological and environmental resources at risk.

The DEIS should consider the cumulative impacts associated with multiple large-scale renewable energy projects proposed in the Hawaiian Islands and the potential impacts on various resources including: water supply, covered species, and habitat.

DEPARTMENT OF THE ARMY
HONOLULU DISTRICT, US ARMY CORPS OF ENGINEERS
FT. SHAFTER, HAWAII 96858

March 7, 2014

Regulatory Office

Ms. Melissa DeSantis
Tetra Tech, Inc.
Attention: SGSP EIS
10306 Eaton Place, Suite 340
Fairfax, Virginia 22030

Dear Ms. DeSantis:

In a letter dated January 9, 2014, the U.S. Army Corps of Engineers (Corps) was invited to participate in an interagency scoping meeting for the preparation of a joint federal and state environmental impact statement (EIS) for the proposed construction and operation of a biofuel-capable power plant located at Schofield Barracks, Island of Oahu, Hawaii. The invitation letter included a draft copy of the then yet-to-be published notice of intent (NOI) to prepare an EIS pursuant to the National Environmental Policy Act (NEPA) as well as scoping materials prepared by the State of Hawaii Department of Land and Natural Resources (DLNR) pursuant to Chapter 343, Hawaii Revised Statutes. Corps file number POH-2014-00018-SAM has been assigned to this action, which you should refer to in all future correspondence with my office on this project.

While my staff was unable to attend the February 4, 2014 interagency scoping meeting, we have reviewed the NOI that was published in the Federal Register on January 17, 2014 (79 FR 3187). In response to the NOI, I offer the following scoping comments for your consideration.

Given the relative proximity of the proposed Schofield Generating Station Project (SGSP) to the Waikele Stream and other aquatic resources that may occur within the Department of the Army's NEPA scope of analysis, I request the EIS identify all potential waters of the United States (U.S.), including wetlands and streams (perennial, intermittent, and ephemeral) that could be directly or indirectly affected by your proposed action. In doing so, a wetlands ecologist or other qualified scientist should conduct a literature search and review, perform a field reconnaissance assessment, and survey the project area to identify, characterize, and map all aquatic resource features. The boundaries of any adjacent wetlands should be delineated using the Corps 1987 *Wetlands Delineation Manual* and the *Hawaii and Pacific Islands Regional Supplement to the Corps of Engineers Wetland Delineation Manual* (ERDC, 2012). Streams should also be inventoried and mapped, including the demarcation of an observed ordinary high water mark, if one exists, to help establish the lateral limits of potential Corps regulatory jurisdiction.

In addition to identifying the physical location and characteristics of aquatic resources, we recommend the application of the *Hawaii Stream Visual Assessment Protocol* (NRCS, 1998; 2001) or other appropriate peer-reviewed methodology to assess the condition (quality) of streams that flow through or near the action area.

As you formulate alternatives to the proposed action and evaluate the direct, indirect, and cumulative effects on the human environment as compared to the No Action alternative, all practicable steps should be taken to avoid and minimize adverse impacts to the aquatic environment. At this early planning stage, the SGSP footprint of disturbance and any ancillary project features, such as new or improved access roads and parking facilities, should be designed and located in areas that would avoid direct and indirect adverse effects to aquatic resources. Similarly, construction-related elements, including, but not limited to, staging areas, temporary access roads, haul roads, stockpile areas, and disposal sites should be sited in areas where aquatic features and other sensitive environmental resources do not exist.

If jurisdictional aquatic resources our determined by the Corps to occur within the project area and cannot be practicably avoided, activities that would discharge fill material into waters of the U.S. will require Corps authorization under Section 404 of the Clean Water Act (33 USC 1344). In some cases, if the regulated activity(s) results in minimal adverse impact on the aquatic environment and meets the terms and conditions of our 2012 nationwide permits (NWPs), a relatively expedient permit decision can be made. However, if the regulated activity(s) and associated impacts to waters of the U.S. do not meet the terms and conditions of our NWPs or other general permits, then an individual permit (IP) would be required. In the latter scenario, the applicant (i.e., Hawaiian Electric Company) would need to demonstrate to the Corps that its preferred alternative is the least environmentally damaging practicable alternative in accordance with U.S. Environmental Protection Agency's Section 404(b)(1) Guidelines ("Guidelines"). Accordingly, if it appears that the proposed action would require an IP, I recommend that as the U.S. Army and DLNR move forward with the joint federal and state EIS, that pre-application consultations take place with my office to ensure the NEPA alternatives analysis is adequate and robust enough to comply with the substantive requirements of the Guidelines, including, but not limited to, an on- and off-site alternatives analysis. Towards this end, it would also be prudent for the Corps to become a cooperating agency on the EIS based upon our jurisdiction by law and special expertise.

Furthermore, in the event unavoidable adverse impacts to waters of the U.S. would result from the proposed action, the applicant will need to propose compensatory mitigation to offset the loss of aquatic resource functions. If no third-party compensatory mitigation options are available (e.g., Corps-approved mitigation bank or in-lieu fee program), then applicant must develop a permittee-responsible mitigation

plan that follows the requirements set forth in the Corps' 2008 *Compensatory Mitigation for Losses of Aquatic Resources Final Rule* (73 FR 19594).

Lastly, in acknowledging the U.S. Army's NEPA lead agency role and responsibility to comply with all applicable federal laws and regulations for the proposed SGSP, the Corps would rely upon the U.S. Army's consultations with other federal and state agencies (e.g., U.S. Fish and Wildlife Service, DLNR, and State Historic Preservation Officer) in fulfilling our independent federal responsibilities under the same federal laws and regulations for the issuance of a Corps permit decision, assuming a Section 404 permit were to be required. Such laws and regulations include, but would not be limited to, Section 7 of the Endangered Species Act, Fish and Wildlife Coordination Act, and Section 106 of the National Historic Preservation Act

I appreciate the opportunity to comment and look forward to engaging in the NEPA process, as appropriate and based upon the extent of our regulatory scope of analysis. If you have any questions, please contact Susan A. Meyer at (808) 835-4599 or at susan.a.meyer@usace.army.mil.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Office

Copy Furnished:
Mr. Doug Waters, Department of the Army, Army Energy Initiatives Task Force

Siegel, Amber

From: Jean Public <[redacted]>
Sent: Saturday, January 18, 2014 3:53 PM
To: DIV.SGSP Comments; DOUGLAS.S.WATERS.CIV@MAIL.MIL; USARY.JBSA.AEX.MBX@MAIL.MIL; PRESIDENT@WHITEHOUSE.GOV; SPEAKERBOEHNER@MALI.HOUSE.GOV; AMERICANVOICES@MAIL.HOUSE.GOV; scoop@huffingtonpost.com; jungaro@gannett.com
Subject: Fw: PUBLIC COMMENT ON FEDERAL REGISTER i want solar or wind - no biofuel which takes more eneergy to make than it gives - biofuel is an energy waster

BIOFUEL HAS BEEN A BIG SCAM ON THE PEOPLE OF THE USA. MOST BIOFUELS ARE SHUTTING DOWN. THEY TAKE SO MUCH ENERGY TO MAKE THE BIOFUEL THAT THEY TAKE MORE ENERGY THAN THEY EVER GIVE YOU. WHOSE BRIGHT IDEA WAS THIS AWFUL IDEA?

I THINK SOLAR OR WIND WOULD BE A BETTER CHOICE. SOLAR OF COURSE IS THE BEST. WATER POWER? ALSO. THIS IS SO MUCH BETTER THAN THIS BIOFUEL STUPIDITY. SHUT DOWN THIS AWFUL SCAM ON THE TAXPAEYRS OF THE USA. THIS PROJECT IDEA STINKS AND DESERVES A GRADE OF F MINUS. JEAN PUBLIC PLEASE RECEIPT.

WHY BIOFUEL WHICH TAKES SO MUCH ENERGY TO RUN?

On Friday, January 17, 2014 8:07 AM, "[redacted]> wrote:
Federal Register Volume 79, Number 12 (Friday, January 17, 2014)]
[Notices]
[Pages 3187-3188]
From the Federal Register Online via the Government Printing Office [http://www.gpo.gov/]

[FR Doc No: 2014-00888]

DEPARTMENT OF DEFENSE

Department of the Army

Preparation of Environmental Impact Statement for the Lease of Army Land at Schofield Barracks, Oahu, Hawaii for the Construction and Operation of a Biofuel-Capable Power Generation Plant

AGENCY: Department of the Army, DoD.

ACTION: Notice of intent.

SUMMARY: The Department of the Army notifies interested parties of its intent to prepare a Joint Environmental Impact Statement (EIS) for the proposed lease of Army land at Schofield Barracks to the Hawaiian Electric Company (``Hawaiian Electric'') for the construction and operation on that land of a 50-megawatt (MW) biofuel-capable power

generation plant. This EIS is designed to meet the requirements of both the National Environmental Policy Act (NEPA) and the Hawaii Environmental Policy Act (HEPA) as a matter of efficiency and cooperation with the State's decision-making process. The decision makers, the Department of the Army and the Hawaii Department of Land and Natural Resources, will use the analysis in the EIS to determine the potential effects of implementing the proposed action and alternatives. The Army also intends to integrate this NEPA process with the consultation and public participation requirements of Section 106 of the National Historic Preservation Act.

ADDRESSES: Written comments on the scope of the EIS or a request to be added to the EIS distribution list may be submitted as follows: Email to sgspcomments@tetratech.com; Facsimile (fax) to 703-385-6007 (Attention: SGSP EIS); U.S. mail to Melissa DeSantis, Tetra Tech, Inc. (Attention: SGSP EIS, 10306 Eaton Place, Suite 340, Fairfax VA 22030).

FOR FURTHER INFORMATION CONTACT: For more information on the Army's proposed action, please contact Mr. Doug Waters, Army Energy Initiatives Task Force. Mr. Waters can be reached by phone at 703-601-0511, Monday through Friday from 8:00 a.m. to 5:00 p.m. eastern, or by email at douglas.s.waters.civ@mail.mil. For general information about the Army NEPA process, please contact the Public

[[Page 3188]]

Affairs Office of the Army Environmental Command at 210-466-1590 or 1-855-846-3940 (toll free), or by email at usarmy.jbsa.aex.mbx@mail.mil.

SUPPLEMENTARY INFORMATION: The Army's proposed action, referred to as the Schofield Generating Station Project (SGSP), is a lease of 10.3 acres of land and a related 2.5 acre interconnection easement on Schofield Barracks to Hawaiian Electric, as well Hawaiian Electric's construction, ownership, operation, and maintenance of a 50 MW biofuel-capable power generation plant and 46-kilovolt subtransmission line.

The SGSP would be a source of renewable power that would provide an energy security service to Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia if loss of service occurs from the normal sources of electricity supporting these installations. Any electricity produced from renewable biofuels would also help achieve the Army goals of producing renewable energy on Army-owned real property.

The SGSP would benefit Hawaiian Electric and the residents of Oahu. It would provide a quick-starting facility to help maintain grid stability; provide a facility at a higher elevation and away from coastlines; provide a physically secure facility on a military installation; and makes progress toward the Hawaii Renewable Portfolio Standard.

The SGSP would operate on a mix of biofuel and diesel, as required to meet Hawaiian Electric's Renewable Portfolio Standard and the Army's renewable energy goals, and may help sustain a local demand for biofuels. Since the SGSP would be multi-fuel capable, it would be able to run on a combination of fuels as necessary to ensure operations are economically viable and can continue under adverse operating conditions.

The EIS will assess the potential for direct, indirect, and cumulative effects on the human, natural, and cultural environment and identify mitigation measures for any adverse effects.

The EIS will examine two alternative operating scenarios for the proposed action. Under the first scenario, the SGSP would run approximately six hours per day, and consume up to eight million gallons of fuel per year. Under the second scenario, the SGSP would

operate seven days a week and 24 hours per day, and would consume up to 31.5 million gallons of fuel per year.

The EIS will analyze a No Action Alternative, as prescribed by the Council on Environmental Quality (CEQ) regulations, to serve as the baseline against which the proposed action and alternatives are compared. Under this alternative, the SGSP would not be built. The EIS process will also examine whether there are additional reasonable alternatives that could meet the needs of both the Army and Hawaiian Electric.

Key resources of concern, for which potentially significant impacts could occur, include air quality, traffic, and stormwater. The Army is preparing supporting studies for those resources.

The Department of the Army encourages all interested members of the public, as well as federal, state, and local agencies to participate in the scoping process for the preparation of this EIS. Interested members may participate in scoping meetings, submit written comments, or both. Written comments will be accepted within a 45-day period following the publication of the Notice of Intent (NOI) in the Federal Register. Scoping meetings will be held on the Island of Oahu, Hawaii during the first week of February 2014. Notification of the locations and times for the meetings will be published in the Honolulu Star-Advertiser.

Brenda S. Bowen,
Army Federal Register Liaison Officer.
[FR Doc. 2014-00888 Filed 1-16-14; 8:45 am]
BILLING CODE 3710-08-P

Siegel, Amber

From: Robert Hennkens <[redacted]>
Sent: Tuesday, February 04, 2014 11:52 PM
To: DIV.SGSP Comments
Cc: Governor Neil Abercrombie
Subject: Schofield Barracks - Carbontech comment about the proposed bio energy generator on the Army Base, proposed by HECO.
Attachments: Scouping Comments for Fuel Requirements for the Schofield Barracks Army Base on Oahu.pdf; Carbontech Global Business Card.pdf

Please add our comment concerning the the scouping period as suggested by Ms Amy L. Bugala of Schofield Barracks to the catalog of recommendations proposed for the 50 mWh-REA steam powered bio generator. Our comment provide the only practical solution to the 325,000 tons of combustion fuel required to operate the large bio generator with grid quality on a dispatchable around-the clock basis. Our recommendations are socially noble, perpetually sustainable, nearly environmentally inert, eliminate much of the organic landfill wastes on all of the Island Counties, has the economic benefits of producing all of the fuel from organic waste streams that do not have to be imported, are persistent and readily available on the five Island Counties. In addition CT Fuel and BHLF if selected as the energy resource will assure that the bio generator emissions will be in compliance with the Hawaiian Mandate for mWh-REAs. The CO2 from emissions can be captured and used in adjoining greenhouses that can easily be a major component to help the thousands of Wounded Warriors. We will provide copies of the machinery and process patents and disclosures. And we will provide complete resumes of the individuals selected to manage the organic resource program and logistics, construction and operation of the CT Fuel and BHLF facilities, provide competent and professional training and management, provide patented equipment, processes, and independent combustion emission analysis. The resumes of all listed as managers and operation directors can also be provided on request. The CT Fuel facilities can commence to be operational and producing standardized size, weight, and btu fuel inventory for storage in Intermodal Containers within six months.
Also it is possible for our Carbontech Cooperative, Inc. member Mountain Cogeneration, Incorporated to bid at the pleasure of HECO for the bio generator, CO2 capture, and water recycling components that are optimum operating with CT Fuel. MCCI has constructed and operated over 100 bio fueled facilities since 1964. MCCI currently has plans and components for a 49.1mW-REA faceplate bio generation facility, and also has plans and components for twin 22.5 mW-REA faceplate plans and components available to bid and commence construction once permits are granted.
Thank you for entering our comment. Robert G. Hennkens

Robert G. Hennkens Cell 520 808 2123

AVELIS Biotechnologies
Carbontech Cooperative
Organic Energy Transfer
SAMMS Technologies

P.O. Box 65466 Tucson, Arizona 85728
520 577 6990 carbontechglobal@gmail.com

Carbontech Global

OUR MISSION IS SIMPLY TO MAKE SOMETHING OUT OF NOTHING, SUSTAINABLY

New Water, New Cultivars, New Soils, New Foods, New Forage, New Fibers, New Energy, New Housing,
Less Carbon Emissions, Clean Atmosphere, Better Biodiversity, Perpetually Sustainable Living

January 31, 2014

PROPOSAL: TO USE MULTIPLE ORGANIC WASTE STREAMS FROM THE FIVE ISLAND COUNTIES OF HAWAII TO PRODUCE 325,000 ANNUAL TONS OF GREEN AND PERPETUALLY SUSTAINABLE GREEN SOLID AND/OR LIQUID HYDROCARBON FUEL FOR EMPLOYMENT AS ENERGY RESOURCE TO POWER A HAWAII ELECTRIC COMPANY (HECO) 50 MW ELECTRIC BIO GENERATOR THAT SUPPORTS A LONG-TERM POWER PURCHASE AGREEMENT PROVIDED BY THE UNITED STATES ARMY BASE FACILITIES AT OAHU, HAWAII, AND HAWAII'S RENEWABLE ENERGY MANDATE.

Eight Page Scoping Project Narrative and Slides Presented by:

Carbontech Cooperative, Inc. , P.O. Box 65466, Tucson, Arizona 85728
Telephone: 520 577 6990 Email Carbontechglobal@gmail.com
Project coordinator: Robert G. Hennkens Cell: 520 808 2123 Email: rhennkens@gmail.com

Orientation: The Army Assistant Secretary of Installations, Energy, and the Environment has declared that the Army has land and it wants energy financed and generated by private organizations globally on its land to provide distributed secure, perpetually sustainable, and environmentally sensitive sources of on-site vital electricity to complete its missions. A project is proposed by Hawaii Electric Company (HECO) to generate 50 mW – REA of grid quality electricity on a continuous around the clock dispatch-able basis to principally serve electricity requirements of the United States Army Base Facilities at Oahu, Hawaii. And when not used by the Army, will revert to HECO's electricity grid.

IP: Carbontech Cooperative, Inc. members have patents and disclosures for technologies to produce Carbontech Composite (CT) solid fuel and CT Bio Hydrocarbon Liquid Fuel (BHLF) to fuel the proposed steam-powered bio generation system.

Technology Brief: CT and BHLF are unique perpetually sustainable, substantially environmentally inert, and socially noble non-food or water-based energy resources. CT and hot BHLF plasma will fire and co-fire a combustion boiler and steam powered generator(s). Hot BHLF plasma co-fired with bio diesel will provide bio energy to direct fire engine(s) to torque a generator. CT and BHLF are produced exclusively from persistently occurring waste organics that are readily available and have no-value what-so-ever. The solid and liquid fuels are to be processed by cookie-cutter CT mills and Organic Energy Transfer (OET) bio reactor facilities on each of the five Hawaiian County Islands. CT and OET technologies are good neighbors. The combined facilities use no water acids or enzymes; and produce no odors or black smoke. The combined facilities require five acres for infrastructure, building(s) outdoor and indoor processes, roadways and infrastructure at each site. A rail spur provides convenience but is not required. A permanent or temporary seaport facility is required on each Island where facilities are located. CT Fuel and BHLF facilities may be sited together or separately and may be sited on a county landfill or other brown field location under the EPA exemption for Renewable Energy Facilities.

Intent to Prepare Environment Impact Statement for Schofield Barracks Project Announced

SCHOFIELD BARRACKS, Hawaii (January 17, 2014) The Army invites the public to provide comments on the scope of an Environmental Impact Statement (EIS) for the construction and operation of a 50 MW biofuel-capable power generation plant at Schofield Barracks, City and County of Honolulu, O'ahu. Written comments to the EIS can be submitted during the 45-day scoping period from January 8 to February 22, 2014. Scoping meetings will be held at:

February 5, 2014 6:30–9:00 PM
Mililani Makua Elementary School Cafeteria
95-1111 Makaikai St.
Mililani, HI 96789

February 6, 2014 6:30–9:00 PM
Wahiawa District Park Recreation Center
1139a Kilani Avenue
Wahiawa, HI 96786

The Schofield Generating Station Project (SGSP) would be a source of renewable power that would provide energy security for Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia if loss of service occurs from the normal sources of electricity supporting these installations. The SGSP would also benefit the Hawaiian Electric Company (HECO) and the residents of Oahu by supplying power to the island-wide grid during normal operations.
The EIS will study the impacts of developing the SGSP on existing land at Schofield Barracks. The Army would lease 10.3 acres to HECO and grant a related 5-acre interconnection easement on South Range, Schofield Barracks. HECO would construct, own, operate, and maintain the power generation plant. A 46-kilovolt subtransmission line would be built to connect the SGSP to the HECO grid. Key resources of concern, for which potentially significant impacts could occur, include air quality, traffic, and storm water. More information can be found in the Notice of Intent (NOI) published in the Federal Register.
All interested members of the public, as well as Federal, state, and local agencies are invited to participate in the scoping process for the preparation of this EIS by participating in scoping meetings, submitting written comments, or both. The scoping process will help identify possible alternatives, potential environmental impacts, and key issues of concern to be analyzed in the EIS.

U.S.ARMY

ENERGY INITIATIVES TASK FORCE
Securing Army installations with energy that is clean, reliable and affordable

U.S. Army Energy Initiatives Task Force

June 19, 2013

From: Katherine Hammack, Assistant Secretary of the Army for Installations, Energy and Environment
To: Qualified Finance and Contractor Resources

Subject: We are facing interesting times.

The Honorable Katherine Hammack, Assistant Secretary of the Army for Installations, Energy and Environment (ASA IE&E).

We are living in interesting times. Today, the Department of Defense faces multiple threats and non-traditional challenges, all of which jeopardize our future security environment.

Lt. Gen. Mary Legere, the Army's senior intelligence officer, reports that the key defining element of the complex, future operating environment will be the "lack of Governance or Rule of Law." Driving this break down in governance will be an increasing, worldwide demand for scarce resources. Rising oil prices and scarcity of water driven by increasing demand; cultural and demographic conflicts, and political unrest in several regions; unstable weather conditions, and the effects of climate change; will create increased global tensions and worsen our future security environment.

The Army's ability to accomplish our mission on a global scale depends on secure, uninterrupted access to power and energy. With today's volatile energy market, the long-standing assumption that the Army will have unlimited availability of affordable fossil fuels is no longer valid. We must become more flexible, and adaptable, in obtaining necessary energy supplies.

Due to the need for expansive maneuver areas, Army installations are typically isolated and at the end of utility lines. By constructing renewable energy projects, the Army increases its energy security, reduces vulnerability in the event of power outages, and reduces utility bills that are increasing much faster than inflation.

While we may use appropriated funding and performance contracting for smaller renewable energy projects, the Army recognizes it must take a different partnership path if it is going to develop the large-scale projects it requires to meet our energy security needs. The Army's goal is to have 25 percent of our power requirements generated by renewable energy sources by 2025, and, very importantly, to have that power consumed on our installations.

To address these issues and to comply with Congressional and Presidentially-directed mandates for energy consumption and alternate energy production (NDAA of 2007, 2010, Energy Policy Act 2005, and Executive Order 13514) the Secretary of the Army established the Energy Initiatives Task Force on September 15, 2011. The EITF leverages private-sector financing and expertise to gain access to up-front capital investments in return for a long-term power purchase agreement.

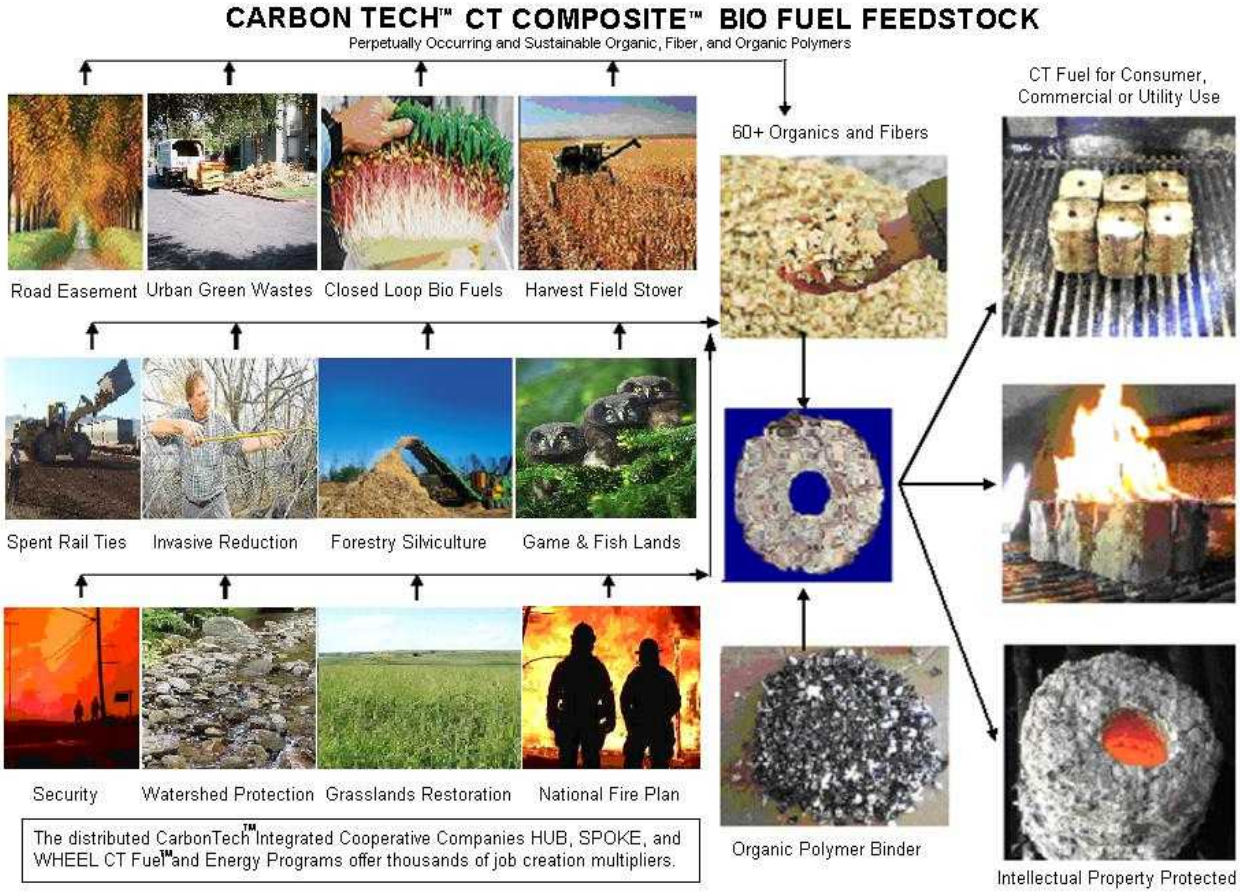
To support the EITF, the U.S. Army Corps of Engineers initiated the first of its kind, Multiple Award Task Order Contract, or MATOC, to identify a pre-approved list of project developers in four technology areas: wind, solar, geothermal electricity, and energy/biomass. The total contract ceiling across all four technologies is $7 billion, and allows for maximum flexibility for use by other military Services.

These energy initiatives are part of a broader effort to take an integrated approach to achieving Net Zero energy, waste, and water across all Army communities. The Army's Net Zero Installation initiative involves 17 pilot installations that serve as test beds for new design approaches as well as technological and non-technological solutions striving to reach Net Zero in one or more of these areas by 2020. We expect Army installations to serve as models of sustainability that minimize resource competition with local communities, have lower operating costs, and offer a better quality of life for our soldiers and their families.

The Army is collaboratively managing its Energy and Sustainability efforts at an enterprise level that leverages the best practices of industry, academia, and the other military Services. We offer a model of successful public-private partnerships. We are achieving all of this while enhancing our energy security and strengthening our ability to perform our mission in an increasingly complex and challenging global environment.

Army Strong!

HAWAII - KAUAI - MAUI - MOLOKAI - OAHU
Hawaii Bioenergy
Master Plan
Volume 1
State of Hawaii
Department of Business
Economic Development
and Tourism
University of Hawaii
December 2009
Infrastructure – CT Fuel to 50 mW bio gemerator


CARBON TECH™ CT COMPOSITE™ BIO FUEL FEEDSTOCK
Perpetually Occurring and Sustainable Organic, Fiber, and Organic Polymers
Road Easement
Urban Green Wastes
Closed Loop Bio Fuels
Harvest Field Stover
60+ Organics and Fibers
CT Fuel for Consumer, Commercial or Utility Use
Spent Rail Ties
Invasive Reduction
Forestry Silviculture
Game & Fish Lands
Security
Watershed Protection
Grasslands Restoration
National Fire Plan
The distributed CarbonTech™ Integrated Cooperative Companies HUB, SPOKE, and WHEEL CT Fuel™ and Energy Programs offer thousands of job creation multipliers.
Organic Polymer Binder
Intellectual Property Protected

QUICK SUMMARY
CARBONTECH COMPOSITE SOLID FUEL (CT FUEL) AND BIO HYDROCARBON LIQUID FUEL (BHLF)

FEEDSTOCK: CT Fuel requires no specific new cultivars or GMO crops. The process exclusively employs perpetually renewable, persistent, and readily available organic waste feed stocks available on each of the five Hawaiian County Islands described in the 997 page document HAWAII BIOENERGY MASTER PLAN VOLUME 1. Waste organics include materials such as orchard, forest, woodlands, grasslands, game and fish lands, and watershed thinning under auspices of the National Fire Plan and NEPA; Invasive species such as eucalyptus, abeceda, guinea grass, and sugar cane (use the sugar for ethanol plastics) residue; agriculture harvest field stover and bagasse (including GMO crops); palm fronds and cactus urban green wastes; food contaminated non-recyclable paper and cardboard; pre-landfill construction and demolition wood; and clean non-toxic plastic.

COMBUSTION: CT Fuel is a specific shape and size to substantially reduce the difficulties of storage, conveyor feed and pre-combustion characteristics of most biomass fuel. It has high combustion values of 11,500 to 12,000 btu's per pound. This is nearly double the btu value of most raw woody biomass with consistent moisture range of 8% to 12% that is substantially less than bone-dry raw wood. Less water in any fuel equals fewer btu's required to flash the water and more btu's for torque-energy. More btus per pound = less fuel required for the same work-duty job. Less fuel combusted = less emission release. CT Fuel contains no ancient carbon monoxide and carbon dioxide, only trace amounts of sulfur, inorganic metals, and $\pm$ 2% nitrogen. The modern biology of the feedstock and high thermal value results in carbon neutral, very low Hazardous Atmospheric Pollutants, Polycyclic Aromatic Hydrocarbons, and trace amounts of sub-micron 10 particulates (black smoke) from combustion emission to air or water. Ash from combustion is $\pm$ 2% and is substantially sanitary. The ash may be used for soil amendment or in composting. This is in stark contrast to ancient organic fossil fuels that are a composite of biomass and algae combined with volcanic and other natural toxins in the atmosphere, land, and water at the time the organics were forced under the earth's surface and compressed under great heat and pressure, in the absence of oxygen to form coal, petroleum oil, and natural gas. The ancient greenhouse gases and toxic elements are released at combustion.

BHLF: Is the cellulosic hydrocarbon liquid produced from CT Fuel and other organic wastes such as cooking oils, animal fats and greases, cattle manure and chicken litter. The liquid is 100% soluble in petroleum crude oil, and has the aromatic and chemical characteristics of West Texas Light Intermediate Crude Oil. It may be used to co-fired with any fossil fuel, as asphalt binder, refined in any petroleum refinery, or injected with hydrogen to produce green gasoline and green diesel fuel. The Organic Energy Transfer facilities are cookie-cutter in machinery and facility, to employ 12,000 tons of CT Fuel per year.

Each cookie-cutter identical CT Fuel line produces four (4) tons of green CT Fuel from a wide variety of organic wastes. This plant has four lines that can produce sixteen (16) tons per hour or 128 tons per eight hour shift X 350 days = 44, 800 tons per year. One plant sited on Kauai, Molokai and Maui, 2 plants sited on Hawaii, and 3 plants sited on Oahu =

Each 12,000 CT Fuel ton per year Bio Reactor will convert CT Fuel & other organics to a liquid 100% soluble in fossil crude with characteristics and aromatic values of West Texas Intermediate Light Sweet Crude

358,400 tons of CT Fuel per year, enough to meet the projected requirements of the proposed 50 mW-REA HECO/Oahu Army Facilities around the clock bio generators needs of 325,000 tons per year. CT Fuel adoption will also substantially reduce organic landfill wastes that average around 63% nationally, and most likely higher in the Hawaiian Islands due to the tourist industry. It will also satisfy Hawaii's Renewable Energy Attributes (REAs) for reduction of five gases CO, CO2, Lead, Sulfur Dioxides, and Nitrous Oxides, Hazardous Atmospheric Pollutants (PM10), and Polycyclic Aromatic Hydrocarbons (ethanol, etc.), and heavy metals such as lead and mercury water pollutants. CO2 can be collected from combustion in the bio generator and delivered to greenhouses that may be considered for the Wounded Warrior program. Combustion of CT Fuel and related BHLF is considered carbon neutral. Either fuel type resists pre-combustion and is delivered to combustion without the normal difficulties with raw organic resource. Combustion produces no bottom ash that requires toxic landfill. The ash from combustion is +2% and more towards the 1% range in the patent disclosure tests, is substantially sanitary and may be used as a powerful natural fertilizer for soil amendment. Adoption of CT Fuel will provide forty direct jobs, and one hundred or more indirect green collar family-wage jobs with a projected economic multiplier potential of $5 for each $1invested….annually. CT Fuel can be stored in Intermodal Containers for years if necessary. It is so dense at over 80,000 psi that water does not invade the fuel so the many idled sugar cane barges with sea-going tugs can provide efficient inter-County Island transportation from islands or landfills on Oahu to the bio generator by tug, rail, and trailer. Patents and disclosures are available for information.

Projected Carbontech Cooperative personnel to manage and coordinate the cooperative management of the full with prime responsibility per county for CT Fuel and BHLF Hawaiian Island waste organic resource program to support the HECO 50 mW-REA bio generator long-term program:

OAHU - Rich Alsup: Cal Pomona Structural Engineering, University of Alaska Fairbanks - Indigenous Anthropology, Sheldon-Jackson College – Forestry, Owner/operator J & R Forestry, work - Hilton Hotels and Suites, Los Angeles. U.S. Army Special Forces (Ret.) stationed at Schofield Barracks, Oahu, Hawaii.

MAUI- Brad Dreadfulwater: US Marine Corps, Staff Academy Leadership School, U.S. National Forest Service – Advanced Timber Cruiser, Wild lands Fire Fighter, Level 2 Law Enforcement, Tree Management and Planting, Stream and Watershed Restoration, Organic Layouts for Fuel Reduction, Machinery Mastication. U.S. Marine Corps (Honorable Discharge), Certified Helicopter Avionics and Ground Radio Transmission. Member of the Cherokee Nation of Oklahoma.

MOLOKAI – Steve Hall: US Air Force, Founder Carbontech Cooperative, Inc., Owner and operator of Environmental Forest Solutions, Grow-Fast, Western Renewable Fuels, and the Eagar, Arizona Small Business Incubator and Bio Generation Facility, Hall Trucking Company, and Operates Landfill Restoration. Experienced with key personnel on Molokai and proponent of all-natural agriculture.

KAUAI – Kai and John Hoff: Kai, owner and operator of Paradise Landscaping on Kauai.
John, owner and operator of NuSun Energy and Bed and Breakfast on Kauai. Both active proponents of the renewal of Kauai and the Hawaiian Islands. US Coast Guard Reserve – John.

HAWAII – Bob Hennkens: Oklahoma State Univ, - Agriculture, Washington Univ, Embry-Riddle Aeronautical Univ, Univ of Arizona ChemE and Adjunct, Tenneco Mgmt Institute, Farm Equipment Mfg Assn, American Chianina Assn, Trustee McKendree College, Dir. Magna Bank Holdings, Founder MegaBank Holding, development in Asia, CIF States of the former Soviet Union, Ecuador, and Mexico. Vice Chair FLC.org), founder Carbontech Cooperative, Inc., plan-for-sustainability Hawaii's solid-waste programs – 2481. Director Development Buffalo Soldiers Monument Committee, Fort Leavenworth, Kansas, Conversational Spanish, U.S. Coast Guard Reserve.

Advisory Directors

Brig General Coy Pettijohn: USAF (Ret) Insurance, Former Director Intelligence Pacific Command.
Colonel Andy Baardson, USA (Ret) Bio Generation, Former Commander Fort Sill, Oklahoma.
Hon. Barry M. Goldwater, Jr., Finance, Former U.S. Congressman from California.
Shampara Jose Butalo, Jr., Social Issues, Teacher, National Living Treasure of the People of Hawaii.
Captain Jim Biggers, USNR, Engineering, Former Fuels Officer USS Enterprise, NASA & NAVAIR scientist.
Joseph Gross, West Point, Water, Former Director Engineering & Construction US Corps of Engineers.
Doug Fant, Esq., Legal, Former U.S. Interior Dept., EHS Director Mobil Oil, Adv. Western Governors Assn.
Francis Nakayama PhD, Agriculture, former scientist chemistry, USDA ARS, raised in Hawaii.
Havafi Fravel, Bio Technology Sensors, Member of Royal Academy of Physics, Patent Holder.
Bob Shatz, Capital Structure, Founding Member Carbontech Global, former VP Nomura Securities.
Bob Campos, Construction, Founding Member Carbontech Cooperative, owner Campos Construction Co.
Ronald Larzalier, Forestry, owner Apache Land Restoration, Apache 8 Wildfire fighters, fluent in Apache.
Ing. Luis Carlos-Cruz, Professional Engineer, Fluent in Spanish.

Melissa DeSantis ATTN: SGSP Comments
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Ronald Gunderson
[redacted]

Reference: Public Scoping Comments Schofield Generating Station Project (SGSP)

To Whom It May Concern

I attended the public hearing in Mililani, HI on 5 Feb as a private citizen and have several comments concerning the Schofield Generating Station Project concerning Air Quality, Noise, Public Health and Safety, Utilities and Infrastructure, water resources and other concerns.

Water resources for cooling of the generation plant power is provided by water yet the public briefing did not discuss if the water cooling was a self contained system. The rate of usage at 7 gal per min would require a huge amount of water if not a self contained system. If the system is not self contained the water is being taken from the ground at 7 gal per min and where is the excess flowing. This is a huge drag on the ground water and waste water system. If the water cooling system is a contained system, in the event of a spillage or break, what is the containment to avoid contamination of the ground water aquifer? This is a public health and safety issue that must be addressed to avoid any contamination of the ground water aquifer?

Noise generation from the operating plant was not discussed yet the location of the plant near large communities on the military base and outside is a major concern.

Primary source fuel for the power generation plant is bio-fuel. The power plant is also capable of using various alternate liquid fuels such as diesel oil. Bio-fuel as a primary fuel source should not be considered, it is weather dependent for growing, costly, takes away from the food supply and is not a highly sought fuel making it costly. HECO should be discussing the use of liquid natural gas as a primary fuel for this power generation plant. Liquid natural gas is the planned primary fuel in the future to be used at the main generating plants in the next few years and should be the primary fuel for this generation plant. LNG is less expensive than oil and bio-fuel, and would provide HECO with a single source of fuel. Containment of LNG is much less expensive and spillage or line breakage would not contaminate the ground water system. Small bio-fuel and oil spills can contaminate the entire ground water system causing a water shortage on the whole island. The military does not have a good record of reporting spills in a timely manner, evidence of the last spill at the large fuel tanks in Pearl Harbor where over 20,000 gallons were spilled before it was discovered and higher contamination is being found in the island ground water supply system. This is a public health and safety issue that must be addressed to avoid any contamination of the ground water aquifer with the use of any bio-fuel or diesel oil.

Air Quality is is reduced by the use of a bio-fuel or diesel oil for power of the generating plant. Liquid natural gas should be the preferred fuel as it burns cleaner, is less costly, and much more plentiful with vast amounts of US resources.

The briefing mentioned that the military would have first source to power in the event of an emergency and yet when asked what type of emergency, how much energy for what duration, to what locations and on whose order, the reply was the military leadership. This is not a suitable reply. HECO needs to define and write out in detail the contingencies and other factors to include facilities to be powered. Military national security requirements and communications already have alternate power sources so just why and where does Schofield need this power must to be defined.

The briefing did not provide a great amount of detail on what national security and disaster response conditions that Wheeler AAF would provide that the generation plant . Wheeler AAF may be a FEMA disaster site based on its location and supports the Hawaii Army National Guard , however based on news reports the Hawaii Army National Guard is moving in the next few years and the airfield is much too small with a 6500 foot runway and small footprint size to consider as an offload base of large and heavy jet aircraft. Wheeler AAF does not have runway aligned landing system and any use by large heavy aircraft would have a significant impact on the safety of the surrounding communities . The location of Wheeler AAF between two mountain ranges within 5 to 10 miles at 4 to 5000 feet in elevation above field elevation creates a hazardous condition that is even more compounded at night. Wheeler AAF does not have the required open space for parking of several large aircraft or equipment to unload several large aircraft. If the site is intended only for rotary wing aircraft than it is more than suitable, however it would only require a tower to control aircraft and it already has an alternate power source in case of emergencies. Lighting of the runway and taxiway would not be required in an emergency and at night rotary wing aircraft are mostly using night vision aids that would preclude the use of lights on the airfield surface. Lighting of the ramp for offload is already limited so portable generator lights would have to be brought in with their own generator source.

Utilities and Infrastructure will require a major upgrade by building the generation plant so far from the substation to which connected. The briefing did not provide why building a private power plant on federal military installation land would be beneficial or the associated costs or savings based on building on a federal installation. The building of a private power generation plant on federal land should be a last resort and not based on some unknown security requirement. HECO can provide their own security and should whether on a military installation or not. The plant will require a fence and gate in either location. The federal government and military commanders can restrict usage and entrance to the facility at their will if located on a military installation. See latest NEWS releases where US supreme court has given base commanders control over easement and leased land. This appears to be a way of least resistance for HECO to use the federal military land via a least agreement at little cost and provide first usage to the military and pay for the power upgrades to Schofield and still have to pay for power lines to the power substation many miles away and subvert Oahu land use requirements by using federal military land.

This is not a win for Oahu or the public. HECO and the Oahu public is left holding the price tag and schofield is out very little. Schofield does not pay private customer rates but rather a much lower commercial business rates and should not be getting special consideration. There are no national security issues and if there were the federal government should be paying and not HECO and the Oahu public. The plan to use bio-fuel is ill conceived when HECO has stated that LNG is the fuel of the future and is less costly, more efficient, and cleaner burning. HEO should procure the land at or near the substation to reduce the power lines and infrastructure required and build an LNG electrical generation plant.

NEIL ABERCROMBIE
GOVERNOR

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DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

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February 28, 2014

VIA U.S. MAIL AND E-MAIL

Melissa DeSantis
Tetra Tech, Inc.
Attention: SGSP EIS
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sgspcomments@tetratech.com

Re: Preparation of Environmental Impact Statement for the Lease of Army Land at Schofield Barracks, Oahu, Hawaii for the Construction and Operation of a Biofuel-Capable Power Generation Plant

Dear Ms. DeSantis:

The Hawaii Department of Business, Economic Development, and Tourism ("DBEDT") submits the following comments in response to the Department of the Army's ("Army") Notice of Intent[1] to prepare a Joint Environmental Impact Statement ("Joint EIS") for the proposed lease of Army land and easement at Schofield Barracks to the Hawaiian Electric Company, Inc. ("HECO") for the construction and operation of a 50-megawatt ("MW") biofuel-capable power generation plant and 46-kilovolt subtransmission line, the Schofield Generating Station Project ("Project").

DBEDT acknowledges the Army's need for energy security for the Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia, and DBEDT is committed to working with the Army, HECO, the State of Hawaii's Department of Land and Natural Resources' ("DLNR"), and other interested stakeholders during the National Environmental Policy Act ("NEPA") and Hawaii Environmental Policy Act ("HEPA") process to ensure a successful and reasonable outcome. DBEDT thus requests to be added to the EIS distribution list.

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1 Department of the Army, *Preparation of Environmental Impact Statement for the Lease of Army Land at Schofield Barracks, Oahu, Hawaii for the Construction and Operation of a Biofuel-Capable Power Generation Plant*, Notice of Intent, 79 Fed. Reg. 3187 (January 17, 2014) ("Notice").

DBEDT's comments herein are guided by Hawaii's clean energy policy, which has a significant influence on the State's economic and environmental well-being. Based on that perspective there are other considerations that should be accounted for and other alternatives that should be explored as part of the Joint EIS. Such alternatives would better serve Hawaii's and the Army's mutual interests in reducing consumption of petroleum-based generation and in exploring other clean energy options that would reliably and cost-effectively promote Hawaii's and the Army's energy security.

I. Comments

A. Building Petroleum-based Electricity Generation is Contrary to Hawaii's Energy Policy and is Not in the Public Interest in Hawaii

Based on its interests and statutory obligation to reach and exceed Hawaii's clean energy targets, DBEDT is concerned with the characterization of this Project as one that would "make progress toward the Hawaii Renewable Portfolio Standard [("RPS")]."[2] Of primary concern is the fact that diesel is proposed to be an integral part of the fuel mix.[3] Building a diesel-based electricity generation unit is contrary to meeting Hawaii's RPS mandate, which requires each electric utility company that sells electricity for consumption in Hawaii to establish a RPS of forty per cent of its net electricity sales by December 31, 2030.[4] Both DLNR and DBEDT are charged with facilitating the private sector's development of renewable energy projects by supporting the private sector's attainment of the RPS.[5]

Moreover, Hawaii and the United States Department of Energy's partnership—the Hawaii Clean Energy Initiative—is aimed at attaining independence from Hawaii's detrimental reliance on fossil fuels.[6] DBEDT submits that using diesel to operate the Project would be a step backwards for Hawaii from an energy policy and environmental perspective. DBEDT also notes that there is insufficient clarity at this time as to the extent of the proposed reliance on diesel versus biofuels in all of the scenarios proposed for consideration.[7]

DBEDT further notes that the intent to use diesel for the Project was not stated in support of HECO's application to the Hawaii Public Utilities Commission ("Hawaii PUC") for waiver from the Hawaii PUC's Framework for Competitive Bidding.[8] There, HECO claimed that a waiver

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2 Notice at 3188.

3 State of Hawaii Department of Land and Natural Resources Environmental Impact Statement Preparation Notice for the Proposed Schofield Generating Station Project (December 23, 2013)("DLNR EISPN") at 3:13-15.

4 H.R.S. § 269-92 (Renewable Portfolio Standards).

5 H.R.S. § 196-41 (State Support for achieving Renewable Portfolio Standards).

6 *See* http://www.hawaiicleanenergyinitiative.org/about; *cf.* 2009 H.B. 1464, Act 155.

7 DLNR EISPN at 3:13-15 ("The Schofield Generating Station would operate on a mix of biofuel and diesel as required to meet Hawaiian Electric's Renewable Portfolio Standards . . . .").

8 *See I/M/O the Application of Hawaiian Electric Co. for Approval of Application for Waiver from the Framework for Competitive Bidding*, Decision and Order No. 30522, Hawaii PUC Docket No. 2011-0386 at 7 (August 1, 2012) ("Waiver Order") at 5 (noting that by Decision and Order No. 23121, filed on December 8,

for the Project was appropriate "since the utility is seeking to acquire power from a non-fossil fuel (biofueled) facility to meet the governmental objective of energy security for the military."[9] The Hawaii PUC generally found that the Project meets the criteria for a waiver under Section II.A.3 of the Competitive Bidding Framework,[10] and specifically found that the "Project will be addressing a critical governmental objective, in which the fuel source is renewable, which is consistent with Sections II.A.3.c.(iii) and II.A.3.c(iv) of the Framework."[11] In addition, the HECO Companies' 2013 IRP Report and Action Plan[12] did not indicate that the Project would rely on diesel fuel. Rather, the Report stated that the Project "would more efficiently consume 3,000,000 gallons/year of biodiesel . . . ."[13]

In addition to raising concerns pertaining to State energy policy, reliance on petroleum-based fuels raises concerns regarding price, energy security, and environmental impacts.[14] As such, DBEDT is concerned that the Project as currently proposed would not support the State's efforts to redefine Hawaii's energy future.

B. Other Alternatives that Would Foster the State's and Army's Interests Should be Considered

DBEDT believes the State of Hawaii's goals are consistent with the goals of the Army Energy Initiatives Task Force, which serves as the central management office for partnering with Army installations to implement cost-effective, large-scale renewable energy projects, such as the

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2006, in Hawaii PUC Docket No. 03-0372, "the commission adopted the Framework to govern competitive bidding as a mechanism for acquiring new energy generation in Hawaii. Under the Framework, competitive bidding is the required mechanism for acquiring a future generation resource or a block of generation resources, subject to certain conditions and exceptions.").

9 *I/M/O the Application of Hawaiian Electric Co. for Approval of Application for Waiver from the Framework for Competitive Bidding,* Application for Waiver, Hawaii PUC Docket No. 2011-0386 at 7 (filed December 27, 2011). *See also* Waiver Order at 7 (noting the same).

10 We note that the Waiver Order underscored certain provisions in Part II.A.3 of the Competitive Bidding Framework that HECO had argued in support the request for waiver. One such provision was Part II.A.3.b.(iv), which provides that a circumstance when competitive bidding may not be appropriate includes "when competitive bidding will impede or create a disincentive for the achievement of [Integrated Resource Planning ("IRP")] goals, renewable energy portfolio standards or other government objectives and policies". Waiver Order at 5-6.

11 *Id.* at 10. Sections II.A.3.c(iii) pertains to "the acquisition of power from a non-fossil fuel facility (such as a waste-to-energy facility) that is being installed to meet a governmental objective;" and II.A.3.c(iv) pertains to "the acquisition of power supplies needed to respond to an emergency situation." *Id.* at 7.

12 Hawaiian Electric Companies' 2013 IRP Report and Action Plan, Hawaii PUC Docket No. 2012-0036 (filed June 28, 2013) (hereinafter "IRP Report"). HECO has two subsidiaries, Hawaii Electric Light Company, Inc. ("HELCO") and Maui Electric Company, Limited ("MECO"). DBEDT refers to the three companies collectively as the "HECO Companies."

13 *Id.* at ES-13.

14 Biofuels Study Final Report to the Legislature In Accordance with Act 203, Session Laws of Hawaii, 2011, State of Hawaii Dept. of Business, Economic Development & Tourism (December 2012) at i. This report is available at: http://files.hawaii.gov/dbedt/annuals/2012/2012-biofuels-study-act-203.pdf.

Project.[15] This Task Force seeks to ensure that favorable project sites move to completion and that the Army achieves its renewable energy goal of deploying one gigawatt of renewable energy by 2025. Incorporating oil-based fuels as part of this Project would run counter to this goal. The DLNR EISPN states that the purpose of the Project is to meet the common needs of Hawaiian Electric and the U.S. Army Garrison—Hawaii for secure, reliable, and renewable power generation.[16] Building petroleum-based electricity generation units is not part of a clear generation scheme that: 1) promotes and maximizes the use of locally produced renewable energy; and 2) increases fuel diversity by moving away from oil-based options.

The State of Hawaii has an interest in diversifying its energy portfolio and leveraging our international status as a clean energy test bed. Hawaii is fortunate to have ample access to natural resources, including the sun, wind, ocean, bioenergy, and geothermal resources.[17] Additionally, the State has numerous additional options to enhance fuel diversity that are consistent with DBEDT's support for an "all of the above" strategy to accomplish these goals. For instance, cost competitive liquefied natural gas ("LNG") could play a limited, transitional role in the power generation market.[18] LNG, rather than the more expensive diesel, could provide generation for peak load demand. There is currently a surplus of natural gas in our country, evidenced by the proposed export terminals at Cove Point, MD, Sabine Pass, TX, and the Gulf of Mexico, among others.[19] The United States Department of Energy has been approving LNG terminal export licenses, thus expanding the use of LNG. These successful examples of LNG integration suggest a positive potential for the use of LNG to meet Hawaii's demand for cleaner energy and a more diverse supply.

Consistent with the goals of the Army Energy Initiatives Task Force, natural gas can be used in combination with renewables to solve intermittency and improve energy reliability.[20] This type of strategy would help the Army meet its three driving principles of energy security, mandates, and economic benefits.[21]

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15 http://www.armyeitf.com/.

16 DLNR EISPN at 2:29-30.

17 *See* State of Hawaii Energy Resources Coordinator's Annual Report 2013 at 9 (providing Hawaii renewable energy generation by resource). This report is available at: http://files.hawaii.gov/dbedt/annuals/2013/2013-erc.pdf.

18 HECO noted in its IRP Report, "[f]or the fuel-burning generation fleet (existing and future), LNG may be the lowest-cost fuel, and to the benefit of customers, may be substantially lower cost than ultra-low-sulfur diesel (ULSD). The use of ULSD may be necessary to comply with more stringent environmental regulations, and LNG would be an attractive alternative to more expensive ULSD." IRP Report at ES-19.

19 http://www.ferc.gov/industries/gas/indus-act/lng/lng-proposed-potential.pdf.

20 Energy Initiatives Task Force, Collaboration for Energy Security, slide 14 (February 7, 2014), *available at* http://energyoutlook.naseo.org/Data/Sites/3/presentations/Simpson.pdf.

21 *Id.* at slide 15. The Army must satisfy multiple renewable energy mandates under Section 203 of the Energy Policy Act of 2005, Executive Order 13514, the National Defense Authorization Act of 2007, and President Obama's Climate Action Plan. *See* http://army-energy.hqda.pentagon.mil/renewable/renewable.asp (summarizing targets under the Energy Policy Act of 2005 and the National Defense Authorization Act of 2007); *see also* Executive Order 13514 – Federal Leadership in Environmental, Energy, and Economic Performance, http://energy.gov/eere/femp/downloads/executive-order-13514-federal-leadership-environmental-

While the Project has the primary stated purpose of grid stability to compensate for an anticipated increase in variable power generation from solar and wind resources, other mitigation strategies should be studied. Variable power generation can be mitigated by employing a host of techniques to enable quick start other than by using diesel generators. For instance, energy storage systems, ancillary services, or demand response methods could be employed to mitigate any loss of biofuel inputs. Other mitigation measures may include better management of certain HECO baseload units on Oahu.[22] The addition or conversion of combined-cycle units may also be evaluated. Furthermore, since the Project is a quick start resource, studies could be conducted to determine if a battery energy storage system ("BESS") system could offer the desired back-up to the biofuel generators, just as a BESS offers operating reserves in the Maui grid.[23] According to HECO, its stated quick load pick-up is a 3-second window and sufficient capacity must be available to restore system frequency.[24] Has a study been conducted to demonstrate that the Project's quick start generators can sufficiently restore system frequency without the use of BESS or demand response?

In accordance with the State's renewable energy policies and HECO's own IRP, the Project should take into account a holistic view of the Oahu system. Such an approach should consider not only variable generation equipment capabilities but also utility equipment and operating practices.[25] Furthermore, while the policy goal of the Energy Initiatives Task Force is to increase the use of renewable energy, its other stated aim is to increase such use in a fiscally prudent manner, taking into account life-cycle cost-effectiveness.[26] Accordingly, any mitigation measures such as the Project's quick start resource should fit into a holistic, grid-wide strategy to cost effectively mitigate variable power.

As is evident from the above discussion, DBEDT understands that the Army is open to the consideration of other options for the Project that would meet its objects of procuring reliable, cost-effective and renewable energy, and DBEDT supports that effort. To reach that end, however, DBEDT believes it is important to understand how this Project fits with other ongoing developments to facilitate a cumulative understanding of the environmental, economic and policy impacts of this Project. As such, DBEDT discusses some of the various considerations that should be accounted in this process below.

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energy-and-economic-0; *see also* President Obama's Climate Action Plan: http://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf. The Army's own goal is to deploy one gigawatt of renewable energy by 2025. http://www.armyeitf.com/.

22 *See* Hawaii Solar Integration Study: Executive Summary, National Renewable Energy Laboratory (June 2013) at 3, available at http://www.nrel.gov/docs/fy13osti/57215.pdf.

23 *Id.*

24 *See* Operating Reserves and Variable Generation, National Renewable Energy Laboratory (August 2011) at 47, available at http://www.nrel.gov/docs/fy11osti/51978.pdf.

25 *See generally*, Hawaii Solar Integration Study: Executive Summary, National Renewable Energy Laboratory at 3.

26 *See* Memorandum re: Energy Goal Attainment Responsibility Policy for Installations, Department of the Army, Assistant Secretary of the Army (Installations, Energy and Environment (August 24, 2012) at 3.

C. *Other Proceedings, Developments and Considerations Should Inform the Review of the Project*

The Project is proposed to be operated to "meet load and reliability requirements" of the Oahu grid, and to help maintain "grid stability as the amount of power from variable renewable sources (wind and solar) increases over time."[27] The Project is also proposed as one that would "complement, rather than compete with, other existing and anticipated renewable energy sources in the system."[28] Moreover, the various operating scenarios proposed depend on factors such as whether "demand increases, operations of other generating facilities decline, and/or future renewable resources do not develop."[29] Given that these claimed benefits and scenarios are dependent on various other ongoing developments and factors, DBEDT believes it would be imprudent to consider the Project and the various alternatives in a vacuum. It is also clear that environmental reviews require an expansive view of options and impacts. The following are some of the developments and Hawaii proceedings that could inform the need, cost-effectiveness, environmental impacts and composition of the Project.

This process could be informed by the Reliability Standards Working Group ("RSWG") proceeding in Hawaii PUC Docket No. 2011-0206, which was established to determine how to facilitate the increased use of renewable energy in the islands without compromising grid reliability. The RSWG concluded its work on January 24, 2013. The Independent Facilitator submitted a Final Report on March 13, 2013 and the PUC's selected Technical Review Committee submitted its Report to the Commission in May 2013. The effort of the RSWG resulted in work products and other studies that reflected technical review and recommendations on various factors involved in the consideration, such as ancillary services that can maintain system reliability and better integrate intermittent renewable resources, generation interconnection standard improvements, and methods to reduce renewable generation curtailments.[30] Some recommendations included the initiation of further proceedings. The implementation of the recommendations in those work products and further proceedings would likely influence factors of relevance to the Project's structure and alternative scenarios, such as the enhancement of grid stability, the ability of the system to accommodate new future renewables resources and the likelihood of their development.

Moreover, DBEDT believes that an important consideration is how this Project fits within HECO's overall generation mix. HECO's IRP Report could impact considerations such as load requirements, grid stability, and even the overall cost-impact of the proposed options.[31] In its

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[27] DLNR EISPN at 2:31-38.

[28] *Id.* at 2:38-39.

[29] *Id.* at 3:35-37.

[30] RSWG Independent Facilitator's Final Report, Hawaii PUC Docket No. 2011-0206 (dated March 17, 2013) at 19.

[31] *See Instituting a Proceeding to Investigate Proposed Amendments to the Framework for Integrated Resource Planning*, Decision and Order, Hawaii PUC Docket No. 2009-0108 (March 14, 2011), Revised Framework at Section II.A ("The goal of integrated resource planning is to develop an Action Plan that governs how the utility will meet energy objectives and customer energy needs consistent with state energy policies and goals, while

IRP Report, HECO noted that its first area of focus was to "make every effort to eliminate the dependency on imported oil for power generation."[32] HECO noted that this would involve deactivation or decommissioning of older, oil-fired steam generators, procuring or developing low-cost, fast track utility-scale renewable energy resources, and converting existing generating units to cost effective renewable and lower carbon fuels, including biomass, biofuels, and LNG.[33] Some of the relevant actions proposed for HECO in the IRP Report may impact the consideration of the Project's composition and use. For instance, the IRP Report noted that "[i]f Honolulu units 8 and 9 are deactivated in 2014 and reactivated in 2017, and Waiau units 3 and 4 are deactivated in 2017, CT-1 converted to combined cycle in 2017, Schofield added in 2017, Honolulu decommissioned or retired in 2018, and no other decommissioning of the remaining firm capacity resources, the IRP scenario analysis indicates that there is a possibility of very limited new capacity need after that."[34] This statement appears to be relevant as to the appropriate fuel mix and the consideration of the six hours a day versus twenty-four hours a day scenarios as well as the No Action Alternative described in the Notice.[35] In this regard, DBEDT notes that its view on the various scenarios and No Action Alternative will be guided by a holistic perspective consistent with Hawaii's clean energy policies. Once again, it is important to offer the State's perspective that moving away from oil-based generation is critical to our future.

Other questions that are raised include whether the IRP's proposal to convert HECO's CIP CT-1 located in Campbell Industrial Park from a simple-cycle combustion turbine operating on biodiesel, to a combined-cycle combustion turbine/steam turbine should serve as guidance for the Project or whether HECO could use the biodiesel that currently serves CIP CT-1 to serve the Project.[36] In this regard, HECO noted in its IRP Report that the cost of using biofuels would also be a factor.[37] Additionally, in the Waiver Order, the Hawaii PUC "direct[ed] HECO to address

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providing safe and reliable utility service at reasonable cost, through the development of Resource Plans and Scenarios of possible futures that provide a broader long-term perspective."). In the IRP Docket, DBEDT commented that the PUC should acknowledge the shortcoming in the IRP Report, accept rather than approve the HECO Companies' IRP Report, require the HECO Companies to file for approval prior to implementing specific actions contained in the IRP Action Plans, and establish specific expedited procedures to develop Action Plans that advance the State's clean energy goals. *See, e.g.*, *I/M/O Regarding Integrated Resource Planning*, the Dept. of Business, Economic Development, and Tourism's Reply Comments to Statements of Position in Response to Order No. 31443, Hawaii PUC Docket No. 2012-0036 (filed October 10, 2013) at 3.

32 IRP Report at ES-6.

33 *Id.*

34 *Id.* at 18-35.

35 Notice at 3188. *See also* DLNR EISPN at 3:26-34; 4:44-5:7.

36 *See* IRP Report at 19-6 to 19-7 (where HECO stated, "With the conversion of CIP CT-1 to combined cycle and adding the capability to burn ULSD and/or LNG with approval of the Commission, the biodiesel that would have been consumed at CIP CT-1 could then be used at this Schofield Generating Station. The Schofield Generating Station is designed to operate at a heat rate (i.e., fuel efficiency) approximately equivalent to that for CIP CT-1 in a combined cycle mode, and approximately twice as efficient as CIP CT-1 in a simple cycle mode. If the biodiesel originally intended for CIP CT-1 were to be deployed at the Schofield Generating Station it would contribute to the Companies' attainment of RPS.").

37 *Id.* at 19-6 (where HECO claimed, "if biodiesel prices are high in the future, a fuel switch to a lower price fuel, such as ULSD or LNG, would be more cost effective. Under a future with lower cost biodiesel, keeping CIP CT-1 on biodiesel is the best option.").

in any subsequent application relating to the Project, the reasonableness of exclusively using biofuels for the Project."[38] DBEDT acknowledges the PUC's concerns with the potential cost impacts and also recognizes that biofuels may serve well in the power generation market through existing contracts, such that other options from the "all-of-the-above" strategy may also need to be explored. The mix of biofuels and diesel as proposed for this Project could impact the provision of cost-effective, reliable and clean energy to the Army and other ratepayers within the State. DBEDT requests that HECO and the Army take these factors into account as they consider next steps for studying this Project.[39] As noted above, we are concerned that an unlimited reliance on oil-based diesel is inconsistent with Hawaii's statutes, Hawaii clean energy policy and direction from the Army.

HECO also asserted in the IRP Report that the electrical output from the Project "will normally supply power to all Oahu customers through the Oahu electrical grid. However, during outages that meet the criteria specified in an operating agreement with the Army, [Project] output will be "islanded" to serve only the Army facilities at Schofield Barracks, Wheeler Army Air Field, and Field Station Kunia."[40] There is a need for further information and study on the extent of the need for the facility by Oahu customers currently and to the extent other actions proposed in the IRP Report, technologies, rules, policies or procedures are implemented, including those stemming from the other proceedings discussed in these comments. Similarly, while the IRP Report asserted that the Project's attributes would "enable increased integration of intermittent renewable resources on the Oahu grid (and minimize the potential for energy curtailment,"[41] it is not clear the extent to which these benefits would be realized and how the other potential regulatory requirements discussed herein, among others, would provide similar benefits.

Another salient consideration for this Project is the State legislation and pending investigation into the viability of an inter-island cable.[42] DBEDT believes that the Oahu-Maui interisland marine electric transmission cable that is currently under investigation by the PUC is anticipated to facilitate greater renewable energy development that will displace current fossil generation and reduce the need to develop future fossil generation. Not only did DBEDT's economic analysis demonstrate that the benefits of the inter-island cable would outweigh the costs, DBEDT's analysis found that the inter-island cable would have other benefits such as increasing flexibility in siting new renewable generation, reducing curtailment of renewable generation and providing direct health benefits associated with reduced air emissions of filterable particulate matter,

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38 Waiver Order at 14, n.15.

39 DBEDT also concurs in the other items that the PUC found HECO would need to address in any subsequent application filed related to the Project, such as: (1) the scope and cost of the Project, including as to the size and capacity of the 50 MW Project; (2) whether HECO can provide cost containment for the Project to avoid ratepayers having to pay for cost overruns; and (3) whether reasonable alternatives to the Project were given adequate consideration during the development of the Project. *Id.* at 14-15.

40 IRP Report at 18-17.

41 *Id.* at ES-19.

42 H.R.S. §§ 269-131 to -135, *et seq.*

carbon dioxide, nitrogen oxides and sulfur dioxide.[43] DBEDT's analysis also found that connecting the Oahu and Maui electric systems with a high voltage direct current transmission cable would accommodate transmission of power and ancillary services in both directions and allow the two systems to operate in a coordinated fashion, which would improve the power system economics and reliability on both islands. The construction of such an inter-island cable could have a significant impact on the generation mix in Oahu. This in turn, could potentially reduce the risk of frequency of loss of service to the Army from the other sources of electricity.

Thus, DBEDT submits that the various considerations described above, among others, would have an impact on the Project and any future studies should be reviewed in context with those other developments.

D. It is Imperative to Balance Technical, Economic, Environmental, and Cultural Considerations in the Joint EIS

DBEDT appreciates that the Notice provides that the EIS is designed to meet NEPA and HEPA requirements, and that the Army is preparing supporting studies for key resources of concern include air quality, traffic and stormwater.[44] The DLNR EISPN also lists several impact categories that have been tentatively identified for consideration in the EIS.[45] DBEDT submits that it is imperative to balance technical, economic, environmental, and cultural considerations in the Joint EIS.[46] Although the DLNR EISPN identifies some of these concerns, the Joint EIS should fully address the following:

- Technical Considerations: DBEDT has raised some technical considerations above that should be explored in the Joint EIS. In addition, various statements in the DLNR EISPN require further support and study. For instance, the Project proponents should provide support for its statement that the Project would allow the grid to accommodate more fluctuating renewable energy than would otherwise be the case.[47] It is not clear what assumptions are being used (*e.g.*, high or low renewable penetration) in making this statement. The DLNR EISPN also describes two ways in which it expects the penetration of renewable resources to change the load curve.[48] Have the Project proponents completed a study to support these conclusions? If so, what inputs and assumptions were used?

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43 *I/M/O Public Utilities Comm'n Opening a Proceeding to Investigate Whether an Oahu-Maui Interisland Transmission System May Be in the Public Interest*, Initial Public Comments of the Dept. of Business, Economic Development and Tourism in Response to Order No. 31356, Hawaii PUC Docket No. 2013-0169 (filed September 9, 2013) at 6.

44 Notice at 3187-3188.

45 DLNR EISPN at 5:12-42.

46 *See* State of Hawaii Energy Resources Coordinator's Annual Report 2013 at 3 (explaining that the Abercrombie Administration has focused the next phase of Hawaii's energy transformation on five principles, including "[b]alancing technical, economic, environmental, and cultural considerations.").

47 DLNR EISPN at 3:28-29.

48 *Id.* at 3:18-25.

- Economic Considerations: The Army provides critical national security and first responder services. The continued and stable operation of those services is an important state interest.[49] At the same time, the Army has an interest in pursuing cost-effective solutions, and the Joint EIS should consider alternatives that will be more cost-effective for the Army and all other HECO ratepayers. This analysis should not be done in isolation but rather should consider multiple scenarios, such as high or low load forecasts, high or low renewable penetration, high or low biofuel prices, fuel diversity, etc. The Joint EIS should consider that significant price fluctuations in oil have had harmful effects on Hawaii's ability to meet its diversification goals and highly negative economic consequences. These fluctuations cost jobs, hurt businesses, and ultimately harm consumers, including military service members who live on Oahu. In addition, the DLNR EISPN makes claims that "since the [Project] would be multi-fuel capable, it would be able to run on a combination of fuels as necessary to ensure operations are economically viable and can continue under adverse operating conditions."[50] The Joint EIS should define "economically viable" and present the incremental cost of using biofuels versus other fuels for the generators to support its claim that the multi-fuel capability option is economically viable. The Joint EIS should consider the fluctuation of diesel prices over time[51] as well as the transportation costs of diesel as well.

- Environmental Concerns: The DLNR EISPN states that the six biofuel-capable reciprocating engine-generator sets would add 50 MW of firm, utility-owned renewable energy capacity to the Oahu electrical grid.[52] As discussed above, this claim ignores the fact that, as currently proposed, the Project would also rely on diesel. Reliance on diesel fuel, as opposed to cleaner and greener energy sources that would help control greenhouse gas emissions, does not advance Hawaii's and the Army's renewable goals.

- Cultural Concerns: The DLNR EISPN generally states that the EIS should consider cultural and historical resources (including Native Hawaiian resources), but does not specifically identify which resources will be impacted by the Project. Project proponents should coordinate with other agencies, including the Office of Hawaiian Affairs, the National Park Service, the Hawaii Island Burial Council, the State Historic Preservation Division, and the Historic Hawaii Foundation, among others, to determine which cultural and historical resources are of concern on the Schofield Barracks and Wheeler Army Airfield. The Joint EIS should take steps to ensure that historical, archaeological, and architectural sites are sufficiently protected. DBEDT appreciates the statement in the

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[49] DBEDT acknowledges the Army's assertion that the Project would provide an energy security service to Schofield Barracks, Wheeler Army Airfield and, and Field Station Kunia if loss of service occurs from the normal sources of electricity supporting these installations. Notice at 3188.

[50] DLNR EISPN at 5:15-17.

[51] Biofuels Study Final Report to the Legislature in Accordance with Act 2013, Session Laws of Hawaii, State of Hawaii, Department of Business, Economic Development & Tourism at 5 (December 2012) (showing that fuel oil prices paid by Hawaii's electric utilities have varied from $59/barrel up to $120/barrel from 2006-2011).

[52] DLNR EISPN at 2:34-35.

Notice providing that the Army intends to integrate the NEPA process with the consultation and public participation requirements of Section 106 of the National Historic Preservation Act.[53]

These considerations must not be viewed in isolation but rather the Joint EIS should balance these interests.

II. Conclusion

The concerns raised herein demonstrate that the Project as currently proposed would not be in the best interests of the State, the Army and other Hawaii ratepayers. As such, DBEDT supports review of other alternatives that would better serve the State's energy policy and the energy security and economic interests of the State and the Army and consideration of other developments, proceedings and other factors that would inform the review of the Project.

We appreciate the opportunity to provide these comments for use in the preparation of the Joint EIS and DBEDT formally requests to be added to the EIS distribution list. If you have any questions, please feel free to contact me at (808) 587-3812 or mark.b.glick@dbedt.hawaii.gov.

Sincerely,

Mark B. Glick
Energy Administrator

[53] Notice at 3187.

EISPN COMMENTS

HAWAII RENEWABLE RESOURCES, LLC

January 24, 2014

Mr. William Aila, Chairman
Department of Land and Natural Resources
1151 Punchbowl St., Room 131
Honolulu, HI 96813

Ms. Melissa DeSantis,
Tetra Tech, Inc.
10306 Eaton Place, Suite 340,
Fairfax VA 22030

Re: SGSP EISPN

Dear Mr. Aila and Ms. DeSantis:

Hawaii Renewable Resources (HRR) is in the process of receiving a long term lease and is committed to constructing an animal feed mill and biogas production facility to be located on State Department of Agriculture land (TMK No.: 9-4-012:01 and 9-4-012:03). This TMK is adjacent to the proposed site of the HECO Schofield Generating Station Project.

We have read the above-referenced EISPN with great interest because it directly impacts our operations. Our specific comments and concerns are detailed below for your consideration.

- The proposed power line easement and power poles P1 –P3 located on and across our TMK would withdraw essential land from our facility for production equipment and buildings.
- The operation of the SGSP will negatively impact the operation of our facility for processing agricultural products and foods into animal feeds and biogas.
- Access to our site will be more limited.

We request to be consulted with regard to the design and operating characteristics of the proposed SGSP. We would be happy to meet with appropriate personnel at your convenience and look forward to constructive discussions.

Sincerely,

Valentine Peroff

Valentine Peroff

cc: Scott Enright
Jimmy Nakatani

Mr. Valentine Peroff
Hawaii Renewable Resources, LLC
99-1324 Koaha Place
Aiea, Hawai'i 96701-3200

Subject: Schofield Generating Station Project:
Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Peroff:

Thank you for your January 24th 2014 letter concerning the Environmental Impact Statement Preparation Notice (EISPN) for the Schofield Generating Project. With respect to the request for a meeting contained in the last paragraph of your letter, we would be happy to meet with you. However, as all of the issues that you indicated an interest in discussing have to deal with land that is owned by the State of Hawai'i, we believe that such a meeting should include representatives of the State Department of Agriculture and the State Department of Land and Natural Resources as well. Please call me at (808) 543-4088 and I will try to help set up a meeting time/place.

In addition to your more general request for consultation, your letter also contained several specific "bulleted" statements that we believe it best to address at this time. Those comments are reproduced below, followed by brief responses that I hope will be helpful going forward.

Comment:

> *The proposed power line easement and power poles P1 —P3 located on and across our TMK would withdraw essential land from our facility for production equipment and buildings.*

Response: The first paragraph of your letter states that: *"Hawaii Renewable Resources (HRR) is in the process of receiving a long term lease and is committed to constructing an animal feed mill and biogas production facility to be located on State Department of Agriculture land (TMK No.: 9-4-012:01 and 9-4-012:03)."*

Hawaiian Electric has been discussing its proposed project with State agencies for many months now but had not heard of any plans for construction of the facility you outlined in your letter. As soon as we received your remarks we contacted the Department of Land and Natural Resources Office of Conservation and Coastal Lands (DLNR/OCCL) who is handling the EIS process. OCCL in turn spoke with the asset manager in the Department of Agriculture (DoA) who responsible for this site. OCCL informed me that the DoA reported no lease application was on record for the TMK under discussion.

April 1, 2014

Comment:

The operation of the SGSP will negatively impact the operation of our facility for processing agricultural products and foods into animal feeds and biogas.

Response: Hawaiian Electric understands that you are concerned that the operation of the Schofield Generating Station might in some way adversely affect the viability of the operation that you are contemplating. However, as your letter provided no information about the design or operational characteristics of your facilities, it is impossible for us to understand how that might occur. Without such information, it is impossible to address them specifically in the environmental impact statement.

The EIS will, of course, discuss the potential effects on the existing environment of all of the elements that are part of the project. You will have the opportunity to offer your comments on the Draft Environmental Impact Statement (DEIS) during the public comment period.

Comment:

Access to our site will be more limited.

Response: As indicated earlier in this letter, your comments do not contain a physical description of your proposed facilities or of the way in which you propose to operate them. Without those, it is not possible to know what kind of "access limitations" may be of concern. Unless you are able to provide additional information we will not be able to address this concern in the DEIS.

If you have any questions or would like to discuss this further, please call me at (808) 543-4088.

Sincerely,

Jack Shriver
Senior Engineer,
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Hawaii Department of Land and Natural Resources Office of Conservation and Coastal Lands
Ms. Stephanie Gardin, Office of Public Affairs, US Army Garrison—Hawaii
Mr. Doug Waters, US Army Energy Initiatives Task Force

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8480 • Fax: (808) 768-4567
Web site: www.honolulu.gov

KIRK CALDWELL
MAYOR

CHRIS T. TAKASHIGE, P.E., CCM
DIRECTOR

MARK YONAMINE, P.E.
DEPUTY DIRECTOR

February 5, 2014

Hawaiian Electric
P.O. Box 2750
Honolulu, Hawaii 96840

Attn: Jack Shriver

Dear Mr. Shriver:

Subject: Schofield Generating Station Project Environmental Impact Statement Preparation Notice (EISPN)

The Department of Design and Construction does not have any comments to offer on the preparation of the environmental impact statement preparation.

Thank you for the opportunity to review and comment. Should there be any questions, please contact me at 768-8480.

Sincerely,

for M. Yonamine

Chris T. Takashige, P.E., CCM
Director

CTT: cf (546289)

April 1, 2014

Mr. Chris T. Takashige, Director
Department of Design and Construction
City and County of Honolulu
650 South King Street, 11th Floor
Honolulu, Hawai'i 96813

Subject: Schofield Generating Station Project:
Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Takashige:

Thank you for your February 5th 2014 letter concerning the Environmental Impact Statement Preparation Notice (EISPN) for the Schofield Generating Project. We appreciate the time that you and your staff spent reviewing the EISPN and responding.

We understand that you have no comments to offer at this time. If you have any questions or would like to discuss this further, please call me at (808) 543-4088.

Sincerely,

Jack Shriver
Senior Engineer,
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Hawaii Department of Land and Natural Resources Office of Conservation and Coastal Lands
Ms. Stephanie Gardin, Office of Public Affairs, US Army Garrison—Hawaii
Mr. Doug Waters, US Army Energy Initiatives Task Force

POLICE DEPARTMENT

CITY AND COUNTY OF HONOLULU

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

KIRK CALDWELL
MAYOR

LOUIS M. KEALOHA
CHIEF

DAVE M. KAJIHIRO
MARIE A. McCAULEY
DEPUTY CHIEFS

OUR REFERENCE EO-WS

January 29, 2014

Mr. William J. Aila, Jr., Chairperson
Office of Conservation and Coastal Lands
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Dear. Mr. Aila:

This is in response to letters from Mr. Jack Shriver of the Hawaiian Electric Company (dated January 8, 2014) and Ms. Amanda Simpson of the Energy Initiatives Task Force, Department of the Army (dated January 9, 2014), requesting comments on the Environmental Impact Statement Preparation Notice for the proposed Schofield Generating Station project located in Wahiawa.

The Honolulu Police Department (HPD) has no major concerns at this time regarding the project. However, there may be concerns with traffic issues in the area of the Schofield Barracks' Lyman Gate during the construction phase. The HPD would like to be consulted when the environmental impact statement is published to reassess the project's impact on police operations.

If there are any questions, please contact Acting Major Larry Lawson of District 2 (Wahiawa) at 723-8703 or via e-mail at llawson@honolulu.gov.

Sincerely,

LOUIS M. KEALOHA
Chief of Police

By Rl K. Mag

RANDAL K. MACADANGDANG
Assistant Chief
Support Services Bureau

cc: Mr. Jack Shriver, Hawaiian Electric Company
Ms. Melissa DeSantis, Tetra Tech, Inc.

April 1, 2014

Mr. Louis M. Kealoha, Chief of Police
Honolulu Police Department
City and County of Honolulu
801 South Beretania Street
Honolulu, Hawai'i 96813

Subject: Schofield Generating Station Project:
Environmental Impact Statement Preparation Notice (EISPN)

Dear Chief Kealoha:

Thank you for your January 29th 2014 letter (Ref. EO-WS) to the State of Hawai'i Department of Land and Natural Resources (DLNR) concerning the Environmental Impact Statement Preparation Notice (EISPN) for the Schofield Generating Project. Because Hawaiian Electric is the applicant seeking the Department's approval for the proposed project, DLNR has asked that we respond.

Let me begin by saying that we are grateful for the time that you and your staff spent reviewing the EISPN and responding. We appreciate your confirmation that the Honolulu Police Department (HPD) does not have any major concerns regarding the project at this time.

As you pointed out, traffic may be a concern, and the Draft Environmental Impact Statement (DEIS) for the Schofield Generating Station Project will address the effect that the proposed project will have on traffic in the vicinity of the Lyman Gate entrance to Schofield Barracks and elsewhere during the construction phase of the proposed project. It will also discuss the effect that the construction and operation of the proposed facility is likely to have on police operations.

Hawaiian Electric will provide a copy of the forthcoming DEIS to your department for additional review and comment as soon as it becomes available.

In the meantime, if you have any questions or would like to discuss this further, please call me at (808) 543-4088.

Sincerely,

Jack Shriver
Senior Engineer,
Generation Project Development
Hawaiian Electric Company

cc: (via email only)

Mr. Alex Roy, Hawaii Department of Land and Natural Resources Office of Conservation and Coastal Lands

Ms. Stephanie Gardin, Office of Public Affairs, US Army Garrison—Hawaii

Mr. Doug Waters, US Army Energy Initiatives Task Force

Acting Major Larry Lawson, Honolulu Police Department, District 2

HISTORIC HAWAI'I FOUNDATION
1974 ► 2014

January 29, 2014

Hawaiian Electric, Co.
ATTN: Jack Shriver, Project Management
PO Box 2750
Honolulu, HI 96840-0001

RE: Schofield Generating Station Project (SGSP) Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Shriver:

Thank you for referring the above project to Historic Hawai'i Foundation for pre-assessment consultation, review and comment. Since 1974, Historic Hawai'i Foundation (HHF) has been a statewide leader for historic preservation. HHF's mission is to preserve and encourage the preservation of Hawaii's historic buildings, sites, objects and communities.

The proposed project consists of three elements including the Hawaiian Electric Company's construction, maintenance, ownership, and operation of a power plant located at Schofield with a transmission line to the existing Wahiawā Substation. The other elements include the lease of the land for the power plant from the Army to Hawaiian Electric, as well as an easement for the transmission line. Additionally the Department of Land and Natural Resources will also grant an easement and conservation district authorization for the remaining portion of the transmission line.

Hawaiian Electric provided Historic Hawai'i Foundation with an Environmental Impact Statement Preparation Notice which included correspondence from Hawaiian Electric with attachments including DLNR EISPN for SGSP, ARMY NOI for SGSP, and Notice for Public Scoping Meetings. HHF understands that the Department of the Army determined the proposed project is subject to the National Environmental Policy Act. Furthermore, the Department of Land and Natural Resources determined the proposed project is subject to HRS Chapter 343 and that an Environmental Impact Statement (EIS) should be prepared. As noted in the EISPN, the EIS will evaluate the potential environmental, cultural, and socioeconomic impacts of the proposed project including the cultural and historic resources (including Native Hawaiian Resources).

HHF would like to remain a participant in the consultation process for both the EIS and Section 106 consultation under the National Historic Preservation Act. Please include our organization in further correspondence.

Thank you for the opportunity to comment.

Very truly yours,

Kiersten Faulkner

Kiersten Faulkner, AICP
Executive Director

680 Iwilei Road, Suite 690 / Honolulu, Hawai'i 96817 / Tel (808) 523-2900 / Fax (808)523-0800
Email preservation@historichawaii.org / Web www.historichawaii.org

April 1, 2014

Ms. Kiersten Faulkner, Executive Director
Historic Hawai'i Foundation
680 Iwilei Road, Suite 690
Honolulu, Hawai'i 96817

Subject: Schofield Generating Station Project:
Environmental Impact Statement Preparation Notice (EISPN)

Dear Ms. Faulkner:

Thank you for your January 29, 2014, letter concerning the Environmental Impact Statement Preparation Notice (EISPN) for the Schofield Generating Project. We appreciate the time that you and your staff spent reviewing the EISPN and preparing your response.

As you requested in your letter, we will include Historic Hawai'i Foundation in the consultation process and include you in further correspondence.

If you have any questions or would like to discuss this further, please call me at (808) 543-4088.

Sincerely,

Jack Shriver
Senior Engineer,
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Hawaii Department of Land and Natural Resources Office of Conservation and Coastal Lands
Ms. Stephanie Gardin, Office of Public Affairs, US Army Garrison—Hawaii
Mr. Doug Waters, US Army Energy Initiatives Task Force

Neil Abercrombie
GOVERNOR OF HAWAII

Gary L. Gill
DEPUTY DIRECTOR OF HEALTH

RECEIVED
OFFICE OF CONSERVATION
AND COASTAL LANDS

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

2014 JAN 29 P 2: 43

In reply, please refer to:
File: EHA/HEER Office
14-030-JIN

DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

January 23, 2014

Mr. Alex J. Roy
Department of Land and Natural Resources
Office of Conservation and Coastal Lands
Kalanimoku Building Room 131
1151 Punchbowl Street
Honolulu, HI 96809

Facility/Site: Schofield Generation Station Project

Subject: Comments for ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE (EISPN) FOR THE PROPOSED SCHOFIELD GENERATION STATION PROJECT

Dear Mr. Roy:

The Hawaii Department of Health (HDOH) Hazard Evaluation and Emergency Response (HEER) Office has reviewed the above referenced document and has the following comments:

The proposed site for the Schofield Generation Station Project crosses the Schofield Military installation across areas known for multiple petroleum and other chemical releases. Many of these areas have been investigated and cleaned up or being managed safely on site. DOH recommends the developer work with closely with the Army to identify areas where ground disturbing activities may impact areas of historic soil or groundwater contamination. Information gathered from the Army and their inventory of areas with Land Use Controls may be used to identify areas of known contamination. These data can then be used to develop an Environmental Hazard Management Plan for Construction Activities to protect worker safety, ensure proper management of contaminated soils and ensure the long term protection of both human health and the environment during any soil disturbing activities.

The HDOH kindly asks that you address the above comments prior to beginning construction of the project. Should you have any questions, please contact me at 586-0958 or at jordan.nakagawa@doh.hawaii.gov.
Sincerely,

Jordan Nakagawa, Project Manager
Site Discovery, Assessment, and Remediation Section
Hazard Evaluation and Emergency Response Office

C: Environmental Planning Office

April 1, 2014

Mr. Jordan Nakagawa, Project Manager
Site Discovery, Assessment, and Remediation Section
Hazard Evaluation and Emergency Response Office
Department of Health
State of Hawai'i
P.O. Box 3378
Honolulu, Hawai'i 96801-3378
jordan.nakagawadoh.hawaii.gov

Subject: Schofield Generating Station Project: Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Nakagawa:

Thank you for your January 23rd 2014 letter (Reference EHA/HEER Office 14-030-JIN) to the State of Hawai'i Department of Land and Natural Resources (DLNR) concerning the Environmental Impact Statement Preparation Notice (EISPN) for the Schofield Generating Project. Because Hawaiian Electric is the applicant seeking approval for the proposed project, DLNR has asked that we respond.

We appreciate the information you provided regarding past releases of petroleum and other chemicals at Schofield Barracks. Hawaiian Electric has carefully coordinated its plans with the Army to ensure that ground-disturbing activities related to the Schofield Generating Station Project do not impact areas of historic soil or groundwater contamination, and we will further assess the site to confirm there is no contamination. If any contamination is found, we will follow approved environmental hazard management procedures throughout the construction phase of the project, thereby protecting worker safety, ensuring proper management of contaminated soils, and protecting both human health and the environment during all soil-disturbing activities.

If you have any questions or would like to discuss this further, please call me at (808) 543-4088.

Sincerely,

Jack Shriver
Senior Engineer,
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Hawaii Department of Land and Natural Resources Office of Conservation and Coastal Lands
Ms. Stephanie Gardin, Office of Public Affairs, US Army Garrison—Hawaii
Mr. Doug Waters, US Army Energy Initiatives Task Force

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GOVERNOR OF HAWAII

GARY L. GILL
ACTING DIRECTOR OF HEALTH

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

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2014 JAN 29 P 2:47
DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

In reply, please refer to:
File:

14-015
EISPN SGSP

January 27, 2014

Mr. Alex J. Roy
Department of Land and Natural Resources
Office of conservation and Coastal Lands
P.O. Box 621
Honolulu, Hawaii

Dear Mr. Roy:

SUBJECT: Environmental Impact Statement Preparation Notice for the Proposed Schofield Generating Station Project, Wahiawa District, Island of Oahu

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your document through the Office of Environmental Quality's "The Environmental Notice" dated January 8, 2014. Thank you for allowing us to review and comment on the subject document. The document was routed to DOH's Clean Air Branch, Clean Water Branch, Indoor R& Radiological Health Branch, Solid and Hazardous Waste Branch, and the Hazard Evaluation & Emergency Response Office. They will provide specific comments to you if necessary. EPO recommends that you review the Standard Comments found on our website: http://health.hawaii.gov/epo/home/landuse-planning-review-program.
You are required to adhere to all Standard Comments specifically applicable to this application.

EPO suggests that you examine the many sources available on strategies to support the sustainable and healthy design of communities and buildings, including the:
State of Hawaii, Office of Planning: www.planning.hawaii.gov and the new 2013 ORMP;
U.H., School of Ocean and Earth Science and Technology: www.soest.hawaii.edu;
U.S. Health and Human Services: www.hhs.gov/about/sustainability;
U.S. Environmental Protection Agency's sustainability programs: www.epa.gov/sustainability;
U.S. Green Building Council's LEED program: www.usgbc.org/leed; and
International Well Building Standard: http://delosliving.com

The DOH encourages everyone to apply these sustainability strategies and principles early in the planning and review of projects. We also request that for future projects you consider conducting a Health Impact Assessment (HIA). More information is available at: www.cdc.gov/healthyplaces/hia.htm. We request you share all of this information with others to increase community awareness on sustainable, innovative, inspirational, and healthy community design.

We request electronic response confirming receipt of this letter and any other letters you receive from DOH in regards to this project. Please email: epo@doh.hawaii.gov. We anticipate that our letter(s) and your electronic response(s) will be included in the final document. If you have any questions, please contact me at (808) 586-4337 or laura.mcintyre@doh.hawaii.gov

Mahalo,

Laura Leialoha Phillips McIntyre, AICP
Program Manager, Environmental Planning Office

April 1, 2014

Ms. Laura Leialoha Phillips McIntyre, Program Manager
Environmental Planning Office
Department of Health
State of Hawai'i
P.O. Box 3378
Honolulu, Hawai'i 96801-3378

Subject: Schofield Generating Station Project:
Environmental Impact Statement Preparation Notice (EISPN)

Dear Ms. McIntyre:

Thank you for your January 27, 2014, letter (Reference 14-015 EISPN SGSP) to the State of Hawai'i Department of Land and Natural Resources (DLNR) concerning the Environmental Impact Statement Preparation Notice (EISPN) for the Schofield Generating Project. Because Hawaiian Electric is the applicant seeking approval for the proposed project, DLNR has asked that we respond.

Hawaiian Electric appreciates your routing the EISPN to the Clean Air Branch, Clean Water Branch, Indoor and Radiological Health Branch, Solid and Hazardous, Waste Branch, and the Hazard Evaluation and Emergency Response Office. We will respond to their separate comments as appropriate. The company is familiar with the "Standard Comments" found on the Department of Health's website, and it will make sure that those that apply are addressed in the Draft Environmental Impact Statement (DEIS). The company and its partners attempt to follow sustainable design strategies wherever possible, including those described in the sources you list. Moreover, in accordance with NEPA guidelines the forthcoming Draft Environmental Impact Statement (DEIS) will evaluate the potential for health effects as a part of the overall environmental impact review process.

We will provide you with a copy of the DEIS when it becomes available. In the meantime, if you have any questions or would like to discuss this further, please call me at (808) 543-4088.

Sincerely,

Jack Shriver
Senior Engineer,
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Hawaii Department of Land and Natural Resources Office of Conservation and Coastal Lands
Ms. Stephanie Gardin, Office of Public Affairs, US Army Garrison—Hawaii
Mr. Doug Waters, US Army Energy Initiatives Task Force
Department of Health (DOH), Environmental Planning Office (EPO)

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GOVERNOR OF HAWAII

GARY L. GILL
ACTING DIRECTOR OF HEALTH

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

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DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

In reply, please refer to:
EMD/CWB

01078PCTM.14

January 24, 2014

Mr. Alex J. Roy
Department of Land and Natural Resources
Office of Conservation and Costal Lands
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Roy:

SUBJECT: Comments on the Environmental Impact Statement Preparation Notice (EISPN) for the Schofield Generating Station Project Waihiawa, Island of Oahu, Hawaii

The Department of Health (DOH), Clean Water Branch (CWB), acknowledges receipt of your letter, received December 23, 2013, requesting comments on your project. The DOH-CWB has reviewed the subject document and offers these comments. Please note that our review is based solely on the information provided in the subject document and its compliance with the Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at: http://health.hawaii.gov/epo/files/2013/10/CWB_Oct22.pdf

1. Any project and its potential impacts to State waters must meet the following criteria:

   a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.

   b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.

   c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).

2. National Pollutant Discharge Elimination System (NPDES) permit coverage is required for pollutant discharges into State surface waters and for certain situations involving storm water (HAR, Chapter 11-55).

   a. Discharges into Class 2 or Class A State waters can be covered under an NPDES general permit only if all of the NPDES general permit requirements are met. Please see the DOH-CWB website (http://health.hawaii.gov/cwb/) for the

NPDES general permits and instructions to request coverage.

b. All other discharges into State surface waters and discharges into Class 1 or Class AA State waters require an NPDES individual permit. To request NPDES individual permit coverage, please see the DOH-CWB forms website located at: http://health.hawaii.gov/cwb/site-map/clean-water-branch-home-page/forms/

c. NPDES permit coverage for storm water associated with construction activities is required if your project will result in the disturbance of one (1) acre or more of total land area. The total land area includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a larger common plan of development or sale. NPDES permit coverage is required before the start of the construction activities.

   Land disturbance includes, but is not limited to clearing, grading, grubbing, uprooting of vegetation, demolition (even if leaving foundation slab), staging, stockpiling, excavation into pavement areas which go down to the base course, and storage areas (including areas on the roadway to park equipment if these areas are blocked off from public usage, grassed areas, or bare ground).

3. If your project involves work in, over, or under waters of the United States, it is highly recommend that you contact the Army Corp of Engineers, Regulatory Branch (Tel: 438-9258) regarding their permitting requirements.

   Pursuant to Federal Water Pollution Control Act [commonly known as the "Clean Water Act" (CWA)], Paragraph 401(a)(1), a Section 401 Water Quality Certification (WQC) is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may **result** in any discharge into the navigable waters..." (emphasis added). The term "discharge" is defined in CWA, Subsections 502(16), 502(12), and 502(6); Title 40 of the Code of Federal Regulations, Section 122.2; and Hawaii Administrative Rules (HAR), Chapter 11-54.

4. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 WQC are required, must comply with the State's Water Quality Standards. Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of $25,000 per day per violation.

If you have any questions, please visit our website at: http://health.hawaii.gov/cwb, or contact the Engineering Section, CWB, at (808) 586-4309.

Sincerely,

ALEC WONG, P.E., CHIEF
Clean Water Branch

CTM:tg

c: DOH-EPO #14-015 [via email only]

April 1, 2014

Mr. Alec Wong, Chief
Clean Water Branch
Department of Health
State of Hawai'i
P.O. Box 3378
Honolulu, Hawai'i 96801-3378

Subject: Schofield Generating Station Project:
Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Wong:

Thank you for your January 24th 2014 letter (Reference 01078PCTM.14) to the State of Hawai'i Department of Land and Natural Resources (DLNR) concerning the Environmental Impact Statement Preparation Notice (EISPN) for the Schofield Generating Project. Because Hawaiian Electric is the applicant seeking approval for the proposed project, DLNR has asked that we respond.

Hawaiian Electric understands that it must comply with the provisions of Hawai'i Administrative Rules §11-54 and 11-55, and appreciates the information you provided regarding antidegradation, designated uses, and water quality criteria. We recognize that National Pollutant Discharge Elimination System (NPDES) permit coverage is required for certain storm water discharges and anticipate that we will require one before proceeding with development of the approximately 10-acre site. We do not expect to undertake work that will require an Army Corps of Engineers permit or a Section 401 Water Quality Certification.

We will provide the Department copies of the Draft Environmental Impact Statement when it is available, and you will have an opportunity to provide additional comments at that time. If, in the meantime you have any questions or would like to discuss this further, please call me at (808) 543-4088.

Sincerely,

Jack Shriver
Senior Engineer,
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Hawaii Department of Land and Natural Resources Office of Conservation and Coastal Lands
Ms. Stephanie Gardin, Office of Public Affairs, US Army Garrison—Hawaii
Mr. Doug Waters, US Army Energy Initiatives Task Force

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
P.O. Box 50004 Rm. 4-118
Honolulu, HI 96850
808-541-2600

February 4, 2014

Tetra Tech, Inc.
Melissa DeSantis (SGSP EIS)
10306 Eaton Place, Ste. 340
Fairfax, VA 22030

Dear Ms. DeSantis,

Thank you for providing the United States Department of Agriculture-Natural Resources Conservation Service (USDA-NRCS) the opportunity to review the status of lands that will be affected by the proposed construction of a biofuel-capable power generation plant on lease land within Schofield Barracks Military Reserve, Mililani, Hawaii. We confine our comments to issues within the purview of NRCS, specifically those related to soil properties that are typically used to assess the quality of land for agricultural uses.

Upon review of the provided Environmental Impact Statement Preparation Notice, we find that the soils within the project area – roughly 10 acres – are classified as "Prime Farmland if Irrigated" in the latest Soil Survey, available through the Web Soil Survey online database interface (http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm). Projects receiving federal funding and to be built on open land that is not considered within urbanized areas, such as this project area, are subject to the Farmland Protection Policy Act [FPPA, subtitle I of Title XV, Section 1539-1549 of the Agriculture and Food Act of 1981 (Public Law 97-98)] and will require that a USDA Form AD-1006 – Farmland Conversion Impact Rating – be completed as part of the Environmental Assessment process. A copy of this form and instructions are attached.

If you have any questions concerning the soils and related quality and suitability ratings for this project area, please contact Dr. Cynthia Stiles, Assistant State Soil Scientist, by phone (808) 541-2600 x129 or email cynthia.stiles@hi.usda.gov.

Sincerely,

Christine S. Clarke

Christine S. Clarke
Acting Director
Pacific Islands Area

Enclosure:

cc: Richard Patterson, District Conservationist, Aiea, Hawaii
Cynthia Stiles, Asst. State Soil Scientist, Honolulu, Hawaii

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U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request
Name Of Project	Federal Agency Involved
Proposed Land Use	County And State

PART II *(To be completed by NRCS)*		Date Request Received By NRCS	
Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply -- do not complete additional parts of this form).* Yes ☐ No ☐		Acres Irrigated	Average Farm Size
Major Crop(s)	Farmable Land In Govt. Jurisdiction Acres: %	Amount Of Farmland As Defined in FPPA Acres: %	
Name Of Land Evaluation System Used	Name Of Local Site Assessment System	Date Land Evaluation Returned By NRCS	

PART III *(To be completed by Federal Agency)*	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly				
B. Total Acres To Be Converted Indirectly				
C. Total Acres In Site	0.0	0.0	0.0	0.0
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland				
B. Total Acres Statewide And Local Important Farmland				
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted				
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value				
PART V *(To be completed by NRCS)* Land Evaluation Criterion Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)*	0	0	0	0

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(These criteria are explained in 7 CFR 658.5(b)*	Maximum Points				
1. Area In Nonurban Use					
2. Perimeter In Nonurban Use					
3. Percent Of Site Being Farmed					
4. Protection Provided By State And Local Government					
5. Distance From Urban Builtup Area					
6. Distance To Urban Support Services					
7. Size Of Present Farm Unit Compared To Average					
8. Creation Of Nonfarmable Farmland					
9. Availability Of Farm Support Services					
10. On-Farm Investments					
11. Effects Of Conversion On Farm Support Services					
12. Compatibility With Existing Agricultural Use					
TOTAL SITE ASSESSMENT POINTS	160	0	0	0	0
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100	0	0	0	0
Total Site Assessment *(From Part VI above or a local site assessment)*	160	0	0	0	0
TOTAL POINTS *(Total of above 2 lines)*	260	0	0	0	0

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? Yes ☐ No ☐

Reason For Selection:

(See Instructions on reverse side)

Form AD-1006 (10-83)

This form was electronically produced by National Production Services Staff

STEPS IN THE PROCESSING THE FARMLAND AND CONVERSION IMPACT RATING FORM

Step 1 – Federal agencies involved in proposed projects that may convert farmland, as defined in the Farmland Protection Policy Act (FPPA) to nonagricultural uses, will initially complete Parts I and III of the form.

Step 2 – Originator will send copies A, B and C together with maps indicating locations of site(s), to the Natural Resources Conservation Service (NRCS) local field office and retain copy D for their files. (Note: NRCS has a field office in most counties in the U.S. The field office is usually located in the county seat. A list of field office locations are available from the NRCS State Conservationist in each state).

Step 3 – NRCS will, within 45 calendar days after receipt of form, make a determination as to whether the site(s) of the proposed project contains prime, unique, statewide or local important farmland.

. Step '4 – In cases where farmland covered by the FPPA will be converted by the proposed project, NRCS field offices will complete Parts II, IV and V of the form.

Step 5 – NRCS will return copy A and B of the form to the Federal agency involved in the project. (Copy C will be retained for NRCS records).

Step 6 – The Federal agency involved in the proposed project will complete Parts VI and VII of the form.

Step 7 – The Federal agency involved in the proposed project will make a determination as to whether the proposed conversion is consistent with the FPPA and the agency's internal policies.

INSTRUCTIONS FOR COMPLETING THE FARMLAND CONVERSION IMPACT RATING FORM

Part I: In completing the "County And State" questions list all the local governments that are responsible for local land controls where site(s) are to be evaluated.

Part III: In completing item B (Total Acres To Be Converted Indirectly), include the following:

1. Acres not being directly converted but that would no longer be capable of being farmed after the conversion, because the conversion would restrict access to them.

2. Acres planned to receive services from an infrastructure project as indicated in the project justification (e.g. highways, utilities) that will cause a direct conversion.

Part VI: Do not complete Part VI if a local site assessment is used.

Assign the maximum points for each site assessment criterion as shown in § 658.5 (b) of CFR. In cases of corridor-type projects such as transportation, powerline and flood control, criteria #5 and #6 will not apply and will, be weighed zero, however, criterion #8 will be weighed a maximum of 25 points, and criterion #11 a maximum of 25 points.

Individual Federal agencies at the national level, may assign relative weights among the 12 site assessment criteria other than those shown in the FPPA rule. In all cases where other weights are assigned relative adjustments must be made to maintain the maximum total weight points at 160.

In rating alternative sites, Federal agencies shall consider each of the criteria and assign points within the limits established in the FPPA rule. Sites most suitable for protection under these criteria will receive the highest total scores, and sites least suitable, the lowest scores.

Part VII: In computing the "Total Site Assessment Points" where a State or local site assessment is used and the total maximum number of points is other than 160, adjust the site assessment points to a base of 160. Example: if the Site Assessment maximum is 200 points, and alternative Site "A" is rated 180 points:

$$\frac{\text{Total points assigned Site A}}{\text{Maximum points possible}} = \frac{180}{200} \times 160 = 144 \text{ points for Site "A."}$$

Site Assessment Scoring for the Twelve Factors Used in FPPA

The Site Assessment criteria used in the Farmland Protection Policy Act (FPPA) rule are designed to assess important factors other than the agricultural value of the land when determining which alternative sites should receive the highest level of protection from conversion to non agricultural uses.

Twelve factors are used for Site Assessment and ten factors for corridor-type sites. Each factor is listed in an outline form, without detailed definitions or guidelines to follow in the rating process. The purpose of this document is to expand the definitions of use of each of the twelve Site Assessment factors so that all persons can have a clear understanding as to what each factor is intended to evaluate and how points are assigned for given conditions.

In each of the 12 factors a number rating system is used to determine which sites deserve the most protection from conversion to non-farm uses. The higher the number value given to a proposed site, the more protection it will receive. The maximum scores are 10, 15 and 20 points, depending upon the relative importance of each particular question. If a question significantly relates to why a parcel of land should not be converted, the question has a maximum possible protection value of 20, whereas a question which does not have such a significant impact upon whether a site would be converted, would have fewer maximum points possible, for example 10.

The following guidelines should be used in rating the twelve Site Assessment criteria:

1. **How much land is in non-urban use within a radius of 1.0 mile from where the project is intended?**

More than 90 percent:	15 points
90-20 percent:	14 to 1 points
Less than 20 percent:	0 points

This factor is designed to evaluate the extent to which the area within one mile of the proposed site is non-urban area. For purposes of this rule, "non-urban" should include:

- Agricultural land (crop-fruit trees, nuts, oilseed)
- Range land
- Forest land
- Golf Courses
- Non paved parks and recreational areas
- Mining sites
- Farm Storage
- Lakes, ponds and other water bodies
- Rural roads, and through roads without houses or buildings
- Open space
- Wetlands
- Fish production
- Pasture or hayland

Urban uses include:

- Houses (other than farm houses)
- Apartment buildings
- Commercial buildings
- Industrial buildings
- Paved recreational areas (i.e. tennis courts)
- Streets in areas with 30 structures per 40 acres
- Gas stations

- Equipment, supply stores
- Off-farm storage
- Processing plants
- Shopping malls
- Utilities/Services
- Medical buildings

In rating this factor, an area one-mile from the outer edge of the proposed site should be outlined on a current photo; the areas that are urban should be outlined. For rural houses and other buildings with unknown sizes, use 1 and 1/3 acres per structure. For roads with houses on only one side, use one half of road for urban and one half for non-urban.

The purpose of this rating process is to insure that the most valuable and viable farmlands are protected from development projects sponsored by the Federal Government. With this goal in mind, factor S1 suggests that the more agricultural lands surrounding the parcel boundary in question, the more protection from development this site should receive. Accordingly, a site with a large quantity of non-urban land surrounding it will receive a greater
number of points for protection from development. Thus, where more than 90 percent of the area around the proposed site (do not include the proposed site in this assessment) is non-urban, assign 15 points. Where 20 percent or less is
non-urban, assign 0 points. Where the area lies between 20 and 90 percent non-urban, assign appropriate points from 14 to 1, as noted below.

Percent Non-Urban Land within 1 mile	**Points**
90 percent or greater	15
85 to 89 percent	14
80 to 84 percent	13
75 to 79 percent	12
70 to 74 percent	11
65 to 69 percent	10
60 to 64 percent	9
55 to 59 percent	8
50 to 54 percent	7
45 to 49 percent	6
40 to 44 percent	5
35 to 39 percent	4
30 to 24 percent	3
25 to 29 percent	2
21 to 24 percent	1
20 percent or less	0

2. How much of the perimeter of the site borders on land in non-urban use?

More than 90 percent:	I0 points
90 to 20 percent:	9 to 1 point(s)
Less than 20 percent:	0 points

This factor is designed to evaluate the extent to which the land adjacent to the proposed site is non-urban use. Where factor #1 evaluates the general location of the proposed site, this factor evaluates the immediate perimeter of the site. The definition of urban and non-urban uses in factor #1 should be used for this factor.

In rating the second factor, measure the perimeter of the site that is in non-urban and urban use. Where more than 90 percent of the perimeter is in non-urban use, score this factor 10 points. Where less than 20 percent, assign 0 points. If a road is next to the perimeter, class the area according to the

use on the other side of the road for that area. Use 1 and 1/3 acre per structure if not otherwise known. Where 20 to 90 percent of the perimeter is non-urban, assign points as noted below:

Percentage of Perimeter Bordering Land	Points
90 percent or greater	10
82 to 89 percent	9
74 to 81 percent	8
65 to 73 percent	7
58 to 65 percent	6
50 to 57 percent	5
42 to 49 percent	4
34 to 41 percent	3
27 to 33 percent	2
21 to 26 percent	1
20 percent or Less	0

3. How much of the site has been farmed (managed for a scheduled harvest or timber activity) more than five of the last ten years?

More than 90 percent:	20 points
90 to 20 percent:	19 to 1 point(s)
Less than 20 percent:	0 points

This factor is designed to evaluate the extent to which the proposed conversion site has been used or managed for agricultural purposes in the past 10 years.

Land is being farmed when it is used or managed for food or fiber, to include timber products, fruit, nuts, grapes, grain, forage, oil seed, fish and meat, poultry and dairy products.

Land that has been left to grow up to native vegetation without management or harvest will be considered as abandoned and therefore not farmed. The proposed conversion site should be evaluated and rated according to the percent, of the site farmed.

If more than 90 percent of the site has been farmed 5 of the last 10 years score the site as follows:

Percentage of Site Farmed	Points
90 percent or greater	20
86 to 89 percent	19
82 to 85 percent	18
78 to 81 percent	17
74 to 77 percent	16
70 to 73 percent	15
66 to 69 percent	14
62 to 65 percent	13
58 to 61 percent	12
54 to 57 percent	11
50 to 53 percent	10
46 to 49 percent	9
42 to 45 percent	8
38 to 41 percent	7
35 to 37 percent	6
32 to 34 percent	5
29 to 31 percent	4
26 to 28 percent	3

23 to 25 percent	2
20 to 22 percent percent or Less	1
Less than 20 percent	0

4. Is the site subject to state or unit of local government policies or programs to protect farmland or covered by private programs to protect farmland?

Site is protected:	20 points
Site is not protected:	0 points

This factor is designed to evaluate the extent to which state and local government and private programs have made efforts to protect this site from conversion.

State and local policies and programs to protect farmland include:

State Policies and Programs to Protect Farmland

1. Tax Relief:

   A. Differential Assessment: Agricultural lands are taxed on their agricultural use value, rather than at market value. As a result, farmers pay fewer taxes on their land, which helps keep them in business, and therefore helps to insure that the farmland will not be converted to nonagricultural uses.

      1. Preferential Assessment for Property Tax: Landowners with parcels of land used for agriculture are given the privilege of differential assessment.

      2. Deferred Taxation for Property Tax: Landowners are deterred from converting their land to nonfarm uses, because if they do so, they must pay back taxes at market value.

      3. Restrictive Agreement for Property Tax: Landowners who want to receive Differential Assessment must agree to keep their land in - eligible use.

   B. Income Tax Credits

   Circuit Breaker Tax Credits: Authorize an eligible owner of farmland to apply some or all of the property taxes on his or her farmland and farm structures as a tax credit against the owner's state income tax.

   C. Estate and Inheritance Tax Benefits

   Farm Use Valuation for Death Tax: Exemption of state tax liability to eligible farm estates.

2. "Right to farm" laws:

   Prohibits local governments from enacting laws which will place restrictions upon normally accepted farming practices, for example, the generation of noise, odor or dust.

3. Agricultural Districting:

   Wherein farmers voluntarily organize districts of agricultural land to be legally recognized geographic areas. These farmers receive benefits, such as protection from annexation, in exchange for keeping land within the district for a given number of years.

4. Land Use Controls: Agricultural Zoning.

Types of Agricultural Zoning Ordinances include:

A. Exclusive: In which the agricultural zone is restricted to only farm-related dwellings, with, for example, a minimum of 40 acres per dwelling unit.

B. Non-Exclusive: In which non-farm dwellings are allowed, but the density remains low, such as 20 acres per dwelling unit.

Additional Zoning techniques include:

A. Sliding Scale: This method looks at zoning according to the total size of the parcel owned. For example, the number of dwelling units per a given number of acres may change from county to county according to the existing land acreage to dwelling unit ratio of surrounding parcels of land within the specific area.

B. Point System or Numerical Approach: Approaches land use permits on a case by case basis.

LESA: The LESA system (Land Evaluation-Site Assessment) is used as a tool to help assess options for land use on an evaluation of productivity weighed against commitment to urban development.

C. Conditional Use: Based upon the evaluation on a case by case basis by the Board of Zoning Adjustment. Also may include the method of using special land use permits.

5. Development Rights:

A. Purchase of Development Rights (PDR): Where development rights are purchased by Government action.

Buffer Zoning Districts: Buffer Zoning Districts are an example of land purchased by Government action. This land is included in zoning ordinances in order to preserve and protect agricultural lands from non-farm land uses encroaching upon them.

B. Transfer of Development Rights (TDR): Development rights are transferable for use in other locations designated as receiving areas. TDR is considered a locally based action (not state), because it requires a voluntary decision on the part of the individual landowners.

6. Governor's Executive Order: Policy made by the Governor, stating the importance of agriculture, and the preservation of agricultural lands. The Governor orders the state agencies to avoid the unnecessary conversion of important farmland to nonagricultural uses.

7. Voluntary State Programs:

A. California's Program of Restrictive Agreements and Differential Assessments: The California Land Conservation Act of 1965, commonly known as the Williamson Act, allows cities, counties and individual landowners to form agricultural preserves and enter into contracts for 10 or more years to insure that these parcels of land remain strictly for agricultural use. Since 1972 the Act has extended eligibility to recreational and open space lands such as scenic highway corridors, salt ponds and wildlife preserves. These contractually restricted lands may be taxed differentially for their real value. One hundred-acre districts constitute the minimum land size eligible.

Suggestion: An improved version of the Act would state that if the land is converted after the contract expires, the landowner must pay the difference in the taxes between market value for the land and the agricultural tax value which he or she had been

paying under the Act. This measure would help to insure that farmland would not be converted after the 10 year period ends.

B. Maryland Agricultural Land Preservation Program: Agricultural landowners within agricultural districts have the opportunity to sell their development rights to the Maryland Land Preservation Foundation under the agreement that these landowners will not subdivide or develop their land for an initial period of five years. After five years the landowner may terminate the agreement with one year notice.

   As is stated above under the California Williamson Act, the landowner should pay the back taxes on the property if he or she decides to convert the land after the contract expires, in order to discourage such conversions.

C. Wisconsin Income Tax Incentive Program: The Wisconsin Farmland Preservation Program of December 1977 encourages local jurisdictions in Wisconsin to adopt agricultural preservation plans or exclusive agricultural district zoning ordinances in exchange for credit against state income tax and exemption from special utility assessment. Eligible candidates include local governments and landowners with at least 35 acres of land per dwelling unit in agricultural use and gross farm profits of at least $6.000 per year, or $18,000 over three years.

8. Mandatory State Programs:

A. The Environmental Control Act in the state of Vermont was adopted in 1970 by the Vermont State Legislature. The Act established an environmental board with 9 members (appointed by the Governor) to implement a planning process and a permit system to screen most subdivisions and development proposals according to specific criteria stated in the law. The planning process consists of an interim and a final Land Capability and Development Plan, the latter of which acts as a policy plan to control development. The policies are written in order to:

   - prevent air and water pollution;
   - protect scenic or natural beauty, historic sites and rare and irreplaceable natural areas; and
   - consider the impacts of growth and reduction of development on areas of primary agricultural soils.

B. The California State Coastal Commission: In 1976 the Coastal Act was passed to establish a permanent Coastal Commission with permit and planning authority The purpose of the Coastal Commission was and is to protect the sensitive coastal zone environment and its resources, while accommodating the social and economic needs of the state. The Commission has the power to regulate development in the coastal zones by issuing permits on a case by case basis until local agencies can develop their own coastal plans, which must be certified by the Coastal Commission.

C. Hawaii's Program of State Zoning: In 1961, the Hawaii State Legislature established Act 187, the Land Use Law, to protect the farmland and the welfare of the local people of Hawaii by planning to avoid "unnecessary urbanization". The Law made all state lands into four districts: agricultural, conservation, rural and urban. The Governor appointed members to a State Land Use Commission, whose duties were to uphold the Law and form the boundaries of the four districts. In addition to state zoning, the Land Use Law introduced a program of Differential Assessment, wherein agricultural landowners paid taxes on their land for its agricultural use value, rather than its market value.

D. The Oregon Land Use Act of 1973: This act established the Land Conservation and Development Commission (LCDC) to provide statewide planning goals and guidelines.

Under this Act, Oregon cities and counties are each required to draw up a comprehensive plan, consistent with statewide planning goals. Agricultural land preservation is high on the list of state goals to be followed locally.

If the proposed site is subject to or has used one or more of the above farmland protection programs or policies, score the site 20 points. If none of the above policies or programs apply to this site, score 0 points.

5. How close is the site to an urban built-up area?

The site is 2 miles or more from an urban built-up area	15 points
The site is more than 1 mile but less than 2 miles from an urban built-up area	10 points
The site is less than 1 mile from, but is not adjacent to an urban built-up area	5 points
The site is adjacent to an urban built-up area	0 points

This factor is designed to evaluate the extent to which the proposed site is located next to an existing urban area. The urban built-up area must be 2500 population. The measurement from the built-up area should be made from the point at which the density is 30 structures per 40 acres and with no open or non-urban land existing between the major built-up areas and this point. Suburbs adjacent to cities or urban built-up areas should be considered as part of that urban area.

For greater accuracy, use the following chart to determine how much protection the site should receive according to its distance from an urban area. See chart below:

Distance From Perimeter of Site to Urban Area	Points
More than 10,560 feet	15
9,860 to 10,559 feet	14
9,160 to 9,859 feet	13
8,460 to 9,159 feet	12
7,760 to 8,459 feet	11
7,060 to 7,759 feet	10
6,360 to 7,059 feet	9
5,660 to 6,359 feet	8
4,960 to 5,659 feet	7
4,260 to 4,959 feet	6
3,560 to 4,259 feet	5
2,860 to 3,559 feet	4
2,160 to 2,859 feet	3
1,460 to 2,159 feet	2
760 to 1,459 feet	1
Less than 760 feet (adjacent)	0

6. How close is the site to water lines, sewer lines and/or other local facilities and services whose capacities and design would promote nonagricultural use?

None of the services exist nearer than 3 miles from the site	15 points
Some of the services exist more than one but less than 3 miles from the site	10 points
All of the services exist within 1/2 mile of the site	0 points

This question determines how much infrastructure (water, sewer, etc.) is in place which could facilitate nonagricultural development. The fewer facilities in place, the more difficult it is to develop an area. Thus, if a proposed site is further away from these services (more than 3 miles distance away), the site should be awarded the highest number of points (15). As the distance of the parcel of land to services decreases, the number of points awarded declines as well. So, when the site is equal to or further than 1 mile but less than 3 miles away from services, it should be given 10 points. Accordingly, if this distance is 1/2 mile to less than 1 mile, award 5 points; and if the distance from land to services is less than 1/2 mile, award 0 points.

Distance to public facilities should be measured from the perimeter of the parcel in question to the nearest site(s) where necessary facilities are located. If there is more than one distance (i.e. from site to water and from site to sewer), use the average distance (add all distances and then divide by the number of different distances to get the average).

Facilities which could promote nonagricultural use include:

- Water lines
- Sewer lines
- Power lines
- Gas lines
- Circulation (roads)
- Fire and police protection
- Schools

7. **Is the farm unit(s) containing the site (before the project) as large as the average-size farming unit in the county? (Average farm sizes in each county are available from the NRCS field offices in each state. Data are from the latest available Census of Agriculture, Acreage of Farm Units in Operation with $1,000 or more in sales.)**

As large or larger:	10 points
Below average: Deduct 1 point for each 5 percent below the average, down to 0 points if 50 percent or more is below average	9 to 0 points

This factor is designed to determine how much protection the site should receive, according to its size in relation to the average size of farming units within the county. The larger the parcel of land, the more agricultural use value the land possesses, and vice versa. Thus, if the farm unit is as large or larger than the county average, it receives the maximum number of points (10). The smaller the parcel of land compared to the county average, the fewer number of points given. Please see below:

Parcel Size in Relation to Average County Size	Points
Same size or larger than average (l00 percent)	10
95 percent of average	9
90 percent of average	8
85 percent of average	7
80 percent of average	6
75 percent of average	5
70 percent of average	4
65 percent of average	3
60 percent of average	2
55 percent of average	1
50 percent or below county average	0

State and local Natural Resources Conservation Service offices will have the average farm size information, provided by the latest available Census of Agriculture data

8. If this site is chosen for the project, how much of the remaining land on the farm will become non-farmable because of interference with land patterns?

Acreage equal to more than 25 percent of acres directly converted by the project	10 points
Acreage equal to between 25 and 5 percent of the acres directly converted by the project	9 to 1 point(s)
Acreage equal to less than 5 percent of the acres directly converted by the project	0 points

This factor tackles the question of how the proposed development will affect the rest of the land on the farm The site which deserves the most protection from conversion will receive the greatest number of points, and vice versa. For example, if the project is small, such as an extension on a house, the rest of the agricultural land would remain farmable, and thus a lower number of points is given to the site. Whereas if a large-scale highway is planned, a greater portion of the land (not including the site) will become non-farmable, since access to the farmland will be blocked; and thus, the site should receive the highest number of points (10) as protection from conversion

Conversion uses of the Site Which Would Make the Rest of the Land Non-Farmable by Interfering with Land Patterns

Conversions which make the rest of the property nonfarmable include any development which blocks accessibility to the rest of the site Examples are highways, railroads, dams or development along the front of a site restricting access to the rest of the property.

The point scoring is as follows:

Amount of Land Not Including the Site Which Will Become Non-Farmable	Points
25 percent or greater	10
23 - 24 percent	9
21 - 22 percent	8
19 - 20 percent	7
17 - 18 percent	6
15 - 16 percent	5
13 - 14 percent	4
11 - 12 percent	3
9 - 11 percent	2
6 - 8 percent	1
5 percent or less	0

9. Does the site have available adequate supply of farm support services and markets, i.e., farm suppliers, equipment dealers, processing and storage facilities and farmer's markets?

All required services are available	5 points
Some required services are available	4 to 1 point(s)
No required services are available	0 points

This factor is used to assess whether there are adequate support facilities, activities and industry to keep the farming business in business. The more support facilities available to the agricultural

landowner, the more feasible it is for him or her to stay in production. In addition, agricultural support facilities are compatible with farmland. This fact is important, because some land uses are not compatible; for example, development next to farmland cam be dangerous to the welfare of the agricultural land, as a result of pressure from the neighbors who often do not appreciate the noise, smells and dust intrinsic to farmland. Thus, when all required agricultural support services are available, the maximum number of points (5) are awarded. When some services are available, 4 to 1 point(s) are awarded; and consequently, when no services are available, no points are given. See below:

Percent of Services Available	Points
100 percent	5
75 to 99 percent	4
50 to 74 percent	3
25 to 49 percent	2
1 to 24 percent	1
No services	0

10. Does the site have substantial and well-maintained on farm investments such as barns, other storage buildings, fruit trees and vines, field terraces, drainage, irrigation, waterways, or other soil and water conservation measures?

High amount of on-farm investment	20 points
Moderate amount of non-farm investment	19 to 1 point(s)
No on-farm investments	0 points

This factor assesses the quantity of agricultural facilities in place on the proposed site. If a significant agricultural infrastructure exists, the site should continue to be used for farming, and thus the parcel will receive the highest amount of points towards protection from conversion or development. If there is little on farm investment, the site will receive comparatively less protection. See-below:

Amount of On-farm Investment	Points
As much or more than necessary to maintain production (100 percent)	20
95 to 99 percent	19
90 to 94 percent	18
85 to 89 percent	17
80 to 84 percent	16
75 to 79 percent	15
70 to 74 percent	14
65 to 69 percent	13
60 to 64 percent	12
55 to 59 percent	11
50 to 54 percent	10
45 to 49 percent	9
40 to 44 percent	8
35 to 39 percent	7
30 to 34 percent	6
25 to 29 percent	5
20 to 24 percent	4
15 to 19 percent	3
10 to 14 percent	2
5 to 9 percent	1
0 to 4 percent	0

11. Would the project at this site, by converting farmland to nonagricultural use, reduce the support for farm support services so as to jeopardize the continued existence of these support services and thus, the viability of the farms remaining in the area?

Substantial reduction in demand for support services if the site is converted	10 points
Some reduction in demand for support services if the site is converted	9 to 1 point(s)
No significant reduction in demand for support services if the site is converted	0 points

This factor determines whether there are other agriculturally related activities, businesses or jobs dependent upon the working of the pre-converted site in order for the others to remain in production. The more people and farming activities relying upon this land, the more protection it should receive from conversion. Thus, if a substantial reduction in demand for support services were to occur as a result of conversions, the proposed site would receive a high score of 10; some reduction in demand would receive 9 to 1 point(s), and no significant reduction in demand would receive no points.

Specific points are outlined as follows:

Amount of Reduction in Support Services if Site is Converted to Nonagricultural Use	**Points**
Substantial reduction (100 percent)	10
90 to 99 percent	9
80 to 89 percent	8
70 to 79 percent	7
60 to 69 percent	6
50 to 59 percent	5
40 to 49 percent	4
30 to 39 percent	3
20 to 29 percent	2
10 to 19 percent	1
No significant reduction (0 to 9 percent)	0

12. Is the kind and intensity of the proposed use of the site sufficiently incompatible with agriculture that it is likely to contribute to the eventual conversion of the surrounding farmland to nonagricultural use?

Proposed project is incompatible with existing agricultural use of surrounding farmland	10 points
Proposed project is tolerable of existing agricultural use of surrounding farmland	9 to 1 point(s)
Proposed project is fully compatible with existing agricultural use of surrounding farmland	0 points

Factor 12 determines whether conversion of the proposed agricultural site will eventually cause the conversion of neighboring farmland as a result of incompatibility of use of the first with the latter. The more incompatible the proposed conversion is with agriculture, the more protection this site receives from conversion. Therefor-, if the proposed conversion is incompatible with agriculture, the site receives 10 points. If the project is tolerable with agriculture, it receives 9 to 1 points; and if the proposed conversion is compatible with agriculture, it receives 0 points.

CORRIDOR - TYPE SITE ASSESSMENT CRITERIA

The following criteria are to be used for projects that have a linear or corridor - type site configuration connecting two distant points, and crossing several different tracts of land. These include utility lines, highways, railroads, stream improvements, and flood control systems. Federal agencies are to assess the suitability of each corridor-type site or design alternative for protection as farmland along with the land evaluation information.

For Water and Waste Programs, corridor analyses are not applicable for distribution or collection networks. Analyses are applicable for transmission or trunk lines where placement of the lines are flexible.

(1) How much land is in nonurban use within a radius of 1.0 mile form where the project is intended?

(2) More than 90 percent	(3) 15 points
(4) 90 to 20 percent	(5) 14 to 1 point(s).
(6) Less than 20 percent	(7) 0 points

(2) How much of the perimeter of the site borders on land in nonurban use?

(3) More than 90 percent	(4) 10 point(s)
(5) 90 to 20 percent	(6) 9 to 1 points
(7) less than 20 percent	(8) 0 points

(3) How much of the site has been farmed (managed for a scheduled harvest or timber activity) more than five of the last 10 years?

(4) More than 90 percent	(5) 20 points
(6) 90 to 20 percent	(7) 19 to 1 point(s)
(8) Less than 20 percent	(9) 0 points

(4) Is the site subject to state or unit of local government policies or programs to protect farmland or covered by private programs to protect farmland?

Site is protected	20 points
Site is not protected	0 points

(5) Is the farm unit(s) containing the site (before the project) as large as the average - size farming unit in the County? (Average farm sizes in each county are available from the NRCS field offices in each state. Data are from the latest available Census of Agriculture, Acreage of Farm Units in Operation with $1,000 or more in sales.)

As large or larger	10 points
Below average deduct 1 point for each 5 percent below the average, down to 0 points if 50 percent or more below average	9 to 0 points

(6) If the site is chosen for the project, how much of the remaining land on the farm will become non-farmable because of interference with land patterns?

Acreage equal to more than 25 percent of acres directly converted by the project	25 points
Acreage equal to between 25 and 5 percent of the acres directly convened by the project	1 to 24 point(s)
Acreage equal to less than 5 percent of the acres directly converted by the project	0 points

(7) Does the site have available adequate supply of farm support services and markets, i.e., farm suppliers, equipment dealers, processing and storage facilities and farmer's markets?

All required services are available	5 points
Some required services are available	4 to 1 point(s)
No required services are available	0 points

(8) Does the site have substantial and well-maintained on-farm investments such as barns, other storage building, fruit trees and vines, field terraces, drainage, irrigation, waterways, or other soil and water conservation measures?

High amount of on-farm investment	20 points
Moderate amount of on-farm investment	19 to 1 point(s)
No on-farm investment	0 points

(9) Would the project at this site, by converting farmland to nonagricultural use, reduce the demand for farm support services so as to jeopardize the continued existence of these support services and thus, the viability of the farms remaining in the area?

Substantial reduction in demand for support services if the site is convened	25 points
Some reduction in demand for support services if the site is convened	1 to 24 point(s)
No significant reduction in demand for support services if the site is converted	0 points

(10) Is the kind and intensity of the proposed use of the site sufficiently incompatible with agriculture that it is likely to contribute to the eventual conversion of surrounding farmland to nonagricultural use?

Proposed project is incompatible to existing agricultural use of surrounding farmland	10 points
Proposed project is tolerable to existing agricultural use of surrounding farmland	9 to 1 point(s)
Proposed project is fully compatible with existing agricultural use of surrounding farmland	0 points

September 3, 2014

Mr. William Puckett, Acting Director
Natural Resources Conservation Service
U.S. Department of Agriculture
P.O. Box 50004 Rm 4-118
Honolulu, HI 96850

Subject: Schofield Generating Station Project (SGSP): Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Puckett:

Thank you for your February 4, 2014 letter addressed to Ms. DeSantis of Tetra Tech concerning the subject EISPN for the SGSP. Hawaiian Electric Company and the U.S. Army are grateful for the time that you and your staff spent reviewing the EISPN and preparing your detailed comments.

We appreciate you informing us that the proposed Schofield Generating Station Project is subject to the Farmland Protection Policy Act (FPPA, subtitle I of Title XV, Section 1539-1549 of the Agriculture and Food Act of 1981 [Public Law 97-98]).

The 8.13-acre generating station site is a portion of the larger 1,402-acre Schofield Barracks South Range Acquisition Area (SRAA) that was assessed in the Stryker Brigade Combat Team (SBCT) EIS in 2004 (Tetra Tech 2004). As part of that NEPA process, the Army coordinated the conversion of the land from prime farmland to nonagricultural use with NRCS in light of the objectives and guidelines of the FPPA. The estimated 535 acres of what at that time was cultivated pineapple land was 0.67 percent of the total USDA-designated agricultural land on Oahu and 2.8 percent of the total area in pineapple production in the state (Tetra Tech 2004). The SBCT EIS concluded that the conversion on the entire South Range to nonagricultural use would not result in significant impacts.

Upon doing some research regarding the SBCT EIS Form AD-1006, the Army became aware that ratings had been prepared and the form completed for the entire SRAA range, but the process had never been finalized. In March 2014, Mr. David Howlett from the Army's Environmental Law Division contacted Dr. Cynthia Stiles, Assistant State Soil Scientist, about the situation and provided her with the rating form that was completed in 2003, but never finalized. Dr. Stiles reviewed the form and agreed with the ratings, but asked that the Army provide some narrative as to how the ratings were determined. The Army is currently in the process of finalizing the Form AD-1006 requirements for coordination with NRCS. Compliance with the FPPA will be addressed in the SGSP EIS.

If you have any questions or would like to discuss this further, please call me at (808) 543-4088, or if you have specific questions concerning the previous consultation for the SBCT EIS, please contact Lisa Graham with the U.S. Army Garrison, Hawai'i at (808) 656-3075.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Hawaii Department of Land and Natural Resources Office of Conservation and Coastal Lands
Ms. Stephanie Gardin, Office of Public Affairs, US Army Garrison—Hawaii
Ms. Kathy Ahsing, US Army Energy Initiatives Task Force

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

SEP 0 2 2014

Office of the Garrison Commander

Mr. William Puckett
Acting Director
USDA-Natural Resources Conservation Service
Pacific Islands Area State Office
P.O. Box 50004
Honolulu, Hawaii 96850-50004

Dear Mr. Puckett:

This letter and enclosed form is being sent to your office to complete consultation under Farmland Protection Policy Act (FFPA). When the 1,402-acre South Range Acquisition Area (SRAA) was assessed as part of the Army Transformation Environmental Impact Statement, the Army initiated consultation with Natural Resources Conservation Service (NRCS) under FPPA. Form AD-1006 was completed by NRCS in May of 2003 with a note in Part VII stating that the Army would complete the process once the Record of Decision was signed. From what NRCS and US Army Garrison, Hawaii (USAG-HI) found in the project archives, the process was never completed.

The Army was recently made aware of this oversight through correspondence from NRCS concerning another project in the SRAA. Mr. David Howlett for the Army's Environmental Law Division contacted Dr. Cynthia Stiles from NRCS in Honolulu. She reviewed the original rating from 2003 and agreed that it is still accurate. Enclosed is the revised AD-1006 with the rating information reviewed and provided by Dr. Stiles. USAG-HI is providing explanation for the site assessment criteria in Part VI and the reason for the site selection (Site A) in Part VII.

If you have any questions, please contact Ms. Lisa Graham, USAG-HI's National Environmental Policy Act Program Manager, at 808.656.3075 or lisa.m.graham52.civ@mail.mil.

Sincerely,

Richard A. Fromm
Colonel, US Army
Commanding

Enclosures

CF: Dr. Cynthia Stiles, USDA-Natural Resources Conservation Service, Pacific Islands Area State Office, P.O. Box 50004, Honolulu, Hawaii 96850-50004

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request 3/31/14
Name Of Project South Range Acquisition Area	Federal Agency Involved U.S. Army Garrison, Hawaii
Proposed Land Use Military Training	County And State Honolulu, Hawaii
PART II *(To be completed by NRCS)*	Date Request Received By NRCS

Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply – do not complete additional parts of this form).*	Yes ☑ No ☐	Acres Irrigated 16303	Average Farm Size 91
Major Crop(s) Fallow	Farmable Land In Govt. Jurisdiction Acres: 151860 % 39	Amount Of Farmland As Defined In FPPA Acres: 94500 % 24	
Name Of Land Evaluation System Used State of Hawaii LESA	Name Of Local Site Assessment System None	Date Land Evaluation Returned By NRCS 3/31/14	

PART III *(To be completed by Federal Agency)*	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	1,402.0	100.0		
B. Total Acres To Be Converted Indirectly				
C. Total Acres In Site	1,402.0	100.0	0.0	0.0.
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland	535.0	84.0		
B. Total Acres Statewide And Local Important Farmland	252.0	3.0		
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted	0.8	0.1		
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value	33.0	15.0		
PART V *(To be completed by NRCS)* Land Evaluation Criterion Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)*	54	87	0	0

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(These criteria are explained in 7 CFR 658.5(b)*	Maximum Points				
1. Area In Nonurban Use	15	15	15		
2. Perimeter In Nonurban Use	10	6	7		
3. Percent Of Site Being Farmed	20	6	20		
4. Protection Provided By State And Local Government	20	20	20		
5. Distance From Urban Builtup Area	15	0	0		
6. Distance To Urban Support Services	15	0	0		
7. Size Of Present Farm Unit Compared To Average	10	10	10		
8. Creation Of Nonfarmable Farmland	10	0	0		
9. Availability Of Farm Support Services	5	0	0		
10. On-Farm Investments	20	4	4		
11. Effects Of Conversion On Farm Support Services	10	0	0		
12. Compatibility With Existing Agricultural Use	10	0	0		
TOTAL SITE ASSESSMENT POINTS	160	61	76	0	0
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100	54	87	0	0
Total Site Assessment *(From Part VI above or a local site assessment)*	160	61	76	0	0
TOTAL POINTS *(Total of above 2 lines)*	260	115	163	0	0

Site Selected: A	Date Of Selection 7/7/04	Was A Local Site Assessment Used? Yes ■ No ☐

Reason For Selection:

Acquiring the full acreage in the South Range Acquisition Area partially cures the shortage of Army training lands in Hawaii, provides a buffer to incompatible development along the southern border of Schofield Barracks Military Reservation, and provides some additional safety zones for Wheeler Army Airfield's runway.

(See Instructions on reverse side) **Form AD-1006 (10-83)**

This form was electronically produced by National Production Services Staff

Justifications for NRCS Form AD-1006 scores assigned in Part VI

US Army Garrison, Hawaii

1. Area in Non-Urban Use: The South Range Acquisition Area (SRAA) receives the maximum 15 points as the entire area is non-urban.
2. Perimeter in Non-Urban Use: The SRAA receives the 6 points as the only a bit over 50% of the perimeter is adjacent to non-urban use areas including Honouliuli Preserve.
3. Percent of Corridor Being Farmed: The SRAA receives the 6 points as only 535 acres of the total area was is cultivate pineapple land.
4. Protection Provided By State and Local Government: The SRAA receives the highest score, 20 points, contain land designated Unique and Other Land.
5. Distance from Urban Buildup Area: The SRAA receives lowest score as it is adjacent to urban areas at Schofield Barracks Main Post and Wheeler Army Airfield.
6. Distance from Urban Support Services: The SRAA receives lowest score as it is adjacent to urban support services located at Schofield Barracks Main Post and Wheeler Army Airfield.
7. Size of Present Farm Unit Compared to Average: The SRAA received the maximum 10 points as the 535 acres was prime and local important farmland, which is much larger than the average farm size in the area.
8. Creation of Nonfarmable Farmland: The SRAA was given the minimum of zero points as the estimated 535 acres of cultivated pineapple land is .67 percent of the total USDA-designated agricultural land on Oahu and 2.8 percent of the total area in pineapple production in the state (USDA 2004).
9. Availability of Farm Support Services: All alignments were given the minimum zero points bi required services are available.
10. On-Farm Investments: All alignments get the 4 points score because it has a minimum amount of on-farm investment.
11. Effects of Conversion on Farm Support Services: The SRAA received the minimum of zero points as it would not reduce the demand for farm support services in the area.
12. Compatibility with Existing Agricultural Use: The SRAA received a score of zero points as the project will be fully compatible with existing agricultural use.

BOARD OF WATER SUPPLY

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

February 11, 2014

KIRK CALDWELL, MAYOR

DUANE R. MIYASHIRO, Chairman
MAHEALANI CYPHER, Vice Chair
THERESIA C. McMURDO
ADAM C. WONG
DAVID C. HULIHEE

ROSS S. SASAMURA, Ex-Officio
GLENN M. OKIMOTO, Ex-Officio

ERNEST Y. W. LAU, P.E.
Manager and Chief Engineer

ELLEN E. KITAMURA, P.E.
Deputy Manager and Chief Engineer

Mr. Jack Shriver, Project Manager
Hawaiian Electric
P.O. Box 2750
Honolulu, Hawaii 96840-0001

Dear Mr. Shriver:

Subject: Your Letter Dated January 8, 2014 Requesting Comments on the Environmental Impact Statement Preparation Notice for the Schofield Generating Station Project – Tax Map Key: 7-7-001: 001, 002; 7-3-001:001, 002, 006, 007, 008, 009, 011, 012, 013, 019, 022, 024; 7-6-001; 7-6-001: 001, 006; 9-4-012: 001, 003, 011

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

We do not have a water system in the vicinity of the proposed generating plant. Water service should be provided by the private water system in this area.

The construction drawings for the 46 kilovolt sub-transmission line should be submitted for our review.

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

Very truly yours,

ERNEST Y. W. LAU, P.E.
Manager and Chief Engineer

April 1, 2014

Mr. Ernest Y. W. Lau, P.E.
Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, HI 96843

Subject: Schofield Generating Station Project:
Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Lau:

Thank you for your February 11th 2014 letter concerning the Environmental Impact Statement Preparation Notice (EISPN) for the Schofield Generating Project. We appreciate the time that you and your staff spent reviewing the EISPN and preparing your response.

We are grateful for your confirmation that the City and County of Honolulu Board of Water Supply does not have a water system in the vicinity of the proposed generating plant. Hawaiian Electric anticipates that the relatively small amounts of water that would be used by the proposed project will be obtained from the Army water system that serves the area.

Hawaiian Electric will submit a building permit application for the proposed 46 kilovolt sub-transmission line. We understand that as part of the normal building permit application process, your agency will have an opportunity for review and approval at that time. We do not expect that there will be any conflict with your existing pipelines or other facilities. In the meantime, if you have any questions or would like to discuss this further, please call me at (808) 543-4088.

Sincerely,

Jack Shriver
Senior Engineer,
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Hawaii Department of Land and Natural Resources Office of Conservation and Coastal Lands
Ms. Stephanie Gardin, Office of Public Affairs, US Army Garrison—Hawaii
Mr. Doug Waters, US Army Energy Initiatives Task Force

DEPARTMENT OF PARKS & RECREATION

CITY AND COUNTY OF HONOLULU

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

KIRK CALDWELL
MAYOR

TONI P. ROBINSON
DIRECTOR

JEANNE C. ISHIKAWA
DEPUTY DIRECTOR

February 13, 2014

Mr. Jack Shriver, Project Manager
Hawaiian Electric
P. O. Box 2750
Honolulu, Hawaii 96840-0001

Dear Mr. Shriver:

SUBJECT: Environmental Impact Statement Preparation Notice (EISPN)
Schofield Generating Station Project

Thank you for the opportunity to review and comment on the proposed Schofield Generating Station Project.

The Department of Parks and Recreation has no comment. As the proposed project will have no impact on any program or facility of the Department, you may remove us as a consulted party to the balance of the EIS process.

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

Sincerely,

Toni P. Robinson

Toni P. Robinson
Director

TPR:jr
(546404)

April 1, 2014

Ms. Toni P. Robinson, Director
Department of Parks and Recreation
City and County of Honolulu
1000 Uluohia Street, Suite 309
Honolulu, Hawai'i 96707

Subject: Schofield Generating Station Project:
Environmental Impact Statement Preparation Notice (EISPN)

Dear Ms. Robinson:

Thank you for your February 13th 2014 letter concerning the Environmental Impact Statement Preparation Notice (EISPN) for the Schofield Generating Project. We appreciate the time that you and your staff spent reviewing the EISPN and responding.

We understand that the City and County of Honolulu Department of Parks and Recreation has no program or facility that it believes could be adversely affected by the proposed project. In accordance with your request, we will remove the agency from the list of parties to be consulted during the balance of the EIS process.

If in the future you have any questions or would like to discuss this further, please call me at (808) 543-4088.

Sincerely,

Jack Shriver
Senior Engineer,
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Hawaii Department of Land and Natural Resources Office of Conservation and Coastal Lands
Ms. Stephanie Gardin, Office of Public Affairs, US Army Garrison—Hawaii
Mr. Doug Waters, US Army Energy Initiatives Task Force

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 3RD FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8305 • Fax: (808) 768-4730 • Internet: www.honolulu.gov

KIRK CALDWELL
MAYOR

MICHAEL D. FORMBY
DIRECTOR

MARK N. GARRITY, AICP
DEPUTY DIRECTOR

TP1/14-546361R

February 12, 2014

Ms. Melissa DeSantis
Tetra Tech, Inc.
10306 Eaton Place, Suite 340
Fairfax, Virginia 22030

Attention: SGSP EIS

Dear Ms. DeSantis:

SUBJECT: Environmental Impact Statement Preparation Notice (EISPN) for the Lease of Army Land at Schofield Barracks, Oahu, Hawaii, for the Construction and Operation of a Biofuel-Capable Power Generation Plant; Wahiawa, Oahu, Hawaii

In response to Ms. Amanda Simpson's letter dated January 9, 2014, we have no comments to offer at this time.

Although, we did not attend the scoping meeting, we reserve further comment pending submission of the Environmental Impact Statement.

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

Very truly yours,

Michael D. Formby
Director

cc: Ms. Amanda Simpson, Executive Director
Department of the Army, Energy Initiatives Task Force

April 1, 2014

Mr. Michael D. Formby, Director
Department of Transportation Services
City and County of Honolulu
650 South King Street, 3rd Floor
Honolulu, Hawai'i 96813

Subject: Schofield Generating Station Project:
Environmental Impact Statement Preparation Notice (EISPN)

Dear Ms. Robinson:

Thank you for your February 12th 2014 letter to Ms. Melissa DeSantis of Tetra Tech, Inc. (Reference TP1/14-546361R) concerning the Environmental Impact Statement Preparation Notice (EISPN) for the Schofield Generating Project. We appreciate the time that you and your staff spent reviewing the EISPN and preparing your letter.

We understand that the City and County of Honolulu Department of Transportation Services did not attend the scoping meeting and has no comments to offer at this time. We will provide a copy of the Draft Environmental Impact Statement to you for review and comment when it is available.

In the meantime, if you have any questions or would like to discuss the project further, please call me at (808) 543-4088.

Sincerely,

Jack Shriver
Senior Engineer,
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Hawaii Department of Land and Natural Resources Office of Conservation and Coastal Lands
Ms. Stephanie Gardin, Office of Public Affairs, US Army Garrison—Hawaii
Mr. Doug Waters, US Army Energy Initiatives Task Force

NEIL ABERCROMBIE
GOVERNOR

RICHARD C. LIM
DIRECTOR

MARY ALICE EVANS
DEPUTY DIRECTOR

DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

No. 1 Capitol District Building, 250 South Hotel Street, 5th Floor, Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804
Web site: www.hawaii.gov/dbedt

Telephone: (808) 586-2355
Fax: (808) 586-2377

February 28, 2014

VIA U.S. MAIL

Department of Land and Natural Resources
1151 Punchbowl Street, Room 131
Honolulu, Hawaii 96813
Attention: William Aila, Chairperson

VIA U.S. MAIL AND E-MAIL

Melissa DeSantis
Tetra Tech, Inc.
Attention: SGSP EISPN
10306 Eaton Place, Suite 340
Fairfax, Virginia 22030
sgspcomments@tetratech.com

Re: SGSP EISPN (Notice of Intent to Prepare an Environmental Impact Statement for the Schofield Generating Station Plant)

Dear Chair Aila and Ms. DeSantis:

The Hawaii Department of Business, Economic Development, and Tourism ("DBEDT") submits the following comments in response to the State of Hawaii's Department of Land and Natural Resources' ("DLNR") Environmental Impact Statement ("EIS") Preparation Notice ("EISPN" or "Notice") for the proposed Schofield Generating Station Project ("Project"). DBEDT acknowledges the Department of the Army's ("Army") need for energy security for the Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia, DBEDT seeks to work as a consulted party and is committed to working with the Army, Hawaiian Electric Company, Inc. ("HECO"), DLNR, and other interested stakeholders during the EIS process to ensure a successful and reasonable outcome.

DBEDT's comments herein are guided by the State's clean energy policy, which has a significant influence on the State's economic and environmental well-being. Based on that perspective there

are other considerations that should be accounted for and other alternatives that should be explored. Such alternatives would better serve the State's and the Army's mutual interests in reducing consumption of petroleum-based generation and exploring other clean energy options that would reliably and cost-effectively promote Hawaii's energy security.

I. Comments

A. Building Petroleum-based Electricity Generation is Contrary to Hawaii's Energy Policy and is Not in the Public Interest in Hawaii

Based on its interests and statutory obligation to reach and exceed the State's clean energy targets, DBEDT is concerned with the characterization of this Project as one that would advance the State's renewable goals.[1] Of primary concern is the fact that diesel is proposed to be an integral part of the fuel mix.[2] Building a diesel-based electricity generation unit is contrary to meeting the State's Renewable Portfolio Standards ("RPS") mandate. This mandate requires each electric utility company that sells electricity for consumption in Hawaii to establish a RPS of forty per cent of its net electricity sales by December 31, 2030.[3] Both DLNR and DBEDT are charged with facilitating the private sector's development of renewable energy projects by supporting the private sector's attainment of the RPS.[4]

Moreover, the State and the United States Department of Energy's partnership—the Hawaii Clean Energy Initiative—is aimed at attaining independence from the State's detrimental reliance on fossil fuels.[5] While the Notice states that the "use of renewable biofuels will contribute to State [RPS] goals,"[6] DBEDT submits that using diesel to operate the Project would be a step backwards for Hawaii from an energy policy and environmental perspective. DBEDT also notes that there is insufficient clarity at this time as to the extent of the proposed reliance on diesel versus biofuels in all the scenarios proposed for consideration.[7]

DBEDT further notes that the intent to use diesel for the Project was not stated in support of HECO's application to the Hawaii Public Utilities Commission ("Hawaii PUC") for waiver from the Framework for Competitive Bidding.[8] There, HECO claimed that a waiver for the Project

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1 *See e.g.*, Notice at 2:34-35 (noting that "[t]he six biofuel-capable reciprocating engine-generator sets would add 50MW of firm, utility-owned renewable energy capacity" to the Oahu electrical grid).

2 *Id.* at 3:13-15.

3 H.R.S. § 269-92 (Renewable Portfolio Standards).

4 H.R.S. § 196-41 (State Support for achieving Renewable Portfolio Standards).

5 *See* http://www.hawaiicleanenergyinitiative.org/about; *cf.* 2009 H.B. 1464, Act 155.

6 Notice at 3:6-7.

7 *Id.* at 3:13-15 ("The Schofield Generating Station would operate on a mix of biofuel and diesel as required to meet Hawaiian Electric's Renewable Portfolio Standards . . . .").

8 *See I/M/O the Application of Hawaiian Electric Co. for Approval of Application for Waiver from the Framework for Competitive Bidding*, Decision and Order No. 30522, Hawaii PUC Docket No. 2011-0386 at 7 (August 1, 2012) ("Waiver Order") at 5 (noting that by Decision and Order No. 23121, filed on December 8, 2006, in Hawaii PUC Docket No. 03-0372, "the commission adopted the Framework to govern competitive

was appropriate "since the utility is seeking to acquire power from a non-fossil fuel (biofueled) facility to meet the governmental objective of energy security for the military."[9] The Hawaii PUC generally found that the Project meets the criteria for a waiver under Section II.A.3 of the Competitive Bidding Framework,[10] and specifically found that the "Project will be addressing a critical governmental objective, in which the fuel source is renewable, which is consistent with Sections II.A.3.c.(iii) and II.A.3.c(iv) of the Framework."[11] In addition, the HECO Companies' 2013 IRP Report and Action Plan[12] did not indicate that the Project would rely on diesel fuel. Rather, the Report stated that the Project "would more efficiently consume 3,000,000 gallons/year of biodiesel . . . ."[13]

In addition to raising concerns pertaining to State energy policy, reliance on petroleum-based fuels raises concerns regarding price, energy security, and environmental impacts.[14] As such, DBEDT is concerned that the Project as currently proposed would not support the State's efforts to redefine Hawaii's energy future.

B. *Other Alternatives that Would Foster the State's and Army's Interests Should be Considered*

DBEDT believes the State's goals are consistent with the goals of the Army Energy Initiatives Task Force, which serves as the central management office for partnering with Army installations to implement cost-effective, large-scale renewable energy projects, such as the Project.[15] This

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bidding as a mechanism for acquiring new energy generation in Hawaii. Under the Framework, competitive bidding is the required mechanism for acquiring a future generation resource or a block of generation resources, subject to certain conditions and exceptions.").

9 *I/M/O the Application of Hawaiian Electric Co. for Approval of Application for Waiver from the Framework for Competitive Bidding,* Application for Waiver, Hawaii PUC Docket No. 2011-0386 at 7 (filed December 27, 2011). *See also* Waiver Order at 7 (noting the same).

10 We note that the Waiver Order underscored certain provisions in Part II.A.3 of the Competitive Bidding Framework that HECO had argued would support the request for waiver. One such provision was Part II.A.3.b.(iv), which provides that a circumstance when competitive bidding may not be appropriate includes "when competitive bidding will impede or create a disincentive for the achievement of [Integrated Resource Planning ("IRP")] goals, renewable energy portfolio standards or other government objectives and policies". Waiver Order at 5-6.

11 *Id.* at 10. Sections II.A.3.c(iii) pertains to "the acquisition of power from a non-fossil fuel facility (such as a waste-to-energy facility) that is being installed to meet a governmental objective;" and II.A.3.c(iv) pertains to "the acquisition of power supplies needed to respond to an emergency situation." *Id.* at 7.

12 Hawaiian Electric Companies' 2013 IRP Report and Action Plan, Hawaii PUC Docket No. 2012-0036 (filed June 28, 2013) (hereinafter "IRP Report"). HECO has two subsidiaries, Hawaii Electric Light Company, Inc. ("HELCO") and Maui Electric Company, Limited ("MECO"). DBEDT refers to the three companies collectively as the "HECO Companies."

13 *Id.* at ES-13.

14 Biofuels Study Final Report to the Legislature In Accordance with Act 203, Session Laws of Hawaii, 2011, State of Hawaii Dept. of Business, Economic Development & Tourism (December 2012) at i. This report is available at: http://files.hawaii.gov/dbedt/annuals/2012/2012-biofuels-study-act-203.pdf.

15 http://www.armyeitf.com/.

Task Force seeks to ensure that favorable project sites move to completion and that the Army achieves its renewable energy goal of deploying one gigawatt of renewable energy by 2025. Incorporating oil-based fuels as part of this Project would run counter to this goal. The Notice states that the purpose of the Project is to meet the common needs of Hawaiian Electric and the U.S. Army Garrison—Hawaii for secure, reliable, and renewable power generation.[16] Building petroleum-based electricity generation units is not part of a clear generation scheme that: 1) promotes and maximizes the use of locally produced renewable energy; and 2) increases fuel diversity by moving away from oil-based options.

The State has an interest in diversifying its energy portfolio and leveraging our international status as a clean energy test bed. The State is fortunate to have ample access to natural resources, including the sun, wind, ocean, bioenergy, and geothermal resources.[17] Additionally, the State has numerous additional options to enhance fuel diversity that are consistent with DBEDT's support for an "all of the above" strategy to accomplish these goals. For instance, cost competitive liquefied natural gas ("LNG") could play a limited, transitional role in the power generation market.[18] LNG, rather than the more expensive diesel, could provide generation for peak load demand. There is currently a surplus of natural gas in our country, evidenced by the proposed export terminals at Cove Point, MD, Sabine Pass, TX, and the Gulf of Mexico, among others.[19] The federal Department of Energy has been approving LNG terminal export licenses, thus expanding the use of LNG. These successful examples of LNG integration suggest a positive potential for the use of LNG to meet Hawaii's demand for cleaner energy and a more diverse supply.

Consistent with the goals of the Army Energy Initiatives Task Force, natural gas can be used in combination with renewables to solve intermittency and improve energy reliability.[20] This type of strategy would help the Army meet its three driving principles of energy security, mandates, and economic benefits.[21]

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16 Notice at 2:29-30.

17 *See* State of Hawaii Energy Resources Coordinator's Annual Report 2013 at 9 (providing Hawaii renewable energy generation by resource). This report is available at: http://files.hawaii.gov/dbedt/annuals/2013/2013-erc.pdf.

18 HECO noted in its IRP Report, "[f]or the fuel-burning generation fleet (existing and future), LNG may be the lowest-cost fuel, and to the benefit of customers, may be substantially lower cost than ultra-low-sulfur diesel (ULSD). The use of ULSD may be necessary to comply with more stringent environmental regulations, and LNG would be an attractive alternative to more expensive ULSD." IRP Report at ES-19.

19 http://www.ferc.gov/industries/gas/indus-act/lng/lng-proposed-potential.pdf.

20 Energy Initiatives Task Force, Collaboration for Energy Security, slide 14 (February 7, 2014), *available at* http://energyoutlook.naseo.org/Data/Sites/3/presentations/Simpson.pdf.

21 *Id.* at slide 15. The Army must satisfy multiple renewable energy mandates under Section 203 of the Energy Policy Act of 2005, Executive Order 13514, the National Defense Authorization Act of 2007, and President Obama's Climate Action Plan. *See* http://army-energy.hqda.pentagon.mil/renewable/renewable.asp (summarizing targets under the Energy Policy Act of 2005 and the National Defense Authorization Act of 2007); *see also* Executive Order 13514 – Federal Leadership in Environmental, Energy, and Economic Performance, http://energy.gov/eere/femp/downloads/executive-order-13514-federal-leadership-environmental-energy-and-economic-0; *see also* President Obama's Climate Action Plan:

While the Project has the primary stated purpose of grid stability to compensate for an anticipated increase in variable power generation from solar and wind resources, other mitigation strategies should be studied. Variable power generation can be mitigated by employing a host of techniques to enable quick start other than by using diesel generators. For instance, energy storage systems, ancillary services, or demand response methods could be employed to mitigate any loss of biofuel inputs. Other mitigation measures may include better management of certain HECO baseload units on Oahu.[22] The addition or conversion of combined-cycle units may also be evaluated. Furthermore, since the Project is a quick start resource, studies could be conducted to determine if a battery energy storage system ("BESS") system could offer the desired back-up to the biofuel generators, just as a BESS offers operating reserves in the Maui grid.[23] According to HECO, its stated quick load pick-up is a 3-second window and sufficient capacity must be available to restore system frequency.[24] Has a study been conducted to demonstrate that the Project quick start generators can sufficiently restore system frequency without the use of BESS or demand response?

In accordance with the State's renewable energy policies and HECO's own IRP, the Project should take into account a holistic view of the Oahu system. Such an approach should consider not only variable generation equipment capabilities but also utility equipment and operating practices.[25] Furthermore, while the policy goal of the Energy Initiatives Task Force is to increase the use of renewable energy, its other stated aim is to increase such use in a fiscally prudent manner, taking into account life-cycle cost-effectiveness.[26] Accordingly, any mitigation measures such as the Project quick start resource should fit into a holistic, grid-wide strategy to cost-effectively mitigate variable power.

As is evident from the above discussion, DBEDT understands that the Army is open to the consideration of other options for the Project that would meet its objects of procuring reliable, cost-effective and renewable energy, and DBEDT supports that effort. To reach that end, however, DBEDT believes it is important to understand how this Project fits with other ongoing developments to facilitate a cumulative understanding of the environmental, economic and policy impacts of this Project. As such, DBEDT discusses some of the various considerations that should be accounted in this process below.

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http://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf. The Army's own goal is to deploy one gigawatt of renewable energy by 2025. http://www.armyeitf.com/.

22 *See* Hawaii Solar Integration Study: Executive Summary, National Renewable Energy Laboratory (June 2013) at 3, available at http://www.nrel.gov/docs/fy13osti/57215.pdf.

23 *Id.*

24 *See* Operating Reserves and Variable Generation, National Renewable Energy Laboratory (August 2011) at 47, available at http://www.nrel.gov/docs/fy11osti/51978.pdf.

25 *See generally*, Hawaii Solar Integration Study: Executive Summary, National Renewable Energy Laboratory at 3.

26 *See* Memorandum re: Energy Goal Attainment Responsibility Policy for Installations, Department of the Army, Assistant Secretary of the Army (Installations, Energy and Environment (August 24, 2012) at 3.

C. *Other Proceedings, Developments and Considerations Should Inform the Review of the Project*

The Project is proposed to be operated to "meet load and reliability requirements" of the Oahu grid, and to help maintain "grid stability as the amount of power from variable renewable sources (wind and solar) increases over time."[27] The Project is also proposed as one that would "complement, rather than compete with, other existing and anticipated renewable energy sources in the system."[28] Moreover, the various operating scenarios proposed depend on factors such as whether "demand increases, operations of other generating facilities decline, and/or future renewable resources do not develop."[29] Given that these claimed benefits and scenarios are dependent on various other ongoing developments and factors, DBEDT believes it would be imprudent to consider the Project and the various alternatives in a vacuum. It is also clear that environmental reviews require an expansive view of options and impacts. The following are some of the developments and proceedings that could inform the need, cost-effectiveness, environmental impacts and composition of the Project.

This process could be informed by the Hawaii PUC's Reliability Standards Working Group ("RSWG") proceeding in Hawaii PUC Docket No. 2011-0206, which was established to determine how to facilitate the increased use of renewable energy in the islands without compromising grid reliability. The RSWG concluded its work on January 24, 2013. The Independent Facilitator submitted a Final Report on March 13, 2013 and the PUC's selected Technical Review Committee submitted its Report to the Commission in May 2013. The effort of the RSWG resulted in work products and other studies that reflected technical review and recommendations on various factors involved in the consideration, such as ancillary services that can maintain system reliability and better integrate intermittent renewable resources, generation interconnection standard improvements, and methods to reduce renewable generation curtailments.[30] Some recommendations included the initiation of further proceedings. The implementation of the recommendations in those work products and further proceedings would likely influence factors of relevance to the Project's structure and alternative scenarios, such as the enhancement of grid stability, the ability of the system to accommodate new future renewables resources and the likelihood of their development.

Moreover, DBEDT believes that an important consideration is how this Project fits within HECO's overall generation mix. HECO's IRP Report could impact considerations such as load requirements, grid stability, and even the overall cost-impact of the proposed options.[31] In its

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[27] Notice at 2:31-38.

[28] *Id.* at 2:38-39.

[29] *Id.* at 3:35-37.

[30] RSWG Independent Facilitator's Final Report, Hawaii PUC Docket No. 2011-0206 (dated March 17, 2013) at 19.

[31] *See Instituting a Proceeding to Investigate Proposed Amendments to the Framework for Integrated Resource Planning*, Decision and Order, Hawaii PUC Docket No. 2009-0108 (March 14, 2011), Revised Framework at Section II.A ("The goal of integrated resource planning is to develop an Action Plan that governs how the utility will meet energy objectives and customer energy needs consistent with state energy policies and goals, while

IRP Report, HECO noted that its first area of focus was to "make every effort to eliminate the dependency on imported oil for power generation."[32] HECO noted that this would involve deactivation or decommissioning of older, oil-fired steam generators, procuring or developing low-cost, fast track utility-scale renewable energy resources, and converting existing generating units to cost effective renewable and lower carbon fuels, including biomass, biofuels, and LNG.[33] Some of the relevant actions proposed for HECO in the IRP Report may impact the consideration of the Project's composition and use. For instance, the IRP Report noted that "[i]f Honolulu units 8 and 9 are deactivated in 2014 and reactivated in 2017, and Waiau units 3 and 4 are deactivated in 2017, CT-1 converted to combined cycle in 2017, Schofield added in 2017, Honolulu decommissioned or retired in 2018, and no other decommissioning of the remaining firm capacity resources, the IRP scenario analysis indicates that there is a possibility of very limited new capacity need after that."[34] This statement appears to be relevant as to the appropriate fuel mix and the consideration of the six hours a day versus twenty-four hours a day scenarios, as well as the No Action Alternative described in the Notice.[35] In this regard, DBEDT notes that its view on the various scenarios and No Action Alternative will be guided by a holistic perspective consistent with Hawaii's clean energy policies. Once again, it is important to offer the State's perspective that moving away from oil-based generation is critical to our future.

Other questions that are raised include whether the IRP's proposal to convert HECO's CIP CT-1 located in Campbell Industrial Park from a simple-cycle combustion turbine operating on biodiesel, to a combined-cycle combustion turbine/steam turbine should serve as guidance for the Project or whether HECO could use the biodiesel that currently serves CIP CT-1 to serve the Schofield Project.[36] In this regard, HECO noted in its IRP Report that the cost of using biofuels would also be a factor.[37] Additionally, in the Waiver Order, the PUC "direct[ed] HECO to

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providing safe and reliable utility service at reasonable cost, through the development of Resource Plans and Scenarios of possible futures that provide a broader long-term perspective."). In the IRP Docket, DBEDT commented that the PUC should acknowledge the shortcoming in the IRP Report, accept rather than approve the HECO Companies' IRP Report, require the HECO Companies to file for approval prior to implementing specific actions contained in the IRP Action Plans, and establish specific expedited procedures to develop Action Plans that advance the State's clean energy goals. *See, e.g., I/M/O Regarding Integrated Resource Planning*, the Dept. of Business, Economic Development, and Tourism's Reply Comments to Statements of Position in Response to Order No. 31443, Hawaii PUC Docket No. 2012-0036 (filed October 10, 2013) at 3.

32 IRP Report at ES-6.

33 *Id.*

34 *Id.* at 18-35.

35 Notice at 3:26-34; 4:44-5:7.

36 *See* IRP Report at 19-6 to 19-7 (where HECO stated, "With the conversion of CIP CT-1 to combined cycle and adding the capability to burn ULSD and/or LNG with approval of the Commission, the biodiesel that would have been consumed at CIP CT-1 could then be used at this Schofield Generating Station. The Schofield Generating Station is designed to operate at a heat rate (i.e., fuel efficiency) approximately equivalent to that for CIP CT-1 in a combined cycle mode, and approximately twice as efficient as CIP CT-1 in a simple cycle mode. If the biodiesel originally intended for CIP CT-1 were to be deployed at the Schofield Generating Station it would contribute to the Companies' attainment of RPS.").

37 *Id.* at 19-6 (where HECO claimed, "if biodiesel prices are high in the future, a fuel switch to a lower price fuel, such as ULSD or LNG, would be more cost effective. Under a future with lower cost biodiesel, keeping CIP CT-1 on biodiesel is the best option.").

address in any subsequent application relating to the Project, the reasonableness of exclusively using biofuels for the Project."[38] DBEDT acknowledges the PUC's concerns with the potential cost impacts and also recognizes that biofuels may serve well in the power generation market through existing contracts, such that other options from the "all-of-the-above" strategy may also need to be explored. The mix of biofuels and diesel as proposed for this Project could impact the provision of cost-effective, reliable and clean energy to the Army and other ratepayers within the State. DBEDT requests that HECO and the Army take these factors into account as they consider next steps for studying this Project.[39] As noted above, we are concerned that an unlimited reliance on oil-based diesel is inconsistent with the State statutes, State clean energy policy and direction from the Army.

HECO also asserted in the IRP Report that the electrical output from the Project "will normally supply power to all Oahu customers through the Oahu electrical grid. However, during outages that meet the criteria specified in an operating agreement with the Army, [Project] output will be "islanded" to serve only the Army facilities at Schofield Barracks, Wheeler Army Air Field, and Field Station Kunia."[40] There is a need for further information and study on the extent of the need for the facility by Oahu customers currently and to the extent other actions proposed in the IRP Report, technologies, rules, policies or procedures are implemented, including those stemming from the other proceedings discussed in these comments. Similarly, while the IRP Report asserted that the Project's attributes would "enable increased integration of intermittent renewable resources on the Oahu grid (and minimize the potential for energy curtailment,"[41] it is not clear the extent to which these benefits would be realized and how the other potential regulatory requirements discussed herein, among others, would provide similar benefits.

Another salient consideration for this Project is the State legislation and pending investigation into the viability of an inter-island cable.[42] DBEDT believes that the Oahu-Maui interisland marine electric transmission cable that is currently under investigation by the PUC is anticipated to facilitate greater renewable energy development that will displace current fossil generation and reduce the need to develop future fossil generation. Not only did DBEDT's economic analysis demonstrate that the benefits of the inter-island cable would outweigh the costs, DBEDT's analysis found that the inter-island cable would have other benefits such as increasing flexibility in siting new renewable generation, reducing curtailment of renewable generation and providing direct health benefits associated with reduced air emissions of filterable particulate matter,

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38 Waiver Order at 14, n.15.

39 DBEDT also concurs in the other items that the PUC found HECO would need to address in any subsequent application filed related to the Project, such as: (1) the scope and cost of the Project, including as to the size and capacity of the 50 MW Project; (2) whether HECO can provide cost containment for the Project to avoid ratepayers having to pay for cost overruns; and (3) whether reasonable alternatives to the Project were given adequate consideration during the development of the Project. *Id.* at 14-15.

40 IRP Report at 18-17.

41 *Id.* at ES-19.

42 H.R.S. §§ 269-131 to -135, *et seq.*

carbon dioxide, nitrogen oxides and sulfur dioxide.[43] DBEDT's analysis also found that connecting the Oahu and Maui electric systems with a high voltage direct current transmission cable would accommodate transmission of power and ancillary services in both directions and allow the two systems to operate in a coordinated fashion, which would improve the power system economics and reliability on both islands. The construction of such an inter-island cable could have a significant impact on the generation mix in Oahu. This in turn, could potentially reduce the risk of frequency of loss of service to the Army from the other sources of electricity.

Thus, DBEDT submits that the various considerations described above, among others, would have an impact on the Project and any future studies should be reviewed in context with those other developments.

D. It is Imperative to Balance Technical, Economic, Environmental, and Cultural Considerations in the EIS

The EISPN lists several impact categories that have been tentatively identified for consideration in the EIS.[44] DBEDT submits that it is imperative to balance technical, economic, environmental, and cultural considerations in the EIS.[45] Although the Notice identifies some of these concerns, the EIS should fully address the following:

- Technical Considerations: DBEDT has raised some technical considerations above that should be explored by DLNR and the Project proponents. In addition, various statements in the Notice require further support and study. For instance, the Project proponents should provide support for the statement that the Project would allow the grid to accommodate more fluctuating renewable energy than would otherwise be the case.[46] It is not clear what assumptions are being used (*e.g.*, high or low renewable penetration) in making this statement. The Notice also describes two ways in which it expects the penetration of renewable resources to change the load curve.[47] Have the Project proponents completed a study to support these conclusions? If so, what inputs and assumptions were used?

- Economic Considerations: The Army provides critical national security and first responder services. The continued and stable operation of those services is an important state interest. At the same time, the Army has an interest in pursuing cost-effective

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43 *I/M/O Public Utilities Comm'n Opening a Proceeding to Investigate Whether an Oahu-Maui Interisland Transmission System May Be in the Public Interest*, Initial Public Comments of the Dept. of Business, Economic Development and Tourism in Response to Order No. 31356, Hawaii PUC Docket No. 2013-0169 (filed September 9, 2013) at 6.

44 Notice at 5:12-42.

45 *See* State of Hawaii Energy Resources Coordinator's Annual Report 2013 at 3 (explaining that the Abercrombie Administration has focused the next phase of Hawaii's energy transformation on five principles, including "[b]alancing technical, economic, environmental, and cultural considerations.").

46 Notice at 3:28-29.

47 *Id.* at 3:18-25.

solutions, and the Draft EIS should consider alternatives that will be more cost-effective for the Army and all other HECO ratepayers. This analysis should not be done in isolation but rather should consider multiple scenarios, such as high or low load forecasts, high or low renewable penetration, high or low biofuel prices, fuel diversity, etc. The Draft EIS should consider that significant price fluctuations in oil have had harmful effects on Hawaii's ability to meet its diversification goals and highly negative economic consequences. These fluctuations cost jobs, hurt businesses, and ultimately harm consumers, including military service members who live on Oahu. In addition, the Notice makes claims that "[b]eing multi-fuel capable, [the Project] would be able to run on a combination of fuels as necessary to ensure operations are economically viable and can continue under adverse operating conditions."[48] The Draft EIS should define "economically viable" and present the incremental cost of using biofuels versus other fuels for the generators to support its claim that the multi-fuel capability option is economically viable. The Draft EIS should consider the fluctuation of diesel prices over time[49] as well as the transportation costs of diesel as well.

- Environmental Concerns: The Notice states that the six biofuel-capable reciprocating engine-generator sets would add 50 MW of firm, utility-owned renewable energy capacity to the Oahu electrical grid.[50] As discussed above, this claim ignores the fact that, as currently proposed, the Project would also rely on diesel. Reliance on diesel fuel, as opposed to cleaner and greener energy sources that would help control greenhouse gas emissions, does not advance Hawaii's and the Army's renewable goals.

- Cultural Concerns: The Notice generally states that the EIS should consider cultural and historical resources (including Native Hawaiian resources), but does not specifically identify which resources will be impacted by the Project. The Project proponents should coordinate with other agencies, including the Office of Hawaiian Affairs, the National Park Service, the Hawaii Island Burial Council, the State Historic Preservation Division, and the Historic Hawaii Foundation, among others, to determine which cultural and historical resources are of concern on the Schofield Barracks and Wheeler Army Airfield. The Draft EIS should take steps to ensure that historical, archaeological, and architectural sites are sufficiently protected.

These considerations must not be viewed in isolation but rather the Draft EIS should balance these interests.

II. Conclusion

The concerns raised herein demonstrate that the Project as currently proposed would not be in the

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48 *Id.* at 5:15-17.

49 Biofuels Study Final Report to the Legislature in Accordance with Act 2013, Session Laws of Hawaii, State of Hawaii, Department of Business, Economic Development & Tourism at 5 (December 2012) (showing that fuel oil prices paid by Hawaii's electric utilities have varied from $59/barrel up to $120/barrel from 2006-2011).

50 Notice at 2:34-35.

best interests of the State, the Army and other Hawaii ratepayers. As such, DBEDT supports review of other alternatives that would better serve the State's energy policy and the energy security and economic interests of the State and the Army and consideration of other developments, proceedings and other factors that would inform the review of the Project.

We appreciate the opportunity to provide these comments for use in the preparation of the Joint EIS and DBEDT formally requests to be added to the EIS distribution list. If you have any questions, please feel free to contact me at (808) 587-3812 or mark.b.glick@dbedt.hawaii.gov.

Sincerely,

Mark B. Glick
Energy Administrator

October 2, 2014

Mr. Mark Glick, Energy Administrator
Department of Business, Economic Development & Tourism
State of Hawai'i
P.O. Box 2359
Honolulu, Hawai'i 96804

Subject: Schofield Generating Station Project:
Environmental Impact Statement Preparation Notice

Dear Mr. Glick:

Thank you for the Department of Business, Economic Development & Tourism's (DBEDT's) February 28, 2014, letter to the State of Hawai'i Department of Land and Natural Resources (DLNR) and Tetra Tech Inc. concerning the Environmental Impact Statement Preparation Notice (EISPN) for the Schofield Generating Project (Project). Because Hawaiian Electric is the applicant seeking approval for the proposed Project, DLNR has asked that we respond. Hawaiian Electric appreciates your input to the EIS process for this Project, and provides the following responses to your comments.

Comment A. "Building Petroleum-based Electricity Generation is Contrary to Hawai'i's Energy Policy and is Not in the Public Interest in Hawai'i"

Response: We appreciate your comments concerning the Hawai'i Renewable Portfolio Standard (RPS) and your concerns regarding the use of petroleum-based fuels. Please be assured that the Project is not a "diesel-based electricity generation unit." Rather, as clarified in our subsequent application filed with the Public Utilities Commission (PUC) as docket 2014-0113, the Project will use a minimum of 50% biofuel, and also consume a minimum of 3.5 million gallons of biofuel annually. It is this requirement that formed the basis of our statement that the Project will contribute to our ability to continue to meet or exceed the State RPS mandate. For the balance of its fuel needs, the Project could use additional biofuel (e.g, biogas or biodiesel), natural gas, or diesel if natural gas is not available.

In accordance with the requirements of National Environmental Policy Act (NEPA) and Hawai'i Revised Statutes (HRS) Chapter 343, the Draft EIS will provide greater detail concerning the mix of fuels under consideration consistent with purpose and need for the Project, and disclose the environmental impacts thereof. The importance of fuel mix and flexibility to this Project, in the context of broader energy policy considerations, is discussed in our PUC application (docket 2014-0113) and our Power Supply

Improvement Plan (PSIP) filed with the PUC on August 26, 2014 in docket 2011-0206, and will be more appropriately addressed in those proceedings.

Comment B. "Other Alternatives that Would Foster the State's and Army's Interests Should be Considered"

Response: We appreciate your comments concerning the advantages of enhancing fuel diversity and your "all of the above" strategy to accomplish these goals. In accordance with NEPA and HRS Chapter 343, the Draft EIS will provide information on strategies and alternatives that would support energy security, reliability, and increased integration of renewable generation, consistent with the purpose and need for the Project. Like you, Hawaiian Electric supports cost competitive liquefied natural gas (LNG), and has incorporated its use into the Project as a less expensive, cleaner fuel than diesel.

While the Draft EIS will review the environmental impacts of the proposed Project, how this Project fits in more broadly with other state- and system-wide energy initiatives that you mentioned is discussed in our PUC application for this Project and in our PSIP, and will be explored in those proceedings.

Comment C. "Other Proceedings, Developments and Considerations Should Inform the Review of the Project"

Response: We appreciate your comments regarding resources that may inform the Project. The Draft EIS will take into consideration any proceedings that are relevant to the purpose and need for this Project, and that are within the scope of this Draft EIS, as prescribed by NEPA and HRS Chapter 343. However, the primary purpose and focus of the Draft EIS will be to disclose the environmental impacts of the Project and available alternatives, so that those impacts may be considered by decision-makers in their later consideration of this Project.

Regarding the Reliability Standards Working Group and Integrated Resource Planning dockets that you reference, Hawaiian Electric has addressed the issues raised therein, many of which are consistent with your concerns, in our recently filed PSIP and Distributed Generation Interconnection Plan (filed 26, 2014 in docket 2011-0206).

Comment D. "It is Imperative to Balance Technical, Economic, Environmental, and Cultural Considerations in the Joint EIS"

Response: The purpose of both NEPA and HRS Chapter 343 is informed decision-making. With this in mind, the Draft EIS will describe the technical, economic,

environmental and cultural impacts of the Project and its alternatives. However, it is the purpose of environmental reviews to disclose the environmental impacts of a project, not to balance them. Consistent with this distinction, we have addressed in our PUC application for this Project the technical and economic concerns that you raised, and which we expect will be fully explored in the PUC proceedings. Your environmental and cultural concerns will be considered through the EIS process.

We will provide DBEDT copies of the Draft EIS when it is available, and you will have an opportunity to provide additional comments at that time. If, in the meantime you have any questions or would like to discuss this further, please call me at 543-4088.

Sincerely,

Jack Shriver
Senior Engineer,
Generation Project Development
Hawaiian Electric Company

copy: (via email only)
Mr. Alex Roy, Hawai'i Department of Land and Natural Resources Office of Conservation and Coastal Lands
Ms. Stephanie Gardin, Office of Public Affairs, US Army Garrison – Hawai'i
Ms. Kathy Ahsing, US Army Office of Energy Initiatives

NEIL ABERCROMBIE
GOVERNOR

GLENN M. OKIMOTO
DIRECTOR

Deputy Directors
FORD N. FUCHIGAMI
RANDY GRUNE
AUDREY HIDANO
JADINE URASAKI

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

IN REPLY REFER TO:
DIR 0127
STP 8.1483

February 21, 2014

TO: THE HONORABLE WILLIAM J. AILA, JR., CHAIRPERSON
DEPARTMENT OF LAND AND NATURAL RESOURCES

FROM: GLENN M. OKIMOTO, PH.D.
DIRECTOR OF TRANSPORTATION

SUBJECT: SCHOFIELD GENERATING STATION PROJECT
ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE (EISPN)
TMK: (1) 7-7-001: 001, 002; 7-3-001:001, 002, 006-009, 011-013, 019, 022 and 024; 7-6-001:001 and 006; 9-4-012:001, 003 and 011

Our Department of Transportation's (DOT) comments on the subject project are as follows:

1. The project construction plans and other applicable plans/permits for work within the DOT State highway right-of-way must be submitted to the DOT Highways Division for review and approval.

2. A permit from the DOT Highways Division is required for the transport of oversize and/or overweight materials and equipment on State highway facilities.

If there are any questions, please contact Mr. Norren Kato of the DOT Statewide Transportation Planning Office at telephone number (808) 831-7976.

EKT:gm

c: Melissa DeSantis, Tetra Tech, Inc.
Jack Shriver, Hawaiian Electric Company

bc: HWY-P (w/incoming), STP (7-7-001-001)

April 1, 2014

Mr. Glenn M. Okimoto, Director
Department of Transportation
State of Hawai'i
869 Punchbowl Street
Honolulu, Hawai'i 96813-5097

Subject: Schofield Generating Station Project:
Environmental Impact Statement Preparation Notice (EISPN)

Dear Mr. Okimoto:

Thank you for your February 21st 2014 letter to the Department of Land and Natural Resources (Reference DIR 0127 STP 8.1483) concerning the Environmental Impact Statement Preparation Notice (EISPN) for the Schofield Generating Station Project. We appreciate the time that you and your staff spent reviewing the EISPN and preparing your letter. Because Hawaiian Electric is the applicant seeking approval for the proposed project, DLNR has asked that we respond.

Hawaiian Electric understands that it may be required to obtain a permit from the Highways Division of the State of Hawai'i Department of Transportation (DOT-Highways) for the transport of oversize and/or overweight vehicles. The company and/or its contractors will submit project construction plans and other applicable plans and permits that may be required for work within your Department's right-of-way to DOT-Highways for review and approval prior to commencement of construction activities. We will also provide a copy of the Draft Environmental Impact Statement to you for review and comment when it is available.

In the meantime, if you have any questions or would like to discuss the project further, please call me at (808) 543-4088.

Sincerely,

Jack Shriver
Senior Engineer,
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Hawaii Department of Land and Natural Resources Office of Conservation and Coastal Lands
Ms. Stephanie Gardin, Office of Public Affairs, US Army Garrison—Hawaii
Mr. Doug Waters, US Army Energy Initiatives Task Force

Appendix A-3

Draft EIS Public Notices

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FOR FURTHER INFORMATION CONTACT: Mr. Chuck Wullenjohn, Yuma Proving Ground Public Affairs Office, at (928) 328–6189, Monday through Thursday from 6:30 a.m. to 5:00 p.m., Mountain Time.

SUPPLEMENTARY INFORMATION: YPG consists of approximately 840,000 acres of DoD-managed land in the Sonoran Desert in southwestern Arizona. The Department of the Army prepared a FPEIS to analyze potential impacts from new construction, changes in testing and training, and activities conducted under private industry partnerships.

Two alternatives were analyzed in the FPEIS: (1) No Action, which describes the resulting conditions if there were no changes in testing and training activities conducted at YPG and (2) the Proposed Action/Preferred Alternative, which includes new construction and associated demolition, testing and training activities occurring on YPG, and new testing and training proposed by tenants to meet anticipated testing or training needs. The Preferred Alternative was determined after consideration of Native American concerns and feedback from agencies and resulted in reduction of the proposed impact areas for four projects.

The FPEIS addressed the following types of activities:

- Short-term, well-defined activities at known locations that could be implemented without additional NEPA analysis once a decision is made.
- Short-term, less well-defined activities for which locations are not known or for which additional information regarding site-specific implementation must be developed that would receive additional site-specific NEPA analysis prior to project implementation.
- Long-term, less well-defined activities that would occur later in time and would receive additional site-specific NEPA analysis prior to project implementation.

The FPEIS provided thorough analysis under NEPA for the short-term well-defined projects and allows less well-defined projects to be implemented following a focused, site-specific NEPA analysis that would tier from this analysis.

The Army is not seeking to expand the boundaries of YPG and all proposed activities would be conducted within the boundaries of the installation or its currently authorized airspace. No changes were proposed to ongoing military activities conducted at off-post areas in Arizona and California that are used for specific military testing activities under conditions not found at YPG. Therefore, activities conducted in these areas were not included in the analysis in the FPEIS.

The potential for environmental impacts is greatest for the following resource areas: soils, air quality, solid and hazardous materials/waste, vegetation, and wildlife. Impacts to these resources may occur as a result of converting existing land use to support military testing and training or from increasing the scope or magnitude of testing activities. Best management practices and other mitigation measures were identified in the FPEIS.

The Army will observe a waiting period of 30 days following the publication of the Notice of Availability for the FPEIS in the **Federal Register** by the U.S. Environmental Protection Agency before making a decision. Copies of the FPEIS have been sent to affected Federal, State, and local government agencies, to federally recognized Native American tribes, and to other stakeholders. Copies of the FPEIS are available for public inspection at the Yuma County Library, Main Branch, 2951 S. 21st Drive and the Yuma Proving Ground Post Library. The FPEIS can also be viewed at the following Web sites: *http://www.yuma.army.mil/Documents.aspx,* and *http://www.epa.gov/compliance/nepa/eisdata.html.*

Brenda S. Bowen,

Army Federal Register Liaison Officer.

[FR Doc. 2015–09519 Filed 4–23–15; 8:45 am]

BILLING CODE 3710–08–P

DEPARTMENT OF DEFENSE

Department of the Army

Draft Environmental Impact Statement for the Schofield Generating Station Project, United States Army Garrison, Hawaii

AGENCY: Department of the Army, DoD.

ACTION: Notice of availability.

SUMMARY: The Department of the Army announces the availability of the Draft Environmental Impact Statement (DEIS) for the proposed lease of land and granting of easements on Schofield Barracks and Wheeler Army Airfield to Hawaiian Electric Company (Hawaiian Electric) for the construction, ownership, operation, and maintenance of a 50-megawatt (MW) capacity, biofuel-capable power generation plant, referred to as the Schofield Generating Station, and associated power poles, high-tension power lines, and related equipment and facilities. In accordance with the National Environmental Policy Act (NEPA), the DEIS analyzes the environmental impacts associated with construction and operation of the Schofield Generating Station and associated infrastructure. The Army has determined that there are historic properties nearby, but that the undertaking will have no effect upon them as defined in 36 CFR 800.16(i). The Draft EIS documents this finding and it is now being made available for public review. The Draft EIS comment process is also an opportunity for public to provide input about the effects of the proposed actions on historic property, for consideration in Army decision making.

DATES: The public comment period will end 45 days after publication of the Notice of Availability in the **Federal Register**.

ADDRESSES: Please send written comments by mail to the Department of the Army, Directorate of Public Works, United States Army Garrison, Hawaii, ATTN: IMHW–PWE (L. Graham), 947 Wright Avenue, Wheeler Army Airfield, Schofield Barracks, HI 96857–5013; or by email to *sgspcomments@tetratech.com.*

FOR FURTHER INFORMATION CONTACT: For more information please contact Ms. Lisa Graham, NEPA Coordinator, U.S. Army Garrison, Hawaii. Ms. Graham can be reached by phone at (808) 656–3075, or by email at *lisa.m.graham52.civ@mail.mil.*

SUPPLEMENTARY INFORMATION: The Proposed Action, referred to as the Schofield Generating Station Project (SGSP), consists of:

(1) The Army's lease of 8.13 acres of land and the related granting of a 2.5-acre interconnection easement on Schofield Barracks and Wheeler Army Airfield to Hawaiian Electric to construct, operate, and maintain a 50–MW capacity renewable energy power plant to include associated power poles, high-tension power lines, and related equipment and facilities.

(2) The State of Hawaii Department of Land and Natural Resources granting of a 1.28-acre easement and a 0.7-acre conservation district authorization to Hawaiian Electric allowing for the construction of a 46 kilovolt (kV) electrical power transmission line between the SGSP site and the existing Wahiawa Substation.

(3) Hawaiian Electric's construction, ownership, operation, and maintenance of a 50 MW capacity, biofuel-capable power generation plant and 46 kV sub-transmission line required to connect the Schofield Generating Station to the Hawaiian Electric grid.

The primary purpose of the Proposed Action is two-fold: to provide improved energy security to the U.S. Army Garrison, Hawaii at Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia and to provide new secure, firm, flexible, and renewable energy generation to the grid on Oahu, Hawaii.

The need for the Proposed Action are to increase energy security for the Army and Oahu; assist the Army in supporting renewable energy-related laws and Executive Orders and meeting its renewable energy goals; assist Hawaiian Electric in meeting the Hawaii Renewable Portfolio Standard goals; and improve future electrical generation on Oahu.

The electricity produced by the SGSP would normally supply power to all Hawaiian Electric customers through the island-wide electrical grid. During outages that meet the criteria specified in the Operating Agreement, SGSP output would first be provided to Army facilities at Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia up to their peak demand of 32 MW, to meet their missions, and would additionally support the grid up to the station's full capacity. If there were a full island outage, the power plant could be used to restart other plants on the island.

Under the No Action Alternative, the Army would not lease the property or grant the easement and Hawaiian Electric would not construct and operate the SGSP.

The DEIS evaluates the impacts on land use; airspace use; visual resources; air quality, including climate and greenhouse gasses; noise; traffic and transportation; water resources; geology and soils; biological resources; cultural resources; hazardous and toxic substances; socioeconomics, including environmental justice; and utilities and infrastructure.

Impacts were assessed assuming full-time operation of the generating facility (24 hours a day, 365 days a year). Under normal conditions, the facility would likely operate less than full-time, so projected impacts could be less.

Anticipated impacts would be less than significant for all resources. All activities would fall within existing regulations, permits, and plans. Best management practices and design measures that would avoid or minimize adverse effects would be implemented for these resources: visual, air quality, noise, traffic and transportation, water, geology and soils, biological resources, cultural resources, and hazardous and toxic substances.

All government agencies, special interest groups, and individuals are invited to attend the public meetings and/or submit their comments in writing. Information on the dates, times, and locations of the public meetings will be published locally.

The DEIS is available for review at the Sergeant Rodney J. Yano Main Library (on Schofield Barracks); Fort Shafter Library; Wahiawa Public Library; Mililani Public Library; Waialua Public Library; University of Hawaii libraries including Thomas H. Hamilton Library, Edwin H. Mookini Library, Maui College Library, and Kauai Community College Library; Hawaii State libraries including Kaimuki Regional Library, Kaneohe Regional Library, Pearl City Regional Library, Hawaii Kai Regional Library, Hilo Regional Library, Kahului Regional Library, and Lihue Regional Library, and the Hawaii State Library Documents Center; the Legislative Reference Bureau Library; and the City and County of Honolulu Department of Customer Services Municipal Library. The DEIS can also be viewed at the following Web site: *http://www.garrison.hawaii.army.mil/schofieldplant.*

Brenda S Bowen,

Army Federal Register Liaison Officer.

[FR Doc. 2015–09518 Filed 4–23–15; 8:45 am]

BILLING CODE 3710–08–P

DEPARTMENT OF DEFENSE

Department of the Army

Army Education Advisory Subcommittee Meeting Notice

AGENCY: Department of the Army, DoD.

ACTION: Notice of open Subcommittee meeting.

SUMMARY: The Department of the Army is publishing this notice to announce the following Federal advisory committee meeting of the Defense Language Institute Foreign Language Center Board of Visitors, a subcommittee of the Army Education Advisory Committee. This meeting is open to the public.

DATES: The Defense Language Institute Foreign Language Center (DLIFLC) Board of Visitors Subcommittee will meet from 8:00 a.m. to 5:00 p.m. on June 10 and 11, 2015.

ADDRESSES: Defense Language Institute Foreign Language Center, Building 326, Weckerling Center, Presidio of Monterey, CA 93944.

FOR FURTHER INFORMATION CONTACT: Dr. Robert Savukinas, the Alternate Designated Federal Officer for the subcommittee, in writing at Defense Language Institute Foreign Language Center, ATFL–APAS–AA, Bldg. 634, Presidio of Monterey, CA 93944, by email at *robert.savukinas@dliflc.edu,* or by telephone at (831) 242–5828.

SUPPLEMENTARY INFORMATION: The subcommittee meeting is being held under the provisions of the Federal Advisory Committee Act of 1972 (5 U.S.C., Appendix, as amended), the Government in the Sunshine Act of 1976 (5 U.S.C. 552b, as amended), and 41 CFR 102–3.150.

Purpose of the Meeting: The purpose of the meeting is to provide the subcommittee with briefings and information focusing on the Institute's goal for its students to achieve 2+/2+ scores on the Defense Language Proficiency Test (DLPT). The subcommittee will also receive an update on the Institute's accreditation and will address administrative matters.

Proposed Agenda: June 10—The subcommittee will receive briefings associated with the 2+/2+ DLPT goal and the Institute's actions in supporting the 2+/2+ goal. The subcommittee will be updated on the Institute's accreditation. The subcommittee will complete administrative procedures and appointment requirements. June 11—The subcommittee will have time to discuss and compile observations pertaining to agenda items. General deliberations leading to provisional findings will be referred to the Army Education Advisory Committee for deliberation by the Committee under the open-meeting rules.

Public Accessibility to the Meeting: Pursuant to 5 U.S.C. 552b, as amended, and 41 CFR 102–3.140 through 102–3.165, and subject to the availability of space, this meeting is open to the public. Seating is on a first to arrive basis. Attendees are requested to submit their name, affiliation, and daytime phone number seven business days prior to the meeting to Dr. Savukinas, via electronic mail, the preferred mode of submission, at the address listed in the **FOR FURTHER INFORMATION CONTACT** section. Because the meeting of the subcommittee will be held in a Federal Government facility on a military base, security screening is required. A photo ID is required to enter base. Please note that security and gate guards have the right to inspect vehicles and persons seeking to enter and exit the installation. Weckerling Center is fully handicap accessible. Wheelchair access is available on the right side of the main entrance of the building. For additional information about public access

The Maui County Council Boy Scouts of America (BSA) is proposing to construct a new dining hall and related improvements at Camp Maluhia (TMK (2) 3-1-001:028) (Parcel 28) located at Kahakuloa, Maui, Hawaiʻi. The property is owned by the BSA. This new dining facility is intended to replace the existing aging dining hall structure which was originally built in 1938.

Related improvements include upgrades to the fire protection and existing domestic water systems which serve the camp, including the construction of two (2) new water tanks, booster pump system, and associated waterlines which are intended to augment the existing system and bring the system up to current design standards. A portion of the proposed water system improvements will be located on the adjacent State-owned parcel identified as TMK (2) 3-1-001:001 (Parcel 1), which is leased by the BSA. In addition, the Department of Land and Natural Resources, Division of Forestry and Wildlife proposes to construct a new parking lot also on Parcel 1 near the existing Camp Maluhia gravel parking lots for hikers using the Waiheʻe Ridge Trail.

The proposed project will be funded in part, by State and County grant monies. In addition, a portion of the proposed water system improvements and new trail parking lot will be located on Parcel 1, which is State-owned. For these reasons, Chapter 343, Hawaiʻi Revised Statutes (HRS) compliance is required.

OʻAHU (HRS 343)

3. Schofield Generating Station Project 5(e) DEIS & Appendices

Island: Oʻahu
District: Wahiawā
TMK: (1) 7-7-001:001 and 002; (1) 7-3-001:001, 002, 006, 007, 008, 009, 011, 012, 013, 019, 022, and 024; (1) 7-6-001:001 and 006; (1) 9-4-012:001, 003, and 011
Permits: Easements – Army, DLNR; Conservation District authorization – OCCL; Lease – Army; Air Permit (Covered Source and Prevention of Significant Deterioration) – EPA/HDOH; Notice of Proposed Construction or Alteration – FAA; Airport Hazard Area Zone Permit – FAA; Decision and Order – PUC; Excavation Permit – Army; Site Plan Review – Army; Hazardous Waste Generator ID number (construction and operation) – EPA ; Spill Prevention, Control, and Countermeasures Plan (construction and operation) – EPA; Equipment and Materials Handling, including materials disposal – DOT; Energy Information Administration registration – EIA; NPDES for storm water (construction and operation) – HDOH; Permit and/or variance for noise during construction – HDOH; Emergency and Hazardous Chemical Inventory – Army; HDOH; Honolulu Fire Department; Pressure Vessel Installation Permit – Hawaiʻi Department of Labor; Street Usage Permit – DOT; Use and Occupancy Agreement (UOA) – DOT; Approval to Cross State Water – Army Corps of Engineers; Building Permit – Honolulu Department of Planning and Permitting; Flammable and Combustible Liquid Tanks Installation – Honolulu Fire Department; Liquefied Petroleum Gas Tank Installation – Honolulu Fire Department; Licenses to inspect, test, and maintain fire protection system – Honolulu Fire Department; Fire Alarm Systems Acceptance Test Permit – Honolulu Fire Dept.; Fire Plans Review Fee – Honolulu Fire Dept.; Telecommunications License – New Cingular Wireless PCS, LLC
Applicant: Hawaiian Electric, P.O. Box 2750, Honolulu, HI 96840-0001. Contact: Jack Shriver, (808) 543-4088
Approving Agency: Department of Land and Natural Resources , 1151 Punchbowl Street, Room 131, Honolulu, HI 96813. Contact: Carty Chang, (808) 587-0400
Consultant: Tetra Tech, Inc., 1999 Harrison Street, Suite 500, Oakland, CA 94612. Contact: Kristin Shields, (703) 946-3238
Status: Statutory 45-day public review and comment period starts; comments are due by

June 8, 2015. Please send comments to the applicant, approving agency, and consultant.

The Proposed Action is the granting of an 8.13-acre lease and a 2.5-acre easement of U.S. Army land on Schofield Barracks and Wheeler Army Airfield and the granting of an 1.28-acre easement and 0.7-acre conservation district authorization on state land to Hawaiian Electric Company, Inc. to construct, operate, and maintain a 50-megawatt capacity biofuel-capable power generation plant to include associated power poles, high tension power lines, and related equipment and facilities.

The primary purpose of the Proposed Action is two-fold: to provide improved energy security to the U.S. Army Garrison-Hawaiʻi at Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia and to provide new secure, firm, dispatchable, flexible, and renewable energy generation to the grid on Oʻahu, Hawaiʻi.

The needs for the Proposed Action are to increase energy security for the Army and Oʻahu; assist the Army in supporting renewable energy-related laws and Executive Orders and meeting its renewable energy goals; assist Hawaiian Electric in meeting the Hawaiʻi Renewable Portfolio Standard goals; and to improve future electrical generation on Oʻahu.

KAUAʻI (HRS 343)

4. Maxson Single Family Residence 5(e) DEA (AFNSI)

Island: Kauaʻi
District: Hanalei
TMK: (4) 5-9-002:067
Permits: Conservation District Use Application (CDUA), Building Permit
Applicant: Mark J. Maxson and Robert E. Shaw, c/o Walton D.Y. Hong, 3135-A Akahi Street, Līhuʻe, HI 96766. (808) 245-4757
Approving Agency: Board of Land and Natural Resources, P.O. Box 621, Honolulu, HI 96809. Contact: Lauren Yasaka, (808) 587-0386
Consultant: Walton D.Y. Hong, 3135-A Akahi Street, Līhuʻe, HI 96766. (808) 245-4757
Status: Statutory 30-day public review and comment period starts; comments are due by May 25, 2015. Please send comments to the applicant, approving agency, and consultant.

Construction of a two-bedroom, two-bath, single family residence on property situated on the mauka side of Kuhio Highway, Hāʻena, Kauaʻi, Hawaiʻi. The property is identified as Tax Map Key: (4th) 5-9-002-067, and contains 26,371 square feet, more or less. The proposed residence contains an actual development area of 3,492 square feet.

The subject property is within the Limited Subzone of the State Land Use "Conservation" district, which allows the construction of a single family residence with the issuance of a Conservation District Use Permit.

5. Nualolo Cliff Trail Reroute 5(b) FEA (FONSI)

Island: Kauaʻi
District: Waimea
TMK: (4) 1-4-001:014
Permits:
Proposing/Determination Agency: Department of Land and Natural Resources, Division of Forestry and Wildlife, 3060 Eiwa Street, Room 306, Līhuʻe, HI 96766-1875. Contact: Dan Smith, (808) 274-3433
Consultant: Garcia and Associates, 146 Hekili St. Suite 101, Kailua, HI 96734. Contact: Huang-Chi Kuo, (808) 262-1387

AFFIDAVIT OF PUBLICATION

IN THE MATTER OF
Legal Notice

STATE OF HAWAII }
} SS.
City and County of Honolulu }

Doc. Date: APR 2 4 2015 **# Pages:** 1
Notary Name: Patricia K. Reese First Judicial **Circuit**
Doc. Description: Affidavit of Publication

Patricia K. Reese APR 2 4 2015
Notary Signature Date

PATRICIA K. REESE NOTARY PUBLIC Comm. No. 86-467 STATE OF HAWAII

Julie Clark being duly sworn, deposes and says that she is a clerk, duly authorized to execute this affidavit of Oahu Publications, Inc. publisher of The Honolulu Star-Advertiser, MidWeek, The Garden Island, West Hawaii Today, and Hawaii Tribune-Herald, that said newspapers are newspapers of general circulation in the State of Hawaii, and that the attached notice is true notice as was published in the aforementioned newspapers as follows:

Honolulu Star-Advertiser 1 times on:
04/24/2015
MidWeek 0 times on:
The Garden Island 0 times on:
Hawaii Tribune-Herald 0 times on:
West Hawaii Today 0 times on:

Other Publications: 0 times on:

And that affiant is not a party to or in any way interested in the above entitled matter.

Julie Clark

Subscribed to and sworn before me this 24th day of Apr. A.D. 20 15

Patricia K. Reese, Notary Public of the First Judicial Circuit, State of Hawaii
My commission expires: Oct 07, 2018

Ad # 0000747808

PATRICIA K. REESE NOTARY PUBLIC Comm. No. 86-467 STATE OF HAWAII

SP.NO.: _____ L.N.

FOR IMMEDIATE RELEASE

Schofield Generating Station Project draft environmental impact statement available for review

SCHOFIELD BARRACKS, Hawaii – The U.S. Army invites the public to provide input on the draft environmental impact statement for the construction and operation of a 50-megawatt biofuel-capable power generation plant.

The Schofield Generating Station Project would be a source of renewable power that would benefit the Hawaiian Electric Company and Oahu residents by supplying power to the islandwide grid during normal operations. The generating station project would also provide an energy security service for Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia by serving as a backup source of power during power outages.

More information is available in the Notice of Availability published in the Federal Register or online at www.garrison.hawaii.army.mil/schofieldplant.

All individuals and organizations are invited to review and provide comments. Copies are available for review at the Sergeant Rodney J. Yano Main Library on Schofield Barracks; Fort Shafter Library; Wahiawa Public Library; Mililani Public Library; Waialua Public Library; University of Hawaii libraries including Thomas H. Hamilton Library, Edwin H. Mookini Library, Maui College Library, and Kauai Community College Library; Hawaii State libraries including Kalmuki Regional Library, Kaneohe Regional Library, Pearl City Regional Library, Hawaii Kai Regional Library, Hilo Regional Library, Kahului Regional Library, Lihue Regional Library, and the Hawaii State Library Documents Center; the Legislative Reference Bureau Library; and the City and County of Honolulu Department of Customer Services Municipal Library. The environmental impact statement can also be viewed online at www.garrison.hawaii.army.mil/schofieldplant.

During the 45-day public comment period, April 24 to June 8, 2015, the community can participate in public meetings; submit written comments, or both. The public meetings will be held May 20 and 21 as follows:

May 20, 2015
6:30-9 p.m.
Mililani Mauka Elementary School Cafeteria
95-1111 Makaikai St.
Mililani, HI 96789

May 21, 2015
6:30-9 p.m.
Wahiawa District Park Recreation Center
1129 Kilani Ave.
Wahiawa, HI 96786

The meetings will start with informational display viewing at 6:30 p.m., followed by an overview presentation at 7:00 p.m., and an oral comment period from 7:30-9:00 p.m.

Also, individuals may submit written comments by: 1) Email sgspcomments@tetratech.com; 2) Mail to Department of the Army, Directorate of Public Works, United States Army Garrison, Hawaii ATTN: IMHW-PWE (L. Graham), 947 Wright Avenue, Wheeler Army Airfield, Schofield Barracks, Hawaii 96857-5013. Written comments should be sent or postmarked no later than June 8, 2015.

For questions regarding the environmental impact statement public involvement process and meetings, please contact U.S. Army Garrison-Hawaii Public Affairs at (808) 656-3160.
(SA747808 4/24/15)

Media Release

Public Affairs Office
U.S. Army Garrison, Hawaii
(808)656-3154/3160
"Malama na Koa"

Release number: 2015-04-04

FOR IMMEDIATE RELEASE

Army seeks comments on proposed bio-fuel capable power plant

SCHOFIELD BARRACKS, Hawaii (April 24, 2015) — The U.S. Army invites the public to provide input on the draft environmental impact statement (DEIS) for the construction and operation of a 50-megawatt bio-fuel capable power generation plant, here.

Known as the Schofield Generating Station Project, the plant would be constructed, owned, operated and maintained by Hawaiian Electric on an 8.13-acre parcel of land to be leased from the U.S. Army. It would be a secure, inland source of renewable power that would benefit Oahu residents and Hawaiian Electric by supplying power to the islandwide grid during normal operations.

The plant would also provide energy security for Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia by serving as a backup source of power during power outages. Electricity produced from using renewable biofuels would help the Army and the State of Hawaii achieve renewable energy goals.

The DEIS evaluates the impacts of the proposed action and the "no action" alternative on: land use; airspace use; visual resources; air quality, including climate and greenhouse gasses; noise; traffic and transportation; water resources; geology and soils; biological resources; cultural resources; hazardous and toxic substances; socioeconomics, including environmental justice; and utilities and infrastructure. Impacts would be less than significant for all resources, and beneficial effects would be expected for some resources.

All individuals and organizations are invited to review and provide comments on the DEIS. The DEIS and additional project information are available on the U.S. Army Garrison-Hawaii website at www.garrison.hawaii.army.mil/schofieldplant.

The DEIS is also available at the following libraries: Sergeant Rodney J. Yano Main Library, Schofield Barracks; Fort Shafter Library; Wahiawa Public Library; Mililani Public Library; Waialua Public Library; University of Hawaii libraries, to include the Thomas H. Hamilton Library, Edwin H. Mookini Library, Maui College Library, and Kauai Community College Library; Hawaii State libraries, to include the Kaimuki Regional Library, Kaneohe Regional Library, Pearl City Regional Library, Hawaii Kai Regional Library, Hilo Regional Library, Kahului Regional Library, Lihue Regional Library, and the Hawaii State Library Documents Center; the Legislative Reference Bureau Library; and the City and County of Honolulu Department of Customer Services Municipal Library.

- MORE -

During the 45-day public comment period, April 24 to June 8, 2015, the community can participate in public meetings; submit written comments; or both. The public meetings will be held as follows:

May 20, 2015
6:30–9 p.m.
Mililani Mauka Elementary School Cafeteria
95-1111 Makaikai St.
Mililani, HI 96789

May 21, 2015
6:30–9 p.m.
Wahiawa District Park Recreation Center
1129 Kilani Ave.
Wahiawa, HI 96786

The meetings will start with informational display viewing at 6:30 p.m., followed by an overview presentation at 7 p.m., and an oral comment period from 7:30-9 p.m.

Written comments may be submitted via email to sgspcomments@tetratech.com; or via mail to Department of the Army, Directorate of Public Works, United States Army Garrison-Hawaii ATTN: IMHW-PWE (L. Graham), 947 Wright Avenue, Wheeler Army Airfield, Schofield Barracks, Hawaii 96857-5013. All comments must be sent or postmarked no later than June 8, 2015.

For questions regarding the EIS process or comment period, please contact U.S. Army Garrison–Hawaii Public Affairs at (808) 656-3160 or (808) 656-3158.

- 30 -

Media Contacts:

U.S. Army Garrison-Hawaii
Dennis Drake, (808) 656-3154 / cell (808) 226-2706
Stefanie Gardin, (808) 656-3160

Hawaiian Electric
Darren Pai, (808) 543-7753

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Appendix A-4

Draft EIS Comments and Responses

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United States Department of the Interior

U.S. GEOLOGICAL SURVEY
Pacific Islands Water Science Center
1845 Wasp Boulevard, Building 176
Honolulu, Hawaii 96818

Phone: (808) 690-9600/Fax: (808) 690-9599

F001

May 4, 2015

Mr. Brian E. Peck
Chief, Military Planning and Environmental Compliance Branch
Department of the Army
U.S. Army Engineer District, Mobile District
Corps of Engineers
P.O. Box 2288
Mobile, Alabama 36628-0001

Dear Mr. Peck:

Subject: Draft Environmental Impact Statement (DEIS) for the Schofield Generating Station Project, U.S. Army Garrison, Hawaii

Thank you for forwarding the subject DEIS for review and comment by the staff of the U.S. Geological Survey Pacific Islands Water Science Center. We regret however, that due to prior commitments and lack of available staff, we are unable to review this document.

We appreciate the opportunity to participate in the review process.

Sincerely,

Stephen S. Anthony
Center Director

August 6, 2015

Mr. Stephen S. Anthony
Center Director
Pacific Islands Water Science Center
U.S. Geological Survey
United States Department of the Interior
1845 Wasp Boulevard, Building 176
Honolulu, HI 96818

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. Anthony:

Thank you for your letter concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

Your letter has been assigned identification number F001 and will be included, along with this response letter, in appendix A of the final EIS.

We understand that your staff was unavailable to review the SGSP draft EIS due to other commitments, and we appreciate your taking the time to provide a comment letter. We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources

Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

DEPARTMENT OF THE ARMY
HONOLULU DISTRICT, U.S. ARMY CORPS OF ENGINEERS
FORT SHAFTER, HAWAII 96858-5440

F002

May 18, 2015

SUBJECT: Draft Environmental Impact Statement for the Schofield Generating Station Project in Honolulu, Honolulu County, Island of Oahu, Hawaii; POH-2015-00076

IMHW-PWE (L. Graham)
947 Wright Avenue
Wheeler Army Airfield
Schofield Barracks, HI 96857

Dear Mr. Graham:

In response to your letter dated April 15, 2015 requesting comments for the Draft Environmental Impact Statement for the Schofield Generating Project, U.S. Army Garrison, Hawaii, the following information is provided for your consideration.

Please be advised, if the proposed project involves work in waters of the U.S., a Department of the Army (DA) authorization may be required. Under Section 10 of the Rivers and Harbors Act, structures and/or work in or affecting the course, location, condition, or capacity of navigable waters of the U.S. require DA authorization. Navigable waters of the U.S. are waters subject to the ebb and flow of the tide. Under Section 404 of the Clean Water Act, DA authorization is required for discharges of dredged or fill material into waters of the U.S., including wetlands. Generally, discharges of fill include materials that change the bottom elevation of a water of the U.S. and include rock, sand, soil, debris, overburden, etc. Waters of the U.S. include navigable waters of the U.S. and other waters including wetlands, rivers, streams, lakes, and ponds.

Based on the information you provided, it appears your proposed project may require work within the Waikele and Kiikii watersheds and within the Waikele Stream and may result in the discharge of fill material into these watersheds and the Waikele Stream. Therefore, in accordance with Section 404 you may need to obtain a DA permit from this office prior to commencing your proposed work. Accordingly, we recommend the continued coordination of the development of this project with our office. For your convenience a permit application is enclosed.

Thank you for your cooperation with the Honolulu District Regulatory Program. Should you have any questions related to this determination, please contact Rebecca Frager of my staff at 808-835-4307 or via e-mail at Rebecca.M.Frager@usace.army.mil. You are encouraged to provide comments on your experience with the Honolulu District Regulatory Office by accessing our web-based customer survey form at http://corpsmapu.usace.army.mil/cm_apex/f?p=136:4:0.

Sincerely,

Michelle Lynch

Michelle Lynch
Chief, Regulatory Office

Andrews, Emmy

From: Frager, Rebecca M POH <Rebecca.M.Frager@usace.army.mil>
Sent: Monday, May 18, 2015 2:33 PM
To: DIV.SGSP Comments
Subject: Comment Letter for Schofield Generating Station POH-2015-00076 (UNCLASSIFIED)
Attachments: comment letter signed.pdf; POH_Permit_Application_mar2015_fillable.pdf

Classification: UNCLASSIFIED
Caveats: NONE

Dear Mr. Graham

Please see the attached letter commenting on the Draft EIS for the proposed Schofield Generating Station Project in Honolulu, Honolulu County, Island of Oahu, Hawaii. We have assigned your project Department of the Army (DA) File Number: POH-2015-00076. Please use this number in all future correspondence regarding this project.

Please also see the attached Permit Application to be used in requesting a DA Permit. If you have any questions or comments or if there are any problems with the attachments, please don't hesitate to call me at: 808-835-4307 or reply to this email at: Rebecca.M.Frager@usace.army.mil.

Thank you for your cooperation with the permitting process.

Becca Frager
Biologist
U.S. Army Corps of Engineers
Honolulu District Regulatory Office
Building 230
Fort Shafter, HI 96858-5440
Phone: 808-835-4307

Classification: UNCLASSIFIED
Caveats: NONE

Department of the Army
Permit Application

Date Received by CEPOH-RO

U.S. Army Corps of Engineers Honolulu District	**Send Completed Application to:** Honolulu District, U.S. Army Corps of Engineers Regulatory Office [CEPOH-RO] Building. 230 Fort Shafter, Hawaii 96858-5440 or email to: CEPOH-RO@usace.army.mil
DA File Number	

(1) APPLICANT AND LANDOWNER CONTACT INFORMATION

	Applicant	Property Owner (if different)	Authorized Agent (if applicable) ☐ Consultant ☐ Contractor
Contact Name Business Name Mailing Address 1 Mailing Address 2 City, State, Zip			
Business Phone Cell Phone Fax Email			

(2) PROJECT INFORMATION

A. Provide the project location.

Project Name	Tax Map Key (TMK):	Latitude and Longitude
Project Address / Location	City (nearest)	County
Brief Directions to the Site		

B. What types of waterbodies or wetlands are present in your project area? (Check all that apply.)

☐ River / Stream	☐ Non-Tidal Wetland	☐ Lake / Reservoir / Pond
☐ Estuary or Tidal Wetland	☐ Other	☐ Pacific Ocean

Waterbody or Wetland Name**	River Mile	Watershed	Island

C. Indicate the project category. (Check all that apply.)

☐ Commercial Development	☐ Industrial Development	☐ Residential Development
☐ Institutional Development	☐ Agricultural	☐ Recreational
☐ Transportation	☐ Restoration	☐ Bank Stabilization
☐ Dredging	☐ Utility lines	☐ Survey or Sampling
☐ In- or Over-Water Structure	☐ Maintenance	☐ Other:

* In decimal format (e.g., 44.9399, -123.0283)
** If there is no official name for the wetland or waterway, create a unique name (such as “Wetland 1” or “Tributary A”).

(3) PROJECT PURPOSE AND NEED

Provide a statement of the purpose and need for the overall project.

(4) DESCRIPTION OF RESOURCES IN PROJECT AREA

A. Describe the existing physical and biological characteristics of each wetland or waterway. Reference the wetland and waters delineation report if one is available. Include the list of items provided in the instructions. Submit the biological survey with the application if one has been completed.

B. Describe the existing navigation, fishing and recreational use of the waterway or wetland.

(5) PROJECT SPECIFIC CRITERIA AND ALTERNATIVES ANALYSIS

Describe project-specific criteria necessary to achieve the project purpose. Describe alternative sites and project designs that were considered to avoid or minimize impacts to the waterway or wetland.

(6) PROJECT DESCRIPTION

A. Briefly summarize the overall project including work in areas both in and outside of waters or wetlands.

B. Describe work within waters and wetlands.

C. Construction Methods including any temporary work required, equipment/materials necessary, staging/access locations, location of stockpiles. Describe best management practices i.e. how the activities will be accomplished while minimizing impacts to waters and/or wetlands.

D. Describe source of fill material and disposal locations if known.

(6) PROJECT DESCRIPTION

E. Construction sequence and timeline.

What is the estimated project start date?

What is the estimated project completion date?

Is any of the work underway or already complete? ☐ Yes ☐ No
If yes, describe.

F. Fill Volumes and Dimensions (if more than 4 impact sites, include a summary table as an attachment)

Wetland / Waterbody Name *	Fill Dimensions					Duration of Impact**	Material***
	Length (ft.)	Width (ft.)	Depth (ft.)	Area (sq.ft. or ac.)	Volume (c.y.)		

G. Total Fill Volumes and Dimensions

Fill Impacts to Waters	Length (ft.)	Area (sq. ft or ac.)	Volume (c.y.)
Total Fill to Wetlands			
Total Fill Below Ordinary High Water			
Total Fill Below High Tide Line			
Total Fill Below Mean High Water Tidal Elevation			

H. Removal Volumes and Dimensions (if more than 4 impact sites, include a summary table as an attachment)

Wetland / Waterbody Name*	Removal Dimensions					Duration of Impact**	Material***
	Length (ft.)	Width (ft.)	Depth (ft.)	Area (sq. ft. or ac.)	Volume (c.y.)		

I. Dredging Volumes and Dimensions

Dredging Impacts to Waters	Length (ft.)	Depth (ft.)	Width (ft.)	Volume (c.y.)
Total Dredging Seaward of Mean High Water Tidal Elevation				

* If there is no official name for the wetland or waterway, create a unique name (such as “Wetland 1” or “Tributary A”).
** Indicate the days, months or years the fill or removal will remain. Enter “permanent” if applicable.
*** Example: soil, gravel, wood, concrete, pilings, rock etc.
****If the High Tide Line is not observable in the field, the Mean Higher High Water Elevation may be acceptable.

(7) ADDITIONAL INFORMATION

Are there any federally listed species under the Endangered Species Act on the project site?	☐ Yes	☐ No	☐ Unknown
Is the project site within designated or proposed critical habitat identified under the Endangered Species Act?	☐ Yes	☐ No	☐ Unknown
Is the project site within the 100-year floodplain?	☐ Yes	☐ No	☐ Unknown

*** If yes to listed species or critical habitat, submit a biological assessment with application if one has been prepared or explain in Block 4 and describe measures to minimize adverse effects to these resources in Block 5.**

Is the project site within a State or Federal marine managed area? (i.e. Marine Life Conservation Dist., Wildlife Sanctuary, or Fishery Management Area, etc.)	☐ Yes	☐ No	☐ Unknown
Will the overall project involve construction dewatering or ground disturbance of one acre or more? *** If yes, you may need an NPDES permit.**	☐ Yes	☐ No	☐ Unknown
Is the fill or dredged material a carrier of contaminants from on-site or off- site spills?	☐ Yes	☐ No	☐ Unknown
Has the fill or dredged material been physically and/or chemically tested? ***If yes, explain in Block 4 and provide references to any physical/chemical testing report(s).**	☐ Yes	☐ No	☐ Unknown
Are there known Cultural Resources in the project area? Has coordination with the State Historic Preservation Division occurred (or 6E completed)? *** If yes, provide a copy of any surveys and/or 6E with this application.**	☐ Yes	☐ No	☐ Unknown

Identify any other federal agency that is funding, authorizing or implementing the project.

Agency Name	Contact Name	Phone Number	Most Recent Date of Contact

List other certificates or approvals/denials required or received from other federal, state or local agencies for work described in this application. For example, certain activities that require a Department of Army permit also require 401 Water Quality Certification.

Approving Agency	Certificate/ approval / denial description	Date Applied

Other U.S. Army Corps of Engineers (Corps) Actions associated with this site? (Check all that apply)

☐ Work proposed on or over lands owned by or leased from the Corps

Other Corps Permits Corps #

☐ Violation for Unauthorized Activity Corps #

☐ Wetland and Waters Delineation Corps #

- ☐ A wetland / waters delineation has been completed (if so, provide a copy with the application)
- ☐ The Corps has approved the wetland / waters delineation within the last 5 years

(8) IMPACTS, RESTORATION/REHABILITATION, COMPENSATORY MITIGATION

A. Describe unavoidable environmental impacts that are likely to result from the proposed project. Include permanent, temporary, direct, and indirect impacts.

B. For temporary removal or fill or disturbance of vegetation in waterways, wetlands or riparian (i.e., streamside) areas, discuss how the site will be restored after construction.

Compensatory Mitigation

☐ Permittee-responsible Onsite Mitigation

☐ Permittee-responsible Offsite mitigation

D. Provide a brief description of mitigation approach and the rationale for choosing that approach. If you believe mitigation should not be required, explain why.

(9) ADJACENT PROPERTY OWNERS FOR PROJECT AND MITIGATION SITE		
☐ Pre-printed mailing labels of adjacent property owners attached	Project Site Adjacent Property Owners	Mitigation Site Adjacent Property Owners

Contact Name
Address 1
Address 2
City, State ZIP Code

Contact Name
Address 1
Address 2
City, State ZIP Code

Contact Name
Address 1
Address 2
City, State ZIP Code

Contact Name
Address 1
Address 2
City, State ZIP Code

Contact Name
Address 1
Address 2
City, State ZIP Code

Contact Name
Address 1
Address 2
City, State ZIP Code

Contact Name
Address 1
Address 2
City, State ZIP Code

Contact Name
Address 1
Address 2
City, State ZIP Code

(10) List of Other Certificates or Approvals/Denials received from other Federal, State, or Local Agencies for Work Described in This Application.					
Agency	Approval Type	Number	Date Applied	Date Approved	Date Denied

(11) SIGNATURES	
Application is hereby made for the activities described herein. I certify that I am familiar with the information contained in the application, and, to the best of my knowledge and belief, this information is true, complete and accurate. I further certify that I possess the authority to undertake the proposed activities. I hereby authorize the person identified in the authorized agent block below to act in my behalf as my agent in the processing of this application and to furnish supplemental information in support of this permit application. I understand that the granting of other permits by local, county, state or federal agencies does not release me from the requirement of obtaining the permits requested before commencing the project.	
Applicant Signature	
Print Name	Title
Signature	Date
Authorized Agent Signature	
Print Name	Title
Signature	Date
Landowner Signature(s)	
Landowner of the Project Site (if different from applicant)	
Print Name	Title
Signature	Date
Landowner of the Mitigation Site (if different from applicant)	
Print Name	Title
Signature	Date

(12) ATTACHMENTS

- ☐ **Drawings (items in bold are required)**
  - ☐ **Location map with roads identified**
  - ☐ **U.S.G.S topographic map**
  - ☐ **Tax lot map**
  - ☐ **Site plan(s)**
  - ☐ **Cross section drawing(s)**
  - ☐ **Recent aerial photo**
  - ☐ Project photos
  - ☐ Erosion and Pollution Control Plan(s), if applicable
- ☐ Pre-printed labels for adjacent property owners (Required if more than 5)
- ☐ Restoration plan or rehabilitation plan for temporary impacts
- ☐ Alternatives analysis
- ☐ Biological assessment (if requested by Corps project manager during pre-application coordination.)
- ☐ Other:
  - ☐
  - ☐

INSTRUCTIONS FOR PREPARING THE PERMIT APPLICATION

General Instructions and Tips

- Provide the information in the appropriate blocks of the application form. If you need more space, provide a summary in the space provided and attach additional detail as an appendix to the application.
- Not all items on the application form will apply to all projects.
- For most applications, binding and section dividers are not necessary and require additional handling.

The information requested on the form is necessary for the agency to begin the review. For complex projects or for those that may have more than minimal impacts, additional information may be necessary to complete the evaluation and make a permit decision. Alternative forms of permit applications may be acceptable; contact the Corps for more information.

Section 1. Applicant and Landowner Contact information

Applicant: The applicant is the responsible party. If the applicant is an agency, business entity or other organization, indicate the name of the organization and a person that has the authority to sign the application.
Authorized Agent: An authorized agent is someone who has permission from the applicant to represent their interests and supply information to the agencies. An agent can be a consultant, an attorney, builder, contractor, or any other person or organization. An authorized agent is optional.
Landowner: Provide landowner information if different from the applicant. The landowner must also sign the application.

Section 2. Project Information

Provide location information. Latitude and longitude can be found by zooming in to your respective project location and reading off the coordinates displayed on the bottom of the map on Google earth.
Provide information on wetlands and waterways within the project area. Indicate the category of activities that make up your project.

Section 3. Project Purpose and Need

Explain the purpose and need for the project. Also include a brief description of any related activities needed to accomplish the project objectives.

Section 4. Description of Resources in Project Area

For each wetland, include:

- Whether the wetland is freshwater or tidal, and the Cowardin class and Hydrogeomorphic (HGM) class.
- Source of hydrology and direction of flow (if any).
- Dominant plant species by layer (herb, shrub, tree).
- Refer to wetland delineation report if available, and provide copies to the agency (if not previously provided).
- Describe existing uses, including fish and wildlife use (type, abundance, period of use, significance of site).

For rivers, streams, other waterways, lakes and ponds, include a description of, as applicable:

- Streamflow regime (e.g., perennial year-round flow, intermittent seasonal flow, ephemeral event-driven flow). If flow is ephemeral, provide a stream flow assessment or other information that supports your determination.
- Field indicators used to identify the Ordinary High Water Mark (OHWM).
- Channel and bank conditions.
- Type and condition of riparian (streamside) vegetation.
- Channel morphology (structure and shape).
- Stream substrate.
- Assessment of the functional attributes including hydrologic, geomorphic, biological and chemical and nutrient related functions.
- Fish and wildlife (type, abundance, period of use, significance of site).

Section 5. Alternatives to Avoid and Minimize Impacts to Waters

Provide a brief explanation describing how impacts to waters and wetlands are being avoided and minimized on the project site. The alternatives analysis must include:

- Project-specific criteria that are needed to accomplish the stated project purpose.
- A range of alternative sites and designs that were considered with less impact.
- An evaluation of each alternative site and design against the project criteria and a reason for why the alternative was not chosen.
- If the project involves fill in an estuary for a non-water dependent use, a description of Alternative non- estuarine sites must be included.

Section 6. Project Description

Overall Description. Provide a brief description of the overall project, including:

- All associated work with the project both outside and within waters or wetlands.
- Include both temporary and permanent work.
- Total ground disturbance for all associated work (i.e., area and volume of ground disturbance).
- Total area of impervious surfaces created or modified by the project, if applicable.

Work within Waters and Wetlands. Provide a description of the proposed work within waters and wetlands, including:

- Each removal or fill activity proposed in waters or wetlands, as well as any construction or maintenance of in-water or over-water structures.
- The number and dimensions of in-water or over-water structures (i.e., pilings, floating docks) proposed within waters or wetlands.

Fill Material and Disposal. Provide a description of fill material and procedure for disposal of removed material, including:

- The source(s) of fill materials (if known).
- Locations for disposal area(s) for dredged material, if applicable. If dredged material is to be discharged on an upland site, identify the site and the steps to be taken (if necessary) to prevent runoff from the dredged material back into a waterbody.

Construction Methods. Describe how the removal and/or fill activities will be accomplished including the following:

- Construction methods, equipment to be used, access and staging areas, etc.
- Measures you will use during construction to minimize impacts to the waterway or wetland. Examples may include isolating work areas, controlling construction access and using specialized equipment or materials. Attach work area isolation and/or erosion and pollution control plans, if applicable.

Construction Timing. Provide the proposed start and completion date for the project. Describe project work that is already complete, if applicable.

Summary of removal and fill activities. Summarize the dimensions, volume and type/composition of material being placed or removed in each waterbody or wetland. Describe each impact on a separate row. For instance, if two culverts are being removed from Clear Creek, use two rows. Add extra rows if needed, or include an attachment.

Section 7. Additional Information

Any additional information you provide helps the reviewer(s) understand your project and the other approvals or reviews that may be required. Is the project located within any of the following:

Wetlands, mudflats, vegetated shallows/seagrass beds, coral reefs, riffle and pool complexes?

Section 8. Site Restoration/Rehabilitation and Compensatory Mitigation

Site Restoration/Rehabilitation. For temporary disturbance of soils and/or vegetation in waterways, wetlands or riparian (streamside) areas, discuss how you will restore the site after construction. This may include the following:

- Grading plans to restore pre-existing elevations.
- Planting plans and species list (native species only) to replace vegetation in riparian or wetland areas.
- Maintenance and monitoring plans to document restoration to wetland condition and/or vegetation establishment.
- Associated erosion control for site stabilization.

Compensatory Mitigation. Describe your proposed compensatory mitigation approach, or explain why you believe compensatory mitigation is not required. If proposing permittee-responsible mitigation for permanent impact to wetlands, see 33 CFR 332.4(c) for plan requirements. For permanent impact to waters other than wetlands, 33 CFR 332.4(c) for plan requirements.

Section 9. Adjacent Property Owners for Impact and Mitigation Site(s)

Names and addresses for properties that are adjacent to the project site and permittee responsible mitigation site (if applicable), are required. "Adjacent" means those properties that share or touch upon a common property line or are across the street or stream. If more than 5, attach pre-printed labels.

Section 10. **List of Other Certificates or Approvals/Denials received from other Federal, State, or Local Agencies for Work Described in This Application.**

Section 11. Signatures

The application must be signed by the responsible party, landowner and agent, as identified in section 1.

Section 12: Attachments

Project Drawings. A complete application must include a location map, site plan, cross-section drawings and recent aerial photo (See examples). All drawings should be clear, legible and formatted for 8.5 by 11 printing. Larger drawings may be submitted in addition to the 8.5 by 11 size. Use the fewest number of sheets necessary for your drawings or illustrations. While illustrations need not be professionally prepared, they should be clear, accurate, and contain all necessary information, as follows:

Location maps (with subject property identified):

- Location map with roads identified
- U.S.G.S. Topographic map
- Tax lot map (with subject tax lot(s) identified)

Site plan(s), including:

- Entire project site and activity areas
- Existing and proposed contours
- Location of ordinary high water, wetland boundaries or other jurisdictional boundaries (include wetland delineation report if not previously provided)
- Identification of temporary and permanent impact areas within waterways or wetlands
- Map scale or dimensions and north arrow
- Location of staging areas and construction access
- Location of cross section(s), as applicable
- Location of mitigation area, if applicable

Cross section drawing(s), including:

- Existing and proposed elevations
- Identification of temporary and permanent impact areas within waterways or wetlands
- Ordinary high water and/or wetland boundary or other jurisdictional boundaries
- Map scale or dimensions

Recent Aerial photo

- 1:200, or if not available for your site, highest resolution possible.

August 6, 2015

Ms. Michelle Lynch
Chief
Regulatory Office
Honolulu District, U.S. Army Corps of Engineers
Department of the Army
Fort Shafter, HI 96858-5440

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Ms. Lynch:

Thank you for your letter concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

Your letter has been assigned identification number F002 and will be included, along with this response letter, in appendix A of the final EIS.

The Army and Hawaiian Electric understand that any work that would result in a discharge of fill material to a water of the United States would require a section 404 permit. As described in section 3.7 of the draft EIS, construction would occur near the Waikele Stream and the South Fork of the Kaukonahua Stream, but no fill would be discharged to those waters of the United States and best management practices would be used to control stormwater runoff and erosion. Therefore, it is anticipated that the proposed project would not require a section 404 permit. Hawaiian Electric would, however, upon completion of the final design for the SGSP, make a final determination as to whether a section 404 permit is necessary and would apply for and obtain one if required.

We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

F003

JUN 0 8 2015

Department of the Army
Directorate of Public Works
United States Army Garrison, Hawaii
ATTN: IMHW-PWE (L. Graham)
947 Wright Avenue
Wheeler Army Airfield
Schofield Barracks, Hawaii 96857-5013

Subject: Draft Environmental Impact Statement for the Schofield Generating Station Project, United States Army Garrison, Schofield Barracks, Hawaii (CEQ# 20150108)

Dear Ms. Graham:

F003a

The U.S. Environmental Protection Agency has reviewed the Draft Environmental Impact Statement for the Schofield Generating Station Project pursuant to the National Environmental Policy Act, Council on Environmental Quality regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act.

The EPA supports the U.S. Army's goals of improving energy security and increasing renewable energy generation at Army facilities. Accelerating the development of renewable resources and the deployment of clean energy technologies in Hawaii will help the state meet its energy demand, reduce dependence on imported oil, create new jobs, and provide for increased energy security, while reducing greenhouse gas emissions. EPA understands that the proposed Schofield Generating Station Project (SGSP) would result in the construction and operation of a 50 megawatt capacity biofuel-capable power generation plant that would operate on biofuel or a mix of biofuel and either diesel or liquefied natural gas (LNG). As such, it would be a potential source of renewable power that would provide energy security to Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia in the event that service is lost from normal sources supporting these facilities, while providing Hawaiian Electric Company with a quick-starting facility in a secure location away from the coastline.

Based on our review of the DEIS, we have rated the proposed project and the document *as Environmental Concerns – Insufficient Information* (EC-2). Please see enclosed *Summary of EPA Rating Definitions*. While the air quality analysis in the DEIS includes emissions estimates for criteria pollutants, hazardous air pollutants, and greenhouse gases for three different SGSP operating scenarios based on different fuel mixes, it does not include emission estimates for construction, mobile sources, or ground disturbance. In addition, the DEIS does not address the issue of sustainability, as it pertains to biofuels. Using biofuels has the potential to reduce greenhouse gas emissions, but only if the biofuels are developed in a sustainable manner.

We recommend that the Army provide, in the Final EIS, an updated air quality analysis that includes estimates for construction emissions. We also recommend that the Final EIS provide additional information on biofuels, including measures to ensure that feedstocks are grown and converted into fuel in a sustainable manner. Our detailed comments are enclosed.

We appreciate the opportunity to review this DEIS, and are available to discuss our comments. When the Final EIS is released for public review, please send one hard copy and one CD-ROM to the address above (Mail Code: ENF-4-2). If you have any questions, please contact me at 415-972-3521, or contact Ann McPherson, the lead reviewer for this project. Ann can be reached at 415-972-3545 or mcpherson.ann@epa.gov.

Sincerely,

Kathleen Martyn Goforth, Manager
Environmental Review Section

Enclosures: Summary of the EPA Rating System
EPA's Detailed Comments

SUMMARY OF EPA RATING DEFINITIONS*

This rating system was developed as a means to summarize the U.S. Environmental Protection Agency's (EPA) level of concern with a proposed action. The ratings are a combination of alphabetical categories for evaluation of the environmental impacts of the proposal and numerical categories for evaluation of the adequacy of the Environmental Impact Statement (EIS).

ENVIRONMENTAL IMPACT OF THE ACTION

"LO" (Lack of Objections)

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

"EC" (Environmental Concerns)

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

"EO" (Environmental Objections)

The EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

"EU" (Environmentally Unsatisfactory)

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

ADEQUACY OF THE IMPACT STATEMENT

"Category 1" (Adequate)

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

"Category 2" (Insufficient Information)

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analysed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

"Category 3" (Inadequate)

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analysed in the draft EIS, which should be analysed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640, Policy and Procedures for the Review of Federal Actions Impacting the Environment.

U.S. EPA DETAILED COMMENTS ON THE SCHOFIELD GENERATING STATION PROJECT, DRAFT ENVIRONMENTAL IMPACT STATEMENT, UNITED STATES ARMY GARRISON, SCHOFIELD BARRACKS, HAWAII, JUNE 8, 2015

Sustainability of Biofuels

F003b

The Draft Environmental Impact Statement (DEIS) indicates that the Schofield Generating Station Project (SGSP) would be capable of using several types of fuels, including locally produced biofuels, if and when they become available (pg. 4-8), but it does not discuss the sustainability of biofuels as a feedstock for the facility. Life cycle emissions, including greenhouse gases (GHG), from biofuel are generally much lower than from fossil fuel;[1] however, the benefits of biofuels are only fully realized if the fuels are developed in a sustainable manner. Otherwise, the net benefits may be diminished by the impacts on water, soil, biodiversity, air, habitats, and waste generation that can result from the cultivation of crops for biofuel.

Assessing the net effect of a biofuel on GHG emissions requires analysis of emissions throughout the biofuel's life cycle, including: planting and harvesting the crop; processing the feedstock; transporting the feedstock and final fuel; and storing, distributing and retailing the biofuel. Critical factors related to the agricultural production process include fertilizer and pesticide use, irrigation technology, and soil treatment. Land-use changes associated with expanded biofuel production can also have a major impact. It is important to note that lifecycle emissions of biodiesel vary according to feedstock, with biodiesel produced from waste grease resulting in lower net GHG emissions than those produced from soybeans. The DEIS does not discuss lifecycle emissions of biofuels, diesel, or liquefied natural gas (LNG).

In 2007, the Hawaiian Electric Company and the Natural Resources Defense Council joined in developing an environmental policy to guide the utility's procurement of biofuel from sustainable produced feedstock. Revised in 2013, the policy[2] asserts that a transition from petroleum fuels to biofuels derived from sustainably-produced and, preferably, locally-sourced feedstock offers enormous potential for near-term, dramatic reductions in GHG emissions and increased security from continuing oil market price hikes and potential supply interruptions. Under the revised policy, Hawaiian Electric will purchase biofuels only from suppliers that comply with RSB[3] Principles & Criteria for agricultural, end-of-life[4] and waste water[5] feedstock or similar certifications. The DEIS does not mention this policy.

> *Recommendations:*
> Discuss, in the Final Environmental Impact Statement, the issue of sustainability as it relates to biofuels that may be used in the proposed facility. Include consideration of biofuels produced in Hawaii, as well as biofuels produced elsewhere, since either may be used in the SGSP.

---

[1] IPCC, 2011: IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation. Prepared by Working Group III of the Intergovernmental Panel on Climate Change. See internet address: http://srren.ipcc-wg3.de/report/ , pp. 732 and 734, figures 9.8 and 9.9.

[2] See internet address: https://www.hawaiianelectric.com/vcmcontent/StaticFiles/pdf/HECO-NRDC_Biodiesel_Policy.pdf

[3] In March 2011, the Roundtable on Sustainable Biomaterials (formally the Roundtable on Sustainable Biofuels "RSB") launched a global, universal sustainability standard which describes the requirements for sustainably-produced biofuels and biomass.

[4] End-of-life products include Municipal Solid Waste and Used Cooking Oil.

[5] Waste water includes greases, fats, and any other lipid-rich material, which can be transformed into biodiesel, as well as starchy material or cellulosic elements, which can be used to produce bioethanol.

Include, in the Final EIS, a lifecycle analysis of GHG emissions associated with biofuels, diesel, and LNG.

Discuss, in the Final EIS, the environmental policy for Hawaiian Electric Company's procurement of biofuel from sustainably produced feedstock, and how the U.S. Army and/or Hawaiian Electric would ensure that biofuel used in the SGSP would be produced sustainably.

Consider incorporating into the project a commitment by the Army and/or Hawaiian Electric to use a third-party certification system to verify that biofuel feedstocks are grown and converted into fuel in a sustainable manner. Such systems measure and verify environmental performance of fuels throughout all major stages of the product life cycle, including feedstock production, fuel production, and end use, while considering a range of criteria at each stage that address impacts on water, soil, biodiversity, air, land use, and waste.

Air Quality

F003c

Air Emissions from Construction
The DEIS does not provide estimates for air emissions associated with the construction of the SGSP and installation of the transmission lines. Instead, the document states that there will be short-term minor adverse effects that would end when construction ended (pg. 3-30). An evaluation is necessary to ensure compliance with state and Federal air quality regulations and to disclose the potential impacts from temporary or cumulative degradation of air quality.

Recommendations:
In the Final EIS, describe and estimate emissions from potential construction activities, as well as proposed mitigation measures to minimize these emissions. Specify emission sources by pollutant from mobile sources and ground disturbance, including the transport of fuel.

F003d

Air Emissions from the SGSP
Table 3.4-1 in the DEIS presents federal and state air quality standards and the monitored concentrations of criteria pollutants at the monitoring location closest to Schofield Barracks (pg. 3-24). The DEIS does not identify the monitoring location or the time period for monitor data presented in Table 3.4-1.

Recommendation:
Identify, in the Final EIS, the location and time period for monitor data presented in Table 3.4-1.

F003e

In Section 3.4.2.1.2.4, the DEIS states that preliminary modeling inputs, assumptions, and results are contained in Hawaiian Electric's *Prevention of Significant Deterioration & Covered Source Permit Application for the SGSP* and supplemental modeling report (Hawaiian Electric, 2014 a, 2014c). More recent information is available in the PSD & CSP permit application for the SGSP submitted by Hawaiian Electric in January 2015.

Recommendation:
Include, in the Final EIS, a reference to Hawaiian Electric's January 2015 *Prevention of Significant Deterioration & Covered Source Permit Application for the SGSP*.

F003f

Table 3.4-6 in the DEIS presents estimated emissions of criteria pollutants, hazardous air pollutants, and GHGs under three operating scenarios for the SGSP (pg. 3-31). Table 3.4-7 presents estimates for the SGSP's Potential to Emit (PTE) and compares it to PSD Major Source Thresholds. We compared data in these two tables to values presented in Table 2.0-1 of the *Prevention of Significant Deterioration & Covered Source Permit Application for the SGSP (January 2015).* Discrepancies were noted for the following parameters:

	Table 3.4-7	Table 2.0-1
PM_{10}	139.8	130.1
$PM_{2.5}$	139.8	130.1
Lead	0.0	0.03
Fluorides	0.0	0.02
Mercury	0.0	0.002
SO_2	10.1	9.4

Recommendation:
Ensure that the values for PM_{10}, $PM_{2.5}$, lead, fluorides, mercury, and SO_2 are correct in Table 3.4-7. Explain why they differ from those presented in Table 2.0-1 of the PSD/CSP permit application.

F003g

Hawaiian Electric also submitted a *Proposed Schofield Generating Station Weight of Evidence Ambient Air Quality Analysis*, dated January 2015. There were minor differences in the maximum predicted concentrations for PM_{10}, $PM_{2.5}$, and NO_2, compared to the September 2014 submittal.

Recommendation:
Ensure that the values for PM_{10}, $PM_{2.5}$, and NO_2 are correct in the Final EIS.

F003h

Indirect Emission Reductions
According to the DEIS, the operation of the generating station would indirectly reduce the emissions of some criteria pollutants and GHGs by reducing the use of off-post fossil fuel-based electricity (pg. 3-29). Table 3.4-8 indicates that the indirect reductions in regional emissions of SO_2 and GHGs, (and NOx, in the case of LNG) would be beneficial and appreciably greater than direct operational emissions from the proposed SGSP. The DEIS does not define, however, what type of fossil fuel combustion project was used to estimate the emission reductions shown in Table 3.4-8. In addition, the values for SO_2 differ between Tables 3.4-6 and 3.4-8.

Recommendations:
Specify the type of fossil fuel combustion project that was used to calculate the indirect emission reductions shown in Table 3.4-8.

Ensure that the values used for SO_2 emissions are correct in Tables 3.4-6 and 3.4-8. If they differ, explain why.

F003i

Nonbiogenic CO_2e Emissions

In Table 3.4-6, GHG emissions are calculated for six constituents – carbon dioxide, N_2O, methane, total carbon dioxide equivalent, biogenic CO_2e, and nonbiogenic CO_2e. Table 3.4-5 summarizes which operating scenarios provide the highest and lowest levels of emissions for criteria pollutants, HAPs, and GHGs. According to Table 3.4-5, GHG emissions are lowest for 100% biodiesel. According to the GHG data presented in Table 3.4-6, however, only nonbiogenic CO_2e emissions are lowest for 100% biodiesel (pg. 3-31).

Footnote "b" in Table 3.4-5 states that GHGs are net, based on life cycle analysis, including nonbiogenic CO_2e, as reflected in Table 3.4-8 (pg. 3-30). However, a note at the bottom of Table 3.4-8 states that nonbiogenic emissions do not account for increases from transportation, storage, and processing of fuels or other indirect sources of GHGs (pg. 3-35). These two notes seem to be contradictory; therefore, it is unclear whether a lifecycle analyses has been completed for any component of the fuel system.

> *Recommendations:*
> Clarify, in the Final EIS, whether the values utilized in Table 3.4-5 for GHGs represent only nonbiogenic CO_2e emissions or all CO_2e emissions.
>
> Clarify whether a lifecycle analysis has been completed for biodiesel, diesel, or LNG, and if so, whether the lifecycle analyses included biogenic CO_2e and/or nonbiogenic CO_2e.
>
> Ensure that footnote "b" in Table 3.4-5 and the note at the bottom of Table 3.4-8 regarding nonbiogenic emissions are correct. Revise if necessary.

F003j

Biogenic CO_2e emissions

According to the DEIS, it is generally understood that GHG emissions from the burning of biogenic fuels do not increase the total amount of GHGs in the Earth's atmosphere and, therefore, do not contribute to global warming as much as the burning of fossil fuels (pg. 3-28). The DEIS acknowledges that there are often indirect CO_2 emissions and changes in carbon sequestration from land use changes if the energy consumption for harvesting or production of biofuels is included in the analysis. In addition, transportation, storage, and processing of biofuel also have some amount of CO_2 emissions. The DEIS mentions that EPA is studying the effects of these and other factors to more accurately account for biogenic CO_2 emissions from stationary sources and includes a reference for EPA's 2011 report, *Draft Accounting Framework for Biogenic Carbon Dioxide (CO_2) Emissions from Stationary Sources*.

More up to date information is available. In November 2014, the EPA released a second draft of the technical report, *Framework for Assessing Biogenic CO_2 from Stationary Sources*. This revised report presents a framework for assessing the extent to which the production, processing, and use of biogenic material at stationary sources results in a net atmospheric contribution of biogenic CO_2 emissions. In addition, EPA's current thinking pertaining to biogenic CO_2 emissions within the context of the Clean Power Plan and the Prevention of Significant Deterioration Program is described in a memorandum dated November 19, 2014. Links to these documents and further information on CO_2 emissions associated with bioenergy and other biogenic sources can be found at EPA's webpage: http://www.epa.gov/climatechange/ghgemissions/biogenic-emissions.html.

Recommendation:
Update, in the Final EIS, the status of EPA's involvement in assessing biogenic CO_2 emissions from stationary sources.

F003k

CEQ's Revised Draft Guidance on Greenhouse Gases and Climate Change
On December 24, 2014, the Council on Environmental Quality released, for public comment, revised draft guidance that describes how federal departments and agencies should consider the effects of greenhouse gas emissions and climate change in their NEPA reviews. The revised draft guidance supersedes the draft greenhouse gas and climate change guidance released by CEQ in February 2010.

Recommendation:
Update, in the Final EIS, Section 3.4.1.5, *Regulatory Setting and Permitting for GHG*, to reflect the new CEQ draft guidance.

Hawaii's Clean Energy Initiative and H.B. 623

F003l

The DEIS discusses Hawaii's renewable portfolio standard (RPS) goals (pg. 1-6), but information about the Hawaii Clean Energy Initiative and recent legislation focused on increasing Hawaii's RPS goals is not included. The Hawaii Clean Energy Initiative (HCEI) is a partnership between the State of Hawaii and the U.S. Department of Energy, launched in 2008, that set the goal of achieving 70% clean energy generation in Hawaii by 2030 – including 40% of the State's energy from renewable sources and 30% from efficiency measures. Renewable fuels, including biofuels and other non-petroleum based fuel that can be produced sustainably, are an essential part of the HCEI energy strategy.

H.B. 623 was launched in January 2015, approved by legislators in May 2015, and is currently under review by the Hawaii Governor's office. H.B. 623 would increase Hawaii's RPS goals to 30% by December 31, 2020, 70% by December 31, 2040, and 100% renewable energy by December 31, 2045. The purpose of this legislation is to further reduce Hawaii's dependence on imported fossil fuels and promote the growth of the state's renewable energy industry.

Recommendations:
Discuss, in the Final EIS, the Hawaii Clean Energy Initiative, recent updates to it, and its strategy for biofuels.

Update, in the Final EIS, the discussion on Hawaii's RPS goals to include H.B. 623.

August 6, 2015

Ms. Kathleen Martyn Goforth
Manager
Environmental Section Review
Region 9
U.S. Environmental Protection Agency
75 Hawthorne Street
San Francisco, CA 94105-3901

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Ms. Goforth:

Thank you for your letter concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

Your letter has been assigned identification number F003 and will be included, along with this response letter, in appendix A of the final EIS. As your letter included detailed comments on the draft EIS, we have annotated each comment with a reference number from F003b to F003l (F003a is the introduction and EIS rating information provided with your letter). Your letter, with the annotations included, is attached to provide a reference to the responses provided.

Comment Responses *(listed by reference number)*:

F003b. Thank you for your comments on the sustainability of biofuels. To address your concerns, the final EIS will include a discussion of the "Environmental Policy for Hawaiian Electric Companies' Procurement of Biofuel from Sustainably Produced Feedstock," prepared by Hawaiian Electric Company and the Natural Resources Defense Council, as revised August 2013. As you note, the revised policy provides that Hawaiian Electric will purchase biofuels only from suppliers that comply with the Roundtable on Sustainable Biomaterials (formerly the Roundtable on Sustainable Biofuels) ("RSB") Principles & Criteria for agricultural, end-of-life and wastewater feedstock or similar certifications.

The following additional text has been added to section 2.2.1.5 of the final EIS:

> "One of Hawaiian Electric's goals remains to reduce Hawaii's dependence on imported fossil fuel and the adverse environmental and economic impact of burning fossil fuel to generate electricity for residents and visitors to the Hawaiian Islands. A transition from petroleum fuels to biofuels derived from sustainably-produced and preferably locally-sourced feedstock offers potential for near-term reductions in GHG emissions and increased security from continuing oil market price

volatility and potential supply interruptions. Hawaiian Electric maintains a biofuel purchasing policy that was developed in cooperation with the National Resources Defense Council (NRDC) in 2007 and updated in 2013 (Hawaiian Electric 2013). This policy outlines Hawaiian Electric's preference for procurement of locally sourced biofuel and their requirements for obtaining biofuel generated from sustainable sources. The policy includes a section on local feedstock support mechanisms that discusses Hawaiian Electric's support for development of local biofuel producers, and a section on sourcing requirements for biofuel that requires third-party certification of biofuel sourcing. A copy of the policy has been included as Appendix B."

The following additional text has been added to section 3.4.2.1.2.5, Indirect Effects, of the final EIS:

"GHG emissions outlined in Table 3.4.9 do not account for increases from transportation, storage, and processing or other indirect sources of GHGs, and as such may be higher than those shown. The *IPCC Special Report on Renewable Energy Sources and Climate Change* indicates that lifecycle GHG emissions from all first- and next-generation biofuels have lower lifecycle GHG emissions compared to fossil fuels (IPCC 2012). Table 3.4-9 shows overall ranges of lifecycle GHG emissions from biofuels, natural gas, and oil/diesel. The median lifecycle GHG emissions of all biofuels are between 450 and nearly 1,000 grams CO_2e/kWh lower than their fossil-fueled counterparts. The maximum lifecycle GHG emissions for any biopower scenario is 75 grams CO_2e/kWh; whereas the minimum lifecycle GHG emissions for any fossil fuel scenario is 290 grams CO_2e/kWh. Therefore, regardless of the exact source of and type of biofuel ultimately used, the total lifecycle GHG emissions would be no more than 26 percent of those generated by fossil fuels for the same amount of electricity. The use of biofuels under the Proposed Action would have a net benefit to the environment when compared to using fossil fuels under the No Action Alternative. This is representative of all biofuels and all biopower processing and transportation scenarios. These effects would be moderately beneficial.

Table 3.4-9. Lifecycle GHG Emissions from Biofuels and Fossil Fuels

Values	Lifecycle GHG Emissions (grams CO_2eq/kWh)			
	Biofuels[a]	Natural Gas	Oil/Diesel Fuel	Coal
Minimum	-633	290	510	675
50th percentile	18	469	840	1001
Maximum	75	930	1170	1689

Source: IPCC 2012.

[a] Negative estimates for biopower are based on assumptions about avoided emissions from residues and wastes in landfill disposals and co-products."

The following references were updated or added:

Hawaiian Electric and Natural Resources Defense Council. 2013. *Environmental Policy for Hawaiian Electric Companies' Procurement of Biofuel from Sustainably Produced Feedstock.*

IPCC. 2012. *IPCC Special Report on Renewable Energy Sources and Climate Change.* Cambridge University Press, Cambridge, United Kingdom, 1000 pp.

The Hawaiian Electric biofuels purchasing policy has been included as appendix B to the EIS.

F003c. The following additional text has been added to section 3.4.2.1.1, Construction:

> "Construction emissions were estimated for fugitive dust, on- and off-road diesel equipment, delivery vehicles (including fuel delivery), and worker trips (Table 3.4-5). The estimated construction emissions would be *de minimis* (of minimal importance) and would have minor adverse effects. For analysis purposes, it was assumed that all construction activities would be compressed into a single 12-month period. Therefore, regardless of the ultimate implementation schedule, annual emissions would be less than those shown herein. Moderate changes in the quantity and types of equipment used would not have a substantial influence on the emission estimates and would not change the level of effects under NEPA."

Table 3.4-5.
Estimated Emissions from Construction of the SGSP

Activity/Source	CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$	CO_2
Heavy Equipment	2.8	5.7	0.8	<0.1	0.3	0.3	453.7
Delivery of Equipment	1.2	1.3	0.2	<0.1	<0.1	<0.1	150.1
Surface Disturbance	0.0	0.0	0.0	0.0	1.9	0.1	0.0
Worker Commutes	1.8	0.2	0.2	3.7	<0.1	<0.1	191.3
Total Emissions	5.8	7.2	1.2	3.7	2.3	0.5	795.1

Source: CARB 2012, SCAQMD 1993, USEPA 1995."

Mitigation measures and best management practices for construction emissions are outlined in section 3.4.2.1.3.

The following references were updated or added:

> CARB (California Air Resources Board). 2012. EMFAC Emission Rates Database. Accessed June 2015. http://www.arb.ca.gov/emfac/2011/.
>
> EPA (U.S. Environmental Protection Agency). 1995. AP42, Fifth Edition, Volume I: Stationary Point and Area Sources. Accessed May 2015. http://www.epa.gov/ttn/chief/ap42/.
>
> SCAQMD (South Coast Air Quality Management District). 1993. CEQA Air Quality Handbook. South Coast Air Quality Management District, Diamond Bar, CA.

F003d. Monitored concentrations in the table are 2011 measurements from the Honolulu, Hawai'i, monitoring station obtained from EPA's AirData website: http://www.epa.gov/airdata/ad_rep_con.html.

The following additional text has been added to section 3.4.1.1, National Ambient Air Quality Standards and Attainment Status:

> "Table 3.4-1 is provided for reference and compares recent monitored concentrations to federal and state air quality standards. Monitored concentrations were the values reported for 2011 by the Hawaii Department of Health Clean Air Branch Honolulu monitoring station obtained from the EPA AirData database."

F003e. Reference to Hawaiian Electric's Prevention of Significant Deterioration & Covered Source Permit Application for the SGSP has been added to section 3.4.2.1.2.4.

F003f. Table 3.4-7 in the EIS has been updated based on the comment to be consistent with Table 2.0-1 in *Prevention of Significant Deterioration & Covered Source Permit Application for the SGSP (January 2015)*. Note that the table has been renumbered to Table 3.4-8 due to the addition of a new table in the Air Quality section of the EIS. The former Table 3.4-7 was prepared before the latest revision to the air permit application, which led to the inconsistencies.

F003g. See response to comment F003f.

F003h. Emission factors used to calculate the indirect reductions shown in Table 3.4-8 came directly from the EPA's *eGRID2012 Version 1.0 Year 2010 Summary Tables - Island of Oahu*. Note that the table has been renumbered to Table 3.4-9 due to the addition of a new table in the Air Quality section of the EIS.

Sulfur dioxide (SO_2) emissions in the table have been updated to be consistent with the *Proposed Schofield Generating Station Weight of Evidence Ambient Air Quality Analysis*, dated January 2015.

F003i. This comment is consistent with Table 3.4-5 in the draft EIS. Note "b" confirms that the comparison of SGSP operating scenarios in the table is based on nonbiogenic CO2e, as reflected in Table 3.4-8 in the draft EIS.

Lifecycle analysis of greenhouse gas (GHG) emissions has not been performed. GHG emissions shown in Tables 3.4-6 and 3.4-9 (formerly Tables 3.4-5 and 3.4-8) do not account for emissions from transportation, storage, and processing of fuels or other indirect sources of GHGs, and as such could be higher than those in Table 3.4-9. Note "b" for Table 3.4-6 has been updated to read:

> "Net based on nonbiogenic CO_2e, as reflected in table 3.4-8."

F003j. Reference to EPA's 2011 report, *Draft Accounting Framework for Biogenic Carbon Dioxide (CO_2) Emissions from Stationary Sources,* has been updated as follows:

> EPA (U.S. Environmental Protection Agency). 2014. *Accounting Framework for Biogenic CO2 Emissions from Stationary Sources*. Accessed June 2015. http://yosemite.epa.gov/sab/sabproduct.nsf/0/2F9B572C712AC52E8525783100704886/$File/Biogenic_CO2_Accounting_Framework_Report_LATEST.pdf.

Information in the references outlined in the comment is consistent with sections 3.4.1.4 and 3.1.4.5 of the EIS. Specifically, the EPA memorandum states that:

> "... the EPA is working through the legal process to respond to the Supreme Court's decision in Utility Air Regulatory Group v. EPA and the proceedings currently before the United States Court of Appeals for the District of Columbia Circuit. When developing the PSD regulations described above, the EPA intends to consider the outcome of this process and coordinate its PSD regulations specific to biogenic CO_2 emissions with other rule revisions that may be necessary to address application of PSD permitting requirements to GHGs."

F003k. Text in section 3.4.1.5 has been updated as follows:

> "In 2014, CEQ released draft guidance on when and how federal agencies should consider GHG emissions and climate change in NEPA analyses."

Information in the revised draft guidance is consistent with section 3.4.1.5 of the EIS.

F003l. As you note, the Hawai'i Clean Energy Initiative (HCEI) is a partnership between the state of Hawai'i and the U.S. Department of Energy, with the intent to conserve energy and increase local and renewable energy sources. Since 2008, the HCEI has brought together energy sector stakeholders to define renewable energy goals, and for the electrical energy sector those goals have been incorporated into state law as Renewable Portfolio Standards (RPS).

The SGSP will contribute to Hawaiian Electric's ability to meet RPS requirements as discussed in section 1.4.3 of the EIS. Subsequent to the publication of the draft EIS and the receipt of your comment, H.B. 623 was signed into law, and section 1.4.3 of the EIS has been updated as follows:

> "HRS section 269-92 (as amended by the 2015 State Legislature) sets the following Renewable Portfolio Standards (RPS) targets for the Hawaiian Electric Companies (Hawaiian Electric; Maui Electric Company, Ltd.; and Hawaii Electric Light Company, Inc.) and all other electric utilities in the state to:
>
> - 10 percent of net electricity sales by December 31, 2010.
> - 15 percent of net electricity sales by December 31, 2015.
> - 30 percent of net electricity sales by December 31, 2020.
> - 40 percent of net electricity sales by December 31, 2030.
> - 70 percent of net electricity sales by December 31, 2040.
> - 100 percent of net electricity sales by December 31, 2045.
>
> The Hawaiian Electric companies have achieved 18 percent of net electricity sales from renewable energy in 2014. Because of its ability to use substantial amounts of biofuel in a cost-effective manner, the proposed SGSP would contribute to Hawaiian Electric's ability to continue increasing the proportion of the renewable energy it generates to meet or exceed the RPS and other long-range renewable energy goals."

State policies, strategies, and goals regarding the use of specific fuels (e.g., biofuels or natural gas) are less clearly defined than the RPS goals and are the subject of ongoing discussions between multiple stakeholders. As a result, the EIS focuses on the SGSP's ability to contribute to state RPS achievement and not fuel-use policies. Hawaiian Electric's fuel-related requirement for the SGSP is for the project to be multifuel-capable (both liquid and gaseous fuels, including biofuels), so as to be able to support the company's ability to comply with fuel-related policies as they develop. This requirement is discussed in section 2.1 of the EIS.

We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

From: "McPherson, Ann" <McPherson.Ann@epa.gov<mailto:McPherson.Ann@epa.gov>>
Date: September 3, 2015 at 11:48:02 AM HST
To: "jack.shriver@hawaiianelectric.com<mailto:jack.shriver@hawaiianelectric.com>"
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<Garvin.Heath@nrel.gov<mailto:Garvin.Heath@nrel.gov>>
Subject: Hawaiian Electric's Response to EPA's comments on the Draft EIS for the Schofield Generating Station Project

Dear Mr. Shriver,

Thank you for responding to EPA's comments on the Draft Environmental Impact Statement for the Schofield Generating Station Project in your letter dated August 6, 2015. We appreciate the opportunity to see how our comments will be addressed and to offer additional feedback before the publication of the Final EIS.

There is one item, F003b, on page 2 of your letter that we are concerned about. The letter states that additional text has been added to Section 3.4.2.1.2.5, Indirect Effects, of the Final EIS, including Table 3.4-9. We note, however, that two of the values listed for Biofuels, as presented in Table 3.4-9, are incorrect. These values come from Table A.II.4 of Annex II. However, there was an errata sheet published which affects Table A.II.4. (See errata for pg. 982: http://srren.ipcc-wg3.de/report/errata). The correct values are located at the following website: http://srren.ipcc-wg3.de/report/ipcc_wg3_srren_annexii_tableaii.4_errata.pdf. Due to these changes, the proposed text that compares maximum and minimum lifecycle GHG emissions is thus, incorrect, and should be revised.

Also, the lifecycle GHG emission estimates presented in Table A.II.4 include all "indirect" effects such as transportation, storage and processing. The estimates do not, however, account for any additional emissions associated with transportation to and from Hawaii. The first sentence of the suggested paragraph is similar to one used in the Draft EIS in conjunction with Table 3.4-8 (pg. 3-34). If used in conjunction with Table 3.4.9, the text should be revised.

We have consulted with Garvin Heath, PhD, one of the NREL scientists that worked on the IPCC document. He can provide additional input if needed (garvin.heath@nrel.gov<mailto:garvin.heath@nrel.gov>; 303-384-7460).

Informally, we suggest the following revisions to the proposed text in Section 3.4.2.1.2.5:

GHG emissions outlined in Table 3.4.9 account for basic transportation, storage, and processing but do not account for additional increases associated with from transportation to and from Hawaii. , storage, and processing or other indirect sources of GHGs, and as such may be higher than those shown. The

IPCC Special Report on Renewable Energy Sources and Climate Change indicates that lifecycle GHG emissions from all first- and next-generation biofuels have lower lifecycle GHG emissions compared to fossil fuels (IPCC 2012). Table 3.4-9 shows overall ranges of lifecycle GHG emissions from biofuels, natural gas, and oil/diesel. The median lifecycle GHG emissions of all biofuels are between 432 450 and 964 nearly 1000 grams CO2e/kWh lower than their fossil-fueled counterparts. The maximum lifecycle GHG emissions for any biopower scenario is 75 grams CO2e/kWh; whereas the minimum lifecycle GHG emissions for any fossil fuel scenario is 290 grams CO2 e/kWh. Therefore, regardless of the exact source of and type of biofuel ultimately used, the total lifecycle GHG emissions would be no more than 26 percent of those generated by fossil fuels for the same amount of electricity. The use of biofuels under the Proposed Action would likely have a net benefit to the environment when compared to using fossil fuels under the No Action Alternative. This is representative of all biofuels and all biopower processing and transportation scenarios. These effects would be moderately beneficial.

Table 3.4-9 Lifecycle GHG Emissions from Biofuels and Fossil Fuels

Values	Lifecycle GHG Emissions (grams CO2eq/kWh)			
	Biofuels	Natural gas	Oil/Diesel Fuel	Coal
Minimum	-633	290	510	675
50th %	18 37	469	840	1001
Maximum	75 360	930	1170	1689

Source IPCC 2012
Negative estimates for biopower are based on assumptions about avoided emissions from residues and wastes in landfill disposals and co-products.

We appreciate the opportunity to provide further feedback. Please contact me if you have any additional questions or would like to discuss this further.

Regards,

Ann McPherson

Ann McPherson
Environmental Scientist
U.S. EPA Region 9
Environmental Review Section, ENF-4-2
75 Hawthorne Street
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F004

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Pacific Southwest Region
333 Bush Street, Suite 515
San Francisco, CA 94104

IN REPLY REFER TO:
(ER 15/0261)

Filed Electronically

June 8, 2015

Ms. Lisa Graham
NEPA Program Manager-IMHW-PWE
Department of the Army
Directorate of Public Works
U.S. Army Garrison, Hawaii
947 Wright Avenue, Wheeler Army Airfield
Schofield Barracks, Hawaii 96857-5013

Subject: Draft Environmental Impact Statement (DEIS) for the Lease of Army Land at Schofield Barracks for the Construction and Operation of a Biofuel-Capable Power Generation Unit, Oahu, Hawaii

Dear Ms. Graham,

F004a

The Department of the Interior (Department) has reviewed the U.S. Department of the Army (Army) Draft Environmental Impact Statement (DEIS) for the Schofield Generating Station (SGS) Project. The Department provides the following comments concerning the DEIS with the intent of supporting secure and reliable power generation to meet the needs of the Army and Honolulu County in a way that will avoid or minimize adverse impacts to soil, water, and wildlife resources.

This letter has been prepared under the authority of and in accordance with the provisions of the National Environmental Policy Act of 1969 [42 U.S.C. 4321 et seq.; 83 Stat. 401], as amended (NEPA); the National Invasive Species Act of 1996 [P.L. 104-332], as amended (NISA); the Fish and Wildlife Coordination Act of 1934 (16 U.S.C. 661 et seq.; 48 Stat. 401) as amended (FWCA), the Endangered Species Act of 1973, [16 U.S.C. 1531 et seq.; 87 Stat. 884], as

amended (ESA); and other authorities mandating the Department's concern for environmental values.

General Comments

The Department's U.S. Fish and Wildlife Service (USFWS) participated in early coordination concerning the SGS project design prior to DEIS completion. The USFWS provided technical assistance to the Hawaiian Electric Company (HECO) regarding potential impacts of fuel emissions from the proposed SGS project, in a letter dated March 12, 2013 (2013-TA-0127). On November 6, 2014 the USFWS met with Army and HECO representatives to discuss the proposed SGS project design and ways to modify the action to reduce or remove adverse effects to listed species or critical habitats (2015-I-0113). The USFWS recommendations have been incorporated into the proposed project design to avoid impacts to listed species and are described in DEIS section 3.9.2 (pages 3-78 – 3-81).

The following section-specific comments are focused on those issues raised by the USFWS during review of the DEIS that were not addressed during the early coordination period.

F004b

<u>Section 3.4.1 Impacts to Air Quality and Controls for Monitoring Air Quality Not Clearly Described</u>

The USFWS March 2013 letter recommended that the Army or HECO clearly demonstrate how the proposed project will meet federal and state ambient air quality standards. According to the DEIS, because HECO would own and operate the SGS facility, it was determined that HECO would be the applicant for air quality compliance permits, and although the proposed facility is located on the Army's Schofield Barracks Military Reservation, the SGS facility would not be added to the Army's installation-wide Hawaii Department of Health Covered Source Permit (CSP) (page 3-25).

The CSP is an important mechanism to monitor and limit the amount of air pollutants from significant emission sources, depending on the source type (e.g., restricting operating hours, fuel type, throughput amount, and emission rates). As part of the Army's CSP permit, the installation is required to submit a comprehensive emissions statement annually.

The Department recommends including the proposed SGS facility emissions within the Army's CSP permit, issued in 2007 and currently being renewed (DEIS, page 3-24), rather than segmenting the proposed SGS facility. According to Table 3.4-7 (DEIS, page 3-33), the proposed SGS facility is expected to exceed eight of the 22 Prevention of Significant Deterioration (PSD) Pollutant Thresholds, including thresholds for nitrogen oxide, total particulate matter, benzene, and arsenic. According to the DEIS (page 3-34), HECO submitted a PSD/CSP Application No. 0793-01 for the proposed SGS project, however it is unclear on the status of review or public comment.

Long-term moderate adverse direct effects on air quality are expected from the direct emissions of criteria pollutants, hazardous air pollutants (HAPs) and greenhouse gases (GHGs) from the proposed project (DEIS, page 3-30). These effects are not considered to be significant, due to

the assumed reduction in the use of older power generating stations (page 3-34), however the DEIS does not provide a clear timeframe or information on demonstrating this reduction in emissions or reduction in use of other older power generating stations.

The SGS would burn biofuels, diesel, biofuels/diesel blends, and liquefied natural gas (LNG), if and when LNG becomes available on the island (DEIS, page 2-11). Due to the unavailability of LNG at this time, it is expected that the SGS would operate on 100% biodiesel or 50% biodiesel/50% diesel blend. According to Table 3.4-5, both of these scenarios would result in "Highest levels" of criteria pollutants and any biodiesel blend would result in "Highest levels" of greenhouse gas emissions. Based on the assumed but undescribed reduction in the use of other older power generating stations, there are no mitigation measures for air quality or controls to specifically limit emissions.

F004c

Section 3.7.1 Impacts to Surface Water Quality and Controls for Stormwater Runoff Not Clearly Described

The Waikele Stream is located less than 150 feet northeast of the proposed SGS project site, and is a major feature of the Waikele watershed. The proposed SGS project parcel is undeveloped and relatively flat with stormwater from the parcel expected to flow into the Waikele Stream (DEIS, page 3-61). The Waikele Stream is listed on Hawaii's 303(d) list, pursuant to the Clean Water Act, for nutrients and turbidity. The Total Maximum Daily Load (TMDL) process has not been completed for Waikele Stream (DEIS, page 3-59). It is expected that the TMDL for Waikele Stream will identify sources of pollution within the watershed and determine pollutant load reductions required for the stream to meet water quality standards. The Department requests that this information be provided in the Final EIS.

The Hawaii Department of Health assures the implementation of approved TMDL wasteload allocations through the enforcement of National Pollutant Discharge Elimination System (NPDES) permit conditions. According to the DEIS the Army operates under existing NPDES permit number HI S000090, covering all U.S. military installations on the island of Oahu (page 3-60). However, it is unclear if the proposed SGS facility will be included under the Army's NPDES permit.

According to the DEIS, a NPDES General Permit would be obtained Authorizing Discharges of Stormwater Associated with a Construction Activity; however the applicant for such permit is not identified. In addition, the NPDES General Permit requires a project-specific Stormwater Pollution Prevention Plan (SWPPP); however the SWPPP has not been completed (DEIS, page 3-62). The preparation and implementation of an SWPPP would ensure that spills would be minimized and promptly contained and cleaned up if they occurred.

Due to the proposed project's proximity to the Waikele Stream, the Department is concerned with the storage and treatment of wastewater and hazardous materials. According to the DEIS, if all six engines are operating at full power, the selective catalytic reduction (SCR) equipment to reduce harmful emissions will require approximately 372 gallons per hour of urea solution, made on-site by mixing dry urea pellets and potable water (DEIS, page 2-12). Urea is a chemical compound with high nitrogen content and if released into nearby streams, there is a potential for

this compound to accelerate algae blooms and severely limit available oxygen for aquatic organisms, leading to "dead zones" of various fish species (Bisson et al. 1992).

The DEIS section 2.2.1., provides an overview of the waste management proposed for the power plant, specifically that the urea storage and delivery area would have spill containment. The proposed site is also approximately two miles from the Honouliuli Forest Reserve, home to 39 threatened and endangered species, 16 of which are found nowhere else in the world. Based on the various chemicals and hazardous materials that would be stored and generated by the facility, spill containment, reporting, and proper waste management protocols are critical in ensuring no harmful effects to wildlife resources.

F004d

The Department has also reviewed the Army's Water Characterization Study (DEIS, Appendix E), detailing options for the stormwater retention basin configurations. The Department is in agreement with recommendations in Appendix E; specifically we support the option that reduces or limits the ponding depth to a maximum of two feet, and instead increases the footprint of the basin (page 15, line 9). Increasing the footprint of the basin to a maximum of 0.18 acre will increase the area available for infiltration, and reduce the amount of standing water available.

The endangered Hawaiian stilt or aeʻo (*Himantopus mexicanus knudseni*), Hawaiian coot or ʻalae keʻokeʻo (*Fulica alai*), Hawaiian moorhen or ʻalae ʻula (*Gallinula chloropus* **sandvicensis), Hawaiian duck or koloa maoli (*Anas wyvilliana*), and the Hawaiian goose or nēnē (*Branta sandvicensis*), collectively referred to as "Hawaiian Water birds," are found in the region and are attracted to standing water and emergent vegetation. Ponding of water within the detention basin is expected after storm events; however, through proper maintenance as described in Appendix E, any standing water would be temporary. The Army has also agreed to install netting, floating bird deterrent balls, or an equivalent system to prevent Hawaiian Water birds from nesting at the power plant facility detention basin (DEIS, page 3-81).**

The Department recognizes the efforts of the Army to conserve and protect endangered and threatened wildlife and the nation's soil and water resources. The Department appreciates the opportunity to work with the Army at the national, state and local levels to support Army energy initiatives in a way that avoids or minimizes adverse impacts to fish and wildlife resources. Please contact Deborah Giglio-Willoughby at (916) 414-6600 or at deborah_giglio@fws.gov, if you have any questions or need additional information regarding these comments.

Thank you for the opportunity to review this project.

Sincerely,

Patricia Sanderson Port
Regional Environmental Officer

cc: OEPC-Staff Contact: Shawn Alam, 202-208-5465; shawn_alam@ios.doi.gov
FWS Contact: Deborah Giglio-Willoughby at (916) 414-6600: deborah_giglio@fws.gov

August 6, 2015

Ms. Patricia Sanderson Port
Regional Environmental Officer
Pacific Southwest Region
Office of Environmental Policy and Compliance
U.S. Department of the Interior
333 Bush Street, Suite 515
San Francisco, CA 94104

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Ms. Port:

Thank you for your letter concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

Your letter has been assigned identification number F004 and will be included, along with this response letter, in appendix A of the final EIS. As your letter included detailed comments on the draft EIS, we have annotated each comment with a reference number from F004b to F004d (F004a is the introduction provided in your letter). Your letter, with the annotations included, is attached to provide a reference to the responses provided.

Comment Responses *(listed by reference number)*:

F004b. The air permit program in Hawai'i has been approved by the U.S. Environmental Protection Agency (EPA) and delegated to the state of Hawai'i Department of Health. Hawai'i Revised Statutes Chapter 342B sets forth the requirements for covered source permits in the state. Under section 342B-22(a), "[t]he owner or operator of a covered source shall obtain a permit from the department."

Hawaiian Electric would obtain a Covered Source Permit (CSP) operating permit for the SGSP, which would require both monitoring of emissions and annual emissions statements similar to the CSP for Schofield Barracks. Hawaiian Electric's Prevention of Significant Deterioration & Covered Source Permit (PSD/CSP) application no. 0793-01 for the proposed SGSP has been submitted and is currently under review. It was determined through coordination with both the Hawai'i Department of Health and EPA that, although the proposed facility is located on the installation, Hawaiian Electric would be the proper applicant and permittee of the CSP as Hawaiian Electric would be a tenant that independently owns and operates the facility.

Any electricity produced by the proposed SGSP would reduce the need for other facilities to provide power. This would occur on a one-for-one basis after the facility was in operation. Emission factors used to calculate the indirect reductions shown in Table 3.4-9 (formerly Table 3.4-8) came directly from EPA's *eGRID2012 Version 1.0 Year 2010 Summary Tables—Island of Oahu*. This accounts for the current composite energy production on the island of O'ahu.

Engineering controls for air emission are described in sections 2.2.1.10 and 3.4.2.1.2.1 of the EIS. Section 3.4.2.1.3 outlines mitigation measures and best management practices for air quality.

F004c. Regarding Waikele Stream, draft EIS section 3.7.1.2 states that the stream is on Hawai'i's 303(d) list and that the TMDL process is underway. To fully reflect the information you are requesting be provided in the final EIS, the following sentence has been added to section 3.7.1.2: "It is expected that the TMDL for Waikele Stream will identify sources of pollution within the watershed and determine pollutant load reductions required for the stream to meet water quality standards." Current information on the Hawai'i Department of Health website (health.hawaii.gov/cwb) indicates that the TMDL for Waikele Stream has not been finalized. Any updated information that is available before the final EIS is published will be incorporated into the document.

Regarding NPDES permit coverage, Hawaiian Electric will obtain a separate NPDES permit for construction of the SGSP rather than being covered by the Army's NPDES permit. DOI is correct that the NPDES application has not yet been submitted; however, Hawaiian Electric would apply for and obtain this permit prior to beginning construction activities.

In addition, as stated in draft EIS section 3.7.2.1.1, a project-specific stormwater pollution prevention plan will be completed when the construction plan and design are finalized and prior to construction and operation of the SGSP. As stated in draft EIS section 3.7.1.2, operation of the SGSP will be covered by the Army's existing MS4 permit.

The Army and Hawaiian Electric share DOI's concern that stormwater, wastewater and hazardous materials be managed to minimize the potential for spills occurring or for nearby water bodies being contaminated. Spill prevention, containment, and response are discussed in draft EIS sections 2.2, 3.7 and 3.11, among others. Among the measures indicated are (1) providing sufficient spill containment for urea, fuel and other potentially hazardous materials; (2) creating a project-specific stormwater pollution prevention plan, hazardous materials management plan and spill prevention, control, and countermeasures plan; (3) designing the site so that runoff is fully contained and can be retained as necessary and potentially contaminated runoff is directed through appropriate sumps and an oil/water separator; (4) implementing proper waste management protocols in accordance with regulatory requirements; and (5) properly reporting all spills and other information required by law. The Army and Hawaiian Electric understand the ecological and water quality implications of releases of harmful substances into the environment at the proposed location and will take appropriate measures to ensure that Hawai'i's environment is protected.

The Honouliuli Forest Reserve is approximately 2 miles west of the SGSP and at a higher elevation, so it could not be affected by potential spills of chemicals of hazardous materials from the SGSP. Potential effects to biological resources are discussed in draft EIS section 3.9.

F004d. The Army and Hawaiian Electric appreciate the concern and information provided about Hawaiian water birds. Final design of the stormwater retention basin has not been determined. The information you have provided will be taken into consideration in determining the final design.

As stated in section 3.9 of the draft EIS, the Army informally consulted with the U.S. Fish and Wildlife Service (USFWS) under section 7 of the Endangered Species Act, providing USFWS with a letter documenting the Army's conclusion that, with implementation of the design measures presented in the draft EIS, effects on threatened and endangered species would be less than significant. USFWS concurred with the Army's assessment in a letter dated January 29, 2015. The design measures agreed upon by the Army and USFWS are presented in section 3.9 of the draft EIS.

We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

S001

DAVID Y. IGE
GOVERNOR OF HAWAII

VIRGINIA PRESSLER, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
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HONOLULU, HI 96801-3378

In reply, please refer to:
File:

04023PGH.15

April 22, 2015

ATTN: IMHW-PWE (L. Graham)
Directorate of Public Works
U.S. Army Garrison Hawaii
Department of the Army
947 Wright Avenue, Wheeler Army Airfield
Schofield Barracks, Hawaii 96857-5013

To Whom It May Concern: S001a

SUBJECT: Comments on the Draft Environmental Impact Statement (DEIS) for the Schofield Generating Station Project, U.S. Army Garrison, Hawaii

The Department of Health (DOH), Clean Water Branch (CWB), acknowledges receipt of your letter, dated April 15, 2015, requesting comments on your project. The DOH-CWB has reviewed the subject document and offers these comments. Please S001b note that our review is based solely on the information provided in the subject document and its compliance with the Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at: http://health.hawaii.gov/epo/files/2013/05/Clean-Water-Branch-Std-Comments.pdf

S001c

1. Any project and its potential impacts to State waters must meet the following criteria:

   a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.

   b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.

   c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).

S001d

2. You may be required to obtain National Pollutant Discharge Elimination System (NPDES) permit coverage for discharges of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55).

For NPDES general permit coverage, a Notice of Intent (NOI) form must be submitted at least 30 calendar days before the commencement of the discharge. An application for a NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. To request NPDES permit coverage, you must submit the applicable form ("CWB Individual NPDES Form" or "CWB NOI Form") through the e-Permitting Portal and the hard copy certification statement with the respective filing fee ($1,000 for an individual NPDES permit or $500 for a Notice of General Permit Coverage). Please open the e-Permitting Portal website located at: https://eha-cloud.doh.hawaii.gov/epermit/. You will be asked to do a one-time registration to obtain your login and password. After you register, click on the Application Finder tool and locate the appropriate form. Follow the instructions to complete and submit the form.

S001e

3. If your project involves work in, over, or under waters of the United States, it is highly recommended that you contact the Army Corp of Engineers, Regulatory Branch (Tel: 835-4303) regarding their permitting requirements.

   Pursuant to Federal Water Pollution Control Act [commonly known as the "Clean Water Act" (CWA)], Paragraph 401(a)(1), a Section 401 Water Quality Certification (WQC) is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may **result** in any discharge into the navigable waters..." (emphasis added). The term "discharge" is defined in CWA, Subsections 502(16), 502(12), and 502(6); Title 40 of the Code of Federal Regulations, Section 122.2; and Hawaii Administrative Rules (HAR), Chapter 11-54.

S001f

4. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 WQC are required, must comply with the State's Water Quality Standards. Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of $25,000 per day per violation.

S001g

5. It is the State's position that all projects must reduce, reuse, and recycle to protect, restore, and sustain water quality and beneficial uses of State waters. Project planning should:

   a. Treat storm water as a resource to be protected by integrating it into project planning and permitting. Storm water has long been recognized as a source of irrigation that will not deplete potable water resources. What is often overlooked is that storm water recharges ground water supplies and feeds streams and estuaries; to ensure that these water cycles are not disrupted, storm water cannot be relegated as a waste product of impervious surfaces. Any project planning must recognize storm water as an asset that sustains and protects natural ecosystems and traditional beneficial uses of State waters, like community beautification, beach going, swimming, and fishing. The approaches necessary to do so, including low impact development methods or ecological

bio-engineering of drainage ways must be identified in the planning stages to allow designers opportunity to include those approaches up front, prior to seeking zoning, construction, or building permits.

S001h

b. Clearly articulate the State's position on water quality and the beneficial uses of State waters. The plan should include statements regarding the implementation of methods to conserve natural resources (e.g. minimizing potable water for irrigation, gray water re-use options, energy conservation through smart design) and improve water quality.

S001i

c. Consider storm water Best Management Practice (BMP) approaches that minimize the use of potable water for irrigation through storm water storage and reuse, percolate storm water to recharge groundwater to revitalize natural hydrology, and treat storm water which is to be discharged.

S001j

d. Consider the use of green building practices, such as pervious pavement and landscaping with native vegetation, to improve water quality by reducing excessive runoff and the need for excessive fertilization, respectively.

S001k

e. Identify opportunities for retrofitting or bio-engineering existing storm water infrastructure to restore ecological function while maintaining, or even enhancing, hydraulic capacity. Particular consideration should be given to areas prone to flooding, or where the infrastructure is aged and will need to be rehabilitated.

If you have any questions, please visit our website at:http://health.hawaii.gov/cwb/, or contact the Engineering Section, CWB, at (808) 586-4309.

Sincerely,

Alec Wong

ALEC WONG, P.E., CHIEF
Clean Water Branch

GH:ay

August 6, 2015

Mr. Alec Wong, P.E.
Chief
Clean Water Branch
Department of Health
State of Hawai'i
P.O. Box 3378
Honolulu, HI 96801-3378

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. Wong:

Thank you for your letter concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

Your letter has been assigned identification number S001 and will be included, along with this response letter, in appendix A of the final EIS. As your letter included detailed comments on the draft EIS, we have annotated each comment with a reference number from S001b to S001k (S001a is the introduction provided in your letter). Your letter, with the annotations included, is attached to provide a reference to the responses provided.

Comment Responses *(listed by reference number)*:

S001b. The project proponent has reviewed the standard comments and confirmed that they are addressed in section 3.7 of the EIS.

S001c. The potential impact to state waters from the project would arise from construction stormwater runoff and post-construction stormwater runoff. Both of these sources would be controlled in compliance with regulatory requirements and would be permitted by the Hawai'i Department of Health and other regulatory bodies as required.

S001d. As stated in section 3.7.2.1.1 of the EIS:

> "Permit coverage for stormwater runoff from the construction site would be obtained under the NPDES General Permit Authorizing Discharges of Stormwater Associated with Construction Activity (HAR Chapter 11-55 Appendix C; expires December 5, 2018) issued by the Department of Health, Clean Water Branch."

Hawaiian Electric will follow the regulatory process for obtaining NPDES permit coverage. Hawaiian Electric also will comply with NPDES permit number HI S000090, the Army's small municipal separate storm sewer system (MS4) permit.

S001e. Hawaiian Electric or its contractor will obtain any required permits and authorizations—including a section 401 WQC if required—before commencing work on the facility.

S001f. The requirement to comply with state water quality standards is acknowledged. Hawaiian Electric or its contractor will take all steps necessary to ensure the protection of state waters during facility construction and facility operation. Preparing and implementing a stormwater pollution prevention plan for the control of construction stormwater runoff and incorporating best management practices (BMPs) into facility design to control stormwater runoff once the facility is operational in accordance with regulatory requirements would ensure full protection of potentially affected state waters.

S001g. The Army and Hawaiian Electric recognize stormwater as part of the water cycle and a community asset, and have integrated it into the project planning and permitting process. This is demonstrated by the discussion of stormwater in section 3.7 of the EIS, which addresses stormwater planning, design and permitting and low impact development for construction and operation of the project.

S001h. The project will be designed to minimize water use, and potable water use at the facility will have little-to-no impact on surface water quality or natural resources conservation. Water will primarily be required to make the urea solution needed for the SCR emissions control system, with other minor water uses. Approximately 340 gallons per hour of potable water will be required to generate the maximum anticipated flow rate of 372 gallons of 40 percent urea solution. This translates to 8,160 gallons per day for the facility. A DLNR permit allocates a 12-month moving average of 5.65 million gallons per day to the Army from the ground water aquifer. Potable water use for the SGSP would account for ~1/7 of 1 percent of its permitted withdrawal capacity. Uncontaminated stormwater will be collected in a retention basin and returned to the environment through infiltration and evaporation.

S001i. The Army and Hawaiian Electric will consider stormwater BMPs related to system design. As stated in section 3.7.2.1.3 of the EIS, "the final selection of stormwater BMPs and the design of the stormwater system would be determined as the project design is finalized."

S001j. The Army and Hawaiian Electric will consider the use of green building practices and have already incorporated some such practices into the project design. For example, as stated in section 3.9.2.1.2.1 of the EIS:

> "Any plantings would comply with USAG-HI Policy 63, Landscaping with Native Plants (Department of the Army 2014) … The landscaping would be maintained manually (e.g., mowing, trimming, and weeding) and the use of pesticides or herbicides is not anticipated."

Also, stormwater runoff will be contained on-site and ultimately discharged from an infiltration basin sized to eliminate any impact on Waikele Stream or its watershed. Stormwater runoff from the diesel tanks and lubricating oil equipment areas at the SGSP will be routed into water collection sumps. The sumps will routinely be checked for contamination from the equipment and occasionally be pumped through an on-site oil/water separator system. Primary potential contaminants include fuel and oil from the biodiesel engines and their accompanying equipment. Noncontaminated water will be subjected to stormwater management. Trucks will transport any contaminated stormwater for off-site treatment at an appropriate wastewater disposal facility (Hawaiian Electric 2014c).

S001k. No stormwater infrastructure exists at the site so retrofitting stormwater infrastructure is not applicable to the project.

We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

S002

DAVID Y. IGE
GOVERNOR
STATE OF HAWAII

SHAN S. TSUTSUI
LT. GOVERNOR
STATE OF HAWAII

JOBIE M. K. MASAGATANI
CHAIRMAN
HAWAIIAN HOMES COMMISSION

WILLIAM J. AILA, JR.
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P. O. BOX 1879
HONOLULU, HAWAII 96805

May 5, 2015

Department of the Army
Directorate of Public Works
U.S. Army Garrison, Hawaii
Attn: IMHW-PWE (L. Graham)
947 Wright Avenue
Wheeler Army Airfield
Schofield Barracks, Hawaii 96857-5013

Subject: Draft Environmental Impact Statement for The Schofield Generating Station Project, U.S. Army Garrison, Hawaii

Dear Mr. Graham:

Thank you for the opportunity to review the Draft Environmental Impact Statement for the Schofield Generating Station Project, U.S. Army Garrison, Hawaii.

The Department of Hawaiian Home Lands has no comment to offer at this time.

If you have any questions, please contact our Planning Office at (808) 620-9481.

Aloha,

Marvin Kaleo Manuel,
Acting Planning Program Manager

August 6, 2015

Mr. Marvin Kaleo Manuel
Acting Planning Program Manager
Department of Hawaiian Homelands
State of Hawai'i
P.O. Box 1879
Honolulu, HI 96805

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. Manuel:

Thank you for your letter concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

We appreciate your taking the time to review the draft EIS and understand that the Department of Hawaiian Homelands has no comments at this time. Your letter has been assigned identification number S002 and will be included, along with this response letter, in appendix A of the final EIS. We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

S003

DAVID Y. IGE
GOVERNOR

DOUGLAS MURDOCK
Comptroller

AUDREY HIDANO
Deputy Comptroller

(P)1102.5

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

MAY - 5 2015

Department of the Army
Directorate of Public Works
U. S. Army Garrison, Hawaii
Attn: IMHW-PWE (L. Graham)
947 Wright Avenue
Wheeler Army Airfield
Schofield Barracks, Hawaii 96857-5013

To Whom it May Concern:

Subject: Draft Environmental Impact Statement (DEIS) for Schofield Generating Station Project, U.S. Army Garrison, Hawaii

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

If you have any questions, your staff may call Ms. Gayle Takasaki of the Planning Branch at 586-0584.

Sincerely,

JAMES K.KURATA
Public Works Administrator

GT:mo

August 6, 2015

Mr. James K. Kurata
Public Works Administrator
Department of Accounting and General Services
State of Hawai'i
P.O. Box 1879
Honolulu, HI 96805

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. Kurata:

Thank you for your letter concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

We appreciate your taking the time to review the draft EIS and understand that the Department of Accounting and General Services has no comments at this time. Your letter has been assigned identification number S003 and will be included, along with this response letter, in appendix A of the final EIS. We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

S004

DAVID Y. IGE
GOVERNOR OF HAWAII

VIRGINIA PRESSLER, M.D.
DIRECTOR OF HEALTH

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

In reply, please refer to:
File:

EPO 15-090

May 12, 2015

Tetra Tech, Inc.
Attn: Kristin Shields
1999 Harrison Street, Suite 500
Oakland, CA 94612

Dear Kristin Shields:

SUBJECT: DEIS Schofield Generating Station Project

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges notification of your DEIS to the Department of Health by the U.S. Department of the Army, via letter dated April 15, 2015 and notification of Public Meetings. Thank you for allowing us to review and comment on the proposed project. The proposed project was routed electronically via the OEQC website link: http://oeqc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Oahu/2010s/2015-04-23-OA-5E-DEIS-Schofield-Generating-Station.pdf

The DEIS was routed electronically to various branches and offices. The various branches will provide specific comments to you if necessary. EPO recommends that you review the standard comments and available strategies to support sustainable and healthy design provided at: http://health.hawaii.gov/epo/home/landuse-planning-review-program Projects are required to adhere to all applicable standard comments.

We encourage you to examine and utilize the Hawaii Environmental Health Portal. The portal provides links to our e-Permitting Portal, Environmental Health Warehouse, Groundwater Contamination Viewer, Hawaii Emergency Response Exchange, Hawaii State and Local Emission Inventory System, Water Pollution Control Viewer, Water Quality Data, Warnings, Advisories and Postings. The Portal is continually updated. Please visit it regularly at: https://eha-cloud.doh.hawaii.gov

We request that you utilize all of this information on your proposed project to increase sustainable, innovative, inspirational, transparent and healthy design.

Mahalo nui loa,

Laura Leialoha Phillips McIntyre, AICP
Program Manager, Environmental Planning Office

c: Hawaii State Department of Land and Natural Resources
Hawaiian Electric Company
U.S. Department of the Army (Pacific Command), Army Garrison Hawaii
HDOH: DDEH, CAB, CWB, IRHB, & HEER {via email only}
U.S. EPA PICO & U.S. EPA Region IX

August 6, 2015

Ms. Laura Leialoha Phillips McIntyre, AICP
Program Manager
Environmental Planning Office
Department of Health
State of Hawai'i
P.O. Box 3378
Honolulu, HI 96801-3378

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Ms. McIntyre:

Thank you for your letter concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

The Army and Hawaiian Electric have reviewed the referenced standard comments provided in your letter and will adhere to those that are applicable to the SGSP project. Thank you also for the reference to the Environmental Health Portal, which we will use. The Army and Hawaiian Electric share EPO's commitment to sustainable design.

Your letter has been assigned identification number S004 and will be included, along with this response letter, in appendix A of the final EIS. We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources

Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

S005

OFFICE OF PLANNING
STATE OF HAWAII

235 South Beretania Street, 6th Floor, Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

DAVID Y. IGE
GOVERNOR

LEO R. ASUNCION
ACTING DIRECTOR
OFFICE OF PLANNING

Telephone: (808) 587-2846
Fax: (808) 587-2824
Web: http://planning.hawaii.gov/

Ref. No. P-14762

May 28, 2015

Ms. Lisa Graham
Department of the Army
Directorate of Public Works
U.S. Army Garrison, Hawaii
947 Wright Avenue
Wheeler Army Airfield
Schofield Barracks, Hawaii 96857-5013
Attn: IMHW-PWE

Dear Ms. Graham:

S005a

Subject: Draft Environmental Impact Statement for Schofield Generating Station Project, U.S. Army Garrison, Hawaii

Thank you for the opportunity to provide comments on the Draft Environmental Impact Statement (Draft EIS) for the Schofield Generating Station Project (SGSP), U.S. Army Garrison, Hawaii (USAG-HI), which was transmitted to our office by letter dated April 23, 2015.

It is our understanding that the USAG-HI proposes to lease 8.13 acres of land and the related granting of a 2.5 acre interconnection easement on Schofield Barracks and Wheeler Airfield to Hawaiian Electric Company (HECO) to construct, operate, and maintain a 50 MW capacity energy power plant that includes power poles, high-tension power lines, and related equipment.

The primary purpose for the construction of the SGSP is to provide improved energy security to the USAG-HI at Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia; and provide new secure, firm, dispatchable, flexible, and renewable energy generation to the grid on the island of Oahu.

The Office of Planning (OP) has reviewed the Draft EA, and has the following comments to offer:

S005b

1. The Draft EIS adequately addresses Hawaii Revised Statutes (HRS) Chapter 226, Hawaii State Plan, and HRS § 205A-2, Coastal Zone Management Act objectives and policies;

S005c

2. The Draft EIS, Section 4.4.1, page 4-7, includes an analysis on the Hawaii State Plan's objectives and policies. These include: HRS § 226-18(a) and (b) – (Facilities Systems - Energy).

S005d

3. HRS § 226-108(2) – priority guideline on sustainability, encourages planning that respects and promotes living within the natural resources and limits of the State. The Draft EIS, Section 4.4.2, page 4-9, includes an analysis of the State Sustainability Plan 2050. The Draft EIS states the SGSP generating units would be capable of using several types of fuels, including locally-produced bio-fuels.

   Because this is an energy generation project, the Draft EIS would benefit by detailing the methods by which the SGSP intends to use, in order to promote energy efficiency and renewable energy generation. The Hawaii State Plan analysis in Section 4.4.1, should be amended and include an examination on the proposed project's ability to meet the goals of energy resource conservation principles.

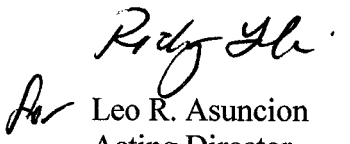
S005e

4. The Draft EIS, Section 5.2.7, page 5-5, includes an analysis on water resources. It identifies the need for a National Pollution Discharge Elimination System permit during the construction phase. The project will also implement a Stormwater Pollution Prevention Plan to limit post-development discharge of stormwater from a 10-year event to the pre-development rate. To ensure the project will have only minor effects on water resources, please investigate the feasibility of reducing the amount of impervious and hardened surfaces surrounding the SGSP during the design phase of this project. During heavy storms, hardened surfaces allow storm runoff to flow into storm-drains and overwhelm nearby coastal areas with sediment and land-based pollutants. To prevent the discharging of untreated runoff directly to nearshore waters, please consider Low-Impact Development (LID) design standards and Best-Management-Practices (BMP) to control stormwater runoff. LID techniques promote a range of structural BMP's for stormwater mitigation that minimizes the negative effect on the marine environment.

   LID design concepts and stormwater runoff BMP's embrace decentralized micro-scale controls that infiltrate, filter, store, reuse, evaporate, and detain runoff close to its source. Examples of effective BMP and LID stormwater control methods are listed in OP's Low Impact Development, A Practitioners Guide. For more information on this, please examine Section 3.4, pgs. 3-14 to 3-17 of this guide. It can be viewed or downloaded from the OP website at:
   http://files.hawaii.gov/dbedt/op/czm/initiative/lid/lid_guide_2006.pdf

If you have any questions regarding this comment letter, please contact Josh Hekekia of our office at 587-2845.

Sincerely,



Leo R. Asuncion
Acting Director

August 6, 2015

Mr. Leo R. Asuncion
Acting Director
Office of Planning
State of Hawai'i
P.O. Box 2359
Honolulu, HI 96804

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. Asuncion:

Thank you for your letter concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) [Chapter 343, Hawai'i Revised Statutes (HRS)] and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

Your letter has been assigned identification number S005 and will be included, along with this response letter, in appendix A of the final EIS. As your letter included detailed comments on the draft EIS, we have annotated each comment with a reference number from S005b to S005e (S005a is the introductory text). Your coded letter is attached to provide a reference to the responses provided.

Comment Responses *(listed by reference number)*:

S005b. The comment that the draft EIS adequately addresses HRS Chapter 226, Hawai'i State Plan, and HRS § 205A-2, Coastal Zone Management Act objectives and policies is noted.

S005c. The comment that the draft EIS, section 4.4.1, page 4-7, includes an analysis on the Hawai'i State Plan's objectives and policies is noted.

S005d. The following text has been added to the end of section 4.4.1 Hawai'i State Plan:

> *"§226-108 Priority guidelines and principles to promote sustainability shall include:*
> *(2) Encouraging planning that respects and promotes living within the natural resources and limits of the State;*

The SGSP's requirement to use biofuels would provide a steady commercial biofuel demand that could encourage investment in local biofuel production capacity. In addition, the high fuel efficiency of the proposed engines compared to existing generating facilities would mean that

when the SGSP is placed in service, less total fuel would be required to meet State energy demands. Combined, these two aspects demonstrate that the SGSP supports the goal of living within the natural resource limits of the State."

S005e. The facility design will minimize impervious area to the greatest extent feasible. Impervious areas will include the facility itself and structures such as storage tanks, parking, and access roads. Low impact development was investigated as a stormwater control option, but an infiltration basin was selected as a more feasible alternative. Untreated runoff will not discharge directly to surface waters or to nearshore waters.

We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

S006

DAVID Y. IGE
GOVERNOR OF HAWAII

CARTY S. CHANG
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KEKOA KALUHIWA
FIRST DEPUTY

W. ROY HARDY
ACTING 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

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

April 21, 2015

MEMORANDUM

FROM ~~TO~~:

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

TO ~~FROM~~: Russell Y. Tsuji, Land Administrator
SUBJECT: Draft Environmental Impact Statement (DEIS) for the Schofield Generating Station Project, U.S. Army Garrison, Hawaii
LOCATION: See Figure 3.1-1 and Table 3.1-1
APPLICANT: Hawaiian Electric Company by its consultant Tetra Tech, Inc.

Transmitted for your review and comments on the above-referenced documents. We would appreciate your comments on these documents which can be viewed online at www.garrison.hawaii.army.mil/schofieldplant.

Please submit any comments by June 3, 2015. If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Supervising Land Agent Steve Molmen at (808) 587-0439. Thank you.

Attachments

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

Signed: _____
Print Name: Tiffany Cha
Date: 4/23/2015

August 6, 2015

Mr. Timmy Chee
Land Division–O'ahu District
Department of Land and Natural Resources
State of Hawai'i
P.O. Box 621
Honolulu, HI 96809

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. Chee:

Thank you for your letter concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

We appreciate your taking the time to review the draft EIS and understand that your department has no objections at this time. Your letter has been assigned identification number S006 and will be included, along with this response letter, in appendix A of the final EIS. We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

S007

DAVID Y. IGE
GOVERNOR OF HAWAII

CARTY S. CHANG
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KEKOA KALUHIWA
FIRST DEPUTY

W. ROY HARDY
ACTING 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

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

April 21, 2015

RECEIVED
LAND DIVISION
2015 APR 27 AM 11:03
DEPT OF LAND & NATURAL RESOURCES
STATE OF HAWAII

MEMORANDUM

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

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Draft Environmental Impact Statement (DEIS) for the Schofield Generating Station Project, U.S. Army Garrison, Hawaii
LOCATION: See Figure 3.1-1 and Table 3.1-1
APPLICANT: Hawaiian Electric Company by its consultant Tetra Tech, Inc.

Transmitted for your review and comments on the above-referenced documents. We would appreciate your comments on these documents which can be viewed online at www.garrison.hawaii.army.mil/schofieldplant.

Please submit any comments by June 3, 2015. If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Supervising Land Agent Steve Molmen at (808) 587-0439. Thank you.

Attachments

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

Signed: [signature]
Print Name LISA HADWAY
Date: 4/24/15

August 6, 2015

Ms. Lisa Hadway
Division of Forestry and Wildlife
Department of Land and Natural Resources
State of Hawai'i
P.O. Box 621
Honolulu, HI 96809

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Ms. Hadway:

Thank you for your letter concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

We appreciate your taking the time to review the draft EIS and understand that your department has no comments at this time. Your letter has been assigned identification number S007 and will be included, along with this response letter, in appendix A of the final EIS. We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

S008

DAVID Y. IGE
GOVERNOR OF HAWAII

CARTY S. CHANG
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KEKOA KALUHIWA
FIRST DEPUTY

W. ROY HARDY
ACTING 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

RECEIVED
OFFICE OF CONSERVATION
AND COASTAL LANDS
2015 APR 22 A 11:38

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

April 21, 2015

MEMORANDUM

APR 28 2015

~~TO:~~ FROM:

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

RECEIVED
LAND DIVISION
2015 APR 28 PM 2:57
DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

TO: ~~FROM:~~ Russell Y. Tsuji, Land Administrator

SUBJECT: Draft Environmental Impact Statement (DEIS) for the Schofield Generating Station Project, U.S. Army Garrison, Hawaii

LOCATION: See Figure 3.1-1 and Table 3.1-1

APPLICANT: Hawaiian Electric Company by its consultant Tetra Tech, Inc.

Transmitted for your review and comments on the above-referenced documents. We would appreciate your comments on these documents which can be viewed online at www.garrison.hawaii.army.mil/schofieldplant.

Please submit any comments by June 3, 2015. If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Supervising Land Agent Steve Molmen at (808) 587-0439. Thank you.

Attachments

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

Signed: [signature]
Print Name: ALEX J. ROY
Date: 4/28/15

PLEASE SEND COPIES OF ALL COMMENTS TO THE OCCL. THE OCCL IS THE "APPROVING AGENCY" REP. FOR DLNR

August 6, 2015

Mr. Alex J. Roy
Office of Conservation and Coastal Lands
Department of Land and Natural Resources
State of Hawai'i
P.O. Box 621
Honolulu, HI 96809

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. Roy:

Thank you for your letter concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

We appreciate your taking the time to review the draft EIS and understand that your department has no objections at this time. Per your request, a consolidated copy of all comments received on the draft EIS was emailed to you on July 13, 2015.

Your letter has been assigned identification number S008 and will be included, along with this response letter, in appendix A of the final EIS. We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

S009

DAVID Y. IGE
GOVERNOR OF HAWAII

CARTY S. CHANG
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KEKOA KALUHIWA
FIRST DEPUTY

W. ROY HARDY
ACTING 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
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MAY 21 AM 10:46
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STATE OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

RECEIVED
APR 23 2015
AQUATIC RESOURCES

DAR # 5105

April 21, 2015

MEMORANDUM

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

JKV
AT
BKK

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Draft Environmental Impact Statement (DEIS) for the Schofield Generating Station Project, U.S. Army Garrison, Hawaii
LOCATION: See Figure 3.1-1 and Table 3.1-1
APPLICANT: Hawaiian Electric Company by its consultant Tetra Tech, Inc.

Transmitted for your review and comments on the above-referenced documents. We would appreciate your comments on these documents which can be viewed online at www.garrison.hawaii.army.mil/schofieldplant.

Please submit any comments by June 3, 2015. If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Supervising Land Agent Steve Molmen at (808) 587-0439. Thank you.

Attachments

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

Signed: Alton Miyasaka
Print Name: Alton Miyasaka
Date: 5-19-15

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

W. ROY HARDY
ACTING 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
DIVISION OF AQUATIC RESOURCES
1151 PUNCHBOWL STREET, ROOM 330
HONOLULU, HAWAII 96813
Telephone: 587-0100

Date: May 19, 2015
DAR # 5105

MEMORANDUM

TO: Alton Miyasaka, Acting Adminstrator 5-19-15
DATE: May 19, 2015
FROM: Annette Tagawa, Aquatic Biologist AT
SUBJECT: Comments on Draft Environmental Impact Statement (DEIS) for the Schofield Generating Station Project, U.S. Army Garrison, Hawaii

Comment	Date Request	Receipt	Referral	Due Date
	Apr. 21, 2015	Apr. 23, 2015	Apr. 23, 2015	June 3, 2015

Requested by: Russell Y. Tsuji, Land Administrator

Summary of Proposed Project

Title: DEIS for the Schofield Generating Station Project, U.S. Army Garrison, Hawaii

Project by: Hawaiian Electric Company by its consultant Tetra Tech, Inc.

Location: Wahiawa District, Island of Oahu, TMK(s): (1) 77001001, 002; (1) 73001001, 002, 006, 007, 008, 009, 011, 012, 013, 019, 022 & 024; 91) 76001001 & 006; (1) 94012001, 003 & 011

Brief Description: The applicant proposes the construction, ownership, operation and maintenance of a 50-megawatt (MW) biofuel-capable power generation plant (the Schofield Generating Station or SGS) and a sub-transmission line to connect the plant to the Hawaiian Electric Grid.

For Hawaiian Electric, the SGSP would provide a quick-starting facility to help maintain grid stability and compensate for increasing network penetration by variable power generation, such as wind and solar; provide a facility at a higher elevation and away from coastlines, which contributes to grid reliability and continuity if a natural disaster occurs; provide a physically secure facility on a military installation, contributing to grid continuity if a natural disaster occurs; provide a physically secure facility on a military installation, contributing to grid continuity of operation in cases of a manmade threat; and make progress towards the State Renewable Portfolio Standards.

For the Army the SGSP would provide energy security for its three installations if loss of service occurs from the normal sources of electricity supporting these installations. It would also help

achieve the Army goals of producing renewable energy on Army-owned real property and increasing installation use of electricity from renewable energy sources.

Comments: The Division has no objections to the proposed project since it is not expected to have significant adverse impact on aquatic resource values in this area. The Division is also in agreement with the Best Management Practices (BMPs) that have been suggested by the applicant. In addition to the listed BMPs, we request that the applicant should take mitigative measures during construction activities to prevent contaminants such as sediment, pollutants, petroleum products, and other debris from possibly entering the aquatic environment. We also suggest that site work be scheduled during periods of minimal rainfall and lands denuded of vegetation be replanted or covered as quickly as possible to control erosion.

Thank you for providing DAR the opportunity to review and comment on the proposed project.

August 6, 2015

Mr. Alton Miyasaka
Acting Administrator
Division of Aquatic Resources
Department of Land and Natural Resources
State of Hawai'i
P.O. Box 621
Honolulu, HI 96809

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. Miyasaka:

Thank you for your letter concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

We appreciate your taking the time to review the draft EIS and understand that your department has no objections, but has requested that Hawaiian Electric take mitigative measures during construction activities to prevent contaminants such as sediment, pollutants, petroleum products, and other debris from possibly entering the aquatic environment. You also suggest that site work be scheduled during periods of minimal rainfall and lands denuded of vegetation be replanted or covered as quickly as possible to control erosion.

As described in section 3.11.2.1.1 of the EIS, prior to the start of construction, Hawaiian Electric will prepare a site-specific hazardous materials management plan detailing relevant best management practices for construction activities, including proper chemical storage, spill prevention, and spill response.

Also, as stated in section 3.7.2.1.1, permit coverage for stormwater runoff from the construction site will be obtained under the NPDES General Permit Authorizing Discharges of Stormwater Associated with Construction Activity (Hawai'i Administrative Rules, Chapter 11-55 Appendix C; expires December 5, 2018) issued by the Department of Health, Clean Water Branch. The permit requires that a project-specific stormwater pollution prevention plan (SWPPP) be prepared. The SWPPP will identify potential sources of stormwater pollution at the construction site, describe stormwater control measures to reduce or eliminate pollutants in stormwater discharges from the construction site, and identify procedures the permittee will implement to comply with the terms and conditions of this general permit. Other provisions of the general permit include:

- Designing, installing, and maintaining erosion and sediment controls that minimize the discharge of pollutants from earth-disturbing activities.
- Minimizing the amount of soil exposed during construction.
- Completing installation of stormwater controls prior to earth-disturbance.
- Ensuring that all erosion and sediment controls remain in effective operating condition during permit coverage and are protected from activities that would reduce their effectiveness.
- Stabilizing exposed portions of the site.
- Designing, installing, and maintaining effective pollution prevention measures to prevent the discharge of pollutants, including measures to prevent pollution from equipment used on and activities performed at the construction site.

The best management practices in the hazardous materials management plan and SWPPP will minimize the potential for contaminants such as sediment, pollutants, petroleum products, and other debris from entering the aquatic environment and minimize erosion.

Your letter has been assigned identification number S009 and will be included, along with this response letter, in appendix A of the final EIS. We will provide a copy of the final EIS to you when it is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

S010

DAVID Y. IGE
GOVERNOR OF HAWAII

CARTY S. CHANG
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KEKOA KALUHIWA
FIRST DEPUTY

W. ROY HARDY
ACTING 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
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FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

April 21, 2015

MEMORANDUM

RECEIVED
LAND DIVISION
2015 MAY 29 AM 10:45
DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

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

FR:

To:

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Draft Environmental Impact Statement (DEIS) for the Schofield Generating Station Project, U.S. Army Garrison, Hawaii
LOCATION: See Figure 3.1-1 and Table 3.1-1
APPLICANT: Hawaiian Electric Company by its consultant Tetra Tech, Inc.

Transmitted for your review and comments on the above-referenced documents. We would appreciate your comments on these documents which can be viewed online at www.garrison.hawaii.army.mil/schofieldplant.

Please submit any comments by June 3, 2015. If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Supervising Land Agent Steve Molmen at (808) 587-0439. Thank you.

Attachments

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

Signed: /s/ W. Roy Hardy
Print Name: Acting Deputy Director
Date: May 27, 2015

FILE ID: RFD. A1723
DOC ID: 12768

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON

DENISE ANTOLINI
KAMANA BEAMER
MICHAEL G. BUCK
MILTON D. PAVAO
VIRGINIA PRESSLER, M.D.
JONATHAN STARR

W. ROY HARDY
ACTING DEPUTY DIRECTOR

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

May 27, 2015

REF: RFD.4172.3

TO: Russell Tsuji, Administrator
Land Division

FROM: W. Roy Hardy, Acting Deputy Director
Commission on Water Resource Management

SUBJECT: DEIS for the Schofield Generating Station Project, U.S. Army Garrison

FILE NO.:
TMK NO.:

S010a

Thank you for the opportunity to review the subject document. The Commission on Water Resource Management (CWRM) is the agency responsible for administering the State Water Code (Code). Under the Code, all waters of the State are held in trust for the benefit of the citizens of the State, therefore, all water use is subject to legally protected water rights. CWRM strongly promotes the efficient use of Hawaii's water resources through conservation measures and appropriate resource management. For more information, please refer to the State Water Code, Chapter 174C, Hawaii Revised Statutes, and Hawaii Administrative Rules, Chapters 13-167 to 13-171. These documents are available via the Internet at http://www.hawaii.gov/dlnr/cwrm.

Our comments related to water resources are checked off below.

S010b

☒ 1. We recommend coordination with the county to incorporate this project into the county's Water Use and Development Plan. Please contact the respective Planning Department and/or Department of Water Supply for further information.

☐ 2. We recommend coordination with the Engineering Division of the State Department of Land and Natural Resources to incorporate this project into the State Water Projects Plan.

☐ 3. We recommend coordination with the Hawaii Department of Agriculture (HDOA) to incorporate the reclassification of agricultural zoned land and the redistribution of agricultural resources into the State's Agricultural Water Use and Development Plan (AWUDP). Please contact the HDOA for more information.

S010c

☒ 4. We recommend that water efficient fixtures be installed and water efficient practices implemented throughout the development to reduce the increased demand on the area's freshwater resources. Reducing the water usage of a home or building may earn credit towards Leadership in Energy and Environmental Design (LEED) certification. More information on LEED certification is available at http://www.usgbc.org/leed. A listing of fixtures certified by the EPA as having high water efficiency can be found at http://www.epa.gov/watersense/.

S010d

☒ 5. We recommend the use of best management practices (BMP) for stormwater management to minimize the impact of the project to the existing area's hydrology while maintaining on-site infiltration and preventing polluted runoff from storm events. Stormwater management BMPs may earn credit toward LEED certification. More information on stormwater BMPs can be found at http://hawaii.gov/dbedt/czm/initiative/lid.php.

S010e

☒ 6. We recommend the use of alternative water sources, wherever practicable.

☐ 7. We recommend participating in the Hawaii Green Business Program, that assists and recognizes businesses that strive to operate in an environmentally and socially responsible manner. The program description can be found online at http://energy.hawaii.gov/green-business-program

☐ 8. We recommend adopting landscape irrigation conservation best management practices endorsed by the Landscape Industry Council of Hawaii. These practices can be found online at http://www.hawaiiscape.com/wp-content/uploads/2013/04/LICH_Irrigation_Conservation_BMPs.pdf

☐ 9. There may be the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality.

Permits required by CWRM:
Additional information and forms are available at http://hawaii.gov/dlnr/cwrm/info_permits.htm.

☐ 10. The proposed water supply source for the project is located in a designated water management area, and a Water Use Permit is required prior to use of water. The Water Use Permit may be conditioned on the requirement to use dual line water supply systems for new industrial and commercial developments.

☐ 11. A Well Construction Permit(s) is (are) required before any well construction work begins.

☐ 12. A Pump Installation Permit(s) is (are) required before ground water is developed as a source of supply for the project.

☐ 13. There is (are) well(s) located on or adjacent to this project. If wells are not planned to be used and will be affected by any new construction, they must be properly abandoned and sealed. A permit for well abandonment must be obtained.

☐ 14. Ground water withdrawals from this project may affect streamflows, which may require an instream flow standard amendment.

☐ 15. A Stream Channel Alteration Permit(s) is (are) required before any alteration(s) can be made to the bed and/or banks of a stream channel.

☐ 16. A Stream Diversion Works Permit(s) is (are) required before any stream diversion works is (are) constructed or altered.

☐ 17. A Petition to Amend the Interim Instream Flow Standard is required for any new or expanded diversion(s) of surface water.

☐ 18. The planned source of water for this project has not been identified in this report. Therefore, we cannot determine what permits or petitions are required from our office, or whether there are potential impacts to water resources.

☒ OTHER: S010f
The report should provide an estimate of the total projected water demand for the proposed plant. The last paragaph under the discussion of potable water (Section 3.13.1.3 on page 3-122) describes the Pearl Harbor Aquifer Sector Area and its sustainable yield and allocation amounts. However, the wells that will provide the additional water needed to support the project are located in the Central Sector, which has a sustainable yield of 23 mgd, of which 22.978 mgd have been allocated.

If there are any questions, please contact Lenore Ohye of the Planning Branch at 587-0216.

August 6, 2015

Mr. W. Roy Hardy
Acting Deputy Director
Commission on Water Resource Management
Department of Land and Natural Resources
State of Hawai'i
P.O. Box 621
Honolulu, HI 96809

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. Hardy:

Thank you for your letter concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

Your letter has been assigned identification number S010 and will be included, along with this response letter, in appendix A of the final EIS. As your letter included detailed comments on the draft EIS, we have annotated each comment with a reference number from S010b to S010f (S010a is the introduction provided in your letter). Your letter, with the annotations included, is attached to provide a reference to the responses provided.

Comment Responses *(listed by reference number)*:

S010b. The Schofield Generating Station will connect directly to the Army's water systems, and will be permitted through the U.S. Army Garrison-Hawai'i Department of Public Works permitting process instead of the County Department of Permitting and Planning. Hawaiian Electric will coordinate with the Army to ensure that the Schofield Generating Station is incorporated into the garrison's water use and development plan.

S010c. Thank you for the suggestion. Hawaiian Electric does not intend for this facility to pursue LEED certification, but will investigate the benefits of water efficient fixtures.

S010d. Thank you for the suggestion. Hawaiian Electric does not intend for this facility to pursue LEED certification, but will consider stormwater management best management practices as discussed in section 3.7 of the EIS.

S010e. Hawaiian Electric has evaluated alternate water sources, such as the treated water available from the wastewater treatment facility at Wheeler Army Airfield. To date, alternate water sources have not demonstrated the ability to meet the project's requirements. The company will continue to evaluate water source options.

S010f. In section 3.13.1.3, Potable Water, the last paragraph has been replaced with the following text:

> "Schofield Barracks' groundwater comes from the Schofield Shaft in the Central Sector of the Central Oahu Watershed (Dashiell 2007). The Army is the second largest federal potable water user in the Central Oahu Watershed (first being the Navy). The Army's total permitted use is 5.648 mgd from the Schofield Shaft. As of March 2015, the Army's actual usage was 3.159 mgd (Bogdanski 2015). The generating station would use approximately 1,100 gallons of water per day; however, even with this addition, the Army's water use would remain well below its permitted use, so effects would be minor."

The following reference was added to section 7 of the EIS:

> Bogdanski, Liz, Environmental Compliance Branch Clean Air/Safe Drinking Water Program, Department of Public Works, U.S. Army Garrison-Hawai'i. 2015. Personal communication, June 30, 2015.

We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

S011

DAVID Y. IGE
GOVERNOR OF HAWAII

CARTY S. CHANG
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KEKOA KALUHIWA
FIRST DEPUTY

W. ROY HARDY
ACTING 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
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HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

RECEIVED
LAND DIVISION
2015 JUN -3 AM 10: 52
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII
'15 APR 22 AM 10:50 ENGINEERING

April 21, 2015

MEMORANDUM

TO: FR:

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

TO:

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Draft Environmental Impact Statement (DEIS) for the Schofield Generating Station Project, U.S. Army Garrison, Hawaii
LOCATION: See Figure 3.1-1 and Table 3.1-1
APPLICANT: Hawaiian Electric Company by its consultant Tetra Tech, Inc.

Transmitted for your review and comments on the above-referenced documents. We would appreciate your comments on these documents which can be viewed online at www.garrison.hawaii.army.mil/schofieldplant.

Please submit any comments by June 3, 2015. If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Supervising Land Agent Steve Molmen at (808) 587-0439. Thank you.

Attachments

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

Signed: _____
Print Name: Carty S. Chang, Chief Engineer
Date: 4/27/15

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/Russell Y. Tsuji
REF: Intergovernmental Review of Federally-Funded Programs: Draft FYs 2016-2017 Overall Work Programs
Oahu.032

COMMENTS

( ) We confirm that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Flood Zone ___.

( ) Please take note that the project site according to the Flood Insurance Rate Map (FIRM), is located in Zone ___.

( ) Please note that the correct Flood Zone Designation for the project site according to the Flood Insurance Rate Map (FIRM) is ___.

(X) Please note that the project(s) located in the Flood Hazard Zones (A, AO, AH, AE, AEF, V, VE, and XS) must comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations (44CFR), whenever development within a Special Flood Hazard Area is undertaken. If there are any questions, please contact the State NFIP Coordinator, Ms. Carol Tyau-Beam, of the Department of Land and Natural Resources, Engineering Division at (808) 587-0267.

Please be advised that 44CFR indicates the minimum standards set forth by the NFIP. Your Community's local flood ordinance may prove to be more restrictive and thus take precedence over the minimum NFIP standards. If there are questions regarding the local flood ordinances, please contact the applicable County NFIP Coordinators below:

(X) Mr. Mario Siu Li at (808) 768-8098 of the City and County of Honolulu, Department of Planning and Permitting.

( ) Mr. Carter Romero (Acting) at (808) 961-8943 of the County of Hawaii, Department of Public Works.

( ) Ms. Carolyn Cortez at (808) 270-7253 of the County of Maui, Department of Planning.

( ) Mr. Stanford Iwamoto at (808) 241-4896 of the County of Kauai, Department of Public Works.

( ) The applicant should include project water demands and infrastructure required to meet water demands. Please note that the implementation of any State-sponsored projects requiring water service from the Honolulu Board of Water Supply system must first obtain water allocation credits from the Engineering Division before it can receive a building permit and/or water meter.

( ) The applicant should provide the water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update.

( ) Additional Comments: _____

( ) Other: _____

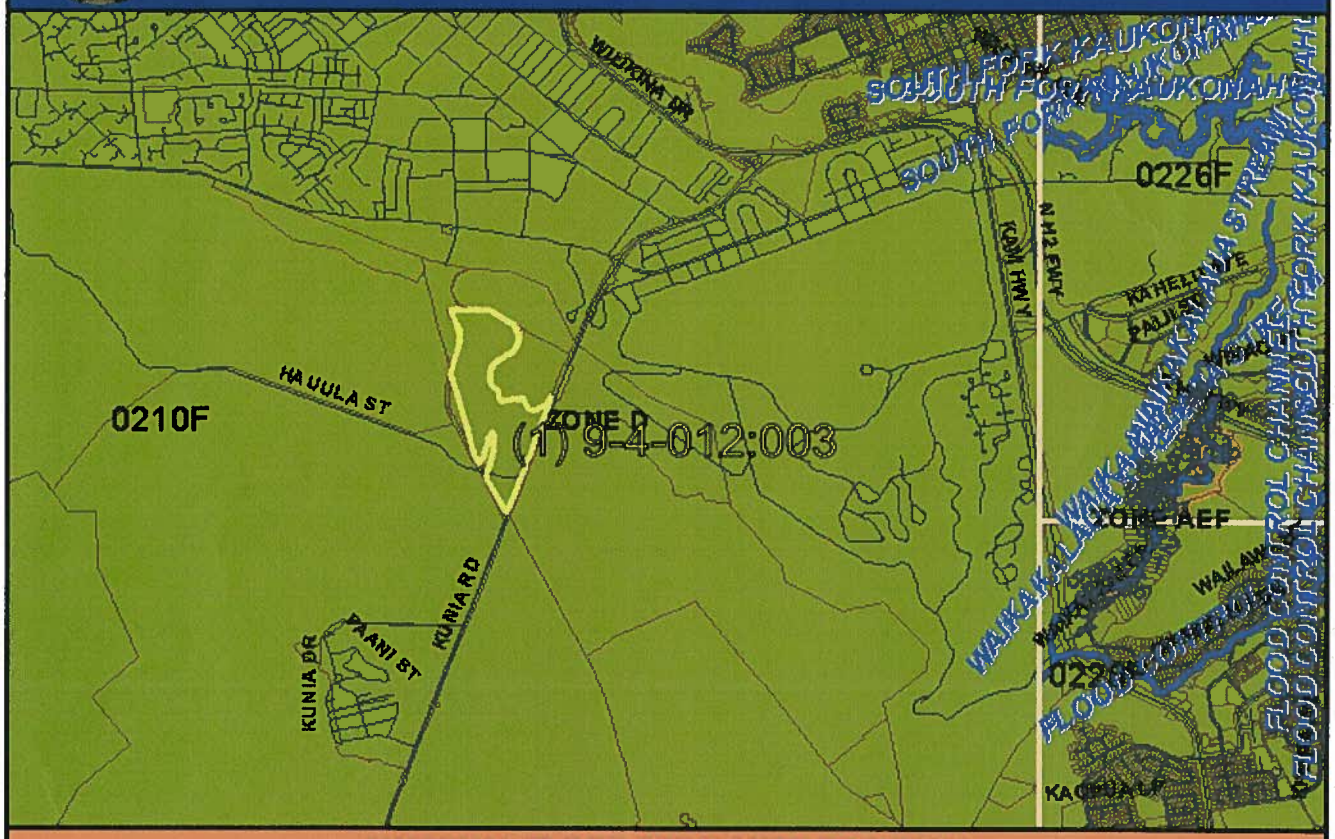
Should you have any questions, please call Mr. Dennis Imada of the Planning Branch at 587-0257.

Signed: _____
CARTY S. CHANG, CHIEF ENGINEER

Date: 6/2/15

State of Hawaii

FLOOD HAZARD ASSESSMENT REPORT



NATIONAL FLOOD INSURANCE PROGRAM

FLOOD ZONE DEFINITIONS

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD – The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water-surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies in these zones:

- **Zone A:** No BFE determined.
- **Zone AE:** BFE determined.
- **Zone AH:** Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined.
- **Zone AO:** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined.
- **Zone V:** Coastal flood zone with velocity hazard (wave action); no BFE determined.
- **Zone VE:** Coastal flood zone with velocity hazard (wave action); BFE determined.
- **Zone AEF:** Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE.

NON-SPECIAL FLOOD HAZARD AREA – An area in a low-to-moderate risk flood zone. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

- **Zone XS (X shaded):** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- **Zone X:** Areas determined to be outside the 0.2% annual chance floodplain.

OTHER FLOOD AREAS

- **Zone D:** Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

PROPERTY INFORMATION

COUNTY:	HONOLULU
TMK NO:	(1) 9-4-012-003
PARCEL ADDRESS:	
FIRM INDEX DATE:	NOVEMBER 05, 2014
LETTER OF MAP CHANGE(S):	NONE
FEMA FIRM PANEL(S):	15003C0210F
PANEL EFFECTIVE DATE:	PANEL NOT PRINTED
PARCEL DATA FROM:	APRIL 2014
IMAGERY DATA FROM:	MAY 2006

IMPORTANT PHONE NUMBERS

County NFIP Coordinator	
City and County of Honolulu	
Mario Siu-Li, CFM	(808) 768-8098
State NFIP Coordinator	
Carol Tyau-Beam, P.E., CFM	(808) 587-0267

Disclaimer: The Department of Land and Natural Resources (DLNR) assumes no responsibility arising from the use of the information contained in this report. Viewers/Users are responsible for verifying the accuracy of the information and agree to indemnify the DLNR from any liability, which may arise from its use.

If this map has been identified as 'PRELIMINARY' or 'UNOFFICIAL', please note that it is being provided for informational purposes and is not to be used for official/legal decisions, regulatory compliance, or flood insurance rating. Contact your county NFIP coordinator for flood zone determinations to be used for compliance with local floodplain management regulations.

August 6, 2015

Mr. Carty S. Chang
Chief Engineer
Engineering Division
Department of Land and Natural Resources
State of Hawai'i
P.O. Box 621
Honolulu, HI 96809

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. Chang:

Thank you for your letter concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

The Army and Hawaiian Electric are aware of the requirements your letter identifies with regard to development in flood hazard areas. Although the transmission line will cross water bodies that are designated Federal Emergency Management Agency special flood hazard area zone AE, no construction will occur in those areas.

The last paragraph of section 3.7.1.1 in the EIS has been edited to clarify:

> "The generating station parcel and the interconnection easement and surrounding properties are not in a floodplain designated by the Federal Emergency Management Agency (Hawaii-NFIP 2013). The eastern portion of the interconnection easement, where poles 31-41 are proposed, crosses ~~lies in a~~ flood zone AE—areas subject to inundation by the 1 percent annual chance flood event—however, no construction is planned within the area designated flood zone AE. The remainder of the project area, including the generating station parcel, is in a flood zone D—unstudied areas where flood hazards are undetermined but flooding is possible."

In section 3.7.2.1.1, the text in blue has been added where indicated:

> "No adverse effects on the coastal zone would be expected from construction of the SGSP. A copy of agency coordination under CZMA is provided as Appendix D.
>
> Construction would not take place in designated flood hazard areas. No adverse effects with regards to flooding would be expected.
>
> No adverse effects on groundwater would be expected during construction."

Your letter has been assigned identification number S011 and will be included, along with this response letter, in appendix A of the final EIS. We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

S012

SHPD/LD

RECEIVED
OFFICE OF CONSERVATION
AND COASTAL LANDS
2015 JUN -9 A 11: 39
DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

RECEIVED
2015 JUN -8 AM 10: 40
DEPT. OF LAND
& NATURAL RESOURCES
STATE OF HAWAII

PHONE (808) 594-1888 FAX (808) 594-1938

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
560 N. NIMITZ HWY., SUITE 200
HONOLULU, HAWAI'I 96817

RECEIVED
LAND DIVISION
2015 JUN 8 PM 3: 01
DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

HRD15/5858C

June 2, 2015

Department of the Army
Directorate of Public Works, USAG-HI
ATTN: IMHW-PWE (L. Graham)
947 Wright Avenue, Wheeler Army Airfield
Schofield Barracks, HI 96857-5013

S012a

Re: Request for Comments for Draft Environmental Impact Statement for the Schofield Generating Station Project by the Department of the Army and the Hawaiian Electric Company
Waikele Ahupua'a, 'Ewa Moku, O'ahu Mokupuni

Aloha Colonel Richard Fromm:

The Office of Hawaiian Affairs (OHA) is in receipt of your April 15, 2015 letter requesting comments on the draft environmental impact statement (DEIS) for the Schofield Generating Station Project. The project is a joint effort between the U.S. Army Garrison, Hawai'i (USAG-HI) and the Hawaiian Electric Company (HECO).

The proposed project entails the construction, operation, and maintenance of a 50-megawatt capacity renewable energy power plant and associated power poles, high-tension power lines, and related equipment and facilities. The power plant will be biofuel-capable and have a 46-kilovolt sub-transmission line that is required to connect the Schofield Generating Station to the HECO grid at the Wahiawā Substation. The State of Hawai'i Department of Land and Natural Resources has granted an easement to HECO, in order to lay the sub-transmission line across State of Hawai'i land and connect it to the Wahiawā Substation. HECO will be responsible for all operation and maintenance of the power plant.

The purpose of the project is two-fold: to provide improved energy security to the USAG-HI at Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia; and to provide secure and renewable energy generation to the electric grid on O'ahu.

S012b

OHA is aware that an archaeological inventory survey and a cultural impact assessment were completed in 2014, and that no historic sites were identified at the proposed project site. We also understand that your consultants have reached a conclusion that there is a low likelihood of archaeological and historical resources being impacted in the area of the proposed power plant, due to the previous use of the land for agricultural purposes and subsequent heavy use by the military as a right-of-way. Nevertheless, OHA does request assurances that should iwi kūpuna or Native Hawaiian cultural deposits be identified during any ground altering activities, all work will immediately cease and the appropriate agencies, including OHA, will be contacted pursuant to applicable law.

S012c

Finally, we note that the draft EIS does not adequately identify the project's construction funding source and the need for a new power generating plant. The project's primary purpose appears to be to provide energy security for the Schofield and Wheeler military installations, however, we understand that primary funding of the construction, maintenance, and operations of the plant will be borne by HECO and therefore its ratepayers. We seek confirmation as to this funding. We also understand that the electricity generated by the plant will be distributed to O'ahu HECO customers, which includes the two military installations, with the caveat that during an emergency situation, the two military installations would be powered first. This, however, does not justify the need for the building of a new power generating facility, in relation to current or expected energy demand in the area, and we therefore request this be addressed more fully in the final EIS. With the potential for roof-top solar at Schofield and Wheeler installations and the emphasis on renewable energy production in Hawai'i, as described in policy such as the Aloha+ Challenge, we would have liked to see the Army do more to support clean energy, rather than remaining tied to traditional power generating plants.

S012d

Mahalo for the opportunity to comment. Should you have any questions, please contact Jeannin Jeremiah at 594-1790 or by email at jeanninj@oha.org.

'O wau iho nō me ka 'oia 'i'o,

Kamana'opono M. Crabbe, Ph.D.
Ka Pouhana, Chief Executive Officer

KC:jj

C: Suzanne Case, Chairperson – State of Hawai'i Department of Land and Natural Resources

**Please address replies and similar, future correspondence to our agency:*

Dr. Kamana'opono Crabbe
Attn: OHA Compliance Enforcement
560 N. Nimitz Hwy, Ste. 200
Honolulu, HI 96817

August 6, 2015

Kamana'opono M. Crabbe, Ph.D.
Chief Executive Officer
Office of Hawaiian Affairs
State of Hawai'i
560 N. Nimitz Hwy., Suite 200
Honolulu, HI 96817

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Dr. Crabbe:

Thank you for your letter concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

Your letter has been assigned identification number S012 and will be included, along with this response letter, in appendix A of the final EIS. As your letter included detailed comments on the draft EIS, we have annotated each comment with a reference number from S012b to S012d (S012a is the introduction provided in your letter). Your letter, with the annotations included, is attached to provide a reference to the responses provided.

Comment Responses *(listed by reference number)*:

S012b. The following language has been added to the end of the last paragraph of section 3.10.2.1.1 of the EIS:

> "However, should iwi küpuna or Native Hawaiian cultural deposits be identified during any ground-altering activities, all work would immediately cease and the required agencies would be contacted pursuant to applicable law. In addition, the State of Hawaii Office of Hawaiian Affairs would be notified."

S012c. Providing energy security to the Army's facilities is one of the many purposes of the project. The other purposes, which benefit all Hawaiian Electric customers, are discussed in sections 1.3 and 1.4 of the EIS, and are further detailed in Hawaiian Electric's application to the Public Utilities Commission (PUC) in Docket 2014-0113.

The project will provide electrical power to all Hawaiian Electric customers during normal operations, which are expected to be the vast majority of the project's 30-year life. In the event of specific

contingencies, the project will have the capability to provide power directly to the Army's installations, thereby providing an energy security guarantee to the Army that will serve as in-kind consideration in lieu of lease rent payment for the life of the project. The Army also is contributing financially to the up-front development costs of the project.

Detailed analyses of the costs and benefits of this arrangement are provided in PUC Docket 2014-0113. The analyses show that this agreement is anticipated to save Hawaiian Electric's customers more than $12 million over the life of the project. Based on the merits of the project and the cost and benefits to the residents of O'ahu, Hawaiian Electric is seeking permission from the PUC to recover, via revenue from its customers, project costs that are not provided by the Army. This financing arrangement will be clarified in section 2.2.5 in the final version of the EIS.

S012d. Section 2.4 of the EIS discusses alternatives to the proposed action that were considered. None of the alternatives, including solar installations, would have met the objectives and requirements of the Army or Hawaiian Electric.

The planning criteria used by Hawaiian Electric to determine the need for new generating capacity on O'ahu are not based upon localized electrical demand, but rather on projected island-wide demand versus projected island-wide generation capacity, and the capabilities of the available generation facilities to provide specific energy services.

The need for the type of new renewable generation capacity that the project will provide is discussed in sections 1.4.3 and 1.4.4 of the EIS. Subsequent to the drafting of the EIS, the state's renewable portfolio standard (RPS) listed in section 1.4.3 increased, and the section has been revised in the final EIS to reflect the new, higher RPS. The state's updated goal of 100 percent renewable energy by 2045 is anticipated to strengthen the requirement to shift the existing generation portfolio on O'ahu to the type of new flexible generation that the SGSP will provide, which will enable the integration of more as-available renewable generation sources such as wind and solar. In addition, the achievement of the 100 percent renewable goal while maintaining system reliability will require that firm generating units be capable of using renewable biofuels, as the proposed SGSP will be.

We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

S013

UNIVERSITY of HAWAI'I SYSTEM

Office of Capital Improvements

June 8, 2015

Brian E. Peck
Chief, Military Planning and Environmental Compliance Branch
Department of the Army
Directorate of Public Works
U.S. Army Garrison, Hawaii
ATTN: IMHW-PWE (L.Graham)
947 Wright Avenue
Wheeler Army Airfield
Schofield Barracks, Hawaii 96857-5013

VIA: sgspcomments@tetratech.com

Dear Mr. Peck,

Subject: Draft Environmental Impact Statement
Schofield Generating Station Project
U.S. Army Garrison, Hawaii

Thank you for the opportunity to review and comment on your DEIS for the subject project.

The University of Hawai'i, Office of Capital Improvements has no comment.

Sincerely,

Maynard Young
Manager, Facilities Planning and Design

1960 East West Road, Biomedical Sciences B-102
Honolulu, Hawai'i 96822
Telephone: (808) 956-7935
Fax: (808) 956-3175

An Equal Opportunity/Affirmative Action Institution

August 6, 2015

Mr. Maynard Young
Manager
Facilities Planning and Design
Office of Capital Improvements
University of Hawai'i
1960 East West Rd., Biomedical Sciences B-102
Honolulu, HI 96822

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. Young:

Thank you for your letter concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

We appreciate your taking the time to review the draft EIS and understand that the Office of Capital Improvements has no comments at this time. Your letter has been assigned identification number S013 and will be included, along with this response letter, in appendix A of the final EIS. We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

S014

OFFICE OF REPRESENTATIVE MARCUS R. OSHIRO

State Capitol, Room 424, Honolulu, Hawaii 96813
Phone: (808) 586-6700 • Fax: (808) 586-6702 • E-Mail: repmoshiro@capitol.hawaii.gov

January 8, 2015

Department of the Army
Directorate of Public Works
U.S. Army Garrison, Hawaii
ATTN: IMHW-PWE (L. Graham)
947 Wright Avenue
Wheeler Army Airfield
Schofield Barracks, Hawaii 96857-5013

Re: Draft Environmental Impact Statement (DEIS) for the Schofield Generating Station Project (SGSP),

Dear Directorate of Public Works,

Please accept this letter as my official comments on the Draft Environmental Impact Statement (DEIS) for the Schofield Generating Station Project (SGSP), U. S. Army Garrison, Hawaii, that envisions a lease of Army land and the State of Hawaii Department of Land and Natural Resources, (DLNR) granting of a 1.28-acre easement and a 0.7-acre conservation district authorization to the Hawaiian Electric Company, Inc. for the construction and operation of a 50-megawatt biofuel power generation plant and 46-kilovolt sub-transmission line.

I am writing in support of the project for the specific reasons set forth in the DEIS Executive Summary that states in relevant part:

"The needs of the Proposed Action are as follows:

- Increase energy security for the Army and Oahu,
- Assist the Army in compliance with renewable energy-related laws and Executive Orders and meeting its renewable energy goals,
- Assist Hawaiian Electric in meeting the Hawaii Renewable Portfolio Standard goals, and
- Improve future electrical generation on Oahu."

My further support arises from my understanding that Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia require about 32 megawatts of peak power to meet all operational requirements and that the construction and operation of the SGSP would help insure that the Army can continue critical national security and first responder missions, particularly when the electrical grid on Oahu has been compromised by a natural or man-made disaster. I also lend my strong support to the project because of the ability of the SGSP to use locally produced bio-fuel as a fuel source.

In closing, it is for the reasons stated above that I submit these comments in support of the SGSP. Please contact my office should I be of any assistance with

Yours truly,

REPRESENTATIVE MARCUS R. OSHIRO
46th District (Wahaiwa, Whitmore Village, Launani Valley)

MRO:maal

August 6, 2015

The Honorable Marcus R. Oshiro
Representative District 46
State of Hawai'i
State Capitol, Rm. 424
Honolulu, HI 96813

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. Oshiro:

Thank you for your letter concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

We appreciate your taking the time to review the draft EIS and appreciate your comments in support of the project. Your letter has been assigned identification number S014 and will be included, along with this response letter, in appendix A of the final EIS. We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

DAVID Y. IGE
GOVERNOR OF HAWAII

COPY

VIRGINIA PRESSLER, M.D.
DIRECTOR OF HEALTH

S015

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

In reply, please refer to:
File:

15-365A CAB

June 3, 2015

Ms. Suzanne Case
Chairperson
Department of Land and Natural Resources
State of Hawaii
1151 Punchbowl Street, Room 131
Honolulu, Hawaii 96813

Dear Ms. Case:

SUBJECT: **Draft Environmental Impact Statement**
Schofield Generating Station Project
Wahiawa District, Oahu

Air Pollution Control Permit S015a
As noted in your document, the project will require an air permit from the Clean Air Branch. The project must comply with all applicable permit conditions and requirements.

Control of Fugitive Dust S015b
A significant potential for fugitive dust emissions exists during all phases of construction. The activities must comply with the provisions of Hawaii Administrative Rules, §11-60.1-33 on Fugitive Dust. We encourage the contractor to implement a dust control plan, which does not require approval by the Department of Health, to comply with the fugitive dust regulations. The dust control measures listed in your document should be implemented where appropriate; additional measures may include, but are not limited to, the following:

a) Planning the different phases of construction, focusing on minimizing the amount of dust-generating materials and activities, centralizing on-site vehicular traffic routes, and locating potential dust-generating equipment in areas of the least impact;
b) Providing an adequate water source at the site prior to start-up of construction activities;
c) Landscaping and providing rapid covering of bare areas, including slopes, starting from the initial grading phase;
d) Minimizing dust from shoulders and access roads;
e) Providing adequate dust control measures during weekends, after hours, and prior to daily start-up of construction activities; and
f) Controlling dust from debris being hauled away from the project site. Also, controlling dust from daily operations of material being processed, stockpiled, and hauled to and from the facility.

If you have any questions, please contact Mr. Barry Ching of the Clean Air Branch at 586-4200.

Sincerely,

Nolan S. Hirai

NOLAN S. HIRAI, P.E.
Manager, Clean Air Branch

BC:rg

c: Jack Shriver, Hawaiian Electric Company, Inc.
Kristin Shields, Tetra Tech, Inc.

August 6, 2015

Mr. Nolan S. Hirai, P.E.
Manager
Clean Air Branch
Department of Health
State of Hawai'i
P.O. Box 3378
Honolulu, HI 96817

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. Hirai:

Thank you for your letter concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

As your letter included detailed comments on the draft EIS, we have annotated the comments with reference numbers S015a and S015b. Your letter, with the annotations included, is attached to provide a reference for the responses provided.

Comment Responses *(listed by reference number)*:

S015a. As noted, Hawaiian Electric will apply for an air permit from the Clean Air Branch. The project will comply with all applicable permit conditions and requirements.

S015b. The comment is consistent with sections 3.4.2.1.1 and 3.4.2.1.3 of the EIS. The following dust control measures outlined in the comment have been added to the list in section 3.4.2.1.3 (in addition to those already in the EIS):

- "Planning the different phases of construction, focusing on minimizing the amount of dust-generating materials and activities, centralizing on-site vehicular traffic routes, and locating potential dust-generating equipment in areas of the least impact.
- Providing an adequate water source at the site prior to start-up of construction activities.
- Landscaping and providing rapid cover of bare areas, including slopes, starting from the initial grading phase.
- Minimizing dust from shoulders and access roads.
- Providing adequate dust control measures during weekends, after hours, and prior to daily start-up of construction activities.
- Controlling dust from debris being hauled away from the project site. Also controlling dust from daily operations of material being processed, stockpiled, and hauled to and from the facility."

We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

L001

POLICE DEPARTMENT

CITY AND COUNTY OF HONOLULU

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

KIRK W. CALDWELL
MAYOR

LOUIS M. KEALOHA
CHIEF

DAVE M. KAJIHIRO
MARIE A. McCAULEY
DEPUTY CHIEFS

OUR REFERENCE MT-DK

April 27, 2015

Department of the Army
Directorate of Public Works
U.S. Army Garrison, Hawaii
Attention: IMHW-PWE (L. Graham)
947 Wright Avenue
Wheeler Army Airfield
Schofield Barracks, Hawaii 96857-5013

Dear L. Graham:

This is in response to Chief Brian E. Peck's request for comments on a Draft Environmental Impact Statement for the Schofield Generating Station Project, U.S. Army Garrison, Hawaii.

Based on the information provided, this project should have no significant impact on the services or operations of the Honolulu Police Department.

If there are any questions, please call Major Kerry Inouye District 2 (Wahiawa) at 723-8703.

Thank you for the opportunity to review this project.

Sincerely,

LOUIS M. KEALOHA
Chief of Police

By
MARK TSUYEMURA
Management Analyst VI
Office of the Chief

Serving and Protecting With Aloha

August 6, 2015

Mr. Louis M. Kealoha
Chief of Police
Police Department
City and County of Honolulu
801 S. Beretania St.
Honolulu, HI 96813

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Chief Kealoha:

Thank you for your letter concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

We appreciate your taking the time to review the draft EIS and understand that the Honolulu Police Department has no comments at this time. Your letter has been assigned identification number L001 and will be included, along with this response letter, in appendix A of the final EIS. We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

L002

HONOLULU FIRE DEPARTMENT

CITY AND COUNTY OF HONOLULU

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

KIRK CALDWELL
MAYOR

MANUEL P. NEVES
FIRE CHIEF

LIONEL CAMARA JR.
DEPUTY FIRE CHIEF

April 28, 2015

Department of the Army
Directorate of Public Works
U.S. Army Garrison, Hawaii
Attention IMHW-PWE (L. Graham)
947 Wright Avenue
Wheeler Army Airfield
Schofield Barracks, Hawaii 96857-5013

Dear Mr. Graham:

L002a

In response to a letter from Mr. Brian Peck, Chief of the Military Planning and Environmental Compliance Branch, dated April 15, 2015, regarding the above-mentioned subject, the Honolulu Fire Department (HFD) requires that the following be complied with:

L002b

1. Fire department access roads shall be provided such that any portion of the facility or any portion of an exterior wall of the first story of the building is located not more than 150 feet (46 m) from fire department access roads as measured by an approved route around the exterior of the building or facility. (National Fire Protection Association [NFPA] 1 Uniform Fire Code [UFC]™, 2006 Edition, Section 18.2.3.2.2.)

   A fire department access road shall extend to within 50 feet (15 m) of at least one exterior door that can be opened from the outside and provides access to the interior of the building. (NFPA 1 UFC™, 2006 Edition, Section 18.2.3.2.1.)

L002c

2. A water supply approved by the county, capable of supplying the required fire flow for fire protection, shall be provided to all premises upon which facilities or buildings, or portions thereof, are hereafter constructed, or moved into or within the county. When any portion of the facility or building is in excess of 150 feet (45 720 mm) from a

water supply on a fire apparatus access road, as measured by an approved route around the exterior of the facility or building, on-site fire hydrants and mains capable of supplying the required fire flow shall be provided when required by the AHJ [Authority Having Jurisdiction]. (NFPA 1 UFC™, 2006 Edition, Section 18.3.1, as amended.)

3. Submit civil drawings to the HFD for review and approval. L002d

Should you have questions, please contact Battalion Chief Terry Seelig of our Fire Prevention Bureau at 723-7151 or tseelig@honolulu.gov.

SOCRATES D. BRATAKOS
Assistant Chief

SDB/SY:bh

August 6, 2015

Mr. Socrates D. Bratakos
Assistant Chief
Fire Department
City and County of Honolulu
636 South Street
Honolulu, HI 96813-5007

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. Bratakos:

Thank you for your letter concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

Your letter has been assigned identification number L002 and will be included, along with this response letter, in appendix A of the final EIS. As your letter included detailed comments on the draft EIS, we have annotated each comment with a reference number from L002b to L002d (L002a is the introduction provided in your letter). Your letter, with the annotations included, is attached to provide a reference to the responses provided.

Comment Responses *(listed by reference number)*:

L002b. The design of the SGSP will comply with the applicable requirements of the Uniform Fire Code.

L002c. The design of the SGSP will comply with the applicable requirements of the Uniform Fire Code.

L002d. Honolulu Fire Department permits and approvals for the project will be sought as detailed in Table 2.2-2 of the EIS.

We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

L003

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 3RD FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8305 • Fax: (808) 768-4730 • Internet: www.honolulu.gov

KIRK CALDWELL
MAYOR

MICHAEL D. FORMBY
DIRECTOR

MARK N. GARRITY, AICP
DEPUTY DIRECTOR

TP4/15-606359R

May 29, 2015

Department of the Army
Directorate of Public Works
U.S. Army Garrison, Hawaii
947 Wright Avenue
Wheeler Army Airfield
Schofield Barracks, Hawaii 96857-5013

Attention: IMHW-PWE (L. Graham)

Dear Project Planner:

SUBJECT: Draft Environmental Impact Statement for the Schofield Generating Station Project, Schofield Barracks, Honolulu, Oahu, Hawaii

In response to your letter dated April 15, 2015, we have no comments to offer at this time.

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

Very truly yours,

for Michael D. Formby
Director

August 6, 2015

Mr. Michael D. Formby
Director
Department of Transportation Services
City and County of Honolulu
650 S. King St., 3rd Floor
Honolulu, HI 96813

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. Formby:

Thank you for your letter concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

We appreciate your taking the time to review the draft EIS and understand that the Department of Transportation Services has no comments at this time. Your letter has been assigned identification number L003 and will be included, along with this response letter, in appendix A of the final EIS. We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

L004

BOARD OF WATER SUPPLY

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

KIRK CALDWELL, MAYOR

DUANE R. MIYASHIRO, Chair
ADAM C. WONG, Vice Chair
THERESIA C. McMURDO
DAVID C. HULIHEE
KAPUA SPROAT

ROSS S. SASAMURA, Ex-Officio
FORD N. FUCHIGAMI, Ex-Officio

ERNEST Y. W. LAU, P.E.
Manager and Chief Engineer

ELLEN E. KITAMURA, P.E.
Deputy Manager and Chief Engineer

June 5, 2015

Mr. Brian E. Peck
Chief, Military Planning and Environmental
Compliance Branch
Department of the Army
Directorate of Public Works
U.S. Army Garrison, Hawaii 96857

Attention: IMHW-PWE (L. Graham)

Dear Mr. Peck:

Subject: Your Letter Dated April 15, 2015 Requesting Comments on the Draft Environmental Impact Statement for the Schofield Generating Station Project Tax Map Key: 7-7-001: 001, 002; 7-3-001:001, 002, 006, 007, 008, 009, 011, 012, 013, 019, 022, 024; 7-6-001; 7-6-001, 006; 9-4-012: 001, 003, 011

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

We do not have a water system in the vicinity of the proposed generating plant. Water service should be provided by the private water system in this area.

The construction drawings for the 46 kilovolt sub-transmission line should be submitted for our review.

If you have any questions, please contact Robert Chun, Project Review Branch of our Water Resources Division at 748-5443.

Very truly yours,

ERNEST Y. W. LAU, P.E.
Manager and Chief Engineer

August 6, 2015

Mr. Ernest Y. W. Lau, P.E.
Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, HI 96843

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. Lau:

Thank you for your letter concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

We appreciate your taking the time to review the draft EIS. The proposed generating station will be connected to the U.S. Army Garrison-Hawai'i's water system as discussed in section 2.2.1.6 of the EIS. Construction drawings for the sub-transmission line will be submitted for review once available.
Your letter has been assigned identification number L004 and will be included, along with this response letter, in appendix A of the final EIS. We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

L005

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8480 • Fax: (808) 768-4567
Web site: www.honolulu.gov

KIRK CALDWELL
MAYOR

ROBERT J. KRONING, P.E.
DIRECTOR

MARK YONAMINE, P.E.
DEPUTY DIRECTOR

June 8, 2015

Department of the Army
Directorate of Public Works
U.S. Army Garrison
947 Wright Avenue
Scholfield Barracks, Hawaii 96857

Attn: L. Graham

Dear Sir or Madam:

Subject: Draft Environmental Impact Statement
Scholfield Generating Station Project
U.S. Army Garrison, Hawaii

The Department of Design and Construction does not have comments to offer on the draft environmental impact statement.

Thank you for the opportunity to review and comment. Should there be any questions, please contact me at 768-8480.

Sincerely,

Robert J. Kroning, P.E.
Director

RJK: cf (606329)

August 6, 2015

Mr. Robert J. Kroning, P.E.
Director
Department of Design and Construction
City and County of Honolulu
650 S. King Street, 11th Floor
Honolulu, HI 96813

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. Kroning:

Thank you for your letter concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

We appreciate your taking the time to review the draft EIS and understand that the Department of Design and Construction has no comments at this time. Your letter has been assigned identification number L005 and will be included, along with this response letter, in appendix A of the final EIS. We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

L006

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 768-8000 • FAX: (808) 768-6041
DEPT. WEB SITE: www.honoluludpp.org • CITY WEB SITE: www.honolulu.gov

KIRK CALDWELL
MAYOR

GEORGE I. ATTA, FAICP
DIRECTOR

ARTHUR D. CHALLACOMBE
DEPUTY DIRECTOR

2015/ELOG-753 (lw)

June 5, 2015

Department of the Army
Directorate of Public Works
U. S. Army Garrison, Hawaii
947 Wright Avenue
Wheeler Army Airfield
Schofield Barracks, Hawaii 96857-5013

Attention: IMHW-PWE (L. Graham)

Dear Ms. Graham:

Thank you for your letter dated April 15, 2015, regarding a request for comments on a Draft Environmental Impact Statement (DEIS) for the Schofield Generating Station Project, U. S. Army Garrison, Hawaii. We have reviewed the DEIS and do not have any comments to offer at this time.

Should you have any questions, please contact Lin Wong of our staff at 768-8018.

Very truly yours,

for George I. Atta, FAICP
Director

GIA:bkg
1250632

August 6, 2015

Mr. George I. Atta, FAICP
Director
Department of Planning and Permitting
City and County of Honolulu
650 S. King Street, 7th Floor
Honolulu, HI 96813

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. Atta:

Thank you for your letter concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

We appreciate your taking the time to review the draft EIS and understand that the Department of Planning and Permitting has no comments at this time. Your letter has been assigned identification number L006 and will be included, along with this response letter, in appendix A of the final EIS. We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

L007

DEPARTMENT OF COMMUNITY SERVICES
CITY AND COUNTY OF HONOLULU
715 SOUTH KING STREET, SUITE 311 ● HONOLULU, HAWAII 96813 ● AREA CODE 808 ● PHONE: 768-7762 ● FAX: 768-7792

KIRK CALDWELL
MAYOR

GARY K. NAKATA
DIRECTOR DESIGNATE

BARBARA YAMASHITA
DEPUTY DIRECTOR

June 17, 2015

Department of the Army
Directorate of the Public Works
U.S. Army Garrison, Hawaii
947 Wright Avenue
Wheeler Army Airfield
Schofield Barracks, Hawaii 96857-5013
ATTN: IMHW-PWE (L. Graham)

Dear Chief Peck:

Subject: Title 32 of the Code of Federal Regulations part 651
ENVIRONMENTAL IMPACT STATEMENT
Schofield Generating Station Project
United States Army Garrison, Hawaii

We have reviewed your letter dated April 15, 2015 and the enclosed Draft Environmental Impact Statement for the Schofield Generating Station Project, U.S. Army Garrison, Hawaii.

Our review of the documents provided indicate that the proposed project will have no adverse impacts on any Department of Community Services activities or projects at this time.

Thank you for providing us with the opportunity to comment on this matter.

Sincerely,

Gary K. Nakata
Director Designate

GKN:jc

August 6, 2015

Mr. Gary K. Nakata
Director Designate
Department of Community Services
City and County of Honolulu
715 S. King St., Suite 311
Honolulu, HI 96813

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. Nakata:

Thank you for your letter concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

We appreciate your taking the time to review the draft EIS and understand that the Department of Community Services acknowledges that the project will have no adverse impacts on the department's activities or projects at this time. Your letter has been assigned identification number L007 and will be included, along with this response letter, in appendix A of the final EIS. We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

B001

Hawaiian Telcom

May 13, 2015

Department of the Army
Directorate of Public Works
U.S. Army Garrison, Hawaii
ATTN: IMHW-PWE (L. Graham)
947 Wright Avenue
Wheeler Army Airfield, Schofield Barracks, Hawaii 96857-5013

Dear Ms. Graham:

Subject: **Draft Environmental Impact Statement**
Schofield Generating Station Project
United States Army Garrison, Hawaii

Thank you for the opportunity to review and comment on the Draft Environmental Impact Statement regarding the subject project.

Hawaiian Telcom does not have any comments to offer at this time.

If you have any questions or require assistance in the future on this project, please call me at 546-7761.

Sincerely,

Les Loo
Network Engineer – OSP Engineering
Network Engineering & Planning

cc: File

August 6, 2015

Mr. Les Loo
Network Engineer–OSP Engineering
Network Engineering & Planning
Hawaiian Telecom
P.O. Box 2200
Honolulu, HI 96841

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. Loo:

Thank you for your letter concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

We appreciate your taking the time to review the draft EIS and understand that Hawaiian Telecom has no comments at this time. Your letter has been assigned identification number B001 and will be included, along with this response letter, in appendix A of the final EIS. We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

O001

May 21, 2015

Before the US Army Public Meeting at Wahiawa District Park Recreation Center, Wahiawa HI

Re: Supporting Testimony DEIS for construction of 50 Megawatt Power Plant at Schofield Barracks

This testimony is to provide the support of Wahiawa's oldest community association (76 years) the Wahiawa Community and Business Association (WCBA) to the draft environmental impact statement (DEIS) for the Schofield Generating Station Project.

The WCBA Government Action Committee reviewed the comprehensive DEIS and has determined the important issues were satisfactorily addressed including issues regarding cultural, land use and wild life preservation and conservation were eliminated or minimized.

There are many benefits to the Army and to Hawaii including grid reliability and improved Army disaster response capabilities. Of special interest to Wahiawa is improved outage restoration for our community.

The WCBA is in support of this project. The US army has a long-standing reputation for caring for the lands entrusted to them. We strongly urge that the Army proceed toward the implementation of this project.

Sincerely,

Walter R. Benavitz Jr.
Government Action Committee Chair

Wahiawa Community & Business Association
P. O. 861408
Wahiawa, Hawaii 96786

August 6, 2015

Mr. Walter R. Benavitz, Jr.
Government Action Committee Chair
Wahiawa Community & Business Association
P.O. Box 861408
Wahiawa, HI 96786

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. Benavitz:

Thank you for your letter concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

We appreciate your taking the time to review the draft EIS, and the Wahiawa Community & Business Association's expressed support for the project. Your letter has been assigned identification number O001 and will be included, along with this response letter, in appendix A of the final EIS. We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

P001

From: Ed Wagner <[redacted]>
Sent: Thursday, May 14, 2015 3:55 PM
To: DIV.SGSP Comments
Subject: Statement of Position AGAINST HECO-ARMY Carbon-based Generator Project At Schofield Barracks, Hawaii
Attachments: Small Modular Reactors Senator Fred Hemmings.pdf; Energy Independence Now - Fred Hemmings.pdf

To whom it may concern,

http://www.garrison.hawaii.army.mil/schofieldplant/

Will Rogers said, "Steal a million dollars from one person, and you're a crook, but steal a dollar from a million people and you are a utility."

I am surprised that the Army is so supportive of our 19th century dinosaur utility monopoly in its continued pursuit of profit at all costs to ratepayers and planet and its efforts to survive as a monopoly for another 100 years by continuing to use carbon-based fuels - oil, diesel, bio-fuel, and the most environmentally dangerous of all carbon-based fossil fuels, fracked LNG for the next 20 or more years.

If the PUC had done its job the past 102 years since it was formed in 1913 with a mandate to insure that there would never be a utility monopoly in Hawaii, we would not be in this mess. HECO even falsified history to create its new logo.

The HECO monopoly is a serious threat to both State and National security with its incompetent 19th century mentality. Community-based power will provide far greater security and better support of Civil Defense than this financially strapped company or any other monopoly like Nextera.

Nextera is not the Lone Ranger and Tonto coming to save us nor is HECO, a company that rules this town like an out of control outlaw gang in a wild west town of the 1880's. Neither company is our saint and savior. Neither company's management could tell the truth if their lives depended on it, even if they were waterboarded. They are blinded too much by their insatiable lust for and worship of money. They have sold their souls to the devil, and redemption is impossible.

Nextera's Hawaii TV ads are all lies, and if it lies enough times, the people, AND the Army will begin to believe its lies, and those of HECO, as the God's gospel truth. Be careful of a wolf and an alligator in sheep's clothing.

Both companies continue to spread their hush money / bribe money around to silence dissent in the community. Neither has altruistic motives. It's all about profits, not the people, not Spaceship Earth.

UH Regents : Please Say No to Fossil Fuels

http://www.civilbeat.com/2015/05/uh-regents-please-say-no-to-fossil-fuels/

The Army should support the UH in its efforts to divest itself from fossil fuel investments by rejecting HECO's plan for a 19th century generator at Schofield Barracks and move into the 21st century with true renewable energy.

"The goal is nothing less than the salvation of Earth as we know it." - All the more reason for everyone, including the Army, to support all efforts to push HECO out of the way and convert the monopoly to community-owned non-profit power like Hawaii Island, Maui, Oahu, and now Kulolo.org are pushing to do.

The Legislative goal of 100% renewable by 2045 is a wimpy goal based solely upon HECO's need to survive at the expense of the ratepayers and planet. HECO is a classic example of capitalism gone amuck. If we landed a man on the moon in 10 years, we can be 100% renewable in 10 years as well. We just have to have the political will to do it, starting with pushing HECO out of the way.

The Army wants to support HECO's continued carbon-based fuel use in the form of a NEW Schofield Barracks generator to stabilize the grid and provide more grid reliability. The generator will run on biofuel (carbon-based), diesel (fossil fuel), and most importantly, LNG fossil fuel, to protect HECO's profits and monopoly. If HECO has its way, the generator will run primarily on LNG.

As Henry Curtis of Life of the Land pointed out, decarbonization is not a Hawaii goal, although it should be a common sense goal. Carbon-based biofuels are renewable energy under Hawaii law.

"If the amount of energy produced by rooftop solar exactly matches the amount of energy produced by grid-connected fossil fuel generators then Hawai`i has achieved a Renewable Portfolio Standard of 100% according to Hawaii Revised Statutes 269-91."

"Hawai`i would have a totally black grid and have achieved its 100% renewable goal."

http://ililanimedia.blogspot.com/2015/05/aiming-for-moon-100-percent-renewable.html

http://www.civilbeat.com/2015/05/look-closer-when-talking-about-renewable-energy-percentages/

Perhaps the Army can move into the 21st century by installing wind turbines at the Kolekole pass and install more rooftop PV and a solar farm on Schofield and / or Wheeler AAF, and use utility-scale batteries like those announced by Tesla to stabilize the grid with intermittent renewable energy from sun and wind. HECO was or still is in discussion with Moloka'i about batteries to stabilize and improve grid reliability and is researching battery technology for its own use.

Here is a new technology blade-less wind turbine that may be more suitable for Hawaii.

http://www.forbes.com/sites/billtucker/2015/05/07/wind-power-without-the-mills/

Another option might be to sequester a Small Modular Nuclear Reactor (SMR) like those in the Pearl Harbor submarine fleet, at Schofield. After hurricane Iniki, one of those subs went to Kaua'i with the intention of connecting its SMR to the grid to provide badly needed power, but the Navy decided to use diesel generators instead because of the time and resources needed to connect the SMR to the grid.

This SMR approach is one that has often been promoted by retired Hawaii Senator, Fred Hemmings. See his attached arguments for using SMRs. He is on the Bcc line in case he wants to add his 2 cents in separate testimony.

Attorney John Carroll continues with his open lawsuit against the HEI monopoly and the State of Hawaii for breach of public trust, Article XI of our Constitution. The Honolulu rail and Ho'opili are similar Article XI violations and will be dealt with in court as well.

http://pac.petitions.moveon.org/sign/class-action-lawsuit-6/

Retired Senator Fred Hemmings speaking out against HEI
https://www.youtube.com/watch?v=m16aoMSQhDo

Senator Solomon scolding HECO executives in January, 2013
https://www.youtube.com/watch?v=QTKifphm3j8

Senator Solomon talking about a consumer owned grid
https://www.youtube.com/watch?v=Yi2LCyIzvQM

Henry Curtis of Life of the Land gives an excellent, thorough and frank assessment of the dangers lurking behind the scenes for Hawaii ratepayers.

Henry Curtis @ Kokua Council, Jan. 26, 2015
https://www.youtube.com/watch?v=kfCxRrpZtE0&feature=youtu.be

Feb. 2
NEXTERA SENIOR MANAGEMENT IS ABOUT AS INNOVATIVE AS A BROWN PAPER BAG AT YOUR LOCAL GROCERY STORE
https://plus.google.com/112193033219319144952/posts/EovKE1tineE

Dec. 24
NEXTERA ENERGY - IF YOU LIKE ABUSE, THEN THIS COMPANY IS FOR YOU. POLITICS AND BULLY TACTICS ARE THE NORM - JAN-FEB 2014 - GLASSDOOR
https://plus.google.com/112193033219319144952/posts/EhaD9GzgfQE

HEARTBREAKING COMMENTS FROM PETITION SIGNERS ABOUT GETTING SCREWED BY HAWAIIAN ELECTRIC MONOPOLY
https://plus.google.com/112193033219319144952/posts/RombxSH9nYL

This next video explains what the idolatry of money is doing to destroy our only home, Spaceship Earth.

https://www.facebook.com/PrinceEaHipHop/videos/10153278998454769/

NRG electric utility CEO speaking about a sustainable future:

"And make no mistake about our children. They will hold all of us accountable – true believers and climate deniers alike. The day is coming when our children sit us down in our dotage, look us straight in the eye, with an acute sense of betrayal and disappointment in theirs, and whisper to us, "You knew... and you didn't do anything about it. Why?" And for a long time, our string of excuses has run something like this: "We didn't have the technology...it would have been ruinously expensive...the government didn't make us do it..."

But now we have the technology – actually, the suite of technologies – and they are safe, reliable and affordable as well as sustainable. They do not represent a compromise to our ability to enjoy a modern lifestyle. They represent an opportunity for us to do the right thing while multiplying shareholder value through greater value-

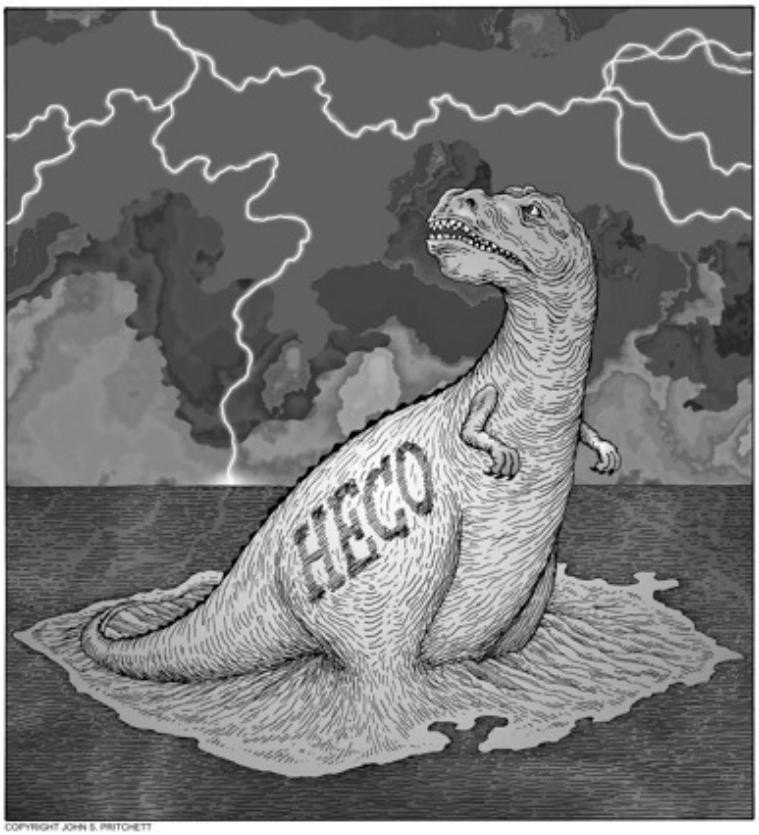
added services. And these technological solutions are focused on the individual consumer - both businesses and individuals.

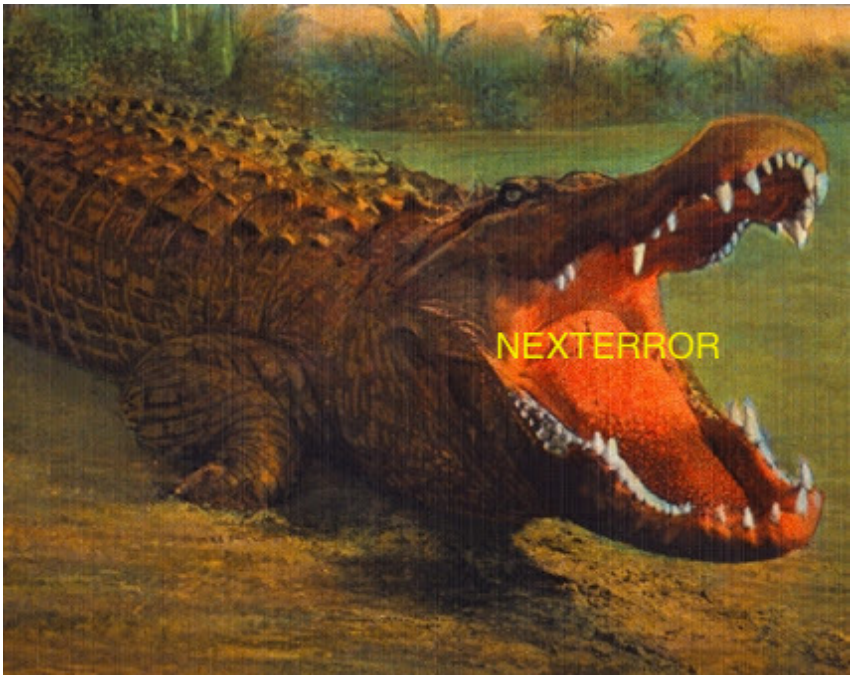
– so the shameful passivity and failure to act of government is irrelevant.

The time for action is now; we have run out of time for more excuses.""

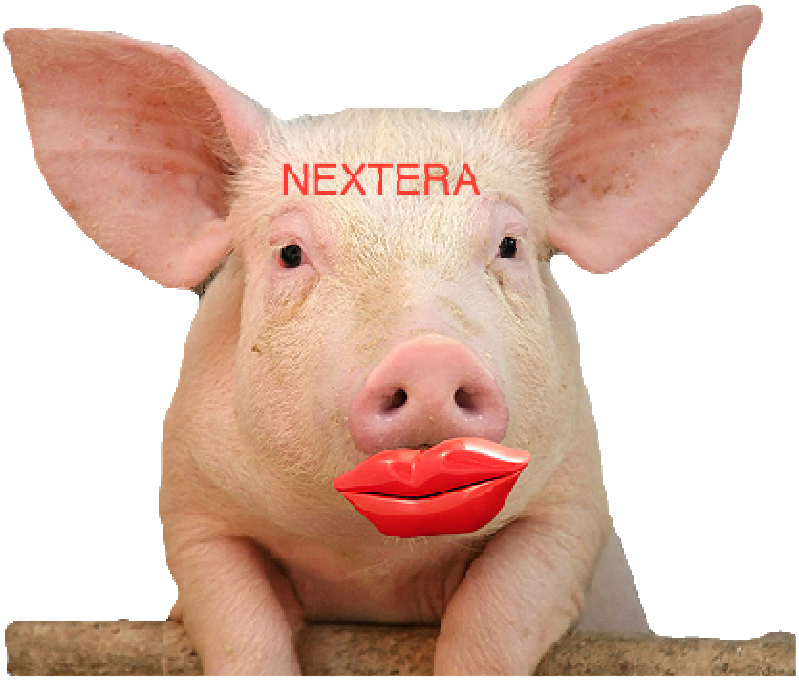
I encourage the Army to learn the truth about HECO from the ratepayer perspective, reject this ill-conceived project that is self-serving to HECO's need to survive as a monopoly and to maintain its profits, and move into the 21st century with true renewable energy that is not carbon-based like this generator project. The survival of Spaceship Earth depends on it.

Facebook.com/stopheco




NEXTERROR

James Robo
Robert Gould
Alan Oshima
Eric Gleason
Colton Ching
Constance Lau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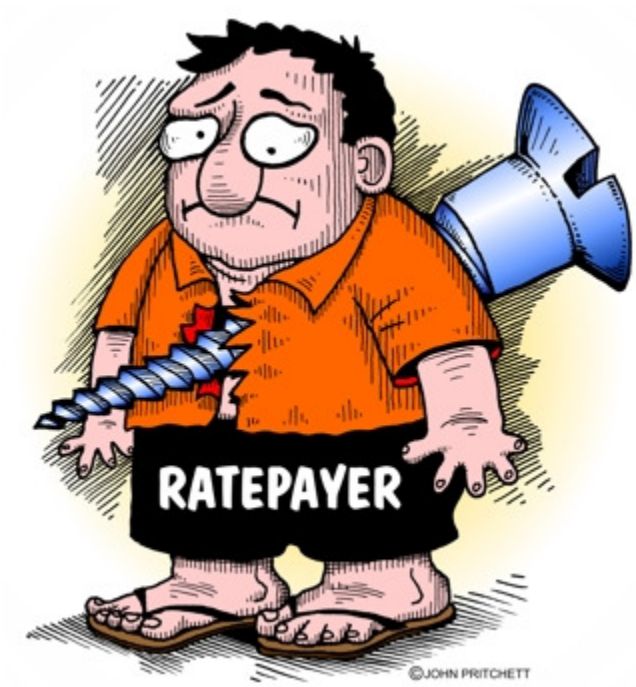

RATEPAYER
©JOHN PRITCHETT

Clean Up
Your MESS!
Love Mother

Mahalo Nui,

Ed Wagner

[redacted]
Mililani, HI 96789

Energy Independence Now

Fred Hemmings

Hawaii and America can become energy self-sufficient, weaned from most fossil fuels, and enjoying affordable clean energy within a generation.

The United States Navy can lead the way by developing safe Small Modular Reactors known as SMRs. It is important to note that the United States military has been the source of many modern day, high tech resources, including the internet. SMRs are generally defined as producing 250 megawatts (MW) of electricity or less that can be sequestered safely, even underground. SMRs are designed to easily shut down not melt down. Two hundred fifty megawatts of electricity can provide enough electricity for thousands of homes. The United States Navy already operates the safest form of energy in the world, nuclear propelled submarines and ships. More people have died in one coal mine or oil rig accident than in all the history of nuclear energy in America. It is my proposal to have the Navy utilize their resources to build and deploy Energy Ships. The Navy does not have to endure the 10 year multimillion dollar plus expense of licensing from the Nuclear Regulatory Commission.

In Hawaii the Department of Defense pays over $220 million annually to the local electric company. Unfortunately for the Hawaii's citizens their electricity costs are 3 times the national average and our state is woefully over-dependent on fossil fuels. Most of the military's energy is consumed at Pearl Harbor. Pearl Harbor already has the highest concentration of SMRs in the world, they are called nuclear submarines. One 250 MW Energy Ship that I am proposing would generate enough electricity to power the military in Hawaii. At night excess capacity could energize ground transportation and if need be desalinate water. All this at no additional cost because nuclear energy is 24/7 firm capacity. An Energy Ship could produce energy for decades. Besides affordable electricity an Energy Ship would also provide the military with base security and independence. At current electricity costs an Energy Ship would pay for itself quickly. Energy Ships could be easily deployed to bases around the world. An Energy Ship would also become very handy when the Navy is involved in humanitarian missions. Electricity and clean water are usually in dire need after a natural disaster.

The United States Navy would prove once again that nuclear energy is the solution to our energy and environmental woes. Our nation and Hawaii then could follow the lead of the Navy to develop SMRs for civilian use.

I expect the naysayers will have a knee jerk negative reaction to my proposal. Facts and experience will provide evidence that emotion-based opposition is in error. This happened in the Eighties when the "just-say-no" crowd opposed geothermal energy on the Big Island which I vigorously supported. Some naysayers will also cite the State constitution as banning nuclear energy in Hawaii that is not true.

Most of the world's existing nuclear plants are dinosaurs. They are large and if they go off line it creates a massive shortage of electricity. They need to be replaced. SMRs are the answer.
SMRs can be redundant and built incrementally without the multibillion capital costs of a large nuclear plant. Several SMRs at one site would also provide for redundancy. One SMR could be shut down for maintenance while the others continue to produce electricity. In Hawaii this could easily break up the dependency and inefficiencies of the massive distribution system of Hawaii's monopolistic electric company. Local independent energy production with inter-connections could be a reality. Remember even currently popular natural gas is a fossil fuel.
In addition by not having to depend on less than friendly nations for imported oil Hawaii and our nation would be more secure. Abundant affordable electricity would also put the American automobile industry on the fast track to develop electric cars. That would put America back in the driver's seat of the global automotive industry Enlightened thinkers see the wisdom in SMRs because SMRs would solve the carbon emission problem. Yes wind and solar power are great but they are expensive and not firm capacity. Safe Nuclear energy is cheaper than wind and solar and is reliable. Most of the nation of France's energy comes from nuclear generation and France recycles approximately 80% of their nuclear waste. The day will come when spent nuclear fuel can be recycled or neutralized.

Do you remember the first cell phones? They were the size of a soda bottle. Now look at them. Economies of scale provided the resources for massive development of "smart phones" That same formula would be true for the future of nuclear energy.

I foresee the day when individual neighborhoods and large buildings will have totally sealed and safe SMRs for generation of all of their electricity. They would last for a long time and would simply be replaced rather than refueled. These SMRs would be small and self-contained.

All of this can begin with the United States Navy creating Energy Ships for deployment sooner than later. The boldness and genius of American enterprise can help lead the world to abundant, clean and safe energy.

Fred Hemmings, Hawaii State Senator (2000-2010) is a proponent for Energy independence and sustainability.

Small Modular Reactors: Creating Energy Independence for Hawaii

By Senator Fred Hemmings

Asia Pacific Clean Energy Summit & Expo September 2, 2010

It has been said that "throughout human history, those that have had the wisdom and fortitude to innovate have been the agents of change and have spawned a better world for all humanity".[1][1] In America, our freedom is the fuel of innovation.

Opportunity abounds in Hawaii. We need to be honest with ourselves in considering the reality of energy in our state. The following is well documented. The cost of electricity in the state of Hawaii is our nation's highest.[2][2] At the height of the fuel crisis in 2008, when it was politically correct to bash the oil companies, gasoline in Hawaii cost 35 percent above the national average. [3][3] At the same time, electric prices were 180 percent more than the national average. [4][4] Another sad fact is that Hawaii is one of the states with the highest potential for wind, solar, and other renewable energies, yet it is one of the most dependent on fossil fuels, coal and oil. Instead of moving forward in energy independence, in the last 20 years Hawaii has regressed. We can change this, and we must change it!

Hawaii now has the goal of being 70 percent energy independent by 2030. I say that by 2030 we could be close to 100 percent energy independent from oil and coal for electricity and ground transportation. Does this sound bold? There is an innovative solution to our energy woes which needs to be seriously considered for Hawaii. This option is nuclear energy, and most specifically small modular reactors. For too long, fear and falsehoods have kept the genie of nuclear energy in the bottle.

Let me make it perfectly clear that the Hawaii State Constitution does not, as some would believe, ban nuclear energy from Hawaii. Our Constitution says that 2/3 majority of the House and Senate must approve the use of nuclear energy in our state. What makes this codicil ludicrous is that Hawaii already has the largest concentration of nuclear reactors of any location in the world.[5][5] Currently, sixteen nuclear submarines are based in Pearl Harbor and, at any

given time, there could be up to a half dozen or more nuclear reactors sitting in the harbor. [6][6]

What does the United States military know that we in Hawaii ignore? The answer is that nuclear energy is clean, reliable, and abundant and has the best safety record of any energy source. More people have died in one coal mine or oil related accident than have died in the history of nuclear energy. The financial costs are staggering. The pollution and degradation of our environment caused by coal and oil is incalculable. If carbon emissions are the world's most pressing environmental problem, then nuclear energy is the solution. Breaking technology is now offering a safe and affordable alternative to large nuclear reactors, called Small Modular Reactors, or SMRs. Even enlightened environmentalists have changed their minds about energy and now support nuclear. Greenpeace activist Patrick Moore, Gaia theorist James Lovelock, Greenpeace UK Executive Director Stephen Tindale, Friends of the Earth board member Bishop Hugh Montefiore and environmental icon Stewart Brand have all switched sides in the nuclear energy debate, notes reporter Steve Christ in a recent issue of *Wealth Daily*.[7][7]

Let me give you reasons why small modular reactors would work for Hawaii. Small modular reactors produce from 25 to 250 mw of energy. SMRs are safe for a number of reasons. Some SMRs use a helium-cooled high-temperature system with direct-cycle gas turbines which prevents meltdown[8][8], others are traditional designs. They can be sequestered underground, thus increasing safety and security. Small modular reactors also provide redundancy—if one goes offline for repair or maintenance, the others can keep energy flowing. Another reason that SMRs make sense is cost. I am a huge proponent of wind, solar and geothermal, but, since wind and solar do not provide firm capacity, other firm energy resources must be used. Wind and solar can also be land intensive. For instance, one small SMR producing 250mw of electricity will incorporate about five acres of land. To produce the same amount of energy will take about 578 acres of land for 12 wind turbines as illustrated by the new Kahuku wind farm. [9][9]

It may not be news to you that I oppose the proposed undersea cable which is a boondoggle we cannot afford. It would contribute to the monopoly grid and could create system wide blackouts. Projected cost is over a billion dollars and does not include the wind farms. Unfortunately there are some politicians that don't understand that all business costs are ultimately paid by the consumers. The genius of small modular reactors, solar panels on roofs and wind generation is that they do not have to be centralized. In the case of energy, big is not necessarily better. Energy independence for individual houses with solar panels, communities with wind mills and select small modular reactor energy plants will

be much more cost effective and efficient in the distribution of electricity and provide for security.

Speaking of security, it is unfathomable that America is buying fossil fuel from nation states that wish our country ill. You can be sure that some of the money we are spending in the Middle East for oil ends up in the hands of Islamic extremists who have declared and are waging the war of terror. Energy independence also means geopolitical security for our state, and our nation.

Curiously, there is a rapidly developing interest in SMRs on a national level. I have been to Washington twice to give speeches on expediting Small Modular Reactor Legislation, one sponsored by the Nuclear Energy Institute in February, and most recently the Nuclear Energy Symposium in Alexandria Virginia. I also gave a similar talk to a Conference on Military Energy Independence in San Diego, California last March.

America needs to revamp the licensing of nuclear energy plants which I have outlined in suggested legislation. I have met with several congressmen who are considering the legislation to expedite licensing of SMRs. The problem in achieving this goal is a government bureaucracy called the Nuclear Regulatory Agency. Incredibly, a new nuclear energy plant is just now going online in the United States after 30 years. It takes over ten years to get a permit from the NRC, and may cost many millions of dollars. Recently a "Nuclear Caucus" has been formed in Congress.

Additionally, operating under archaic laws passed during the Jimmy Carter Administration, America is not recycling spent nuclear fuel. I'm not just speculating that recycling works. It does work. Look at France, where 80 percent of their energy comes from 59 nuclear plants and 90 percent of the waste is recycled. I'm here to tell you that with new technology and economies of scale, nuclear waste will not be a problem if we follow the example established by other countries such as France. I am holding in my hand legislation which was recently passed by the Commonwealth of the Northern Mariana Islands (CNMI). Let me read a portion of the findings cause. This was signed into law by their governor Benigno R. Fitial. CNMI has gone from an island nation that formerly banned nuclear energy to a nation and is now fast tracking its development through small modular reactors. America should lead the world in energy innovation and technology, and we can! The list of well respected companies developing SMRs includes Babcock and Wilcox, Bechtel, GE-Hitachi, Westinghouse, Toshiba, and a host of new companies such as Bill Gates' TerraPower and Hyperion.

Small modular reactors are extremely cost effective. The average cost of wind is

four to eighteen cents per kilowatt hour and solar is fourteen to thirty cents per kW hour.[10][10] These are both considered intermittent sources of power. Nuclear energy, which is a baseload source, can range from six to thirteen cents per kW hour.[11][11] Incredibly in Hawaii we are now paying about 27 cents per kW hour for electricity.[12][12]

Everyone is talking about the electric car company TESLA whose stock soared when they went public. America can once again gain world leadership in ground transportation rather than yielding to companies such as Toyota and Honda. How? Through the use of wind, sun and small modular reactors we can have enough electricity and firm capacity to energize our cars and have an entire electric fleet by 2030. Recently HECO has also agreed to generate more electricity at a reduced rate to energize electric cars. The punch line is that we don't currently have enough clean electricity in Hawaii and increased production will come from expensive fossil fuels. This doesn't make sense does it?

How about water? One small modular reactor electrical plant could provide enough energy to make an entire island, such as Kahoolawe, a virtual paradise. There would be enough excess energy produced to run a desalination plant. Water could be pumped up to a reservoir which could then irrigate the entire island or store energy. The production of abundant, clean water could be a reality statewide and contribute significantly to agriculture and food sustainability.

I freely admit that what I am proposing today may scare people and create a backlash, but we must make decisions based on fact, and not emotions based on falsehoods and outdated information. Look at the number of great initiatives that have been thwarted because of ill informed vocal opposition. The Big Island could have been energized with geothermal 25 years ago. In the eighties, I advocated to Governor Waihee what could have been a multibillion dollar industry for Hawaii. A space launch site on the southeast flank of the Big Island, which is the best place in the world for polar and equatorial launches, could have been a reality. The proposal never got off the ground, excuse the pun, because of a handful of opponents. Just recently, look what happened to the Super Ferry.

I am one state senator that sees great opportunity for our state to achieve sustainability in all its forms…food, energy, and security. We cannot stagnate. We must revolutionize energy generation in Hawaii.
Please remember the greatest strides in human history have been made by those who have not sustained the status quo, rather by those who have changed it. We can't wait for an energy evolution, we need an energy revolution. SMRs ARE revolutionary technology which could create energy independence for our

---

Recent response From Fred to email about nuclear reactors offshore.

I advocate SMR energy ships that could generate 250 MR
1. Military coastal bases (Pearl Harbor/Hickam) energy
2 . At low demand times Excess capacity at no additional
Costs could be used to desalinate water and
Energize electric vehicles.
3 this would make for independence, sustainability at
less costs in Hawaii than buying from HECO
Emery ships would be as safe or safer than nuclear
Submarines which have a perfect safety record. In addition that energy
Ships could be quickly out of port and at sea
Pending a natural or other disaster
Hopefully I can get invited to the Asian Pacific energy conference
To advocate SMRs in changing energy world

Energy ships with SMRs similar to submarines could be built and supply energy cleanly and safely. There are over 16 Nuclear submarines based at Pearl Harbor and at any time along with nuclear surface vessels numerous nuclear energy plants are in Pearl Harbor. Remember Hawaii has the highest concentration of nuclear plants any where in the world. A SMR Energy ship as I propose tied up in Hilo harbor and one tied up on the Kona coast would provide enough electricity for the big isle and non peak use could energize electric cars and desalinization plants. Not only would the reactors be safely secured on the energy ships they would also be portable. Energy ships could service all isles. Even Kahoolawe could be turned into a vibrant green isle. What happen in Japan is a logical reason why our nation must wean ourselves from archaic dinosaur big reactors that are 50 plus year old technology. For the record bio energy is inefficient and we should be using our farming resources for food. Our state desperately needs to be more self sufficient, we are precariously dependent. I am ready to assist this effort where appropriate.

Fred Hemmings

Retired Navy - Name withheld for privacy reasons

On the offshore reactor idea – I am a FIRM believer in a STATE-WIDE

GRID. That means each island connected to another through an undersea/ terrestrial backbone of high voltage power lines. I'm not sure if we want to use cryogenically-cooled cables and run HVAC or something less – but one way or another, there has to be the ability for power sharing amongst the islands if we ever want to see this state come into the modern age of energy and have an efficient energy system. Even without the oil-rig-mounted nuclear power plant, we still need cables connecting the islands. Preferably owned/operated by someone NOT HECO.

The oil-rig-mounted reactor power plant would probably be something we'd need two of, perhaps three, with one to start, on Oahu - – and the reactor doesn't need to be under a dome like the SBX – it just needs to be contained ON THE FLOATING PLATFORM with a way to ensure the ability to scuttle the system if an unforeseen event (like Fukushima) occurs that the tertiary and more redundant, higher level systems can't handle. Anyone who does not have a problem with the small footprint of SBX on the horizon on her way out to see (probably most have never even seen it) wouldn't even another oil rig/power plant located a little closer to land.

August 6, 2015

Mr. Ed Wagner
[redacted]
Mililani, HI 96789

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. Wagner:

Thank you for your email dated May 14, 2015, concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

The objectives of NEPA and Chapter 343 are to ensure that environmental concerns receive appropriate consideration in the decision making process, along with economic and technical concerns. This EIS is a disclosure document. We are responding by providing information related to the environmental concerns raised by your comments.

Regarding your list of potential fuels that could be used in the proposed project, the Army and Hawaiian Electric consider the fuel flexibility of the proposed project to be a contributor to the Army's and O'ahu's energy security. The specific sourcing of the potential fuels for the project is outside the scope of this EIS, for the reasons discussed in section 2.2.1.5 of the EIS.

Regarding your suggestion that the Army install wind and solar generation capacity supplemented by batteries instead of implementing the proposed project, similar alternatives were considered and are detailed in sections 2.4.2 and 2.4.4 of the EIS. As stated in section 2.1 of the EIS, a requirement of the proposed project is the capability to provide all of the required electrical power and energy to the Army installations for 5 continuous days without resupply from off-site and up to 30 days without resupply from off-island in the event of an extended outage (e.g., from a natural disaster or other supply interruption). The provision of a wind or solar facility—even with battery backup—could not meet that level of energy security and was not considered a viable alternative.

Regarding your suggestion to consider using a small modular reactor (SMR), that alternative was not considered because a stated purpose of the project is to provide renewable energy generation. Under current state regulations, nuclear power is not considered renewable energy, so an SMR would not contribute to the achievement of state or Army renewable energy goals.

Your email has been assigned identification number P001 and will be included, along with this response

letter, in appendix A of the final EIS. We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

P002

From: Miriam Peters <[redacted]>
Sent: Wednesday, May 20, 2015 5:49 PM
To: DIV.SGSP Comments
Subject: Bio fuel power plant comment period

My name is Miriam Peters. I am of Native Hawaiian descent. My father retired from the army in 1988, SFC Francis Peters SR. Therefore, thru the influence of the military, my family has taken up residence in the heights of Wahi'awa since 1985. I would like to submit this request to extend the comment period on the EIS of the biofuel power plant. Unfortunately, the Neighborhood Board #26 (Wahiawa/Whitmore) was in recess for the month of april, thus, many community members have just been made aware of the availability of the Evironmental Impact Statement on May 18, 2015. I would like adequate time to review the EIS and submit comment in regards to the historic land/sites that this project may disturb l and any other things that may be affected by this project.
I would like to request a minimum extention of 45 days from the dates of the second presentation planned to occur on thursday May 21, 2015. With the possibility for further extension based on the information or possible lack there of presented at a community level.
With that, Thank you for your time and concern in the comments of the public.

Miriam-Christene H. Peters

August 6, 2015

Ms. Miriam C. Peters
[redacted]
Wahiawa, HI 96786

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Ms. Peters:

Thank you for your letter concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

U.S. Army Garrison-Hawai'i and Hawaiian Electric have met and exceeded public involvement and notification requirements for the proposed project. To keep the community apprised of the development of the project and the EIS, U.S. Army Garrison-Hawai'i and Hawaiian Electric published notices in federal and state publications; distributed notices by mail; held public meetings; reached out to area elected officials, neighborhood boards, and community leaders; and provided project information at 19 libraries and online at http://www.garrison.hawaii.army.mil/schofieldplant/.

The draft EIS was made available for a full 45 days per the requirements of NEPA (40 CFR 1506.10(c)) and Hawai'i Revised Statutes Chapter 343, Environmental Impact Statements. The comment period will not be extended.

In regards to your concern that the project could affect historic lands or sites, the EIS documents the thorough analysis that was conducted of the potential for adverse effects to traditional cultural resources. A cultural impact assessment was conducted per the requirements of HEPA and a determination was made that the project would have no adverse effects on traditional cultural practices, beliefs, or resources. The EIS also was coordinated with the State Historic Preservation Division under section 106 of the National Historic Preservation Act, and the project was found to have no potential for adverse effects on archaeological resources or historic properties. The only impact to cultural resources potentially resulting from the project would be a minor adverse effect on the viewshed within the Wheeler Historic District. New poles and associated transmission lines would be visible from some of the buildings in the district. The Army and Hawaiian Electric intend to implement best management practices to minimize the visual intrusiveness of the new poles and lines.

Your letter has been assigned identification number P002 and will be included, along with this response letter, in appendix A of the final EIS. We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

P003

From: Robert Young <[redacted]>
Sent: Thursday, May 21, 2015 1:15 AM
To: DIV.SGSP Comments
Subject: Bio diesel quality

We have experience extremely poor quality biofuel on Maui. Production seems sloppy and caused fouled engines and filters. The company denied any problem and left users to repair their own rigs. Very poor customer service.

August 6, 2015

Mr. Robert Young
[redacted]

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. Young:

Thank you for your email dated 5/21/2015 concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

Thank you for sharing your experience regarding poor quality biofuel. Hawaiian Electric's biofuel contracting process includes quality assurance requirements that are designed to avoid situations such as those you describe and, if such problems do occur, to protect our customers from electrical reliability and cost repercussions.

Your email has been assigned identification number P003 and will be included, along with this response letter, in appendix A of the final EIS. We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

From: ed.j.wagner[redacted] on behalf of Stop HECO <StopHeco.Hi@gmail.com>
Sent: Thursday, May 21, 2015 2:39 PM
To: DIV.SGSP Comments
Subject: Statement of Position AGAINST HECO-ARMY Carbon-based Generator Project At Schofield Barracks, Hawaii

To Whom it may concern,

http://www.kitv.com/news/new-power-plant-could-be-headed-to-central-oahu/33141216

What will happen to this project if powers to be in Washington finally commit to downsizing the Army in Hawaii, reduce the Army presence at Schofield and WAAF, or even close them?

$170 million could put up a lot of clean PV panels, battery backup, and energy efficiency makeovers for homes and buildings.

What will happen if ratepayers succeed in winning their breach of public trust lawsuit against HECO and the State? What will happen if HECO gets kicked in the okole by a court lawsuit for its fraudulent, criminal behavior in the geothermal RFP? What will happen if the serious allegations made against Hawaiian Electric Light Company in collusion with its monopoly partner, Puna Geothermal Ventures (PGV), are proven true in the current ORMAT-PGV whistleblower lawsuit?

What will happen if the State finally rescinds the HECO franchise that it has violated for many, many years, condemns its assets, and converts the company to community-owned, non-profit power? The company is a serious threat to both state and national security, and community-owned power will be way better for both security and civil defense.

HECO falsified history just to create its new logo, and some have said, and I'm seeking proof, that it was involved in the overthrow of the monarchy in1893. It is the most unethical, immoral, unscrupulous, incompetent, financially strapped, ignorant, fraudulent and criminal organization in Hawaii. It has sold its soul to the devil, and it is beyond redemption.

It is a classic example of capitalism gone amok. It is the kind of company that hedge fund manager and philanthropist, Paul Tudor Jones II, refers to in his TED Talk - Why we need to rethink capitalism. **A laser focus on profits is, as he puts it, "threatening the very underpinnings of society."**

http://www.ted.com/talks/paul_tudor_jones_ii_why_we_need_to_rethink_capitalism

The Army wants to support HECO's continued carbon-based fuel use in the form of a new Schofield Barracks generator to stabilize the grid and provide more grid reliability. The generator will run on biofuel (carbon-based), diesel (fossil fuel), and most importantly, LNG fossil fuel, to protect HECO's profits and monopoly. If HECO has its way, the generator will run primarily on LNG, and the presentation by HECO-Army showed the LNG equipment alongside the photo of the power plant.

HECO claims that it wants to import LNG as a bridge to renewables so why is the army and HECO referring to this project as renewable? The State Energy Office submitted its own scathing testimony to the PUC about HECO's PSIPs, and stated that HECO's use of LNG will be a bridge to more LNG. Once the millions are spent

on LNG infrastructure, HECO will fight tooth and nail to keep using LNG for the next 50 years or however long supplies last, to protect its bottom line.

“UH Regents : Please Say No to Fossil Fuels” article in the news.

The Army should support the UH in its efforts to divest itself from fossil fuel investments by rejecting HECO's plan for a 19th century generator at Schofield Barracks and move into the 21st century with true renewable energy.

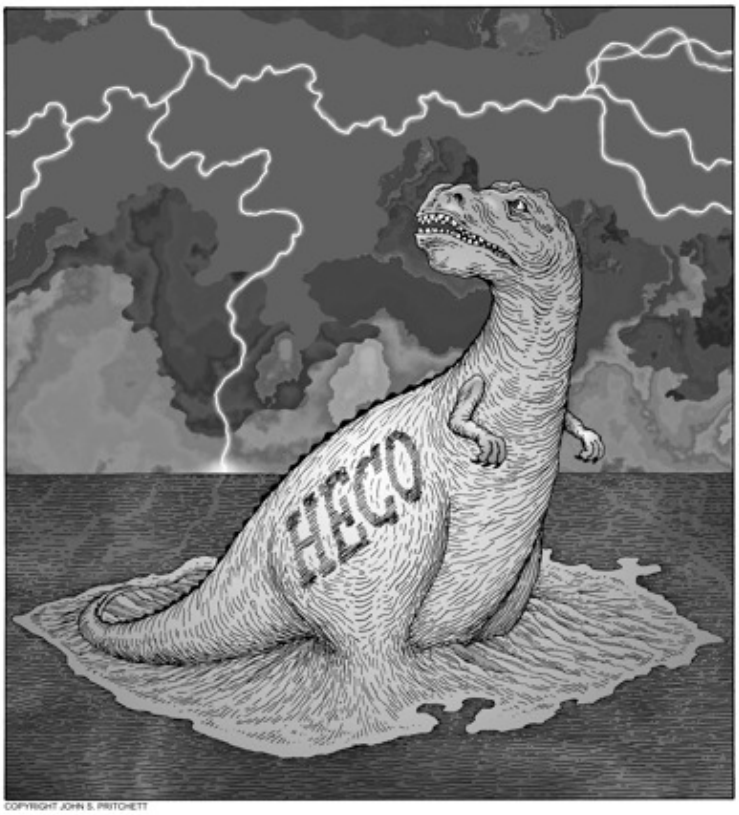
“The goal is nothing less than the salvation of Earth as we know it.” - All the more reason for everyone, including the Army, to support all efforts to push HECO out of the way and convert the monopoly to community-owned non-profit power like Hawaii Island, Maui, Oahu, and now Kulolo.org are pushing to do.

As Henry Curtis of Life of the Land pointed out, decarbonization is not a Hawaii goal, although it should be a common sense goal. Carbon-based biofuels are renewable energy under Hawaii law.

“If the amount of energy produced by rooftop solar exactly matches the amount of energy produced by grid-connected fossil fuel generators then Hawai`i has achieved a Renewable Portfolio Standard of 100% according to Hawaii Revised Statutes 269-91.”
“Hawai`i would have a totally black grid and have achieved its 100% renewable goal.”

Perhaps the Army can move into the 21st century by installing wind turbines at the Kolekole pass and install more rooftop PV and a solar farm on Schofield and / or Wheeler AAF, and use utility-scale batteries like those announced by Tesla to stabilize the grid with intermittent renewable energy from sun and wind. HECO was or still is in discussion with Moloka’i about batteries to stabilize and improve grid reliability and is researching battery technology for its own use.

I encourage the Army to learn the truth about HECO from the ratepayer perspective, reject this ill-conceived project that is self-serving to HECO's need to survive as a monopoly and to maintain its profits, and move into the 21st century with true renewable energy that is not carbon-based like this generator project. The survival of Spaceship Earth depends on it. Stop living in the 19th century with this dinosaur.



facebook.com/StopHeco

Sincerely,

Ed Wagner
Mililani, HI

August 6, 2015

Mr. Ed Wagner
[redacted]
Mililani, HI 96789

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. Wagner:

Thank you for your email dated May 21, 2015, concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

The objectives of NEPA and Chapter 343 are to ensure that environmental concerns receive appropriate consideration in the decision making process, along with economic and technical concerns. This EIS is a disclosure document. We are responding by providing information related to the environmental concerns raised by your comments.

Regarding your question about how future force reductions or base closures in Hawai'i would affect the project, any reduction in force structure in Hawai'i would not change the proposed project. Although the 32-megawatt peak electrical demand of the Army's facilities might be reduced in that case, the other purposes and needs for the project would still apply, and the benefits to all Hawaiian Electric customers would remain substantially the same.

Regarding your list of potential fuels that could be used in the proposed project, the Army and Hawaiian Electric consider the fuel flexibility of the proposed project to be a contributor to the Army's and O'ahu's energy security. The specific sourcing of the potential fuels for the project is outside the scope of this EIS, for the reasons discussed in section 2.2.1.5 of the EIS.

Regarding your question as to why the project is considered a renewable energy project, the proposed project includes a requirement to use biofuels as part of the fuel mix, as discussed in section 3.4.2.1.2. This requirement to use a minimum of 50 percent biofuel, with an annual minimum biofuel use requirement, will ensure that the project will generate renewable energy throughout the life of the project.

Regarding your suggestion that the Army install wind and solar generation capacity supplemented by batteries instead of implementing the proposed project, similar alternatives were considered and are detailed in sections 2.4.2 and 2.4.4 of the EIS. As stated in section 2.1 of the EIS, a requirement of the proposed project is the capability to provide all of the required electrical power and energy to the Army installations for 5 continuous days without resupply from offsite and up to 30 days without resupply from off-island in the event of an extended outage (e.g., from a natural disaster or other supply interruption).

The provision of a wind or solar facility—even with battery backup—could not meet that level of energy security and was not considered a viable alternative.

Your email has been assigned identification number P004 and will be included, along with this response letter, in appendix A of the final EIS. We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

From: Ed Wagner <[redacted]>
Sent: Sunday, May 31, 2015 11:23 PM
To: DIV.SGSP Comments
Cc: John Carroll; sens@capitol.hawaii.gov; reps@capitol.hawaii.gov; PUC; mark.b.glick@dbedt.hawaii.gov
Subject: Statement of Position AGAINST HECO-ARMY Generator Project At Schofield Barracks, Hawaii

To whom it may concern,

I just wanted to be clear about the very distinct possibility that Army reductions will occur at Schofield and Wheeler AAF next year. The possibility also exists that both bases will be closed and turned over to the State.

Could Army Downsizing Be Good for Oahu?
The military controls 25 percent of Oahu land. The downsizing would affect a portion of the Army, potentially paving the way for the return to the state and its people of Schofield Barracks, Wheeler Army Air Field, Dillingham Military Reservation, Makua Valley and the Kolekole Pass road, along with their structures and facilities.

http://hawaiipoliticalinfo.org/node/8109

What then becomes of this fossil fuel generator if the bases are closed and the land returned to the State?

http://www.hawaiiarmyweekly.com/2014/01/24/downsized-army-troop-levels-could-drop-to-420000-by-2019/

Army Downsizing Could Be a Great Blessing
http://hawaiipoliticalinfo.org/node/8159

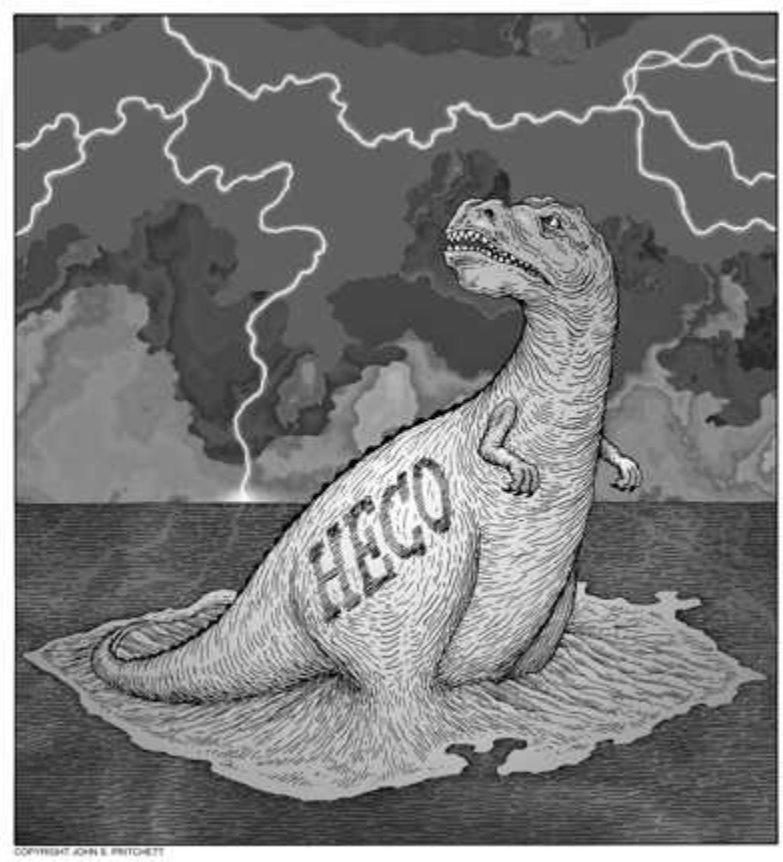
The U.S. Army is largely leaving Hawaii, but Maui Rep. Kaniela Ing is the only state official happy about it
http://mauitime.com/news/politics/u-s-army-preparing-leave-hawaii-besides-maui-rep-kaniela-ing-seem-happy-see-go/?hvid=3hrWJt

A case for army downsizing in Hawaii
http://hawaiiindependent.net/story/army-downsize-a-huge-positive-for-hawaii

Stop protecting, supporting, and perpetuating monopoly power in Hawaii when the entire State is now pushing for public power. HECO is a serious threat to State and national security, all the more reason to convert it to public power that will make Hawaii, and the military more secure than ever possible with a money worshiping dinosaur monopoly.

It literally falsified history to create its new logo and that same history suggests that it was involved in the overthrow of the Hawaiian Monarchy on January 12, 1893. It is the most incompetently managed, financially strapped, fraudulent and criminal organization in Hawaii.

Constance Lau and other top management should be stripped of their pensions and bonuses as ill gotten wealth tearing the shirts off the backs of ratepayers. Lau should be removed by the Board, stripped of her pension, and put in prison for mass financial rape of over a million ratepayers.



Sincerely,

Ed Wagner
[redacted]
Mililani, HI 96789
facebook.com/StopHeco

--
Mahalo Nui,

Ed Wagner
Facebook.com/stopheco

August 6, 2015

Mr. Ed Wagner
[redacted]
Mililani, HI 96789

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. Wagner:

Thank you for your email dated May 31, 2015, the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

The objectives of NEPA and Chapter 343 are to ensure that environmental concerns receive appropriate consideration in the decision making process, along with economic and technical concerns. This EIS is a disclosure document. We are responding by providing information related to the environmental concerns raised by your comments.

Regarding your question about how future force reductions or base closures in Hawai'i would affect the project, any reduction in force structure in Hawai'i would not change the proposed project. Although the 32-megawatt peak electrical demand of the Army's facilities might be reduced in that case, the other purposes and needs for the project would still apply, and the benefits to all Hawaiian Electric customers would remain substantially the same.

Your email has been assigned identification number P005 and will be included, along with this response letter, in appendix A of the final EIS. We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

P006

From: Fred Asmus <[redacted]>
Sent: Monday, June 01, 2015 8:48 AM
To: DIV.SGSP Comments
Subject: opposed to sgsp project

P006a
As a concerned citizen and resident of Wahiawa I am opposed to the SGSP project for a number of reasons. Mainly the need for approx. 31 new power poles that would be an eyesore to the landscape. I suggested and questioned why the lines necessary for the project could not be placed underground and was told it was economically unfeasible. I think the whole project is unfeaseable and not a benefit to the public. Also I find it absurd that the public informational meetings were not properly advertised to the community and that the comment period too short. Also the project is too close to the Wheeler Field flight path. Recently trees around the Leilehua Golf Coarse were removed due to the "hazard" to aircraft operations in the area and now the project is requesting to add more 90 foot utility poles in the project area. This seems wrong and contradictory. I am against this project. Mahalo, Fred Asmus

P006b

P006c

August 6, 2015

Mr. Fred Asmus
[redacted]
Wahiawa, Hawai'i 96786

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. Asmus:

Thank you for your email concerning the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP). This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) [Chapter 343, Hawai'i Revised Statutes (HRS)] and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

Your email has been assigned identification number P006 and will be included, along with this response letter, in appendix A of the final EIS. As your email included detailed comments on the draft EIS, we have annotated each comment with a reference number from P006a to P006c. Your email, with the annotations included, is attached to provide a reference to the responses provided.

Comment Responses *(listed by reference number)*:

P006a. As part of Hawaiian Electric's application to the Public Utilities Commission (PUC) for approval of the Schofield Generating Station Project in Docket 2014-0113, the company analyzed options for overhead versus underground transmission lines. The analysis showed that placing the lines underground would result in an estimated $15 million higher cost than placing them overhead. Based on the company's goal of reducing customer costs, the application recommended placing the lines overhead.

As required by Hawai'i state law (HRS 269-27.5), the PUC held a public hearing on this issue on January 21, 2015, to determine if the public had concerns about the placement of the 46kV lines overhead versus underground. The hearing was also attended by a representative of the Division of Consumer Advocacy. No objections to the proposed overhead lines were heard.

The decision as to whether the transmission lines would be placed overhead or underground rests with the PUC. If you wish to express your opinion that the lines should be placed underground to the greatest extent possible, Hawaiian Electric respectfully suggests that you address your concerns to the PUC (http://puc.hawaii.gov/) and/or the Division of Consumer Advocacy (http://cca.hawaii.gov/dca/) as a "public comment" to Docket 2014-0113.

P006b. U.S. Army Garrison-Hawai'i (USAG-HI) and Hawaiian Electric have met and exceeded public involvement and notification requirements for the proposed project. To keep the community apprised

of the development of the project and the EIS, USAG-HI and Hawaiian Electric published notices in federal and state publications; distributed notices by mail; held public meetings; reached out to area elected officials, neighborhood boards, and community leaders; and provided project information to 19 libraries and online at http://www.garrison.hawaii.army.mil/schofieldplant/.

The EIS was made available for a full 45 days per the requirements of NEPA (40 CFR 1506.10(c)) and HRS Chapter 343, Environmental Impact Statements. The comment period will not be extended.

P006c. Section 3.2.2 of the EIS addresses environmental consequences to airspace. As stated in section 3.2.2.1:

> "No significant impacts on airspace would be expected if the Proposed Action is implemented. Neither construction equipment nor the generating station structure would create an obstacle to air navigation or adversely affect military and civilian aviation operations. The two exhaust silencer stacks at the generating station would be approximately 95 feet above ground level, and transmission poles would be 60 to 80 feet above ground level. Some construction equipment used to build these structures would be slightly taller. The height of these structures and their proximity to Wheeler Army Airfield was a critical consideration informing the project design throughout the process."

The section also details the notification and coordination requirements among Hawaiian Electric, the Army, and the Federal Aviation Administration. Section 3.2.2.1.1 of the EIS further states:

> "The site layout design and all construction operations (including equipment operation) would have to meet the airfield clearances and other requirements of UFC 3-260-01, Airfield and Heliport Planning and Design. Hawaiian Electric, USAG-HI, and Wheeler Army Airfield Aviation Safety would work together to resolve any project design or construction issues that could affect Wheeler Army Airfield flight operations and to make sure the plan conformed to UFC 3-260-01. Any issues would be satisfactorily resolved before construction to minimize impacts on airports and airfields, navigable airspace, and flight routes and flight patterns."

We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiative

ORAL PUBLIC COMMENT

WAHIAWA PUBLIC MEETING

May 21, 2015

MR. WALTER BENAVITZ:

The WCBA is Wahiawa's oldest community organization, we've been around for 75 years, and our Government Action Committee went through the entire -- the entire EIS, this Draft EIS.

And we -- I am here to give WCBA's support to this project. Of special interest to us is the improved outage restoration for Wahiawa. We find that the EIS has addressed the cultural, the land use issues, wildlife preservation and those issues, and, again, we are in support of this, this program.

And Schofield Barracks is our neighbor, and they have a long history of taking care of the lands that has been entrusted to them, and we strongly urge that the Army proceed toward implementing this project.

Thank you.

August 6, 2015

Mr. Walter R. Benavitz, Jr.
Government Action Committee Chair
Wahiawa Community & Business Association
P.O. Box 861408
Wahiawa, HI 96786

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. Benavitz:

Thank you for providing oral comments regarding the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP) at the public meeting held in Wahiawa on May 21, 2015. This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

We appreciate your taking the time to attend the meeting and to provide comments in support of the project on behalf of the Wahiawa Community & Business Association. Your comments have been excerpted from the transcript of the meeting and assigned identification number P007. The excerpted comments will be included, along with this response letter, in appendix A of the final EIS.

We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

P008

ORAL PUBLIC COMMENT

WAHIAWA PUBLIC MEETING

May 21, 2015

MS. ALECIA AU:

P008a

I just wanted to know two questions. Could you have the facility on not ag [agricultural] lands? Ag lands are precious to us, and one day it may be put to use in that area.

P008b

Second question is, have you considered having more than one plant? If there is a time when we have war, if one plant is destroyed, at least we could have another plant on the island to fall back on.

Thank you.

August 6, 2015

Ms. Alecia Au
[redacted]
Wahiawa, HI 96786

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Ms. Au:

Thank you for providing oral comments regarding the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP) at the public meeting held in Wahiawa on May 21, 2015. This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

We appreciate your taking the time to attend the meeting and to provide comments. Your comments have been excerpted from the transcript of the meeting and assigned identification number P008. As your statement included detailed comments on the draft EIS, we have annotated each comment with a reference number (P008a and P008b). The excerpted comments will be included, along with this response letter, in appendix A of the final EIS.

P008a. The Army and Hawaiian Electric acknowledge the importance of agricultural lands to the people of O'ahu and note that the generating station would not be built on agricultural land. As stated in section 3.8.1.3 of the EIS:

> "The 8.13-acre generating station site is a portion of the larger 535-acre South Range Acquisition Area (referred to as the South Range) that was assessed in the SBCT EIS in 2004. As part of that NEPA process, the Army coordinated the conversion of the land from prime farmland to nonagricultural use with Natural Resources Conservation Service in light of the objectives and guidelines of the Farmland Protection Policy Act. The estimated 535 acres of what at that time was cultivated pineapple land was 0.67 percent of the total US Department of Agriculture-designated agricultural land on Oahu and 2.8 percent of the total area in pineapple production in the state (Tetra Tech 2004). The Stryker Brigade Combat Team EIS concluded that the conversion of the entire South Range to nonagricultural use would not result in significant impacts."

The Natural Resources Conservation Service's Form AD-1006 (Farmland Conversion Impact Rating Form) process was completed in 2015.

P008b. A second plant was not considered. The proposed SGSP would be one of several generating stations on the island that provide electricity to the Army and surrounding community. In the event that any one of the seven existing major generating stations on the island (eight if the SGSP is constructed) is destroyed for any reason, the remaining generating stations would be able to continue supplying power to the island grid.

We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

ORAL PUBLIC COMMENT

WAHIAWA PUBLIC MEETING

May 21, 2015

MS. LEI LEARMONT:

And I want you to know that I did hear the presentation to the neighborhood board, and so I know something about it, you know, before tonight. And I remember many years ago, one day we had a brown-out, I think we had two brown-outs, and one of 'em had to do with something happening at one of the plants. And I think it might have been downtown plant, when it was still active, and somehow certain things had to happen in a generation to bring up the plant again. And the Kahe Plant, which I know very well because I used to work in Waianae, was down for maintenance. So they were already low. And what happened is that they couldn't meet that, and the whole island went black, when they call it a brown-out. And, you know, it was days before they were able to put things together to have the electricity come up again. So it's really gratifying to know that you'll have a generator here in Wahiawa, and, hopefully, this means that if we have a blackout, then we'd be the first to get -- you know. And it's not the tsunami, but, you know, Waianae area is known for getting hit by hurricanes, also. So, I am supporting the project.

August 6, 2015

Ms. Lei Learmont
[redacted]
Wahiawa, HI 96781
[redacted]

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Ms. Learmont:

Thank you for providing oral comments regarding the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP) at the public meeting held in Wahiawa on May 21, 2015. This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

We appreciate your taking the time to attend the meeting and to provide comments in support of the project. Your comments have been excerpted from the transcript of the meeting and assigned identification number P009. The excerpted comments will be included, along with this response letter, in appendix A of the final EIS.

We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

ORAL PUBLIC COMMENT

WAHIAWA PUBLIC MEETING

May 21, 2015

MR. BLAKE MCELHENY (first comment):

I'm a resident of Pupukea. So sorry to get here late, so this may have already been covered, but I think from a resident's perspective, my limited understanding as a lay person is that if you use something like biodiesel, that potentially the emissions could be less harmful to the environment, but your written documents probably have some details on the differences there. But given the large number of agricultural lands and the large acreages, it would make sense, from our community's perspective if -- maybe it's already been documented, that you guys are going to work with Pacific Biodiesel or someone like that, then why not grow the fuel in the region, if possible, rather than rely on imports.

So I apologize if that's already been dealt with, but I just feel like, my from limited knowledge, that, potentially, is cleaner burning, and then also that idea of maybe growing the fuel closer by, if they're able to develop some kind of feed stopper, whatnot, that they can grow and integrate, and however else they're doing that biodiesel production, but I appreciate the opportunity and I'll review the materials more.

Thank you for the opportunity.

August 6, 2015

Mr. Blake McElheny
[redacted]
Haleiwa, Hawai'i 96712

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. McElheny:

Thank you for providing oral comments regarding the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP) at the public meeting held in Wahiawa on May 21, 2015. This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

We appreciate your taking the time to attend the meeting and to provide comments regarding the project. Your comments have been excerpted from the transcript of the meeting and assigned identification number P010. The excerpted comments will be included, along with this response letter, in appendix A of the final EIS.

Regarding your question about biodiesel emissions compared to other fuel sources, please see section 3.4.2.1.2 of the draft EIS. This section presents three operational scenarios that provide a comparison between (1) 100 percent biodiesel, (2) 50 percent biodiesel and 50 percent diesel, and (3) 50 percent biodiesel and 50 percent LNG. While scenarios 1 and 2 have the same emissions profile for criteria pollutants and hazardous air pollutants, scenario 1 (100 percent biodiesel) would emit substantially less greenhouse gases (GHG). Scenario 3 would have the lowest criteria pollutant emissions and the highest hazardous air pollutant emissions, and produce less GHG than scenario 2, but more GHG than scenario 1.

Regarding your question about biofuel for the generating station being grown in the region, if a biofuel supply becomes locally available, Hawaiian Electric could purchase the fuel through its competitive procurement process. To address how Hawaiian Electric procures biofuel, the final EIS will include a discussion of the Environmental Policy for Hawaiian Electric Companies' Procurement of Biofuel from Sustainably Produced Feedstock, prepared by Hawaiian Electric Company and the Natural Resources Defense Council, as revised August 2013. The policy provides that Hawaiian Electric will purchase biofuels only from suppliers that comply with the Roundtable on Sustainable Biomaterials (formerly the Roundtable on Sustainable Biofuels) ("RSB") Principles & Criteria for agricultural, end-of-life, and wastewater feedstock or similar certifications.

In addition, the following additional text has been added to section 2.2.1.5 of the EIS:

"One of Hawaiian Electric's goals remains to reduce Hawaii's dependence on imported fossil fuel and the adverse environmental and economic impact of burning fossil fuel to generate electricity for residents and visitors to the Hawaiian Islands. A transition from petroleum fuels to biofuels derived from sustainably-produced and preferably locally-sourced feedstock offers potential for near-term reductions in GHG emissions and increased security from continuing oil market price volatility and potential supply interruptions. Hawaiian Electric maintains a biofuel purchasing policy that was developed in cooperation with the National Resources Defense Council (NRDC) in 2007 and updated in 2013 (Hawaiian Electric 2013). This policy outlines Hawaiian Electric's preference for procurement of locally sourced biofuel and their requirements for obtaining biofuel generated from sustainable sources. The policy includes a section on local feedstock support mechanisms that discusses Hawaiian Electric's support for development of local biofuel producers and a section on sourcing requirements for biofuel that requires third-party certification of biofuel sourcing. A copy of the policy has been included as Appendix B."

We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

ORAL PUBLIC COMMENT

WAHIAWA PUBLIC MEETING

May 21, 2015

MR. MARCUS OSHIRO, State Representative for District 46:

I'm standing in support of this project. It's something that makes sense. I've had a private briefing about a month and a half ago on base with the Colonel, and it just makes sense to have a backup generator, 50 megawatts, out of the tsunami zone. Right now we have Kahe and Waiau, both near the shoreline. And like Ms. Learmont mentioned, it's prone to hurricanes, tsunamis, rising tidal waters, so I think that it makes sense.

And, number two, it's a biofuel plant. And for those of you who understand what we're trying to do in Hawaii, to lessen our dependence from fossil fuel, this cogeneration-type facility gives us or enables us the opportunity to maybe grow our own and produce our own fuel here, on the nearby ag [agricultural] lands on Oahu, Central Oahu, and North Shore.

I also think the benefit for the nearby community, should Waiau or Kahe go down, even Honolulu go down, we'll have an opportunity to restart the system, the grid. And I think Wahiawa, Mililani, Kunia, maybe even the North Shore would also benefit from having close proximity to the new facility.

So I look forward to it. I'm supporting it, and I will be submitting further written comments accordingly.

Thank you.

August 6, 2015

The Honorable Marcus R. Oshiro
Representative District 46
State of Hawai'i
State Capitol, Rm. 424
Honolulu, Hawai'i 96813

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. Oshiro:

Thank you for providing oral comments regarding the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP) at the public meeting held in Wahiawa on May 21, 2015. This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

We appreciate your taking the time to attend the meeting and to provide comments in support of the project. Your comments have been excerpted from the transcript of the meeting and assigned identification number P011. The excerpted comments will be included, along with this response letter, in appendix A of the final EIS.

We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

ORAL PUBLIC COMMENT

WAHIAWA PUBLIC MEETING

May 21, 2015

MR. BLAKE MCELHENY (second comment):

I believe that the way that U.S. Army Garrison-Hawaii can get HECO or whoever it's going to end up being, to utilize the biodiesel would be through the lease agreement. And so I guess from the public's point of view or a member of the public, advocate that U.S. Army Garrison-Hawaii is firm in those lease negotiations that the fuel source is the biodiesel and that if it's capable of more than the 50 percent that may be into the lease agreement, could be written that there's incremental movement towards a hundred percent, because it seems like Department of Defense's overall policy goals is to use as much renewables as possible, and I think the public stands behind that, for a variety of reasons, public health and natural environment and whatnot.

And so I would just appreciate it being in the record that maybe that's a way that the public and U.S. Army Garrison-Hawaii can hold HECO or whoever the eventual utility is, hold their feet to the fire in that regard as to the lease terms, and I think that's a good idea.

Thank you.

August 6, 2015

Mr. Blake McElheny
[redacted]
Haleiwa, Hawai'i 96712

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. McElheny:

Thank you for providing additional oral comments regarding the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP) at the public meeting held in Wahiawa on May 21, 2015. This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

We appreciate your taking the time to attend the meeting and to provide comments regarding the project. Your comments have been excerpted from the transcript of the meeting and assigned identification number P012. The excerpted comments will be included, along with this response letter, in appendix A of the final EIS.

Regarding your comments on the use of biofuel, the requirement for continued use of biofuel will be in the lease and in the Public Utilities Commission's Decision and Order to Hawaiian Electric. As stated in section 2.2.1.5 of the draft EIS: "The Army and Hawaiian Electric have agreed that at least 50 percent of the fuel used by the generating station will be biofuel, and that the generating station will use a minimum of 3.5 million gallons per year of biofuel."

We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

P013

ORAL PUBLIC COMMENT

WAHIAWA PUBLIC MEETING

May 21, 2015

MR. THORA-J KEAUNUI CUARESMA:

P013a

Okay. And, actually, I'm -- kala mai ia`u ai [apologizing]. I apologize for my lateness and I'm not sure if the questions or concerns that I'm going to raise have already been addressed, but I know the other night at the neighborhood board meeting, we asked -- there was someone in the audience that asked about how many megawatts of power, and I think you said 50 megawatts or power is what you would be generating it, and do you really need it; and if you don't need it, then why are we having it. And if I recall correctly, you said that we were not really in need of it, but it is something I guess we're planning for the future.

And I think he also asked you how many watts. And you can correct me on the terminology, but I think you said you only needed 32 megawatts of power. And this generator, if I'm not mistaken you said, was going to be capable of generating or storing 50 megawatts of power.

So, again, my question on his behalf, and, actually, he's on his way, also, is, if we don't need it, then why are we actually going forward with it? And if we are going to continue to go forward with it, why do we have something that is so big? And, actually, we already have the windmills up in Kawailoa. And, if I'm not mistaken, those windmills were put in place to also generate an alternative source of energy.

P013b

So I guess the whole thing with the windmills and the way the windmills have impacted Kawailoa and that area, not only environmentally but also just esthetics, it has just -- it's an eyesore. I grew up there, on that ridge above Waimea. And the fact that there are two dozen windmills or 30 windmills up there, is that how this project, which are 37 poles, your 37 utility poles that will come up rather than have the utility lines run underground, is that going to impact our view, as well?

So, I know, there's a whole lot of questions in there, but I figure you folks had some heads-up the other night when we asked those questions, so I am hoping that maybe you have little bit more prepared answer to our concerns.

Thank you.

August 6, 2015

Ms. Thora-J-Keaunui Cuaresma
(No contact information provided)

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Ms. Cuaresma:

Thank you for providing oral comments regarding the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP) at the public meeting held in Wahiawa on May 21, 2015. This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

We appreciate your taking the time to attend the meeting and to provide comments. Your comments have been excerpted from the transcript of the meeting and assigned identification number P013. The two questions asked in your statements have been annotated with reference numbers P013a and P013b. The excerpted comments will be included, along with this response letter in appendix A of the final EIS.

Comment Responses *(listed by reference number)*:

P013a. At the Wahiawa neighborhood board meeting on May 18, 2015, the question was asked whether there is adequate generating capacity on O'ahu at the current time to meet customer demand. The answer to that question was (and still is) yes, there is adequate generating capacity on the island to reliably meet current demand. However, as also was stated, the existing portfolio of electrical generators on the island will require replacement as they age. The commissioning of the SGSP would enable Hawaiian Electric to deactivate Waiau Unit 3 or Unit 4, both of which are oil-fired boiler units placed into service in 1947 and 1950, respectively. Although they are reliable and well maintained, the units are reaching the end of their useful life. By replacing them with new flexible generating units like those proposed for the SGSP, Hawaiian Electric will increase the reliability and efficiency of the grid, reduce fuel consumption and air emissions, and enhance our ability to incorporate more renewable energy like wind and solar into the grid.

Regarding why the SGSP will be a 50 megawatt (MW) facility, Hawaiian Electric and the Army have determined through extensive analysis that a facility of that size is required. There are several reasons for this determination:

1. The Army's peak power demand (i.e., the most power the three installations required at one time) is 32 MW. To be able to meet the Army's power reliability requirements—and, therefore, not have to make rent payments for the land, the savings of which are passed on to Hawaiian Electric customers—Hawaiian Electric determined that some 50 MW of machines would be required so that in the event that one machine was down for maintenance and a second machine failed to start, the SGSP could still provide the required power.

2. Hawaiian Electric also required that—even in the event that the SGSP was meeting the maximum 32 MW demand of the Army—the facility would have adequate additional capacity to provide power to our other customers and still provide enough power to restart the grid in the event of any outage.
3. To allow the deactivation of Waiau Unit 3 or 4—which are about 50 MW each—analysis showed that a new 50-MW station would be required.
4. Finally, due to economy-of-scale considerations, larger facilities cost less to build than smaller facilities when compared to their output. That is, although the total cost of a 50 MW facility is more than a 32 MW facility, the cost in $/MW is less. A 50 MW facility actually saves customers money over a 32 MW facility. In fact, Hawaiian Electric would have saved customers money by building an even larger facility, but site restrictions limited the size of the facility to 50 MW.

Regarding the windmills in Kawailoa, they provide a valuable contribution to the state's renewable energy goals. Their output, however, is dependent upon the weather, just as the output of solar photovoltaic panels is dependent upon the sun. In order to provide reliable and renewable electrical power, a mix of different types of generators is required. The SGSP would provide "firm" generating capacity—meaning that it would be under the control of the operators—and it would provide power independently of the weather and time of day. The Kawailoa wind farms do not meet all of the Army's or Hawaiian Electric's requirements, as discussed in sections 1.3, 1.4, and 2.4 of the EIS.

P013b. As part of Hawaiian Electric's application to the Public Utilities Commission (PUC) for approval of the Schofield Generating Station Project in Docket 2014-0113, the company analyzed options for overhead versus underground transmission lines. The analysis showed that placing the lines underground would result in an estimated $15 million higher cost than placing them overhead. Based on the company's goal of reducing customer costs, the application recommended placing the line overhead.

As required by Hawai'i state law (Hawai'i Revised Statutes 269-27.5), the PUC held a public hearing on this issue on January 21, 2015, to determine if the public had concerns about the placement of the 46kV lines overhead versus underground. The hearing was also attended by a representative of the Division of Consumer Advocacy. No objections to the proposed overhead lines were heard.

The decision as to whether the transmission lines would be placed overhead or underground rests with the PUC. If you wish to express your opinion that the transmission lines should be placed underground to the greatest extent possible, Hawaiian Electric respectfully suggests that you address your concerns to the PUC (http://puc.hawaii.gov/) and/or the Division of Consumer Advocacy (http://cca.hawaii.gov/dca/) as a "public comment" to Docket 2014-0113.

We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

P014

ORAL PUBLIC COMMENT

MILILANI PUBLIC MEETING

May 20, 2015

MR. RON GUNDERSON:

I am a little nervous. However, I would like to voice my disapproval of the draft EIS, mainly for a couple of reasons. I'll try to be somewhat brief and I will provide a written copy. 1 But the basis of it is the water usage for it, I think, is extravagant. At seven gallons a minute, that's 400 gallons a day. You know, 400 gallons a day over a month is just huge. It's coming out of our aquifers. All that water just goes back as runoff and it's gone and here we have just a minor adverse effect due to water resources. It seems a little low in effects. P014a

One of the other requirements was that for HECO at -- for the Oahu public, myself, at $170 million, I should be getting something out of this station, and I'm not going to be getting a whole lot out of it because the military is going to take 70 percent of the power. They need 35 kilowatts -- or megawatts of that power to power their structure. I'm going to get 30 percent, or about 15 kilowatts, and I'm just not getting a bang for my buck as a civilian. P014b

The other thing about it is that the military and HECO haven't come up with any -- whatever contingency problems there would be that would require the military to take all the power. I certainly am in agreement with having a power plant outside of the ocean area. However, the military is going to take all the power, leaving only 15 megawatts for the general population, because in your scenario all of the surrounding coastline has been destroyed by a tsunami or whatever has happened. P014c

I'm also a little concerned -- excuse me -- with the fuel sources -- with the fuel source. This is supposed to be an alternative fuel source generating plant, and here recently the state has said that we're not even going to put biofuels in our fuel anymore; for cars we're not even doing it. P014d

I don't know where you're going to come up with biofuel for this plant, to run it on. The only thing left is either regular oil, oil or natural gas. And they came out recently, in the last month, and said that natural gas may not be the fuel of the future for the state. So it seems to me that you're just trying to string people along, saying you have a renewable resource here, when we don't have anything. We're going to be running gas and oil, and we have no way of knowing how much of the oil you're actually generating -- using up there at this plant, whether you're actually using any alternative fuel source at all.

The last one I'd like to bring up is the use of -- you said the power, once again, to power Wheeler Army Airfield in the event of emergencies. And Wheeler is -- while it accepts helicopter traffic just fine; it certainly doesn't accept large aircraft. It's certainly not a 24-hour airport, and the instrument approaches into it are terrible. And when we take all this power from the generating plant to give to the military to power this up -- the military already has generating capacity on their installation for emergencies. So what we're powering is not critical infrastructure. They already have that available to them in their own contingency generating plant such as at the station up there at Kunia and other places on Schofield itself. I would imagine that the headquarters has their own emergency generator ready to go when the lights go off. P014e

But I thank you for your time and consideration on this. Thank you.

August 6, 2015

Mr. Ron Gunderson
[redacted]
Mililani, HI 96789

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. Gunderson:

Thank you for providing oral comments regarding the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP) at the public meeting held in Mililani on May 20, 2015. This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

We appreciate your taking the time to attend the meeting and to provide comments. Your comments have been excerpted from the transcript of the meeting and assigned identification number P014. As your statement included detailed comments on the draft EIS, we have annotated each comment with a reference from P014a to P014e. The excerpted comments will be included, along with this response letter, in appendix A of the final EIS.

Comment Responses *(listed by reference number)*:

P014a. Section 2.2.1.6 of the EIS discusses the water supply for the SGSP and the estimated use. This section states that, when the facility is operating at maximum capacity, the water usage would be approximately 340 gallons per hour. Section 2.2.3 discusses how many hours per day the facility is expected to operate: approximately 3.25 hours per day. The EIS analyzes both expected operation (3.25 hours/day) and maximum operation (24 hours/day) scenarios. Therefore, the expected water use of the facility is approximately 1,100 gallons per day (gpd), and the maximum water use is approximately 8,160 gpd.

To provide a frame of reference, the U.S. Environmental Protection Agency and the Hawai'i Department of Land and Natural Resources estimate that the average family of four uses 400 gpd of water. Therefore, the SGSP's expected water usage of approximately 1,100 gpd is less than the expected water usage of three average households.

It is difficult to accurately compare water use between the SGSP and other existing power plants, because the sources of water and the ways in which the water is used are different for different designs. However, Hawaiian Electric estimates that existing steam turbine generating stations require an average of

approximately 53 gallons of water to produce 1 megawatt-hour (MWh) of electrical energy. In comparison, the proposed SGSP would require approximately 6.8 gal/MWh. From this perspective, shifting to the technology that the SGSP uses would conserve water, compared to continuing to use existing steam turbine technology.

To address your comment, the following language has been added to section 3.7.2.1.2 of the EIS to clarify the water usage of the plant during operations and the resulting environmental effects:

> "Based on the anticipated operation of the SGSP, the generating station would use approximately 1,100 gallons of water per day. If operated at maximum capacity continuously, the generating station would use approximately 8,175 gallons of water per day. For comparison purposes, the U.S. Environmental Protection Agency and the Hawai'i State Department of Land and Natural Resources estimate that the average family of four uses 400 gallons of water per day. Therefore, the SGSP's expected water usage of approximately 1,100 gallons of water per day is less than the expected water usage of three average households.
>
> Potable water for the generating station would be drawn from the Schofield Shaft of the Central Sector of the Central Oahu Aquifer and would be part of the Army's permitted use. The Army's total permitted use is 5.648 mgd from the Schofield Shaft. As of March 2015, the Army's actual usage was 3.159 mgd (Bogdanski 2015). Therefore, even though the plant would use additional potable water, the Army's water use would remain well below its permitted use, so effects would be minor."

Regarding your comment about runoff, as stated in section 2.2.1.6, potable water would primarily be required to make the urea solution needed for the selective catalytic reduction emissions control system and would be released from the exhaust stacks as water vapor, rather than going into the sewer or stormwater system. Other minor water uses would include periodic additions to the air radiator cooling system and on-site fire water tank, washing down equipment, watering landscaping, and providing water for drinking, cleaning (i.e., sinks, toilets, and showers), and eyewash stations for the station's staff of three people per shift. Water from these uses would be directed into the sewer or storm water system as appropriate. Stormwater would be managed to minimize runoff as described in draft EIS section 3.7.

P014b. Providing energy security to the Army's facilities is one of the many purposes of the project. The other purposes, which benefit all Hawaiian Electric customers, are discussed in sections 1.3 and 1.4 of the EIS, and further detailed in Hawaiian Electric's application to the Public Utilities Commission (PUC) in Docket 2014-0113.

The project will provide electrical power to all Hawaiian Electric customers during normal operations, which are expected to be the vast majority of the project's 30-year life. In the event of specific contingencies, the project will have the capability to provide power directly to the Army's installations, thereby providing an energy security guarantee to the Army that will serve as in-kind consideration in lieu of lease rent payment for the life of the project. The Army also is contributing financially to the up-front development costs of the project.

When the SGSP is providing power directly to the Army during a contingency—and *only* during those limited periods—the guarantee is that Hawaiian Electric will provide *up to* 32 MW from the SGSP. This amount of power was determined based on the Army's *peak* historical demand and is not indicative of how much power the Army bases normally demand, or would demand in the event of an outage, which would be significantly less.

Detailed analyses of the costs and benefits of this arrangement are provided in PUC Docket 2014-0113 and show that the agreement is anticipated to save Hawaiian Electric's customers more than $12 million over the life of the project. Based on the merits of the project and the cost and benefits to the residents of

O'ahu, Hawaiian Electric is seeking permission from the PUC to recover, via revenue from its customers, the project costs that are not provided by the Army.

P014c. As stated in P014b, the Army could require *up to* 32 MW of the output of the SGSP under circumstances of prolonged outage, such as a natural disaster or a threat to the Army's military mission. Even in the most extreme case, the Army bases do not have enough electrical equipment to "take all the power."

In the scenario of a natural disaster causing a prolonged outage—which is anticipated to be very rare—the capacity of the SGSP above the Army's demand at any given time (which would be a minimum of 18 MW and usually more) would be available for other uses. Depending on the circumstances, the capacity could be used to provide power to the Wahiawa community or to provide startup power to other Hawaiian Electric generating units at Waiau Power Plant, which could then restore the O'ahu grid.

When considering the value of the SGSP to the general population in the event of a disaster, the reliable electrical power it supplies to the Army and National Guard units, including the aviation units resident at Wheeler Army Airfield, should be considered. Their disaster response capabilities would be enhanced, providing a significant benefit to all O'ahu residents and possibly to the neighbor islands as well.

Finally, it should be noted that the Army has a vested interest in using the SGSP's capabilities to restore the entire O'ahu grid as expeditiously as possible, in order to support its numerous other facilities on O'ahu in addition to the three bases near the SGSP (including Tripler Army Medical Hospital).

P014d. Hawaiian Electric has been using biofuels in bulk for electrical power generation since 2009. During the last 6 years, the company has not experienced a shortage in biofuel suppliers or biofuel itself and does not anticipate a shortage in the future. In fact, the production capacity of local biofuel suppliers has increased over the last several years, which increases the chances that the company will be able to contract for a reliable, cost-effective, and local biofuel source for the life of the SGSP.

If approved by the PUC, the SGSP is proposed to have a required minimum biofuel use. Hawaiian Electric currently provides—and will be required to continue to provide—annual reports to the PUC that detail biofuel usage and renewable energy generation. To find out how much biofuel the company is using and how much renewable energy the company is producing from all renewable sources, you can access Hawaiian Electric's reports on the PUC's website.

P014e. In an emergency, the Army and other emergency responders would work to safeguard national interests and U.S. citizens. Properly coordinating response efforts would require powering Schofield Barracks, Field Station Kunia, and Wheeler Army Airfield. Also, in the event that other O'ahu airports were compromised, Wheeler Army Airfield could serve important air response functions, including use by large fixed-wing aircraft. As stated in section 1.4.1:

> "Maintaining power at the Wheeler Army Airfield during extended outages would benefit Oahu residents if there was a civil emergency or natural disaster by enabling critical support from the Army's first responders. Providing reliable power to the Army's centrally located airfield make it a good choice for use by the Federal Emergency Management Agency and other disaster responders, particularly if the coastal areas are compromised."

The Army already has emergency backup generators for key services and buildings on its installations (see section 3.13.1.2); however, they run on diesel fuel, do not power all Army services, and are not connected to the island-wide grid, so cannot provide power to the citizens of O'ahu. The SGSP would provide a cleaner fuel option for emergency power generation that would also serve the citizens of O'ahu during normal conditions. Since emergency conditions during which the Army would exercise its first

call to power are exceedingly rare, most of the time the SGSP would provide power to all the citizens of O'ahu via the island-wide grid.

We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

ORAL PUBLIC COMMENT

MILILANI PUBLIC MEETING

May 20, 2015

MS. MIRIAM CHRISTINE PETERS:

P015a

I was just wondering -- you brought up in the Neighborhood Board meeting the other night that there's a possibility of 100 percent requirement for renewable energy, and I was wondering if any of your plans involve that, that change, because it's going to come pretty soon. So if whatever you drafted is only good for 65 percent, what kind of additions do you need to meet or make in order to hit that and is it where those places -- Because any time you think about building on the lands, you just -- everything over here is supposed to be historic. Apparently, you guys met with historic and cultural preservation, and so I assume that the place you guys are surveying is not -- you know, it's not going to affect culturally. But if for some reason you need to expand and we're already in the process of approval or you guys building eventually, are you guys -- is there a possibility of a big expansion, and will that conflict with cultural or historical preservation?

...

P015b

And then based on that, because you're not too sure -- I mean, I know Wahiawa is pretty historic, period, but I'm not too sure about Kunia, and because we just came to light of this, I was wondering if there was any way that you guys could make some kind of extension for the commentary period for the proposal.

That's it. Thank you.

August 6, 2015

Ms. Miriam C. Peters
[redacted]
Wahiawa, Hawai'i 96786

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Ms. Peters:

Thank you for providing oral comments regarding the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP) at the public meeting held in Mililani on May 20, 2015. This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

We appreciate your taking the time to attend the meeting and to provide comments. Your comments have been excerpted from the transcript of the meeting and assigned identification number P015. As your statement included detailed comments on the draft EIS, we have annotated your comments with reference numbers P015a and P014b. The excerpted comments will be included, along with this response letter, in appendix A of the final EIS.

Comment Responses *(listed by reference number)*:

P015a. The Schofield Generating Station can operate on up to 100 percent biofuel as designed, so it would be unnecessary to expand the plant in order to use 100% biofuel.

Any future expansion outside of the existing footprint or significant additional construction of facilities inside the footprint would be subject to NEPA and coordination with the State Historic Preservation Division.

P015b. U.S. Army Garrison-Hawai'i and Hawaiian Electric have met and exceeded public involvement and notification requirements for the proposed project. To keep the community apprised of the development of the project and the EIS, U.S. Army Garrison-Hawai'i and Hawaiian Electric published notices in federal and state publications; distributed notices by mail; held public meetings; reached out to area elected officials, neighborhood boards, and community leaders; and provided project information to 19 libraries and online at http://www.garrison.hawaii.army.mil/schofieldplant/.

The EIS was made available for a full 45 days per the requirements of NEPA (40 CFR 1506.10(c)) and Hawai'i Revised Statutes Chapter 343, Environmental Impact Statements. The comment period will not be extended.

We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

P016

ORAL PUBLIC COMMENT

MILILANI PUBLIC MEETING

May 20, 2015

MR. FRED ASMUS:

I went to the Neighborhood Board meeting the other night, and this is the first I heard of the project, and I think a lot of the people that I live -- my neighbors didn't know anything about it either. But, you know, I'm not saying we could have gotten more public relations outside to the people so we would have known about this. P016a

But I've got a few questions -- a couple of questions. I notice the poles -- it seems like there's gonna be a lot of poles necessary for the project. I'm just wondering -- poles is kind of old-fashioned. Can we go underground? I know it's about money, but it's time to spend some money, I guess. P016b

Another thing is we just had an accident out in Kaneohe -- or Waimanalo, involving a military aircraft. Any aircraft -- it doesn't matter. But I've been living out here for a long time. I know Wheeler's kind of in the flight path of this project, I believe. So I'm just kinda concerned about -- I'm sure there's FAA gonna look into it and all that. But kind of concerned about that, that question, the placement of the project. P016c

And I think that's about it. I mean, I don't know really if it's beneficial for the community or not. Like I said, this the first I've found out, so I haven't really got to study it.

Anyway, those are two of my questions.

August 6, 2015

Mr. Fred Asmus
[redacted]
Wahiawa, HI 96786

Subject: Schofield Generating Station Project:
Draft Environmental Impact Statement Comment Response

Dear Mr. Asmus:

Thank you for providing oral comments regarding the draft environmental impact statement (EIS) for the Schofield Generating Station Project (SGSP) at the public meeting held in Mililani on May 20, 2015. This is a joint EIS, which meets the requirements of both federal and state law. Hawaiian Electric Company is the applicant under the state EIS process and—in accordance with the requirements of the Hawai'i Environmental Policy Act (HEPA) (Chapter 343, Hawai'i Revised Statutes) and its implementing administrative rules (Hawai'i Administrative Rules, Chapter 11–200)—is responding in writing to all comments received on the draft EIS. All comments and responses will be incorporated into the final EIS per the requirements of HEPA and of the National Environmental Policy Act (NEPA) [42 United States Code § 4321 to 4370f] and NEPA regulations [Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500–1508], as well as Council on Environmental Quality implementing regulations and 32 CFR Part 651, Environmental Analysis of Army Actions.

We appreciate your taking the time to attend the meeting and to provide comments. Your comments have been extracted from the transcript of the meeting and assigned identification number P016. As your statement included detailed comments on the draft EIS, we have annotated each comment with a reference number from P016a to P016c. The extracted comments will be included, along with this response letter, in appendix A of the final EIS.

Comment Responses *(listed by reference number)*:

P016a. U.S. Army Garrison-Hawai'i (USAG-HI) and Hawaiian Electric have met and exceeded public involvement and notification requirements for the proposed project. To keep the community apprised of the development of the project and EIS, USAG-HI and Hawaiian Electric published notices in federal and state publications; distributed notices by mail; held public meetings; reached out to area elected officials, neighborhood boards, and community leaders; and provided project information to 19 libraries and online at http://www.garrison.hawaii.army.mil/schofieldplant/.

P016b. As part of Hawaiian Electric's application to the Public Utilities Commission (PUC) for approval of the Schofield Generating Station Project (Docket 2014-0113), the company analyzed options for overhead versus underground transmission lines. The analysis showed that placing the lines underground would result in an estimated $15 million higher cost than placing them overhead. Based on the company's goal of reducing customer costs, the application recommended placing the lines overhead.

As required by Hawai'i state law (Hawai'i Revised Statutes 269-27.5), the PUC held a public hearing on this issue on January 21, 2015, to determine if the public had concerns about the placement of the 46kV lines overhead versus underground. The hearing was also attended by a representative of the Division of Consumer Advocacy. No objections to the proposed overhead lines were heard.

The decision as to whether the transmission lines would be placed overhead or underground rests with the PUC. If you wish to express your opinion that the transmission lines should be placed underground to the greatest extent possible, Hawaiian Electric respectfully suggests that you address your concerns to the PUC (http://puc.hawaii.gov/) and/or the Division of Consumer Advocacy (http://cca.hawaii.gov/dca/) as a "public comment" to Docket 2014-0113.

P016c. Section 3.2.2 of the EIS addresses environmental consequences to airspace. As stated in section 3.2.2.1:

> "No significant impacts on airspace would be expected if the Proposed Action is implemented. Neither construction equipment nor the generating station structure would create an obstacle to air navigation or adversely affect military and civilian aviation operations. The two exhaust silencer stacks at the generating station would be approximately 95 feet above ground level, and transmission poles would be 60 to 80 feet above ground level. Some construction equipment used to build these structures would be slightly taller. The height of these structures and their proximity to Wheeler Army Airfield was a critical consideration informing the project design throughout the process."

The section also details the notification and coordination requirements among Hawaiian Electric, the Army, and the Federal Aviation Administration. Section 3.2.2.1.1 of the EIS further states:

> "The site layout design and all construction operations (including equipment operation) would have to meet the airfield clearances and other requirements of UFC 3-260-01, Airfield and Heliport Planning and Design. Hawaiian Electric, USAG-HI, and Wheeler Army Airfield Aviation Safety would work together to resolve any project design or construction issues that could affect Wheeler Army Airfield flight operations and to make sure the plan conformed to UFC 3-260-01. Any issues would be satisfactorily resolved before construction to minimize impacts on airports and airfields, navigable airspace, and flight routes and flight patterns."

We will notify you when the final EIS is available. In the meantime, if you have any questions or would like to discuss the project further, please call me at 808-543-4088.

Sincerely,

Jack Shriver
Senior Engineer
Generation Project Development
Hawaiian Electric Company

cc: (via email only)
Mr. Alex Roy, Office of Conservation and Coastal Lands, Hawai'i Department of Land and Natural Resources
Ms. Stefanie Gardin, Office of Public Affairs, U.S. Army Garrison—Hawai'i
Ms. Kathleen Ahsing, Army Office of Energy Initiatives

Appendix B

~~Scoping Comments~~

Hawaiian Electric Biofuel Purchasing Policy

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Hawaiian Electric Company
Maui Electric Company
Hawaii Electric Light Company

ENVIRONMENTAL POLICY FOR HAWAIIAN ELECTRIC COMPANIES' PROCUREMENT OF BIOFUEL FROM SUSTAINABLY PRODUCED FEEDSTOCK

PREPARED BY HAWAIIAN ELECTRIC COMPANY AND THE NATURAL RESOURCES DEFENSE COUNCIL

AUGUST 2007 (Revised August 2013)

I. Overview and Context

In 2007, the Hawaiian Electric Company, Inc. ("HECO") and the Natural Resources Defense Council ("NRDC") joined in developing an environmental policy to guide the utility's procurement of biofuel from sustainably produced feedstock. The goal remains to reduce Hawai'i's dependence on imported fossil fuel and the adverse environmental and economic impact of burning hundreds of millions of gallons per year of petroleum fuel to generate electricity for residents and visitors to the Hawaiian Islands. A transition from petroleum fuels to biofuels derived from sustainably-produced and preferably locally-sourced feedstock offers enormous potential for near-term, dramatic reductions in greenhouse gas ("GHG") emissions and increased security from continuing oil market price hikes and potential supply interruptions.

Failure to follow through in this effort means that Hawai'i could remain dependent on petroleum-based fuel for its electricity generation - a dependence that carries a high price in terms of GHG emissions, energy security and environmental and economic impacts.

We believe that HECO's switch to biofuel derived from sustainably-produced local feedstock can help lead a global transition to increased use of sustainable fuels. Compared to other utilities in the United States, HECO generates the highest percentage of its electricity from liquid petroleum fuel. With this transition, HECO stands to become one of the largest consumers of biofuel in the United States. This effort is part of a broader strategy to transform Hawai'i's utilities into a model of diversity, sustainability and efficiency. We believe this policy represents a major step forward on the path toward increased self-reliance and sustainability.

NRDC and HECO agree that the utility needs to continue to work on reducing peak load and increasing acquisition of diverse renewable generation resources. We view this policy as a complement to, not a substitute for, other types of renewable generation. Next-generation biofuels can produce significant environmental and social benefits if they are developed with caution and foresight, and they could avoid some of the environmental and economic liabilities associated with conventional petroleum fuels. However, next-generation biofuels may also pose serious environmental risks if scaled up without safeguards (e.g., palm oil cultivation has been responsible for widespread clearing of primary tropical forests, draining of peat soils, catastrophic fires in Southeast Asia, and a number of other negative social and environmental impacts). Without sustainability standards, potential disadvantages could outweigh all potential environmental benefits.

As HECO pursues acquisition of biofuel, the utility must take stock of the possible negative consequences throughout the biofuel chain for our land, water and air, as well as biodiversity and food and feed prices. Sustainability criteria that reduce these risks will help next-generation biofuels achieve scale by setting parameters that can realistically support growth with minimal negative consequences and provide guidance for acquisition of currently available biofuels. Fortunately, voluntary certification is emerging as an option for those who want to commit to a pathway that affirms sustainable biofuels.

In March 2011, the Roundtable on Sustainable Biomaterials (formally the Roundtable on Sustainable Biofuels -"RSB") launched a global, universal sustainability standard which describes the requirements for sustainably-produced biofuels and

biomass. This standard provides a comprehensive and rigorously-tested basis for the RSB certification system and applies to all types of biomass feedstock in every region of the world and at every point in the supply chain. The RSB is supported by over 130 member organizations in more than 30 countries on all continents. It represents a wide range of stakeholders, including fuel producers, large and small farmers, oil companies, investors, non-governmental organizations, United Nations' agencies, governments, and research institutes.

While we believe that widespread adoption of credible sustainability standards and certification is essential to reducing potential environmental, cultural and social harm, NRDC and HECO recognize that voluntary certification is not a total solution. There are limits to the effectiveness of voluntary certification in addressing the problems of today's commodity markets for vegetable oils in general and biomass and oil seed crops in particular. Certification must be coupled with international agreements that protect forests and other biologically and carbon-rich natural ecosystems and keep certification from simply displacing demand to other land.

NRDC and HECO are working to support the adoption of such agreements and encourage the United States government to support and participate in them. However, by enacting this revised policy, we will be taking a step towards expanding the working model for sourcing sustainable biofuel. This model sends a market signal for development and expansion of sustainability standards and practices across the marketplace.

In sum, our approach to the potential problems with the purchase of commodity feedstock is to rely on feedstock with environmental impacts that are known and limited. Under this revision, HECO will purchase biofuels ONLY from suppliers that comply with RSB Principles & Criteria ("P&C") for agricultural, end-of-life and waste water feedstock[1], or similar certifications[2]. For those feedstocks not currently covered by the

[1] *End-of-life-products* include *Municipal Solid Waste* ("MSW") and *Used Cooking Oil* ("UCO"). These raw materials for biofuels are generated at the end of the life of products that were not produced and intended for the production of biofuel. In this way they have reached the end of their intended supply chain, as they have been consumed, used, are spoiled, etc... These end-of-life materials are thus intended to be disposed of and would potentially create environmental and social impacts.

RSB P&C, HECO will continue to use these sources in concurrence with NRDC understanding that they currently fall outside of the RSB P&C. If a P&C for these becomes available, NRDC and HECO will consider adopting that P&C into this policy. In the long term, HECO will continue to support the production in Hawai‘i of feedstock that are sustainably grown in accordance with these P&C. HECO will not purchase biofuel feedstock or biofuel that does not meet the criteria of this policy, even if that means continuing to operate HECO's generators with petroleum products to the extent allowed. This policy will continue to be periodically evaluated and updated.

II. Environmental Policy for HECO Biofuel Strategy

When HECO first considered the use of biofuel for power generation, the utility approached NRDC to help determine how a transition to biofuel could be accomplished in a sustainable manner. The two parties conducted research, negotiated issues, and developed the original Environmental Policy For the Hawaiian Electric Company's Procurement of Biodiesel from Palm Oil and Locally–Grown Feedstock, dated August 2007 ("original Procurement Policy"). In March 2012, HECO and NRDC worked together to review and update the original Procurement Policy. The result was the development of this Environmental Policy for the Hawaiian Electric Company's Procurement of Biofuel from Sustainable Produced Feedstock**,** which is intended to provide comprehensive guidance for a range of biomass and oil seed crop feedstock as well as waste feedstock.

This policy is supported by NRDC and HECO as a unified agreement, intended to address a range of issues raised by the transition to biofuel and to balance environmental, social, cultural and economic objectives. Both parties believe that this policy benefits HECO customers and the agricultural community in Hawai‘i. Further, it is fully consistent with international efforts to develop sustainable biofuels and respond to the threat of climate change. This policy does not address the merits or endorse any specific proposed biofuel production facility or power generation facility in Hawai‘i.

Wastewater can be used to produce biofuels or renewable fuels from its components. These include greases, fats and any other lipid-rich material, which can be transformed into biodiesel, as well as starchy material or cellulosic elements, which can be used to produce bioethanol.

[2] Similar certifications are subject to review and approval by HECO and the NRDC to determine adequacy.

The original Procurement Policy was reviewed by a panel of academic experts[3] with expertise in biofuels, agriculture, energy policy, and international development. Following the academic panel review, a public review draft was made available and public meetings were held in Honolulu, Hilo, Kona, and Kahului. The policy as here revised is in line with the original Procurement Policy and updates that policy to clarify the standards.

This policy has seven separate components including (1) local feedstock support mechanisms, (2) sourcing requirements for biofuel, (3) chain of custody tracking for feedstock and oils, (4) GHG emissions accounting and reporting, (5) role of the Hawai'i Biofuels Foundation, (6) public review and notification, and (7) contingencies.

[3] The academic panel members were: Alex Farrell, U.C. Berkeley, Mike Hamnett, University of Hawai'i, and Pamela Matson and Peter Vitousek, Stanford University. None of these reviewers necessarily endorses or is responsible for the recommendations of this document.

1. Local Feedstock Support Mechanisms

1.1. HECO will preferentially purchase biofuel from feedstock sustainably grown in Hawai‘i if it is available.

1.2. HECO will work with the Hawai‘i State Government and other stakeholders, including the Hawai‘i Biofuels Foundation (see section 5 below), to develop and implement incentives to grow biofuel feedstock sustainably grown in Hawai‘i.

1.3. HECO will work with the Hawai‘i State Government to identify and support low GHG biofuel feedstock and sustainable cultivation practices, using accounting protocols developed by the RSB or similar certifications.

Both NRDC and HECO maintain a strong preference for biofuel feedstock sustainably grown in Hawai‘i with the goal that 100% be locally grown and processed. Local feedstock cultivation can benefit the State’s economy, improve energy security, and substantially reduce the cost and emissions associated with transportation of imported fuels.

To facilitate development of sustainable and locally-grown feedstock, HECO is committed to work with the Hawai‘i Biofuels Foundation, Hawai‘i State government agencies, the University of Hawai‘i, and Hawai‘i's agricultural industry and landowners to:

- conduct research and develop sustainably-produced biofuel feedstock
- support the development of processing facilities for biofuel crops
- develop an economic analysis and policy incentives that take into account the value of local job creation in Hawai‘i, reduced import costs, and other benefits to ensure that Hawai‘i-grown feedstock competes on an even playing field with imported oil

2. Sourcing Requirements for Biofuel

2.1. All agricultural feedstock sourced under this policy must be certified, or show proof of working towards certification within a specific timeframe, by the RSB or similar certifications prior to the first shipment to HECO with the exception of palm oil (see 2.5).

2.2. The biofuel producer and all downstream participants in the chain of custody will allow an independent audit of performance.

2.3. The independent auditor will identify any deficiencies relative to the RSB P&C or similar certifications and propose corrective actions and a schedule for remediation of the identified deficiencies.

2.4. The producer and all downstream participants in the chain of custody will agree to work toward remediation of identified deficiencies, adoption of the corrective actions identified in the independent audit, and RSB or similar certifications

2.5. HECO will not agree to purchase palm oil from any supplier that is not currently certified by the RSB, the Roundtable of Sustainable Palm Oil ("RSPO"), or similar certifications.

2.6. As provided in RSB Principle 7.a, biofuel crops shall not be established on land that was converted from natural ecosystems after January 1st, 2009 (or after 2005 for palm oil, in compliance with RSPO). Biofuel operations shall at a minimum meet requirements provided in RSB Principle 7.e to prevent invasive species from entering areas outside the operation site.

2.7. As provided in RSB Principles 2, 4, 5 and 6, the feedstock producer must have developed and be implementing a management plan that addresses long-term economic and financial viability and is responsibly considering the social and cultural effects of operations on employees and communities.

2.8. As provided in RSB Principles 2, 3, 9,10 and 11 the feedstock producer must have developed and be implementing plans for identifying, reducing and monitoring all polluting activities and emissions, including GHGs.

2.9. Fire may not be used to clear land for new plantings.

Some of these criteria overlap with existing requirements in the RSB P&C, and have been highlighted here for emphasis, while others – in particular, 2.9. – impose even more stringent requirements on feedstock suppliers.

3. Chain of Custody Tracking for Feedstock and Oil

3.1. There is a clear, documented and verifiable chain of custody for all feedstock.

Establishment of a clear and verified chain of custody is an essential component of this policy. Mass-balance may be used for verifying the chain-of-custody for feedstock other than palm oil. Mass-balance and tradable certificate accounting may provide an acceptable approach to establishing chain of custody for palm oil at some time in the future. However, NRDC and HECO believe that complete segregation of palm oil derived fuel supply is currently the most reliable and credible approach to ensuring that all purchased palm oil is compliant with this policy. To ensure that it meets the requirements of this agreement, the utility must be able to track all palm-derived feedstock from the field where it is grown to HECO's facilities.

4. GHG Emissions Accounting and Reporting

4.1. HECO will use the protocols developed by RSB or the U.S. Environmental Protection Agency for calculating and tracking GHG emissions from biofuels.

The methodology/tool developed by RSB or the U.S. Environmental Protection Agency will be used for GHG emission accounting and reporting as well as for the GHG reductions requirements in RSB.

5. Role of the Hawai‘i Biofuels Foundation (“HBF”)

5.1. HECO has provided seed funding for agricultural research related to biofuel feedstock production.

5.2. The HBF governing board represents the following constituencies:

- **Hawai‘i State government**
- **HECO**
- **Labor**
- **Local agricultural community**
- **Local environmental community**
- **Native Hawaiian community**
- **R&D/engineering**

5.3. The HBF funds activities in the following areas:

- **Research and development of locally-grown vegetable oil feedstock**
- **Research and development of algae and other next generation feedstock**
- **Research into measuring and reducing the environmental impacts from RSPO certified palm oil and potential local feedstock, including the net GHG emissions from different agricultural practices**
- **Support for local feedstock production, processing, and use**
- **Development and testing of sustainability standards**
- **Conservation and restoration of ecosystems affected by biofuel feedstock production**

The HBF has representation from key stakeholders that are affected by the transition to biofuels, including state, local agricultural, local environmental, native Hawaiian cultural, and R&D/engineering interests. The HBF has used funds to invest in efforts to enhance the environmental, social, cultural and economic viability of the production and consumption of biofuels in Hawai‘i.

6. Public Review and Notification

6.1. A draft of the original policy dated August 2007 was made available for public review and comment.

6.2. The adopted policy and any future amendments or revisions shall be publicly available and posted on NRDC and HECO's websites.

The NRDC and HECO value public input into the development of this policy. NRDC and HECO are independent, private organizations with ultimate decision-making authority vested in members and shareholders, respectively. We believe this revision will benefit Hawai'i's citizens, (in particular, HECO's customers), the environment, and the state economy and well-being. We recognize that state and county officials and regulators have their own responsibilities, must take into account competing concerns and have the authority to make their own determinations.

7. Contingencies

7.1. Either party will inform the other as early as possible of unforeseen issues associated with the content or implementation of this policy.

7.2. NRDC and HECO agree to cooperate to resolve issues that arise in the implementation of this policy.

NRDC and HECO recognize that after adoption of this policy new issues and problems or opportunities may arise that require further effort and/or discussions to resolve. In particular, HECO has not tested this policy in the market and does not know whether it is possible to contract for a reliable and cost-effective source of oil that meets the foregoing criteria. Both NRDC and HECO are committed to working collaboratively to resolve any issues that arise in implementation of this policy.

APPENDIX A: RESOURCES FOR ADDITIONAL INFORMATION

Information for the following organizations is available at these websites:

NRDC: www.nrdc.org

HECO: www.heco.com

RSPO: www.rspo.org

Roundtable on Sustainable Biomaterials: http://rsb.org/

RSB Services: http://rsbservices.org/

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Appendix C
Traffic Study

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Schofield Generating Station Project

FINAL

Traffic Study

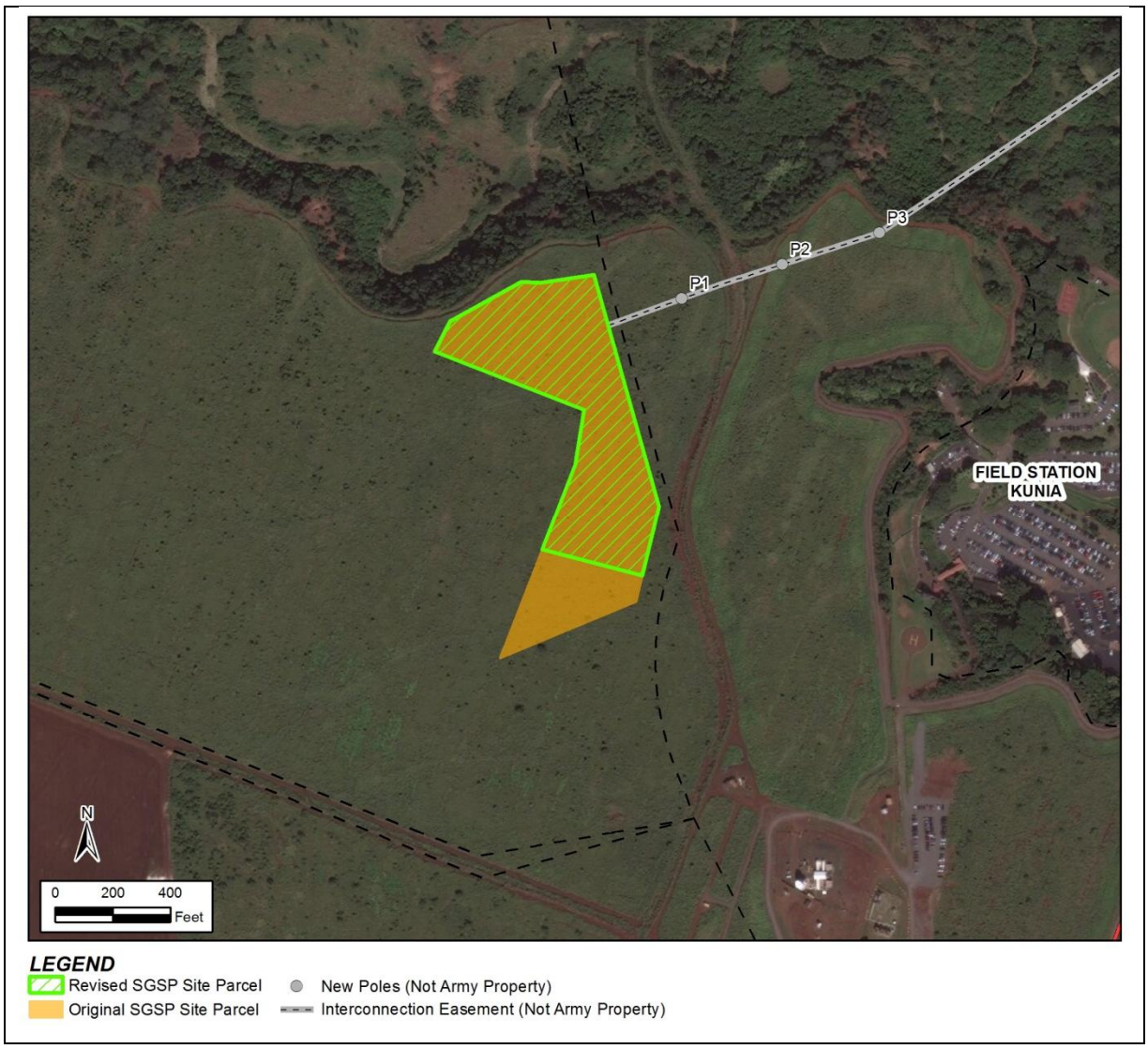
Prepared By
Tetra Tech, Inc.

May 2014

Errata

Prepared on June 4, 2014

After completing the Traffic Study in support of the Joint Environmental Impact Statement (EIS) for the Schofield Generating Station Project, the Army and Hawaiian Electric reduced the size of the parcel on which the generating station will be located from 10.31 acres to 8.13 acres. The map below shows the reduced parcel indicated by hatch marks. Please note that the maps and discussions within the report are based on the larger 10.31 parcel, and therefore do not match the parcel size discussed in the EIS. The reduction in parcel size does not necessitate the revision of Traffic Study because it does not materially change the findings of this report.



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EXECUTIVE SUMMARY

The U.S. Army Corps of Engineers is preparing an Environmental Impact Statement for the Schofield Generating Station Project (SGSP) at Schofield Barracks (SB), Hawaii. The purpose of the proposed action is to establish a stable, renewable source of power that provides energy security for SB, Wheeler Army Airfield (WAAF), and Field Station Kunia on the island of Oahu, Hawaii.

This study presents the results of the traffic impact analysis for the proposed biodiesel plant establishment. The focus of the study is the peak hour traffic impacts resulting from the construction and operation of the biodiesel facility.

Today Kunia Road traffic near SB experiences delays and congestion during peak hours. Grow The Army (GTA) Phase 1 is under construction and will be completed and fully occupied by 2017. Traffic on Kunia Road and Lyman Road will continue experiencing delays because future traffic growth will increase demand on the study area intersections.

The traffic volumes that will be generated by the construction and operation of the SGSP project on the roadway network are minimal. Comparing with the future No-Build scenario, the increase on average vehicle delays from construction traffic is less than 4 seconds per vehicle, and the effects from SGSP operations are negligible.

1. INTRODUCTION

This traffic study analyzes the effects of building and operating a power generating station on 10.31 acres at Schofield Barracks (SB). The Schofield generating station project (SGSP) consists of a 10.31-acre parcel (generating station parcel) and a 2.5-acre linear interconnection easement. The heavily overgrown, undeveloped generating station parcel was once used for growing pineapples and is situated along the eastern boundary of the South Range Acquisition Area. It is about a third of a mile south of Lyman Road, about half a mile west of Kunia Road, and about 150 feet north of the Grow the Army (GTA) construction offices that are accessed from Hauula Street. This site is adjacent to the GTA infrastructure facilities, which are currently under construction. The long-term access route will go through Lyman Road and the access road for the GTA infrastructure facilities in SB. ***Figure 1*** presents the project site location and traffic study intersections.

Figure 1: SGSP Site and Traffic Intersections Studied

The traffic study includes eight intersections on Kunia Road and Lyman Road as shown in ***Figure 1***. Of the eight intersections, six are signal controlled and two are stop sign controlled (Flagler Road and Maili Street intersections on Lyman Road).

This study will evaluate traffic operations for 2014 (current year) and 2017 (estimated year plant will become operational). The construction traffic impact will be evaluated for 2017. It is

anticipated that the Flagler Road and Lyman Road intersection will be improved to a signalized intersection before the plant becomes operational, and the Maili Street intersection will remain a stop sign-controlled intersection.

The operations of these intersections were evaluated for a typical weekday during AM and PM peak hours for the following scenarios:

- Existing 2014 AM and PM Peak Hour Traffic Operations
- 2017 No-Build AM and PM Peak Hour Traffic Operations
- 2017 Construction AM and PM Peak Hour Traffic Operations
- 2017 Build AM and PM Peak Hour Traffic Operations

2. EXISTING CONDITIONS

2.1 Street Network

Kunia Road (SR 750)

Kunia Road is State Route (SR) 750. It has no access control, and is not part of the National Highway System. The posted speed limit on Kunia Road is 35 miles per hour. At the north end, Kunia Road is a four-lane divided north-south major highway, and becomes a two-lane undivided roadway south of the Lyman Road intersection. At the north end, Kunia Road connects to SR 99 (Kamehameha Highway) with a signalized "T" intersection. Kunia Road, SR 99, and Highway (HI) 2 are three parallel roadways connecting the Pearl City/Waipahu area to Wahiawa, SB, and Wheeler Army Airfield (WAAF).

Most intersections on Kunia Road are signalized intersections within the study area. The three major intersections are SR 99, Foote Avenue, and Lyman Road (see ***Figure 2***). The Foote Avenue intersection is one of the two major gateways for SB. The Lyman Road intersection connects to two entrances—to the east is WAAF, and to the west is SB. There are sidewalks on the east side of Kunia Road from the Lyman Road intersection to the Wilikina Drive (SR 99) intersection. On the west end, sidewalk exits are only at the north end of Kunia Road. Utility poles are on the east side of Kunia Road, south of the study area, and cross to the west side south of Lyman Road. Roadway lighting poles are on both sides of Kunia Road north of the Lyman Road intersection.

Per the State of Hawaii, the 2009 Annual Average Daily Traffic (AADT) on Kunia Road in the study area is approximately 13,700 vehicles. The estimated 2014 AADT is approximately 15,400 vehicles.

Lyman Road

Lyman Road is a two-lane east-west roadway going through the SB post. It connects Kunia Road at the entrance gates to both SB and WAAF, and it extends to the west end of the SB post. There are administrative and storage facilities at the east portion of Lyman Road. At the west portion of Lyman Road, it connects mainly to military housing. Lyman Road connects to the GTA infrastructure facilities through the Mellichamp Road extension at the west end of Lyman Road. The facilities and roadways are under construction.

The Humphreys Road intersection is the only signalized intersection on Lyman Road on the post. There are plans to add signals to the Flagler Road intersection in the near future to address the increasing traffic volumes.

The traffic volumes vary along Lyman Road. A 2009 traffic count shows the weekday average daily traffic by the gate was more than14,400 vehicles per day, and decreased to less than 2,000 vehicles per day at the west end section.

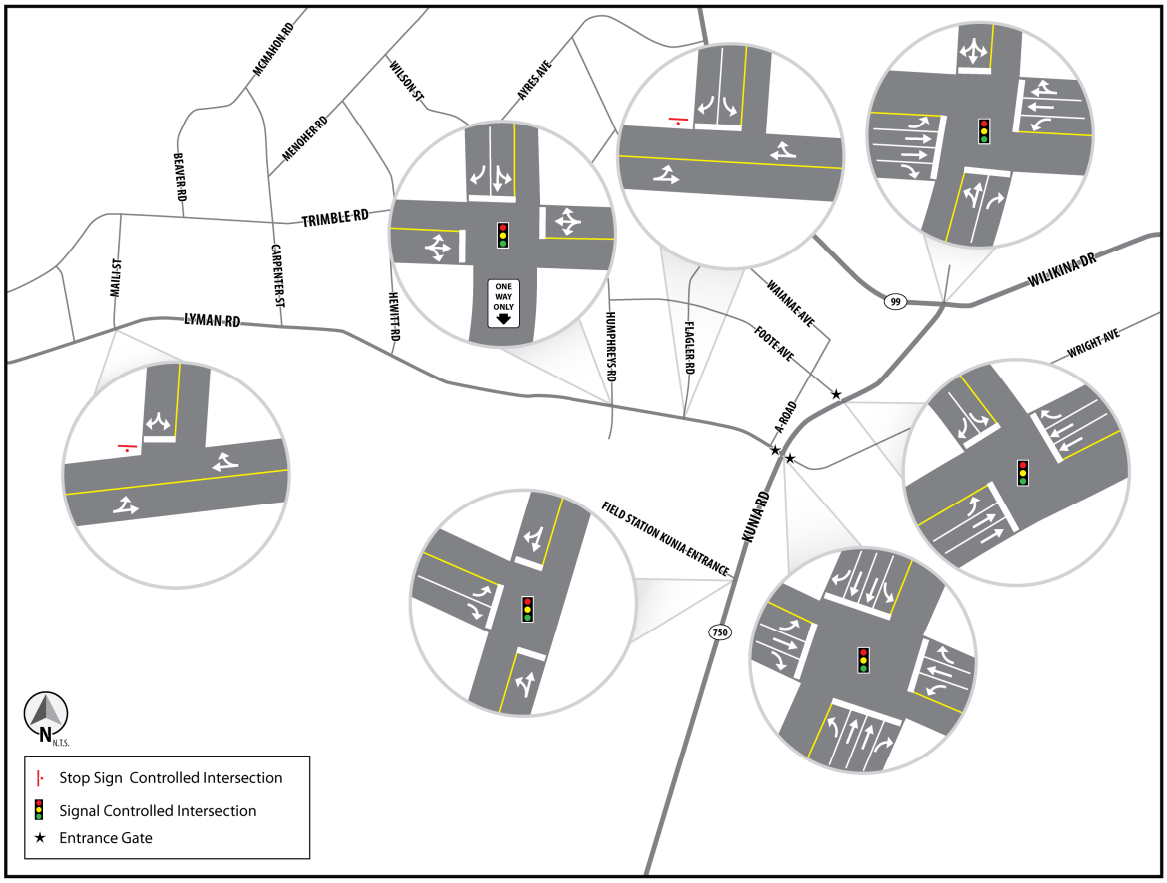


Figure 2. Existing Lane Channelization

2.2 Existing 2014 AM and PM Peak Hour Traffic Volumes

The peak hours observed on Lyman Road were 8:00 a.m.–10:00 a.m. for the morning and 4:00 p.m.–5:00 p.m. for the afternoon. The peak on Kunia Road (SR 750) is between 6:30 a.m.–8:30 a.m. and 3:30 p.m.–4:30 p.m. To capture the overall traffic peak for the study area, turn movement counts were conducted between 7:30 a.m. –9:30 a.m. and 3:30 p.m. –5:30 p.m. The turn movement volumes were then reviewed and balanced for all the study intersections to form the existing volumes.

Figure 3 shows the existing 2014 AM and PM peak hour traffic volumes and turning movement counts used as a baseline for this analysis. ***Appendix A*** provides traffic count data.

Kunia Road (SR 750) carries heavy traffic during AM and PM peak hours. The Kunia Road and Wilikina Drive (SR 99) intersection experiences long queues and delays during both AM and PM peak hours. The intersections at the Lyman Gate and Foot Avenue Gate entrances to the military installations have long cycles and delays.

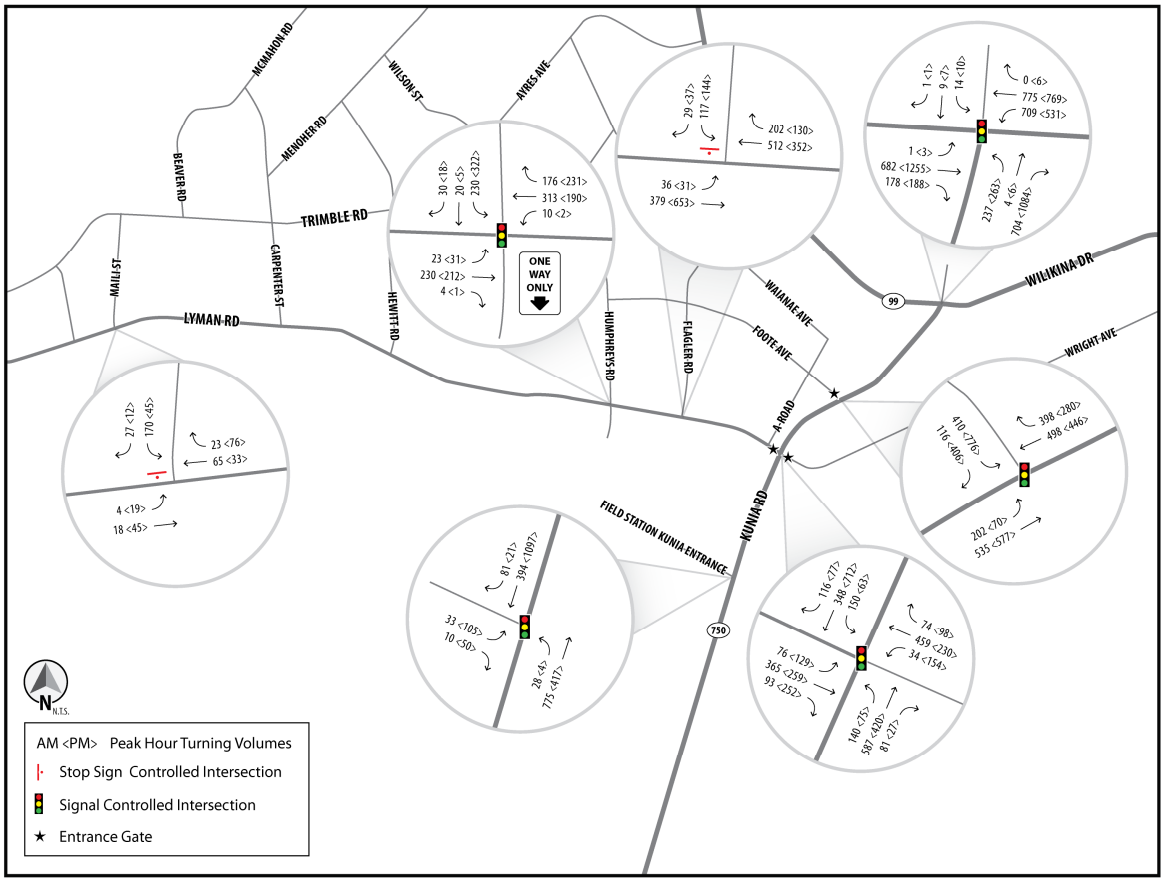


Figure 3. Existing 2014 Peak Hour Traffic Volumes

2.3 Existing 2014 AM and PM Peak Hour Traffic Operations

Trafficware's *Synchro 8* traffic modeling software was used to analyze traffic operations. Synchro is a traffic analysis software program that is based on methods outlined in the 2000 *Highway Capacity Manual* (HCM). The procedures measure the traffic flow obtained from traffic counts and future traffic forecasts to produce measures of effectiveness such as delay per vehicle, intersection level of service (LOS), and intersection queue length.

LOS, which ranges from LOS A to LOS F, is a tool to qualitatively measure the operational conditions of the traffic operations of the intersection. LOS A indicates the free-flow traffic with little or no delay, while LOS F indicates extreme conditions with lengthy delays. ***Appendix B*** provides an expanded definition of LOS.

Table 1 lists the results of the existing AM and PM peak hour traffic operations.

Table 1. Existing 2014 Peak Hour LOS and Average Delay (sec/veh) Summary

Evaluated Intersection	*Intersection Control*	*Existing AM Peak 2014 LOS*	*Existing PM Peak 2014 LOS*
Kunia Road & Wilikina Dr. (SR 99)	**Signalized**	**D** (44.1 sec/veh)	**D** (42.3 sec/veh)
Kunia Road & Foote Avenue	**Signalized**	**C** (33.1 sec/veh)	**C** (33.3 sec/veh)
Kunia Road & Lyman Road	**Signalized**	**D** (50.4 sec/veh)	**D** (38.3 sec/veh)
Kunia Road & Field Station Kunia Entrance	**Signalized**	**A** (6.6 sec/veh)	**B** (18.0 sec/veh)
Lyman Road & Flagler Road	**Stop Sign**	**F** (53.8 sec/veh)	**F** (83.9 sec/veh)
Lyman Road & Humphreys Road	**Signalized**	**B** (12.6 sec/veh)	**B** (11.0 sec/veh)
Lyman Road & Maili Street	**Stop Sign**	**B** (10.7 sec/veh)	**B** (10.3 sec/veh)

Note: sec/veh = seconds per vehicle.

Appendix C provides detailed LOS output reports from Synchro.

Most intersections operate at LOS D or better during both AM and PM peak hours for existing conditions, except the Lyman Road and Flagler Road intersection, which is LOS F. The Flagler Road intersection is stop sign controlled; therefore, the intersection LOS is determined by the average delays on Flagler Road. The delay indicates that it takes a long time for a vehicle on Flagler Road to find gaps in Lyman Road traffic. This supports the plan to add a traffic signal and other improvements at this location.

The Kunia Road and Wilikina Drive (SR 99) intersection suffers long queues and delays during both AM and PM peak hours, especially the Wilikina Drive westbound left turn to southbound Kunia Road movement. At this location the short left turn pocket on Wilikina Drive westbound is not long enough to hold the queuing at the intersection, and spills back into the inside through lane, which worsens the intersection operations.

The Kunia Road and Lyman Gate intersection has long delays and queues due to the large traffic demands and long signal cycles. The security check at the gate entrance also increases the delay and queues at this intersection.

3. FUTURE TRAFFIC VOLUME FORECASTING

It is anticipated that by the end of 2017 the project will be built and fully occupied. The 2017 forecasted traffic demand is comprised of three elements: (1) existing traffic, (2) background traffic growth between 2014 and 2017, and (3) forecasted project-generated traffic. The sum of all three results in the total forecasted traffic volumes for the built condition.

3.1 Background Traffic Growth

The background traffic consists of the future traffic incremental growth added to the existing traffic volumes. This traffic volume growth does not include the project or major developments in the project vicinity.

In determining the traffic growth rate, average daily traffic on Kunia Road was reviewed. The 2009 AADT on Kunia Road is approximately 13,700 vehicles in the study area. The estimated 2014 AADT is approximately 15,400 vehicles. This represents a 2.5 percent straight line annual growth from 2009 to 2014. The 2.5 percent straight line annual growth was used to project peak hour traffic volumes for both Kunia Road and Lyman Road intersections, and applied to existing traffic volumes to generate future background traffic. With limited information, this percentage growth rate represents a reasonable average for the purpose of establishing future background traffic levels. The actual growth rates experienced by the different intersections might be higher or lower than this average.

3.2 Grow The Army Project Traffic

GTA Phase 1 is under construction and will be completed and occupied before 2017. The project expands SB capacity and will generate new traffic volumes in the study area. The GTA traffic is not included in the background traffic growth. Per the Transportation Impact Analysis Report[1] completed by Feher & Peers Transportation Consultants in 2009, the total traffic generated by the GTA development are 690 inbound and 100 outbound vehicle trips during the AM peak hour, with the reverse (100 inbound trips and 690 outbound trips) occurring during the PM peak hour. 70 percent of personnel at the GTA site were assumed to originate from within the base during the AM peak hour, while 30 percent will travel through Lyman Gate. The majority of on-site personnel were expected to use Menoher Road, Carpenter Street, Trimble Road, and Mellichamp Road to get to the GTA site.

The GTA traffic study did not state how traffic was assigned on Kunia Road outside Lyman Gate. For the purpose of this study, the traffic assignment was assumed based on Lyman Gate AM peak hour traffic volume distributions— 45 percent of traffic to/from north on Kunia Road, and 55 percent traffic to/from south on Kunia Road.

[1] Final Transportation Impact Analysis: FY09 Grow the Army Project at Schofield Barracks, June 29, 2009

3.3 Estimated Construction Traffic

During construction, the site will be accessed through a temporary access road from Kunia Road south of the Field Station Kunia entrance signalized intersection. Construction is estimated to start in May 2016 and finish by June 2017.

Hawaiian Electric Company (Hawaiian Electric) and Quanta's estimates indicate that there will be two types of traffic impacts: (1) light personal and noncommercial traffic, and (2) commercial traffic.

Light personal and noncommercial traffic:

- Vehicles on-site and personnel vehicle impact – Average vehicles on-site during construction – Using 1.5 occupants per vehicle.
- Seventy-seven average vehicles will result in 62 noncommercial vehicles commuting daily from September 2016 to July 2017.
- Ninety-eight peak vehicles will result in 79 noncommercial vehicles commuting daily from December 2016 to June 2017.
- Both average and peak vehicles on site traffic was considered twice a day (6:00 a.m. – 8:00 a.m. and 4:00 p.m.–6:00 p.m. Monday through Saturday).

For the purpose of the traffic study, a single-occupant vehicle is assumed for the 98 peak vehicles to ensure the traffic volume is on the conservative side.

A portion of the construction traffic will come from the north on Kunia Road, with the other portion coming from the south. Only the traffic from the north will affect the intersections on Kunia Road within the study area. There will be no construction traffic impacts on Lyman Road intersections.

There is no information to determine the distribution of this construction traffic. For the purpose of this study, it was assumed that half of the traffic comes from the north on Kunia Road, and half comes from the south.

Commercial Traffic:

- Light, local commercial delivery traffic is defined as weighing between 5 – 8 tons class delivery vehicles from the local surrounding markets, and will range from five to seven deliveries a day starting in May 2016 and continuing through July 2017.
- Heavy loads, 10 tons and greater, will range from 3 to 4 loads a day starting in August 2016 and continuing through February 2017.
- Wide and permitted loads for heavy equipment (modules, Wärtsiläs, radiators, and the like) are planned between November 2016 and April 2017.

Hawaiian Electric will use the Barbers Point Harbor as the point of entry for major equipment. The vehicles will leave the port traveling southeast on Malakole Street (HI-95); make a left on Kalaeloa Boulevard (HI-95) to the entrance of HI-1 East; use exit 5 to go north on Kunia Road (HI-750) for approximately 5 miles; and then make a left on the unimproved construction road, entering the project site on the south end.

All commercial traffic will come from the south on Kunia Road and will not affect the studied intersections.

3.4 Project Operation Traffic

Upon project completion, the temporary access road will be closed. All traffic will access the site through the Lyman Gate and the newly built Mellichamp Road extension for GTA facilities.

Initial Fuel Delivery Traffic

Before normal operation begins, the facility fuel tanks need to be filled. According to Hawaiian Electric staff, initial fuel deliveries would occur on workdays at non-peak hours, and:

- Urea would require three 40-foot containers, one container per week.
- Fuel would be offloaded one truck at a time, and each truck will take an hour. Filling the the storage tanks will require 6 trucks per day and 60 fuel trucks over 2 weeks.
- Lube oil would require three trucks, one truck per day for 3 days.

Because the initial fueling delivery occurs during non-peak hours, peak hour traffic will be unaffected. Therefore, the initial fuel delivery traffic was not included in the traffic study.

Normal Operational Traffic

According to Hawaiian Electric staff, normal facility operation requires three shifts, and each shift has one operator and one supervisor. There will be one shift change during the AM peak hours, and no shift changes during the PM peak hours. There will also be an off-duty shift during the AM peak hours. It is assumed that all personnel will drive in a single-occupancy vehicle. This operation will generate six personal vehicles in the morning peak hours—four inbound and two outbound vehicles. For the purposes of this traffic study, it is assumed this traffic will be split equally on Kunia Road in the north and south directions.

It is anticipated that full operation of the facility might require a daily maximum of 26 delivery trucks for fuel/urea and other deliveries. These trucks would spread out evenly over the 24-hour period. For the purpose of the traffic study, it is assumed there will be two truck deliveries during AM peak hours and no truck delivery during PM peak hours.

Overall, the operational traffic is minor during the AM peak hours. There is no induced traffic during the PM peak hours. This traffic study, therefore, will only analyze the AM peak hours for the operation traffic volumes.

4. 2017 NO-BUILD TRAFFIC OPERATIONS

The Army is planning to add a traffic signal to the Flagler Road and Lyman Road intersection. It is assumed that this improvement will be constructed before 2017 and become part of the No-Build roadway network. The improvement will not change the roadway network capacity, and no traffic volume will be added to the network. ***Figure 4*** depicts the 2017 roadway intersection geometry.

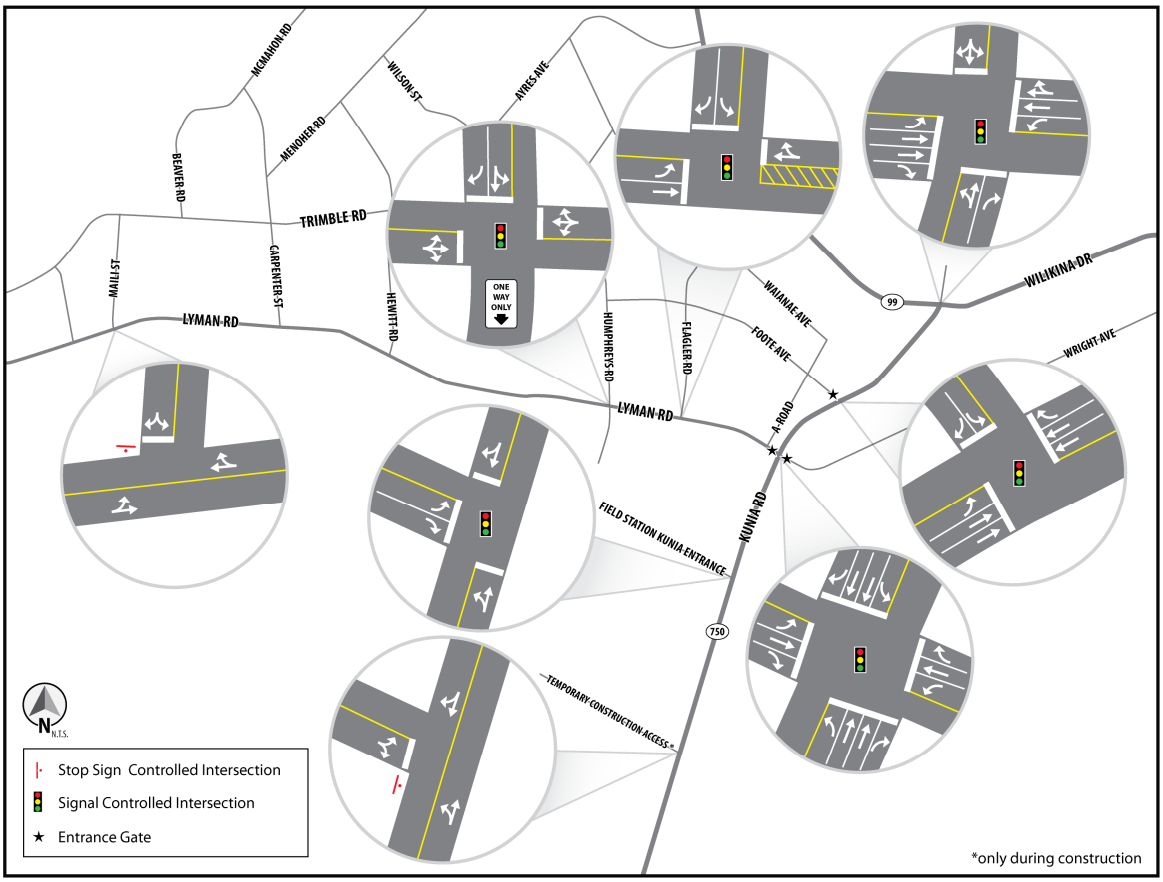


Figure 4. 2017 Intersection Channelization

The No-Build assumes the project will not be built. The construction for the GTA Phase 1 facilities will be finished and fully occupied before 2017. Therefore, the No-Build scenario will include traffic generated by GTA Phase 1 facilities. The 2017 No-Build scenario traffic comprises three elements: (1) existing traffic, (2) background traffic growth, and (3) GTA traffic. ***Figure 5*** shows the 2017 No-Build traffic volumes**.**

2017 No-Build Synchro models are based on the 2014 existing Synchro model. New traffic signal and intersection geometric improvements are added at Flagler Road and Lyman Road per design plans. The geometric and network data for the rest of the network was not modified.

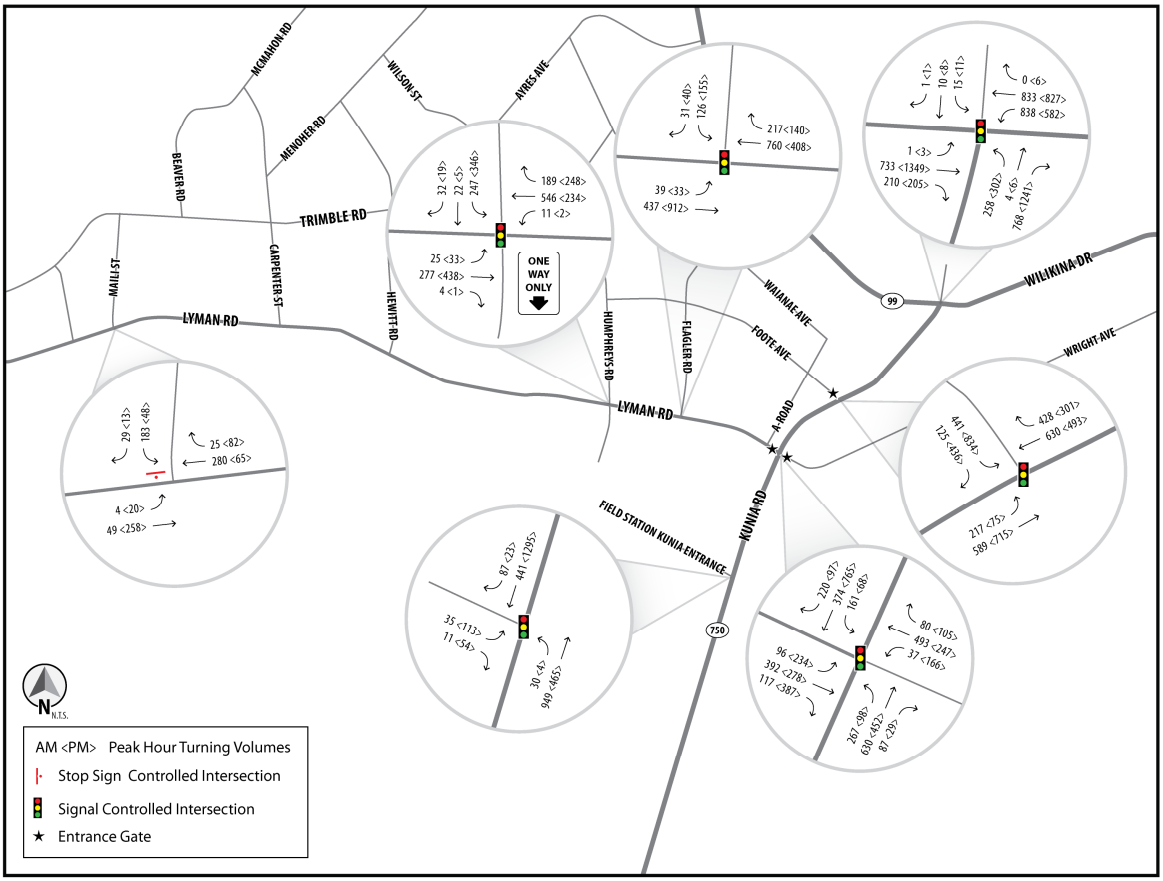


Figure 5. 2017 No-Build Peak Hour Traffic Volumes

Trafficware's *Synchro 8* was used to conduct the traffic operations analysis for the 2017 No-Build AM and PM peak hour scenario. ***Table 2*** lists the analysis results of the 2017 No-Build AM and PM peak hour traffic operations.

Appendix C provides detailed LOS output reports from Synchro.

The GTA facility generates significant traffic volumes in the study area. The Wilikina Drive / Kunia Road and Lyman Road / Kunia Road intersections operate in LOS E during the AM peak hours and LOS D during the PM peak hours. Long queues will be formed on all three legs of the Wilikina Drive and Kunia Road intersection. The Lyman Road and Kunia Road intersection would also have a longer queue. The Kunia Road northbound left turn queue will be longer than the available storage during AM peak hours, and spill back onto the through lane.

The new traffic signal at the Flagler Road and Lyman Road intersection will significantly improve traffic operations. The intersection is anticipated to operate at LOS C during 2017 No-Build AM peak hours and LOS B during PM peak hours.

The rest of the intersections operate at LOS D or better for both AM and PM peak hours in the 2017 No-Build scenario.

Table 2. 2017 No-Build Peak Hour LOS and Average Delay (sec/veh) Summary

Evaluated Intersection	*Intersection Control*	*2017 AM Peak*	*2017 PM Peak*
		LOS (Avg. Delay)	*LOS (Avg. Delay)*
Kunia Road & Wilikina Dr. (SR 99)	**Signalized**	**E** (61.0 sec/veh)	**D** (54.6 sec/veh)
Kunia Road & Foote Avenue	**Signalized**	**D** (36.2 sec/veh)	**D** (41.8 sec/veh)
Kunia Road & Lyman Road	**Signalized**	**E** (60.0 sec/veh)	**D** (51.9 sec/veh)
Kunia Road & Field Station Kunia Entrance	**Signalized**	**A** (7.6 sec/veh)	**D** (35.8 sec/veh)
Lyman Road & Flagler Road	**Signalized**	**C** (24.2 sec/veh)	**B** (13.1 sec/veh)
Lyman Road & Humphreys Road	**Signalized**	**C** (20.2 sec/veh)	**B** (14.7 sec/veh)
Lyman Road & Maili Street	**Stop Sign**	**C** (15.5 sec/veh)	**B** (14.4 sec/veh)

Note: sec/veh = seconds per vehicle.

5. TRAFFIC OPERATIONS DURING CONSTRUCTION

It is anticipated that by the end of 2017 the project will be built and fully occupied. 2017 is the construction and opening year for the project. The 2017 forecasted traffic demand during construction is comprised of four elements: (1) existing traffic, (2) background traffic growth, (3) GTA traffic, and (4) construction traffic. ***Figure 6*** shows the 2017 construction traffic volumes**.**

It is assumed that all construction traffic will access the site via a temporary construction access on Kunia Road south of the Field Station Kunia entrance intersection, and that all construction traffic will come from outside of the post. Construction, therefore, would only affect traffic on Kunia Road. The intersections inside the SB post will not be affected, and the operations will be the same as the No-Build operation.

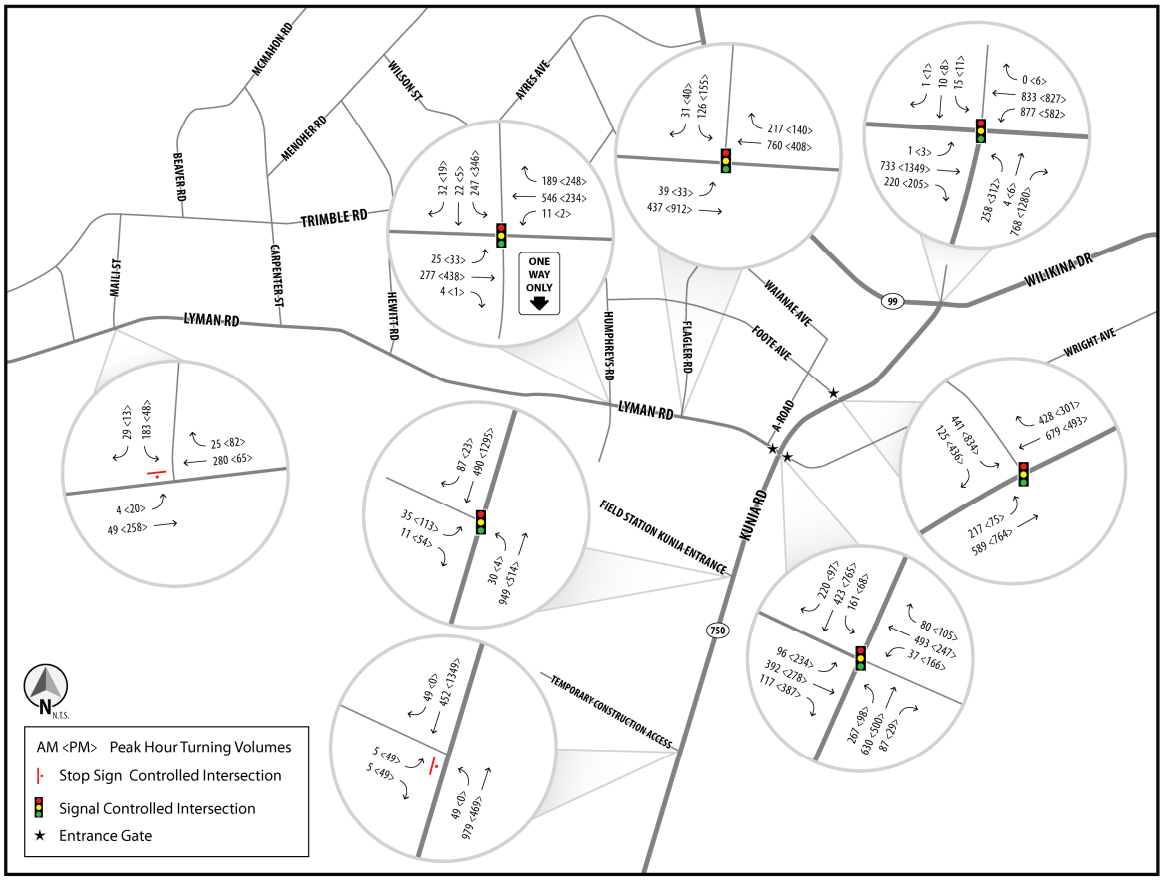


Figure 6. 2017 Peak Hour Traffic Volumes During Construction

2017 construction Synchro models are based on the 2017 No-Build Synchro model. It includes a new intersection on Kunia Road for the temporary construction access road. This intersection will be stop sign controlled with free traffic on Kunia Road.

Trafficware's *Synchro 8* was used to conduct the traffic operations analysis for the 2017 No-Build AM and PM peak hour scenario. ***Table 3*** lists the results of the existing AM and PM peak hour traffic operations.

Table 3. 2017 Construction Peak Hour LOS and Average Delay (sec/veh) Summary

Evaluated Intersection	*Intersection Control*	*2017 AM Peak*	*2017 PM Peak*
		LOS (Avg. Delay)	*LOS (Avg. Delay)*
Kunia Road & Wilikina Dr. (SR 99)	**Signalized**	**E** (64.6 sec/veh)	**E** (56.7 sec/veh)
Kunia Road & Foote Avenue	**Signalized**	**D** (36.6 sec/veh)	**D** (43.3 sec/veh)
Kunia Road & Lyman Road	**Signalized**	**E** (60.7 sec/veh)	**D** (51.8 sec/veh)
Kunia Road & Field Station Kunia Entrance	**Signalized**	**A** (7.7 sec/veh)	**D** (35.0 sec/veh)
Kunia Road & Construction Access Rd	**Stop Sign**	**E** (36.5 sec/veh)	**F** (234.5 sec/veh

Note: sec/veh = seconds per vehicle.

Appendix C provides detailed LOS output reports from Synchro.

The construction traffic will add to the existing traffic congestion within the study area. Although the LOS for the Wilikina Drive and Kunia Road intersection increased from LOS D to LOS E during the PM peak hours, the average delays only increased 2.1 seconds per vehicle. The increase of average control delays for all intersections is less than 4 seconds per vehicle, compared with the 2017 No-Build scenario. The queues and delays are slightly longer on Kunia Road, but the overall traffic impacts generated from construction vehicles are minor.

The vehicle leaving the temporary construction access road intersection will experience delays due to the high volumes on Kunia Road. The traffic on Kunia Road will be minimal. To avoid delays, it is recommended that construction vehicles leaving the site be limited to off-peak hours when possible.

6. 2017 BUILT TRAFFIC OPERATIONS

The Build scenario assumes the project has been constructed and is fully operational. It will include the traffic generated from the GTA facilities and the additional traffic signal at the Flagler Road and Lyman Road intersection. The 2017 Build scenario traffic comprises four elements: (1) existing traffic, (2) background traffic growth, (3) GTA traffic, and (4) facility operational traffic.

All operational traffic will go through the Lyman Gate intersection. It will only affect general traffic during AM peak hours and there will be minimal operational traffic during PM peak hours. ***Figure 7*** shows the 2017 Build traffic AM peak hour volumes**.**

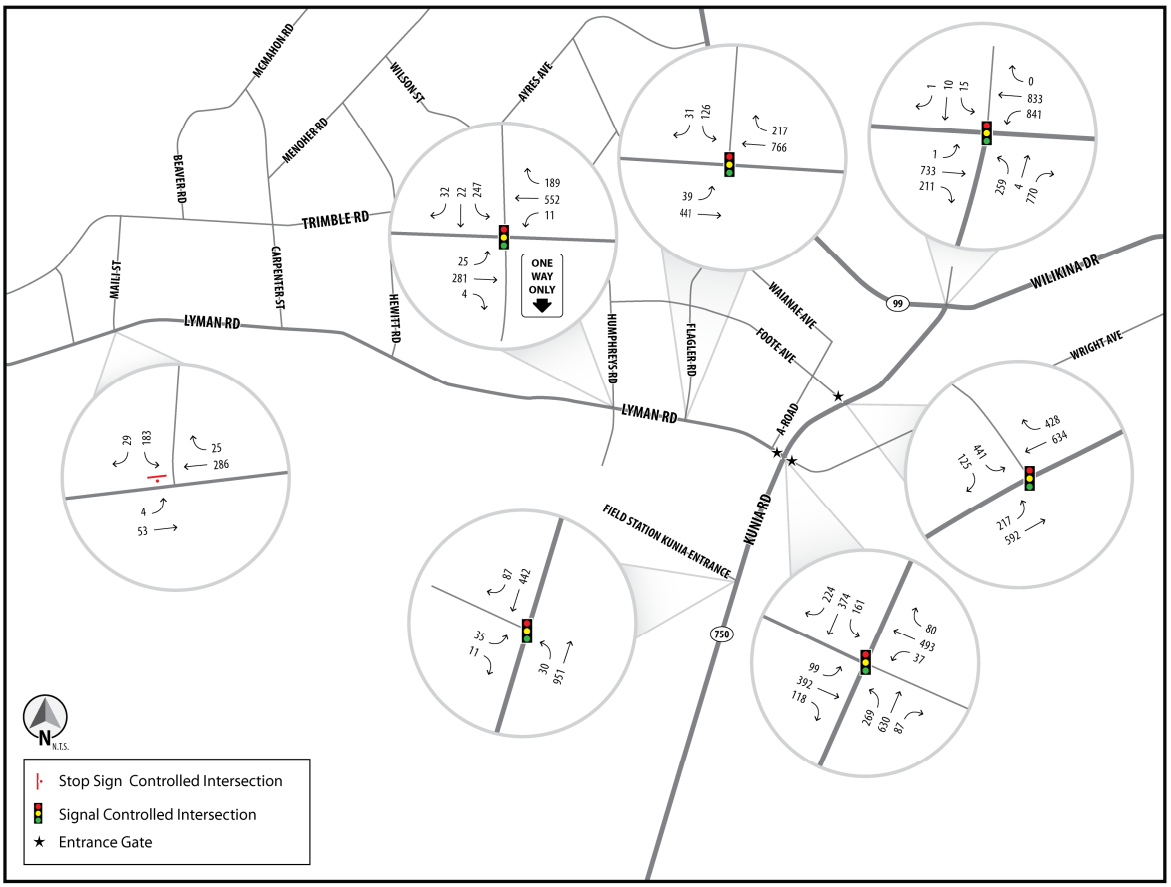


Figure 7. 2017 Build AM Peak Hour Traffic Volumes

2017 Build Synchro models are based on the 2017 No-Build Synchro model. The temporary construction access road is removed from the network.

Trafficware's *Synchro 8* was used to conduct the traffic operations analysis for the 2017 Build AM peak hour scenario. The 2017 Build PM peak hour operation is the same as the 2017 No-Build operation. ***Table 4*** lists the results of the 2017 Build AM peak hour traffic operational analysis. The PM peak hour result is copied from the 2017 No-Build scenario.

Table 4. 2017 Build Peak Hour LOS and Average Delay (sec/veh) Summary

Evaluated Intersection	*Intersection Control*	*2017 AM Peak*	*2017 PM Peak*
		LOS (Avg. Delay)	*LOS (Avg. Delay)*
Kunia Road & Wilikina Dr. (SR 99)	**Signalized**	**E** (61.4 sec/veh)	**D** (54.6 sec/veh)
Kunia Road & Foote Avenue	**Signalized**	**D** (36.2 sec/veh)	**D** (41.8 sec/veh)
Kunia Road & Lyman Road	**Signalized**	**E** (60.6 sec/veh)	**D** (51.9 sec/veh)
Kunia Road & Field Station Kunia Entrance	**Signalized**	**A** (7.6 sec/veh)	**D** (35.8 sec/veh)
Lyman Road & Flagler Road	**Signalized**	**C** (24.8 sec/veh)	**B** (13.1 sec/veh)
Lyman Road & Humphreys Road	**Signalized**	**C** (20.5 sec/veh)	**B** (14.7 sec/veh)
Lyman Road & Maili Street	**Stop Sign**	**C** (15.8 sec/veh)	**B** (14.4 sec/veh)

Note: sec/veh = seconds per vehicle.

Appendix C provides detailed LOS output reports from Synchro.

The facility operational traffic volume is small and only has minimal traffic impact during the AM peak hours. The average traffic delays increase less than 1 second per vehicle during the AM peak hour when compared with the No-Build scenario, and there are no noticeable impacts to queue lengths. All study intersections on the post operate in LOS C during the AM peak hours. No traffic impact is anticipated during the PM peak hours.

7. CONCLUSION

The traffic study analyzed traffic operations of eight intersections on Kunia Road and Lyman Road near SB. Today, the traffic on Kunia Road experiences delays and long queues at intersections during peak hours. By 2017 the traffic in the network will increase from the background growth and the completion of the GTA Phase 1 project. Traffic conditions will be worse on Kunia Road and Lyman Road as traffic demand increases.

The addition of traffic signal and intersection movements on the Flagler Road and Lyman Road intersection are necessary and will improve the operations dramatically compared with the current stop sign-controlled intersections.

The construction and operation of the SGSP project will generate more traffic volumes on the roadway network. These project-generated traffic volumes are small, and will not significantly affect traffic. Compared with the future No-Build scenario, the increase on average vehicle delays from construction traffic is less than 4 seconds per vehicle, and less than 1 second per vehicle for operational traffic during the AM peak hours. There is no traffic impact from operational traffic during the PM peak hour. Overall, the impact from the facility operation traffic is negligible.

The temporary construction access road will have long delays for the construction traffic. It is recommended that limiting the construction traffic to off-peak periods of time to reduce delays be considered if feasible. However, the construction traffic impacts to the general traffic are small because of the low volumes of construction traffic compared to general traffic during the peak hours.

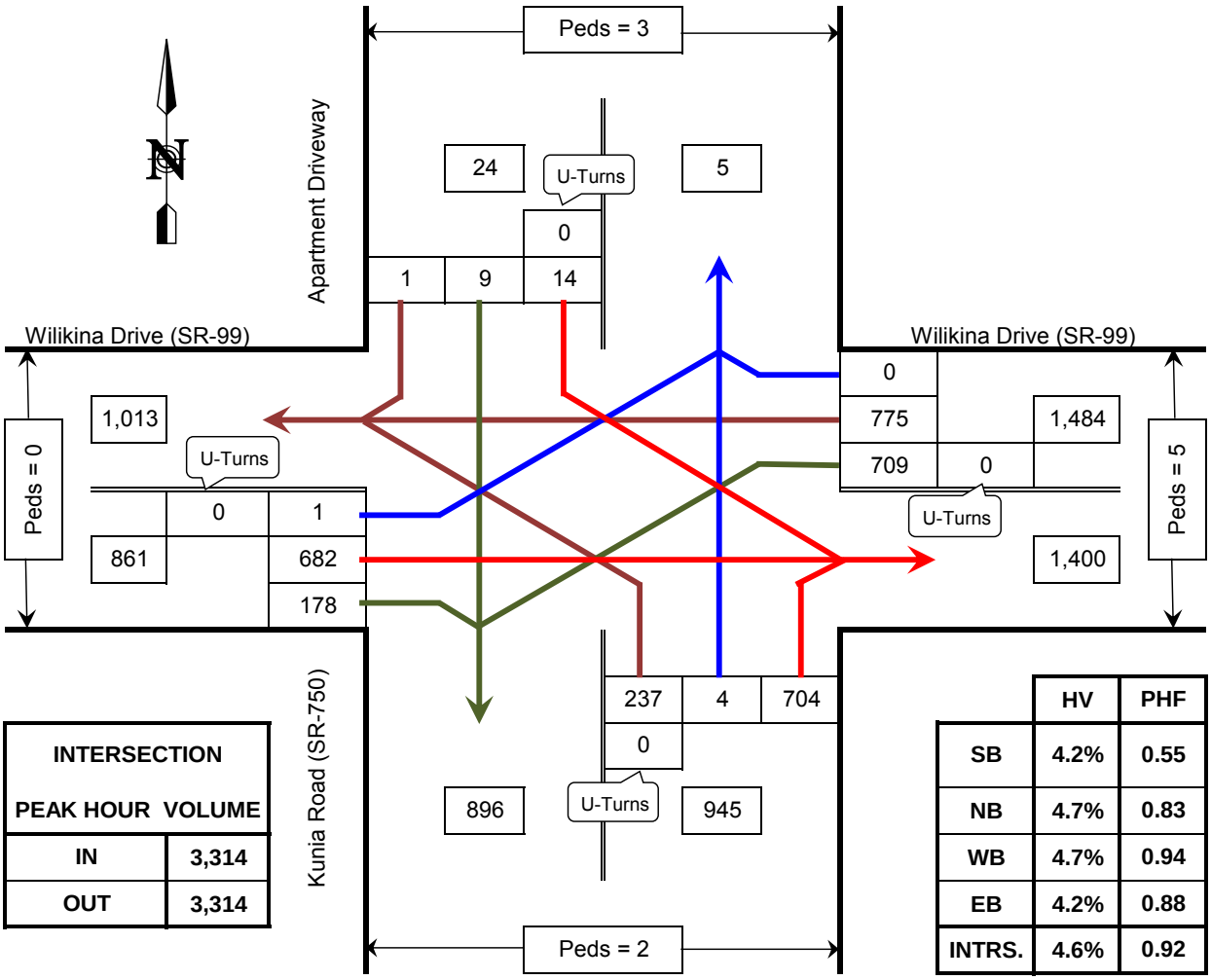
Traffic Study
Appendix A.

Traffic Count Data

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

7:30 AM - 9:30 AM PEAK HOUR: 7:30 AM TO 8:30 AM



INTERSECTION PEAK HOUR VOLUME	
IN	3,314
OUT	3,314

	HV	PHF
SB	4.2%	0.55
NB	4.7%	0.83
WB	4.7%	0.94
EB	4.2%	0.88
INTRS.	4.6%	0.92

PHF = Peak Hour Factor
HV = Heavy Vehicles

Kunia Road (SR-750) @ Wilikina Drive (SR-99)

Schofield Barracks, HI

COUNTED BY: CN

REDUCED BY: CN

REDUCTION DATE: Fri. 2/28/14

DATE OF COUNT: Thu. 2/27/14

TIME OF COUNT: 7:30 AM - 9:30 AM

WEATHER: Sunny

TRAFFIC DATA GATHERING

INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: Kunia Road (SR-750) @ Wilikina Drive (SR-99)
Schofield Barracks, HI

DATE OF COUNT: Thu. 2/27/14
TIME OF COUNT: 7:30 AM - 9:30 AM

COUNTED BY: CN
WEATHER: Sunny

TIME INTERVAL ENDING AT	FROM NORTH ON Apartment Driveway						FROM SOUTH ON Kunia Road (SR-750)						FROM EAST ON Wilikina Drive (SR-99)						FROM WEST ON Wilikina Drive (SR-99)						INTERVAL TOTALS
	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	
05:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
06:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
06:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
06:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
07:45 AM	1	1	0	6	5	0	2	10	0	65	2	216	5	21	0	165	196	0	0	6	0	0	189	57	**901**
08:00 AM	0	0	0	4	2	1	0	12	0	53	0	176	0	17	0	180	214	0	0	10	0	1	155	51	**837**
08:15 AM	1	0	0	2	1	0	0	13	0	62	1	190	0	17	0	182	175	0	0	8	0	0	161	36	**810**
08:30 AM	1	0	0	2	1	0	0	9	0	57	1	122	0	15	0	182	190	0	0	12	0	0	177	34	**766**
08:45 AM	0	0	0	0	2	0	0	7	0	30	0	98	0	15	0	148	178	0	0	2	0	0	163	27	**646**
09:00 AM	5	0	0	5	1	0	1	10	0	50	0	109	0	14	0	151	216	0	0	8	0	0	128	38	**698**
09:15 AM	0	0	0	2	1	0	0	5	0	38	0	102	0	18	0	200	206	0	0	10	0	0	152	27	**728**
09:30 AM	0	1	0	3	0	0	2	5	0	39	0	109	2	15	0	141	161	0	0	10	0	0	124	43	**620**
PEAK HOUR TOTALS	**3**	**1**	**0**	**14**	**9**	**1**	**2**	**44**	**0**	**237**	**4**	**704**	**5**	**70**	**0**	**709**	**775**	**0**	**0**	**36**	**0**	**1**	**682**	**178**	**INTERSECTION**
ALL MOVEMENTS	**24**						**945**						**1484**						**861**						**3314**
% HV	**4.2%**						**4.7%**						**4.7%**						**4.2%**						**4.6%**
PEAK HOUR FACTOR	**0.55**						**0.83**						**0.94**						**0.88**						**0.92**

PHF = Peak Hour Factor

7:30 AM - 9:30 AM PEAK HOUR: 7:30 AM TO 8:30 AM

REDUCED BY: CN

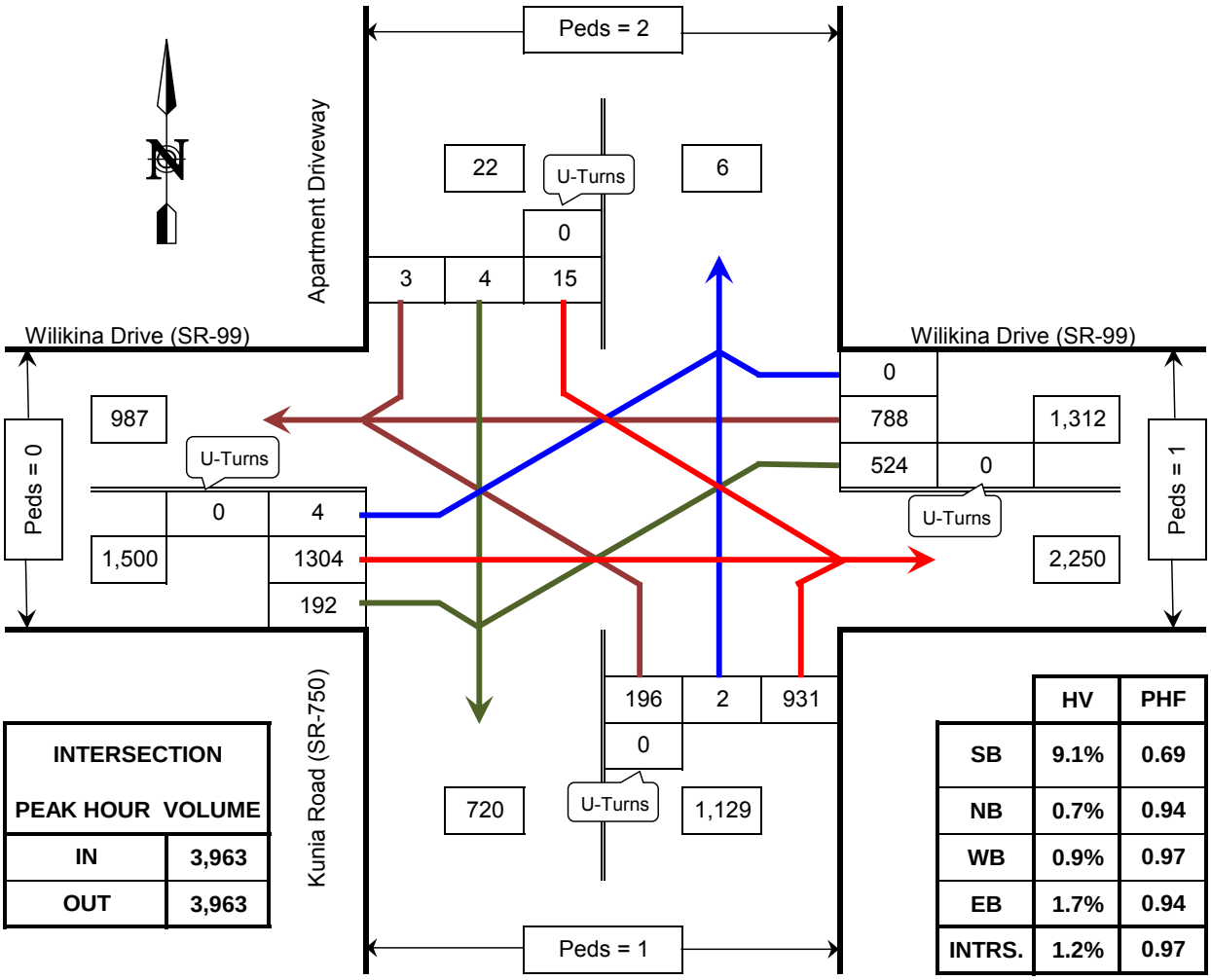
DATE OF REDUCTION: 2/28/2014

	FROM NORTH ON Apartment Driveway						FROM SOUTH ON Kunia Road (SR-750)						FROM EAST ON Wilikina Drive (SR-99)						FROM WEST ON Wilikina Drive (SR-99)						INTERVAL TOTALS
TIME INTERVAL	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	
5:30 AM - 6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5:45 AM - 6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:00 AM - 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:15 AM - 7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:30 AM - 7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:45 AM - 7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7:00 AM - 8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7:15 AM - 8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7:30 AM - 8:30 AM	3	1	0	14	9	1	2	44	0	237	4	704	5	70	0	709	775	0	0	36	0	1	682	178	**3314**
7:45 AM - 8:45 AM	2	0	0	8	6	1	0	41	0	202	2	586	0	64	0	692	757	0	0	32	0	1	656	148	**3059**
8:00 AM - 9:00 AM	7	0	0	9	5	0	1	39	0	199	2	519	0	61	0	663	759	0	0	30	0	0	629	135	**2920**
8:15 AM - 9:15 AM	6	0	0	9	5	0	1	31	0	175	1	431	0	62	0	681	790	0	0	32	0	0	620	126	**2838**
8:30 AM - 9:30 AM	5	1	0	10	4	0	3	27	0	157	0	418	2	62	0	640	761	0	0	30	0	0	567	135	**2692**

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

3:30 PM - 5:30 PM PEAK HOUR: 4:15 PM TO 5:15 PM



INTERSECTION	
PEAK HOUR	VOLUME
IN	3,963
OUT	3,963

	HV	PHF
SB	9.1%	0.69
NB	0.7%	0.94
WB	0.9%	0.97
EB	1.7%	0.94
INTRS.	1.2%	0.97

PHF = Peak Hour Factor
HV = Heavy Vehicles

Kunia Road (SR-750) @ Wilikina Drive (SR-99)

Schofield Barracks, HI

COUNTED BY: CN

REDUCED BY: CN

REDUCTION DATE: Fri. 2/28/14

DATE OF COUNT: Thu. 2/27/14

TIME OF COUNT: 3:30 PM - 5:30 PM

WEATHER: Sunny

TRAFFIC DATA GATHERING

INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: Kunia Road (SR-750) @ Wilikina Drive (SR-99)
Schofield Barracks, HI

DATE OF COUNT: Thu. 2/27/14
TIME OF COUNT: 3:30 PM - 5:30 PM

COUNTED BY: CN
WEATHER: Sunny

TIME INTERVAL ENDING AT	FROM NORTH ON Apartment Driveway						FROM SOUTH ON Kunia Road (SR-750)						FROM EAST ON Wilikina Drive (SR-99)						FROM WEST ON Wilikina Drive (SR-99)						INTERVAL TOTALS
	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
03:45 PM	3	0	0	2	1	0	1	9	0	53	0	241	1	5	0	121	187	6	0	7	0	0	278	28	**917**
04:00 PM	1	0	0	3	3	0	0	2	0	51	3	240	0	9	0	113	200	0	0	10	0	0	305	43	**961**
04:15 PM	0	0	0	2	2	0	2	2	0	65	1	221	2	4	0	91	174	0	0	8	0	2	320	48	**926**
04:30 PM	2	1	0	3	0	1	0	3	0	57	1	230	0	5	0	128	208	0	0	2	0	1	352	41	**1022**
04:45 PM	0	1	0	5	2	1	0	1	0	36	1	222	0	2	0	118	196	0	0	9	0	1	343	55	**980**
05:00 PM	0	0	0	3	1	1	1	2	0	49	0	251	1	2	0	152	186	0	0	9	0	2	291	55	**991**
05:15 PM	0	0	0	4	1	0	0	2	0	54	0	228	0	3	0	126	198	0	0	6	0	0	318	41	**970**
05:30 PM	3	0	0	1	0	0	1	1	0	89	1	243	0	2	0	138	174	0	0	9	0	1	303	44	**994**
PEAK HOUR TOTALS	**2**	**2**	**0**	**15**	**4**	**3**	**1**	**8**	**0**	**196**	**2**	**931**	**1**	**12**	**0**	**524**	**788**	**0**	**0**	**26**	**0**	**4**	**1304**	**192**	**INTERSECTION**
ALL MOVEMENTS	**22**						**1129**						**1312**						**1500**						**3963**
% HV	**9.1%**						**0.7%**						**0.9%**						**1.7%**						**1.2%**
PEAK HOUR FACTOR	**0.69**						**0.94**						**0.97**						**0.94**						**0.97**

PHF = Peak Hour Factor

3:30 PM - 5:30 PM PEAK HOUR: **4:15 PM TO 5:15 PM**

REDUCED BY: CN

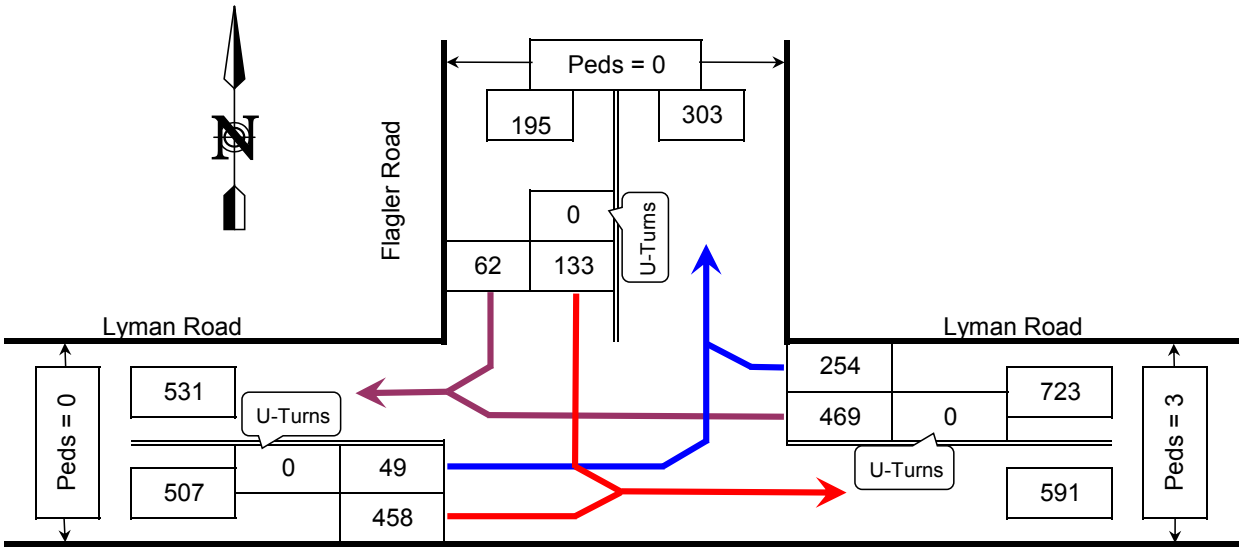
DATE OF REDUCTION: 2/28/2014

	FROM NORTH ON Apartment Driveway						FROM SOUTH ON Kunia Road (SR-750)						FROM EAST ON Wilikina Drive (SR-99)						FROM WEST ON Wilikina Drive (SR-99)						INTERVAL TOTALS
TIME INTERVAL	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	
1:30 PM - 2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:45 PM - 2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:00 PM - 3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:15 PM - 3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:30 PM - 3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:45 PM - 3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:00 PM - 4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:15 PM - 4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:30 PM - 4:30 PM	6	1	0	10	6	1	3	16	0	226	5	932	3	23	0	453	769	6	0	27	0	3	1255	160	**3826**
3:45 PM - 4:45 PM	3	2	0	13	7	2	2	8	0	209	6	913	2	20	0	450	778	0	0	29	0	4	1320	187	**3889**
4:00 PM - 5:00 PM	2	2	0	13	5	3	3	8	0	207	3	924	3	13	0	489	764	0	0	28	0	6	1306	199	**3919**
4:15 PM - 5:15 PM	2	2	0	15	4	3	1	8	0	196	2	931	1	12	0	524	788	0	0	26	0	4	1304	192	**3963**
4:30 PM - 5:30 PM	3	1	0	13	4	2	2	6	0	228	2	944	1	9	0	534	754	0	0	33	0	4	1255	195	**3935**

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

7:30 AM - 9:30 AM PEAK HOUR: 8:30 AM TO 9:30 AM



INTERSECTION PEAK HOUR VOLUME	
IN	1,425
OUT	1,425

	HV	PHF
SB	1.5%	0.86
WB	6.6%	0.89
EB	11.6%	0.84
INTRS.	7.7%	0.89

HV = Heavy Vehicles
PHF = Peak Hour Factor

Lyman Road @ Flagler Road

Schofield Barracks, HI

COUNTED BY: SN

DATE OF COUNT: Thu. 2/27/14

REDUCED BY: CN

TIME OF COUNT: 7:30 AM - 9:30 AM

REDUCTION DATE: Fri. 2/28/14

WEATHER: Sunny

TRAFFIC DATA GATHERING

INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: Lyman Road @ Flagler Road
Schofield Barracks, HI

DATE OF COUNT: Thu. 2/27/14
TIME OF COUNT: 7:30 AM - 9:30 AM

COUNTED BY: SN
WEATHER: Sunny

TIME INTERVAL ENDING AT	FROM NORTH ON Flagler Road						FROM SOUTH ON						FROM EAST ON Lyman Road						FROM WEST ON Lyman Road						INTERVAL TOTALS
	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	
05:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
06:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
06:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
06:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
07:45 AM	0	0	0	26	0	4	0	0	0	0	0	0	0	10	0	0	130	16	0	9	0	14	129	0	**319**
08:00 AM	0	1	0	21	0	13	0	0	0	0	0	0	2	6	0	0	113	54	0	6	0	6	75	0	**282**
08:15 AM	0	2	0	23	0	7	0	0	0	0	0	0	0	7	0	0	151	90	0	5	0	3	77	0	**351**
08:30 AM	0	1	0	47	0	5	0	0	0	0	0	0	0	10	0	0	118	42	0	6	0	13	98	0	**323**
08:45 AM	0	2	0	35	0	9	0	0	0	0	0	0	2	12	0	0	119	48	0	8	0	9	97	0	**317**
09:00 AM	0	1	0	30	0	15	0	0	0	0	0	0	0	15	0	0	110	61	0	5	0	9	91	0	**316**
09:15 AM	0	0	0	29	0	20	0	0	0	0	0	0	1	9	0	0	115	87	0	14	0	17	133	0	**401**
09:30 AM	0	0	0	39	0	18	0	0	0	0	0	0	0	12	0	0	125	58	0	32	0	14	137	0	**391**
PEAK HOUR TOTALS	**0**	**3**	**0**	**133**	**0**	**62**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**48**	**0**	**0**	**469**	**254**	**0**	**59**	**0**	**49**	**458**	**0**	**INTERSECTION**
ALL MOVEMENTS	**195**						**0**						**723**						**507**						**1425**
% HV	**1.5%**						**#N/A**						**6.6%**						**11.6%**						**7.7%**
PEAK HOUR FACTOR	**0.86**						**#N/A**						**0.89**						**0.84**						**0.89**

PHF = Peak Hour Factor

7:30 AM - 9:30 AM PEAK HOUR: 8:30 AM TO 9:30 AM

REDUCED BY: CN

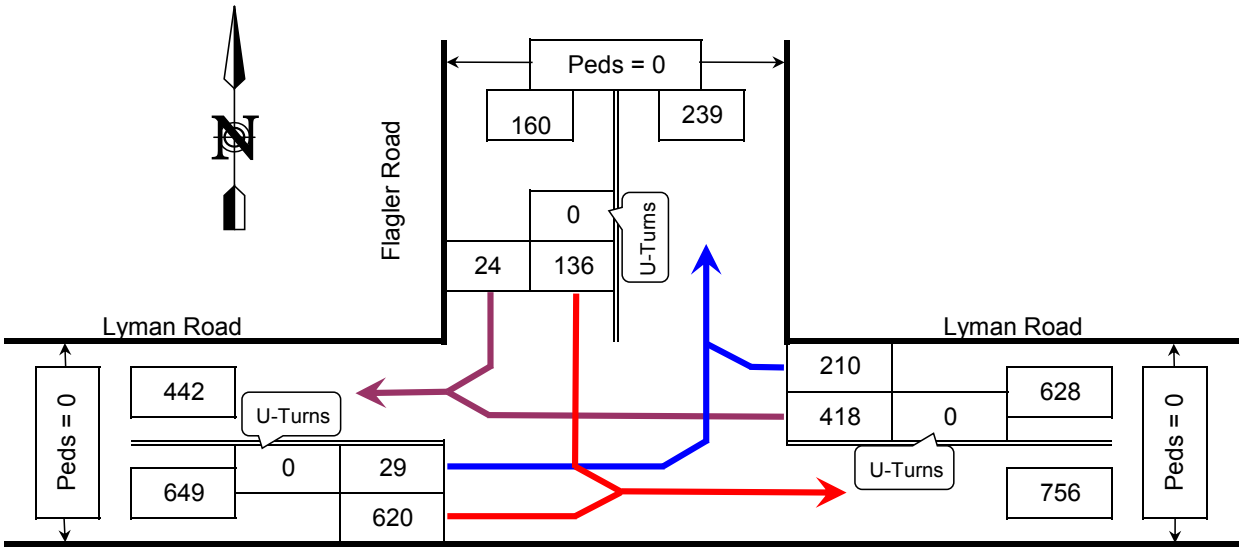
DATE OF REDUCTION: 2/28/2014

	FROM NORTH ON Flagler Road						FROM SOUTH ON						FROM EAST ON Lyman Road						FROM WEST ON Lyman Road						INTERVAL TOTALS
TIME INTERVAL	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	
5:30 AM - 6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5:45 AM - 6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:00 AM - 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:15 AM - 7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:30 AM - 7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:45 AM - 7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7:00 AM - 8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7:15 AM - 8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7:30 AM - 8:30 AM	0	4	0	117	0	29	0	0	0	0	0	0	2	33	0	0	512	202	0	26	0	36	379	0	**1275**
7:45 AM - 8:45 AM	0	6	0	126	0	34	0	0	0	0	0	0	4	35	0	0	501	234	0	25	0	31	347	0	**1273**
8:00 AM - 9:00 AM	0	6	0	135	0	36	0	0	0	0	0	0	2	44	0	0	498	241	0	24	0	34	363	0	**1307**
8:15 AM - 9:15 AM	0	4	0	141	0	49	0	0	0	0	0	0	3	46	0	0	462	238	0	33	0	48	419	0	**1357**
8:30 AM - 9:30 AM	0	3	0	133	0	62	0	0	0	0	0	0	3	48	0	0	469	254	0	59	0	49	458	0	**1425**

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

3:30 PM - 5:30 PM PEAK HOUR: 4:30 PM TO 5:30 PM



INTERSECTION PEAK HOUR VOLUME	
IN	1,437
OUT	1,437

	HV	PHF
SB	1.9%	0.87
WB	0.6%	0.90
EB	1.4%	0.92
INTRS.	1.1%	0.92

HV = Heavy Vehicles
PHF = Peak Hour Factor

Lyman Road @ Flagler Road

Schofield Barracks, HI

COUNTED BY: SN

DATE OF COUNT: Thu. 2/27/14

REDUCED BY: CN

TIME OF COUNT: 3:30 PM - 5:30 PM

REDUCTION DATE: Fri. 2/28/14

WEATHER: Sunny

TRAFFIC DATA GATHERING

INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: Lyman Road @ Flagler Road
Schofield Barracks, HI

DATE OF COUNT: Thu. 2/27/14
TIME OF COUNT: 3:30 PM - 5:30 PM

COUNTED BY: SN
WEATHER: Sunny

TIME INTERVAL ENDING AT	FROM NORTH ON Flagler Road						FROM SOUTH ON						FROM EAST ON Lyman Road						FROM WEST ON Lyman Road						INTERVAL TOTALS
	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
03:45 PM	0	0	0	39	0	13	0	0	0	0	0	0	0	3	0	0	88	38	0	5	0	10	162	0	**350**
04:00 PM	0	0	0	37	0	5	0	0	0	0	0	0	0	1	0	0	78	22	1	2	0	7	185	0	**334**
04:15 PM	0	0	0	38	0	13	0	0	0	0	0	0	0	5	0	0	97	30	0	3	0	8	142	0	**328**
04:30 PM	0	1	0	30	0	6	0	0	0	0	0	0	0	5	0	0	89	40	0	3	0	6	164	0	**335**
04:45 PM	0	1	0	27	0	6	0	0	0	0	0	0	0	2	0	0	105	51	0	2	0	10	167	0	**366**
05:00 PM	0	1	0	39	0	7	0	0	0	0	0	0	0	1	0	0	87	37	0	3	0	5	141	0	**316**
05:15 PM	0	0	0	37	0	3	0	0	0	0	0	0	0	1	0	0	111	62	0	2	0	5	172	0	**390**
05:30 PM	0	1	0	33	0	8	0	0	0	0	0	0	0	0	0	0	115	60	0	2	0	9	140	0	**365**
PEAK HOUR TOTALS	**0**	**3**	**0**	**136**	**0**	**24**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**418**	**210**	**0**	**9**	**0**	**29**	**620**	**0**	**INTERSECTION**
ALL MOVEMENTS	**160**						**0**						**628**						**649**						**1437**
% HV	**1.9%**						**#N/A**						**0.6%**						**1.4%**						**1.1%**
PEAK HOUR FACTOR	**0.87**						**#N/A**						**0.90**						**0.92**						**0.92**

PHF = Peak Hour Factor

3:30 PM - 5:30 PM PEAK HOUR: 4:30 PM TO 5:30 PM

REDUCED BY: CN

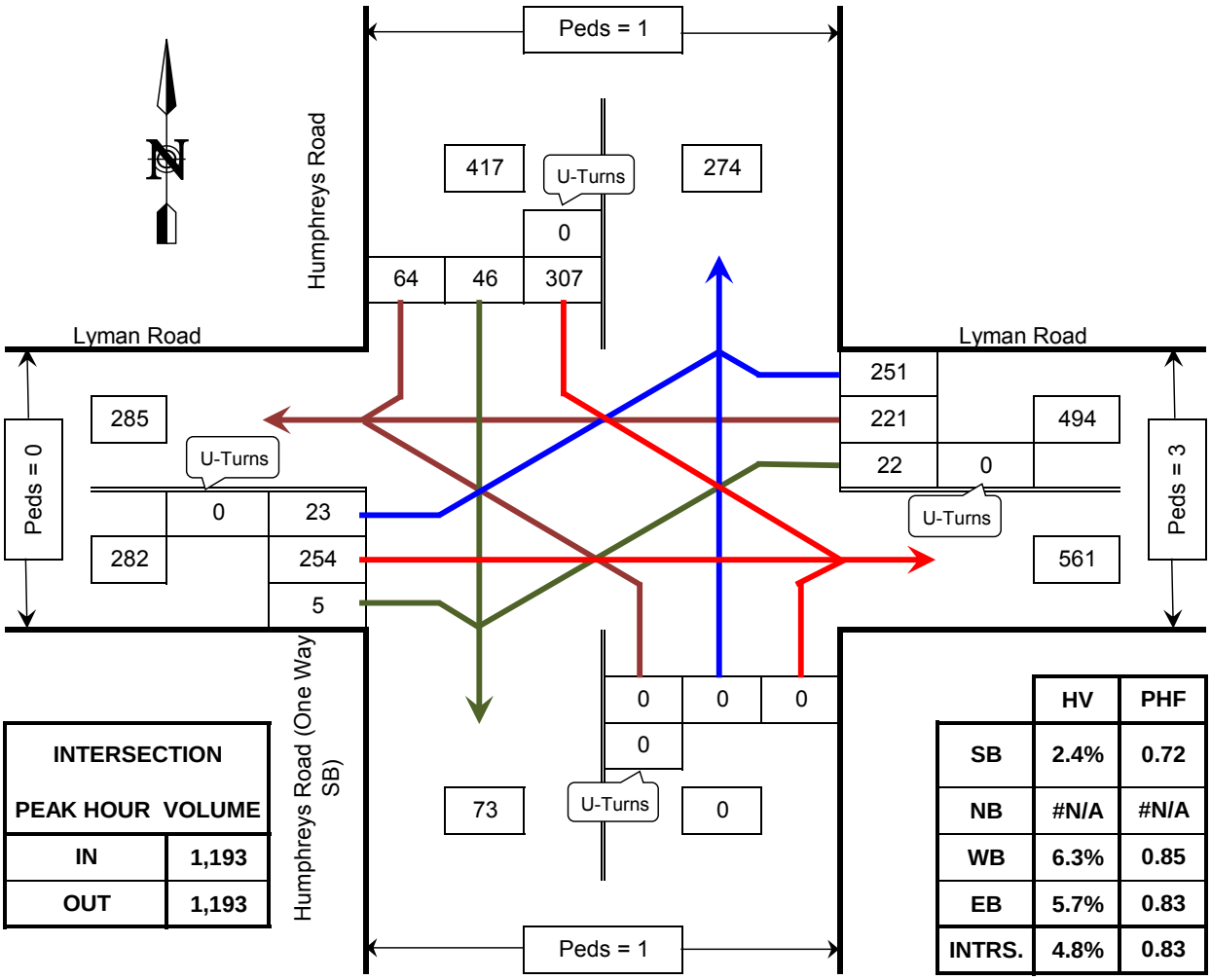
DATE OF REDUCTION: 2/28/2014

	FROM NORTH ON Flagler Road						FROM SOUTH ON						FROM EAST ON Lyman Road						FROM WEST ON Lyman Road						INTERVAL TOTALS
TIME INTERVAL	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	
1:30 PM - 2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:45 PM - 2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:00 PM - 3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:15 PM - 3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:30 PM - 3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:45 PM - 3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:00 PM - 4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:15 PM - 4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:30 PM - 4:30 PM	0	1	0	144	0	37	0	0	0	0	0	0	0	14	0	0	352	130	1	13	0	31	653	0	**1347**
3:45 PM - 4:45 PM	0	2	0	132	0	30	0	0	0	0	0	0	0	13	0	0	369	143	1	10	0	31	658	0	**1363**
4:00 PM - 5:00 PM	0	3	0	134	0	32	0	0	0	0	0	0	0	13	0	0	378	158	0	11	0	29	614	0	**1345**
4:15 PM - 5:15 PM	0	3	0	133	0	22	0	0	0	0	0	0	0	9	0	0	392	190	0	10	0	26	644	0	**1407**
4:30 PM - 5:30 PM	0	3	0	136	0	24	0	0	0	0	0	0	0	4	0	0	418	210	0	9	0	29	620	0	**1437**

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

7:30 AM - 9:30 AM PEAK HOUR: 8:30 AM TO 9:30 AM



INTERSECTION PEAK HOUR VOLUME	
IN	1,193
OUT	1,193

	HV	PHF
SB	2.4%	0.72
NB	#N/A	#N/A
WB	6.3%	0.85
EB	5.7%	0.83
INTRS.	4.8%	0.83

PHF = Peak Hour Factor
HV = Heavy Vehicles

Lyman Road @ Humphreys Road

Schofield Barracks, HI

COUNTED BY: SN

DATE OF COUNT: Wed. 2/26/14

REDUCED BY: CN

TIME OF COUNT: 7:30 AM - 9:30 AM

REDUCTION DATE: Fri. 2/28/14

WEATHER: Sunny

TRAFFIC DATA GATHERING

INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: Lyman Road @ Humphreys Road
Schofield Barracks, HI

DATE OF COUNT: Wed. 2/26/14
TIME OF COUNT: 7:30 AM - 9:30 AM

COUNTED BY: SN
WEATHER: Sunny

TIME INTERVAL ENDING AT	FROM NORTH ON Humphreys Road						FROM SOUTH ON Humphreys Road (One Way SB)						FROM EAST ON Lyman Road						FROM WEST ON Lyman Road						INTERVAL TOTALS
	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	
05:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
06:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
06:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
06:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
07:45 AM	0	3	0	66	3	5	24	0	0	0	0	0	16	8	0	0	82	51	9	5	0	6	72	1	**286**
08:00 AM	0	5	0	58	7	7	1	0	0	0	0	0	16	5	0	2	93	32	7	2	0	0	40	1	**240**
08:15 AM	1	2	0	58	7	15	2	0	0	0	0	0	0	7	0	6	84	47	1	2	0	8	63	1	**289**
08:30 AM	0	1	0	48	3	3	1	0	0	0	0	0	0	5	0	2	54	46	1	6	0	9	55	1	**221**
08:45 AM	1	5	0	57	1	13	1	0	0	0	0	0	0	7	0	2	53	50	0	2	0	3	38	0	**217**
09:00 AM	0	1	0	65	9	14	0	0	0	0	0	0	0	13	0	1	70	75	0	3	0	6	78	1	**319**
09:15 AM	0	2	0	78	24	12	0	0	0	0	0	0	2	2	0	12	48	50	0	8	0	6	66	2	**298**
09:30 AM	0	2	0	107	12	25	0	0	0	0	0	0	1	9	0	7	50	76	0	3	0	8	72	2	**359**
PEAK HOUR TOTALS	**1**	**10**	**0**	**307**	**46**	**64**	**1**	**0**	**0**	**0**	**0**	**0**	**3**	**31**	**0**	**22**	**221**	**251**	**0**	**16**	**0**	**23**	**254**	**5**	**INTERSECTION**
ALL MOVEMENTS	**417**						**0**						**494**						**282**						**1193**
% HV	**2.4%**						**#N/A**						**6.3%**						**5.7%**						**4.8%**
PEAK HOUR FACTOR	**0.72**						**#N/A**						**0.85**						**0.83**						**0.83**

PHF = Peak Hour Factor

7:30 AM - 9:30 AM PEAK HOUR: **8:30 AM TO 9:30 AM**

REDUCED BY: CN

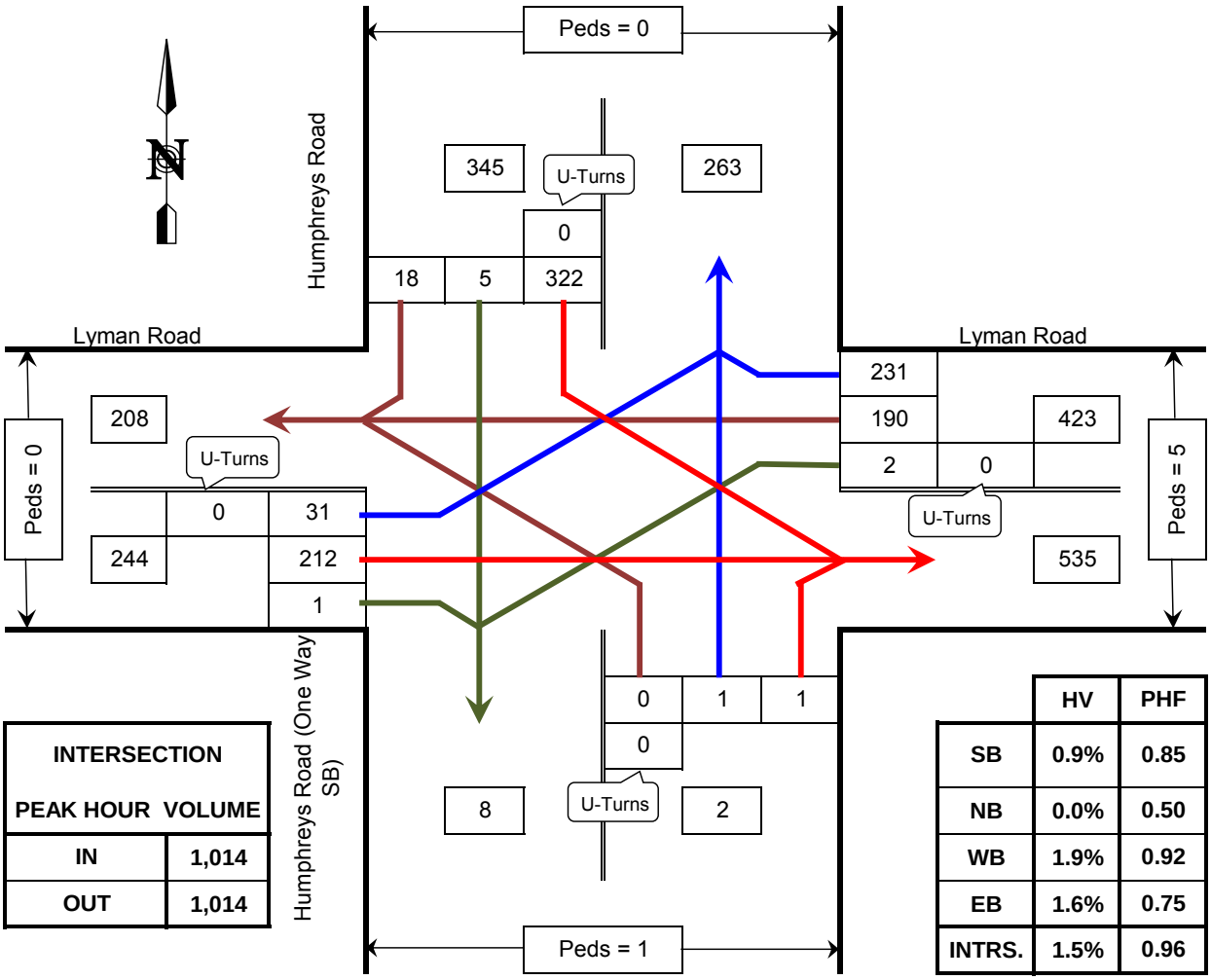
DATE OF REDUCTION: 2/28/2014

	FROM NORTH ON Humphreys Road						FROM SOUTH ON Humphreys Road (One Way SB)						FROM EAST ON Lyman Road						FROM WEST ON Lyman Road						INTERVAL TOTALS
TIME INTERVAL	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	
5:30 AM - 6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5:45 AM - 6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:00 AM - 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:15 AM - 7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:30 AM - 7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:45 AM - 7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7:00 AM - 8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7:15 AM - 8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7:30 AM - 8:30 AM	1	11	0	230	20	30	28	0	0	0	0	0	32	25	0	10	313	176	18	15	0	23	230	4	**1036**
7:45 AM - 8:45 AM	2	13	0	221	18	38	5	0	0	0	0	0	16	24	0	12	284	175	9	12	0	20	196	3	**967**
8:00 AM - 9:00 AM	2	9	0	228	20	45	4	0	0	0	0	0	0	32	0	11	261	218	2	13	0	26	234	3	**1046**
8:15 AM - 9:15 AM	1	9	0	248	37	42	2	0	0	0	0	0	2	27	0	17	225	221	1	19	0	24	237	4	**1055**
8:30 AM - 9:30 AM	1	10	0	307	46	64	1	0	0	0	0	0	3	31	0	22	221	251	0	16	0	23	254	5	**1193**

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

3:30 PM - 5:30 PM PEAK HOUR: 3:30 PM TO 4:30 PM



INTERSECTION PEAK HOUR VOLUME	
IN	1,014
OUT	1,014

	HV	PHF
SB	0.9%	0.85
NB	0.0%	0.50
WB	1.9%	0.92
EB	1.6%	0.75
INTRS.	1.5%	0.96

PHF = Peak Hour Factor
HV = Heavy Vehicles

Lyman Road @ Humphreys Road

Schofield Barracks, HI

COUNTED BY: SN

DATE OF COUNT: Wed. 2/26/14

REDUCED BY: CN

TIME OF COUNT: 3:30 PM - 5:30 PM

REDUCTION DATE: Fri. 2/28/14

WEATHER: Rainy

TRAFFIC DATA GATHERING

INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: Lyman Road @ Humphreys Road
Schofield Barracks, HI

DATE OF COUNT: Wed. 2/26/14
TIME OF COUNT: 3:30 PM - 5:30 PM

COUNTED BY: SN
WEATHER: Rainy

TIME INTERVAL ENDING AT	FROM NORTH ON Humphreys Road						FROM SOUTH ON Humphreys Road (One Way SB)						FROM EAST ON Lyman Road						FROM WEST ON Lyman Road						INTERVAL TOTALS
	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
03:45 PM	0	0	0	57	1	2	0	0	0	0	1	0	1	2	0	0	59	55	0	2	0	6	50	1	**232**
04:00 PM	0	0	0	83	2	7	0	0	0	0	0	0	2	3	0	1	35	55	0	1	0	15	66	0	**264**
04:15 PM	0	1	0	83	2	7	1	0	0	0	0	1	0	3	0	1	42	60	0	1	0	5	61	0	**262**
04:30 PM	0	2	0	99	0	2	0	0	0	0	0	0	2	0	0	0	54	61	0	0	0	5	35	0	**256**
04:45 PM	0	0	0	65	1	7	1	0	0	0	0	0	0	3	0	0	27	43	0	1	0	1	54	1	**199**
05:00 PM	0	0	0	58	0	1	1	0	0	0	0	0	0	3	0	0	31	43	0	1	0	5	46	0	**184**
05:15 PM	0	1	0	72	1	3	1	0	0	0	0	0	0	1	0	0	40	54	0	2	0	3	29	0	**202**
05:30 PM	0	0	0	78	1	1	0	0	0	0	1	0	0	1	0	0	61	52	0	0	0	1	29	0	**224**
PEAK HOUR TOTALS	**0**	**3**	**0**	**322**	**5**	**18**	**1**	**0**	**0**	**0**	**1**	**1**	**5**	**8**	**0**	**2**	**190**	**231**	**0**	**4**	**0**	**31**	**212**	**1**	**INTERSECTION**
ALL MOVEMENTS	**345**						**2**						**423**						**244**						**1014**
% HV	**0.9%**						**0.0%**						**1.9%**						**1.6%**						**1.5%**
PEAK HOUR FACTOR	**0.85**						**0.50**						**0.92**						**0.75**						**0.96**

PHF = Peak Hour Factor

3:30 PM - 5:30 PM PEAK HOUR: 3:30 PM TO 4:30 PM

REDUCED BY: CN

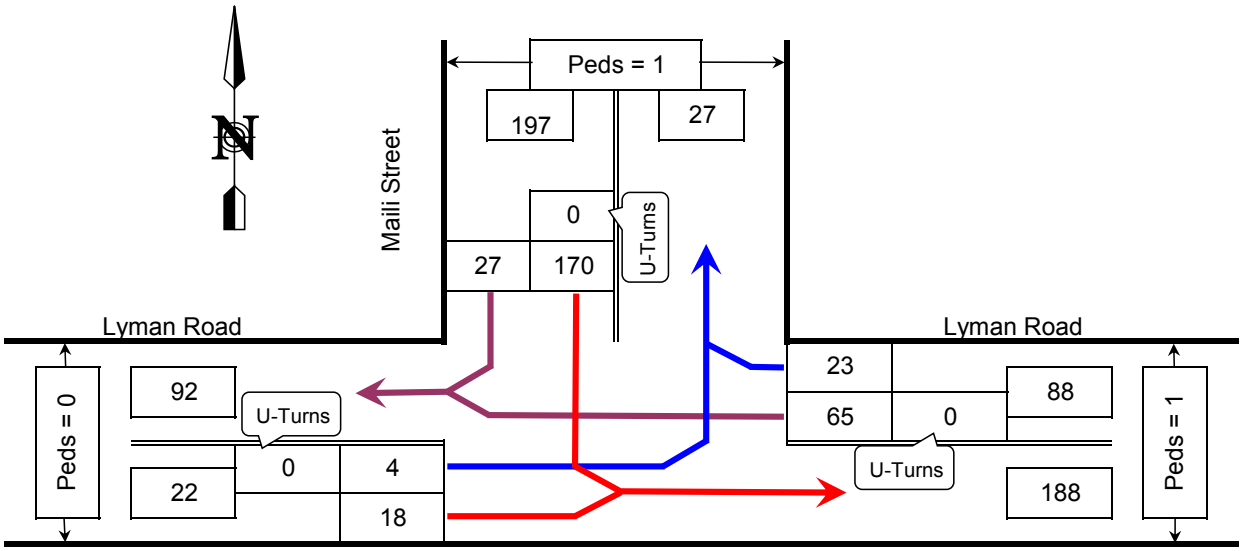
DATE OF REDUCTION: 2/28/2014

	FROM NORTH ON Humphreys Road						FROM SOUTH ON Humphreys Road (One Way SB)						FROM EAST ON Lyman Road						FROM WEST ON Lyman Road						INTERVAL TOTALS
TIME INTERVAL	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	
1:30 PM - 2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:45 PM - 2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:00 PM - 3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:15 PM - 3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:30 PM - 3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:45 PM - 3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:00 PM - 4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:15 PM - 4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:30 PM - 4:30 PM	0	3	0	322	5	18	1	0	0	0	1	1	5	8	0	2	190	231	0	4	0	31	212	1	**1014**
3:45 PM - 4:45 PM	0	3	0	330	5	23	2	0	0	0	0	1	4	9	0	2	158	219	0	3	0	26	216	1	**981**
4:00 PM - 5:00 PM	0	3	0	305	3	17	3	0	0	0	0	1	2	9	0	1	154	207	0	3	0	16	196	1	**901**
4:15 PM - 5:15 PM	0	3	0	294	2	13	3	0	0	0	0	0	2	7	0	0	152	201	0	4	0	14	164	1	**841**
4:30 PM - 5:30 PM	0	1	0	273	3	12	3	0	0	0	1	0	0	8	0	0	159	192	0	4	0	10	158	1	**809**

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

7:30 AM - 9:30 AM PEAK HOUR: 8:30 AM TO 9:30 AM



INTERSECTION PEAK HOUR VOLUME	
IN	307
OUT	307

	HV	PHF
SB	0.5%	0.78
WB	10.2%	0.88
EB	22.7%	0.79
INTRS.	4.9%	0.85

HV = Heavy Vehicles
PHF = Peak Hour Factor

Lyman Road @ Maili Street

Schofield Barracks, HI

COUNTED BY: SN

REDUCED BY: CN

REDUCTION DATE: Fri. 2/28/14

DATE OF COUNT: Tue. 2/25/14

TIME OF COUNT: 7:30 AM - 9:30 AM

WEATHER: Overcast

TRAFFIC DATA GATHERING

INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: Lyman Road @ Maili Street
Schofield Barracks, HI

DATE OF COUNT: Tue. 2/25/14
TIME OF COUNT: 7:30 AM - 9:30 AM

COUNTED BY: SN
WEATHER: Overcast

TIME INTERVAL ENDING AT	FROM NORTH ON Maili Street						FROM SOUTH ON						FROM EAST ON Lyman Road						FROM WEST ON Lyman Road						INTERVAL TOTALS
	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	
05:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
06:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
06:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
06:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
07:45 AM	0	0	0	12	0	0	0	0	0	0	0	0	2	0	0	0	6	6	0	0	0	0	2	0	**26**
08:00 AM	0	0	0	8	0	1	0	0	0	0	0	0	0	0	0	0	15	13	0	1	0	0	3	0	**40**
08:15 AM	0	0	0	10	0	1	0	0	0	0	0	0	0	0	0	0	6	13	0	1	0	1	5	0	**36**
08:30 AM	0	0	0	8	0	4	0	0	0	0	0	0	1	0	0	0	8	9	0	1	0	1	2	0	**32**
08:45 AM	0	1	0	23	0	7	0	0	0	0	0	0	1	5	0	0	14	5	0	0	0	1	4	0	**54**
09:00 AM	1	0	0	39	0	10	0	0	0	0	0	0	0	0	0	0	15	8	0	3	0	1	3	0	**76**
09:15 AM	0	0	0	52	0	3	0	0	0	0	0	0	0	3	0	0	19	6	0	0	0	1	6	0	**87**
09:30 AM	0	0	0	56	0	7	0	0	0	0	0	0	0	1	0	0	17	4	0	2	0	1	5	0	**90**
PEAK HOUR TOTALS	1	1	0	170	0	27	0	0	0	0	0	0	1	9	0	0	65	23	0	5	0	4	18	0	INTERSECTION
ALL MOVEMENTS	197						0						88						22						307
% HV	0.5%						#N/A						10.2%						22.7%						4.9%
PEAK HOUR FACTOR	0.78						#N/A						0.88						0.79						0.85

PHF = Peak Hour Factor

7:30 AM - 9:30 AM PEAK HOUR: 8:30 AM TO 9:30 AM

REDUCED BY: CN

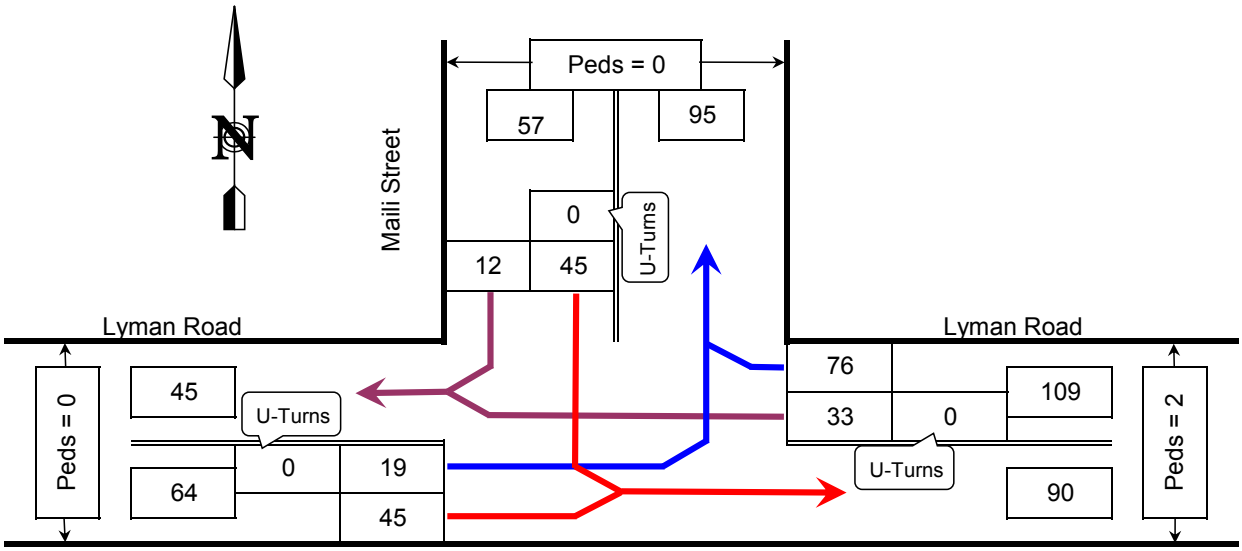
DATE OF REDUCTION: 2/28/2014

	FROM NORTH ON Maili Street						FROM SOUTH ON						FROM EAST ON Lyman Road						FROM WEST ON Lyman Road						INTERVAL TOTALS
TIME INTERVAL	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	
5:30 AM - 6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5:45 AM - 6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:00 AM - 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:15 AM - 7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:30 AM - 7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:45 AM - 7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7:00 AM - 8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7:15 AM - 8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7:30 AM - 8:30 AM	0	0	0	38	0	6	0	0	0	0	0	0	3	0	0	0	35	41	0	3	0	2	12	0	**134**
7:45 AM - 8:45 AM	0	1	0	49	0	13	0	0	0	0	0	0	2	5	0	0	43	40	0	3	0	3	14	0	**162**
8:00 AM - 9:00 AM	1	1	0	80	0	22	0	0	0	0	0	0	2	5	0	0	43	35	0	5	0	4	14	0	**198**
8:15 AM - 9:15 AM	1	1	0	122	0	24	0	0	0	0	0	0	2	8	0	0	56	28	0	4	0	4	15	0	**249**
8:30 AM - 9:30 AM	1	1	0	170	0	27	0	0	0	0	0	0	1	9	0	0	65	23	0	5	0	4	18	0	**307**

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

3:30 PM - 5:30 PM PEAK HOUR: 3:30 PM TO 4:30 PM



INTERSECTION PEAK HOUR VOLUME	
IN	230
OUT	230

	HV	PHF
SB	7.0%	0.79
WB	1.8%	0.76
EB	7.8%	0.57
INTRS.	4.8%	0.94

HV = Heavy Vehicles
PHF = Peak Hour Factor

Lyman Road @ Maili Street

Schofield Barracks, HI

COUNTED BY: SN

REDUCED BY: CN

REDUCTION DATE: Fri. 2/28/14

DATE OF COUNT: Tue. 2/25/14

TIME OF COUNT: 3:30 PM - 5:30 PM

WEATHER: Overcast

TRAFFIC DATA GATHERING

INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: Lyman Road @ Maili Street
Schofield Barracks, HI

DATE OF COUNT: Tue. 2/25/14
TIME OF COUNT: 3:30 PM - 5:30 PM

COUNTED BY: SN
WEATHER: Overcast

TIME INTERVAL ENDING AT	FROM NORTH ON Maili Street						FROM SOUTH ON						FROM EAST ON Lyman Road						FROM WEST ON Lyman Road						INTERVAL TOTALS
	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
03:45 PM	0	0	0	15	0	2	0	0	0	0	0	0	0	1	0	0	5	18	0	1	0	6	9	0	**55**
04:00 PM	0	1	0	8	0	3	0	0	0	0	0	0	0	0	0	0	4	24	0	0	0	8	6	0	**53**
04:15 PM	0	3	0	7	0	4	0	0	0	0	0	0	0	0	0	0	9	13	0	3	0	4	24	0	**61**
04:30 PM	0	0	0	15	0	3	0	0	0	0	0	0	2	1	0	0	15	21	0	1	0	1	6	0	**61**
04:45 PM	0	0	0	5	0	3	0	0	0	0	0	0	0	1	0	0	9	14	2	0	0	3	20	0	**54**
05:00 PM	1	0	0	8	0	2	0	0	0	0	0	0	0	0	0	0	8	8	0	0	0	5	19	0	**50**
05:15 PM	1	0	0	9	0	1	0	0	0	0	0	0	0	0	0	0	2	17	0	1	0	2	19	0	**50**
05:30 PM	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	5	10	0	1	0	2	10	0	**30**
PEAK HOUR TOTALS	**0**	**4**	**0**	**45**	**0**	**12**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**33**	**76**	**0**	**5**	**0**	**19**	**45**	**0**	**INTERSECTION**
ALL MOVEMENTS	**57**						**0**						**109**						**64**						**230**
% HV	**7.0%**						**#N/A**						**1.8%**						**7.8%**						**4.8%**
PEAK HOUR FACTOR	**0.79**						**#N/A**						**0.76**						**0.57**						**0.94**

PHF = Peak Hour Factor

3:30 PM - 5:30 PM PEAK HOUR: 3:30 PM TO 4:30 PM

REDUCED BY: CN

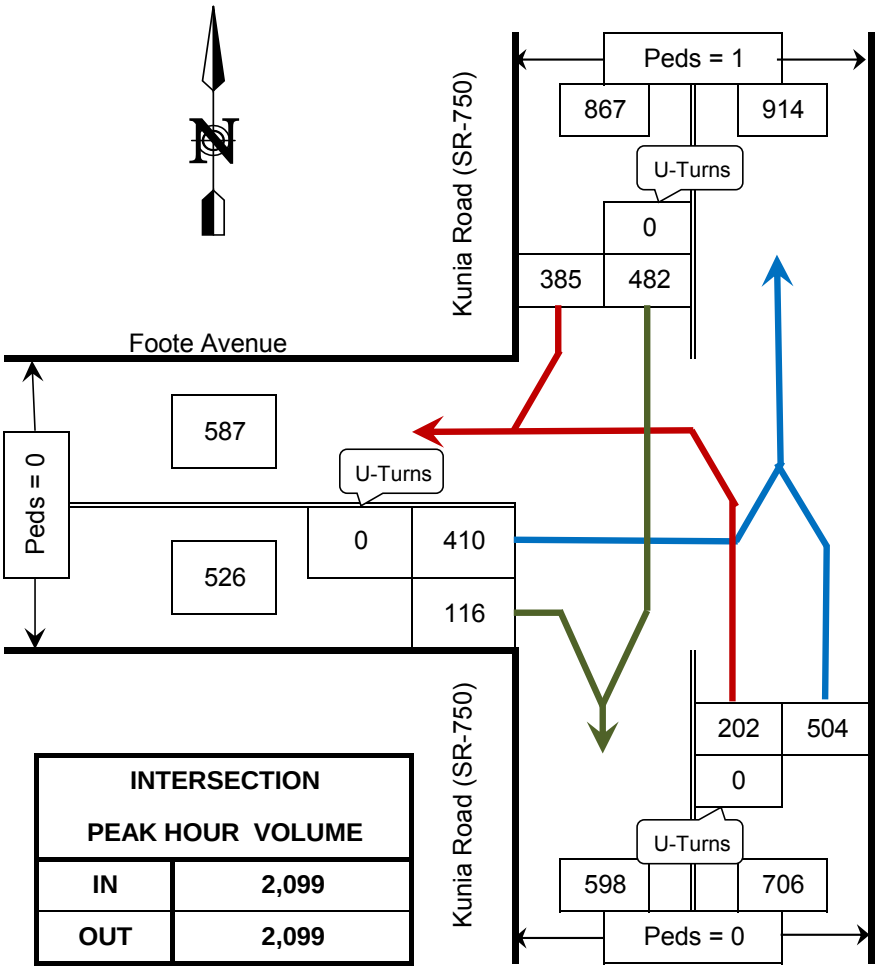
DATE OF REDUCTION: 2/28/2014

	FROM NORTH ON Maili Street						FROM SOUTH ON						FROM EAST ON Lyman Road						FROM WEST ON Lyman Road						INTERVAL TOTALS
TIME INTERVAL	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	
1:30 PM - 2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:45 PM - 2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:00 PM - 3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:15 PM - 3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:30 PM - 3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:45 PM - 3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:00 PM - 4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:15 PM - 4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:30 PM - 4:30 PM	0	4	0	45	0	12	0	0	0	0	0	0	2	2	0	0	33	76	0	5	0	19	45	0	**230**
3:45 PM - 4:45 PM	0	4	0	35	0	13	0	0	0	0	0	0	2	2	0	0	37	72	2	4	0	16	56	0	**229**
4:00 PM - 5:00 PM	1	3	0	35	0	12	0	0	0	0	0	0	2	2	0	0	41	56	2	4	0	13	69	0	**226**
4:15 PM - 5:15 PM	2	0	0	37	0	9	0	0	0	0	0	0	2	2	0	0	34	60	2	2	0	11	64	0	**215**
4:30 PM - 5:30 PM	2	0	0	25	0	6	0	0	0	0	0	0	0	1	0	0	24	49	2	2	0	12	68	0	**184**

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

7:30 AM - 9:30 AM PEAK HOUR: 7:30 AM TO 8:30 AM



INTERSECTION PEAK HOUR VOLUME	
IN	2,099
OUT	2,099

	HV	PHF
SB	5.0%	0.87
NB	3.4%	0.92
EB	2.5%	0.84
INTRS.	3.8%	0.88

HV = Heavy Vehicles
PHF = Peak Hour Factor

Kunia Road (SR-750) @ Foote Avenue

Schofield Barracks, HI

COUNTED BY: CN

REDUCED BY: CN

REDUCTION DATE: Fri. 2/28/14

DATE OF COUNT: Wed. 2/26/14

TIME OF COUNT: 7:30 AM - 9:30 AM

WEATHER: Sunny

TRAFFIC DATA GATHERING

INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: Kunia Road (SR-750) @ Foote Avenue
Schofield Barracks, HI

DATE OF COUNT: Wed. 2/26/14
TIME OF COUNT: 7:30 AM - 9:30 AM

COUNTED BY: CN
WEATHER: Sunny

TIME INTERVAL ENDING AT	FROM NORTH ON Kunia Road (SR-750)						FROM SOUTH ON Kunia Road (SR-750)						FROM EAST ON						FROM WEST ON Foote Avenue						INTERVAL TOTALS
	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	
05:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
06:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
06:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
06:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
07:45 AM	0	9	0	0	129	74	0	6	0	41	146	0	0	0	0	0	0	0	0	6	0	119	0	37	**546**
08:00 AM	0	11	0	0	128	90	0	6	0	47	115	0	0	0	0	0	0	0	0	1	0	97	0	24	**501**
08:15 AM	1	13	0	0	121	128	0	7	0	53	139	0	0	0	0	0	0	0	0	4	0	124	0	29	**594**
08:30 AM	0	10	0	0	104	93	0	5	0	61	104	0	0	0	0	0	0	0	0	2	0	70	0	26	**458**
08:45 AM	1	16	0	0	110	90	0	12	0	67	109	0	0	0	0	0	0	0	0	2	0	43	0	17	**436**
09:00 AM	0	13	0	0	111	129	0	8	0	43	93	0	0	0	0	0	0	0	0	1	0	75	0	30	**481**
09:15 AM	0	5	0	0	99	114	0	5	0	71	82	0	0	0	0	0	0	0	0	2	0	70	0	30	**466**
09:30 AM	1	8	0	0	95	96	0	2	0	56	69	0	0	0	0	0	0	0	0	5	0	76	0	23	**415**
PEAK HOUR TOTALS	**1**	**43**	**0**	**0**	**482**	**385**	**0**	**24**	**0**	**202**	**504**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**13**	**0**	**410**	**0**	**116**	**INTERSECTION**
ALL MOVEMENTS	**867**						**706**						**0**						**526**						**2099**
% HV	**5.0%**						**3.4%**						**#N/A**						**2.5%**						**3.8%**
PEAK HOUR FACTOR	**0.87**						**0.92**						**#N/A**						**0.84**						**0.88**

PHF = Peak Hour Factor

7:30 AM - 9:30 AM PEAK HOUR: 7:30 AM TO 8:30 AM

REDUCED BY: CN

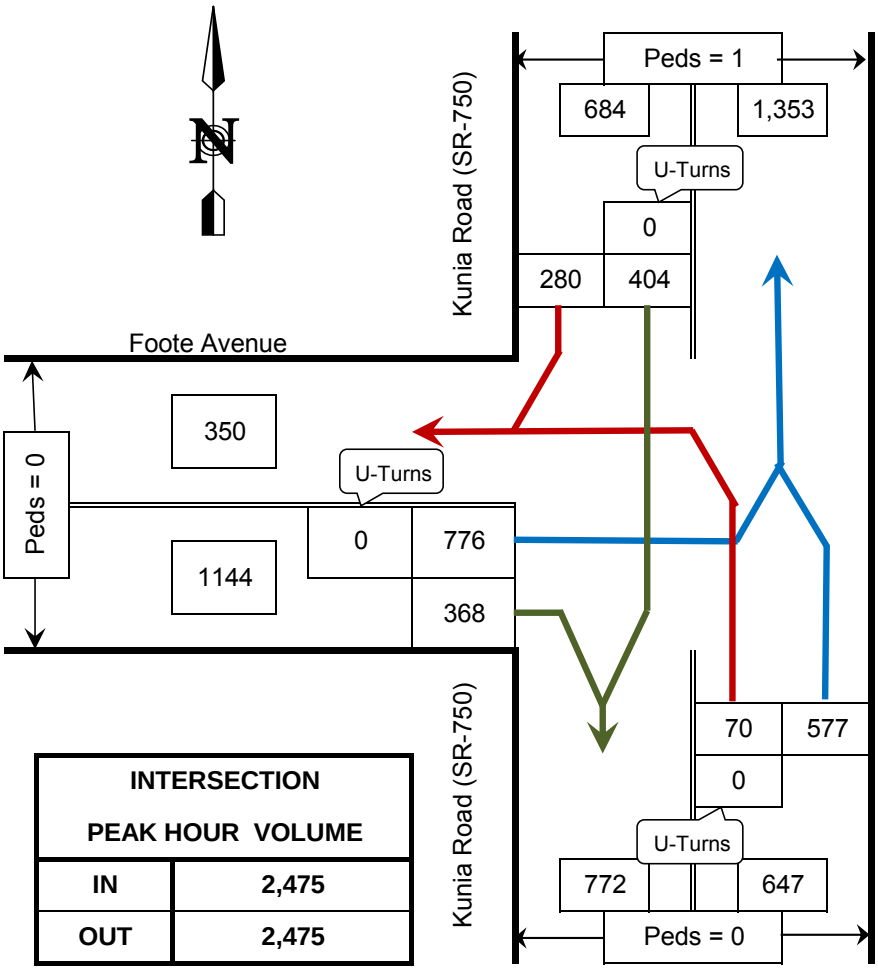
DATE OF REDUCTION: 2/28/2014

	FROM NORTH ON Kunia Road (SR-750)						FROM SOUTH ON Kunia Road (SR-750)						FROM EAST ON						FROM WEST ON Foote Avenue						INTERVAL TOTALS
TIME INTERVAL	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	
5:30 AM - 6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5:45 AM - 6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:00 AM - 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:15 AM - 7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:30 AM - 7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:45 AM - 7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7:00 AM - 8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7:15 AM - 8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7:30 AM - 8:30 AM	1	43	0	0	482	385	0	24	0	202	504	0	0	0	0	0	0	0	0	13	0	410	0	116	**2099**
7:45 AM - 8:45 AM	2	50	0	0	463	401	0	30	0	228	467	0	0	0	0	0	0	0	0	9	0	334	0	96	**1989**
8:00 AM - 9:00 AM	2	52	0	0	446	440	0	32	0	224	445	0	0	0	0	0	0	0	0	9	0	312	0	102	**1969**
8:15 AM - 9:15 AM	1	44	0	0	424	426	0	30	0	242	388	0	0	0	0	0	0	0	0	7	0	258	0	103	**1841**
8:30 AM - 9:30 AM	2	42	0	0	415	429	0	27	0	237	353	0	0	0	0	0	0	0	0	10	0	264	0	100	**1798**

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

3:30 PM - 5:30 PM PEAK HOUR: 3:30 PM TO 4:30 PM



INTERSECTION PEAK HOUR VOLUME	
IN	2,475
OUT	2,475

	HV	PHF
SB	2.2%	0.87
NB	0.8%	0.83
EB	0.5%	0.81
INTRS.	1.1%	0.93

HV = Heavy Vehicles
PHF = Peak Hour Factor

Kunia Road (SR-750) @ Foote Avenue

Schofield Barracks, HI

COUNTED BY: CN

REDUCED BY: CN

REDUCTION DATE: Fri. 2/28/14

DATE OF COUNT: Wed. 2/26/14

TIME OF COUNT: 3:30 PM - 5:30 PM

WEATHER: Rainy

TRAFFIC DATA GATHERING

INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: Kunia Road (SR-750) @ Foote Avenue
Schofield Barracks, HI

DATE OF COUNT: Wed. 2/26/14
TIME OF COUNT: 3:30 PM - 5:30 PM

COUNTED BY: CN
WEATHER: Rainy

TIME INTERVAL ENDING AT	FROM NORTH ON Kunia Road (SR-750)						FROM SOUTH ON Kunia Road (SR-750)						FROM EAST ON						FROM WEST ON Foote Avenue						INTERVAL TOTALS
	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
03:45 PM	1	0	0	0	82	71	0	2	0	15	116	0	0	0	0	0	0	0	0	0	0	220	0	134	**638**
04:00 PM	0	5	0	0	105	75	0	0	0	23	173	0	0	0	0	0	0	0	0	3	0	198	0	89	**663**
04:15 PM	0	7	0	0	105	50	0	1	0	11	154	0	0	0	0	0	0	0	0	0	0	185	0	93	**598**
04:30 PM	0	3	0	0	112	84	0	2	0	21	134	0	0	0	0	0	0	0	0	3	0	173	0	52	**576**
04:45 PM	0	1	0	0	89	76	0	2	0	26	130	0	0	0	0	0	0	0	0	1	0	141	0	53	**515**
05:00 PM	0	2	0	0	84	69	0	2	0	24	83	0	0	0	0	0	0	0	0	2	0	152	0	47	**459**
05:15 PM	0	4	0	0	109	88	0	2	0	17	129	0	0	0	0	0	0	0	0	1	0	179	0	62	**584**
05:30 PM	0	3	0	0	86	56	0	1	0	19	115	0	0	0	0	0	0	0	0	2	0	166	0	44	**486**
PEAK HOUR TOTALS	**1**	**15**	**0**	**0**	**404**	**280**	**0**	**5**	**0**	**70**	**577**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	**0**	**776**	**0**	**368**	**INTERSECTION**
ALL MOVEMENTS	**684**						**647**						**0**						**1144**						**2475**
% HV	**2.2%**						**0.8%**						**#N/A**						**0.5%**						**1.1%**
PEAK HOUR FACTOR	**0.87**						**0.83**						**#N/A**						**0.81**						**0.93**

PHF = Peak Hour Factor

3:30 PM - 5:30 PM PEAK HOUR: 3:30 PM TO 4:30 PM

REDUCED BY: CN

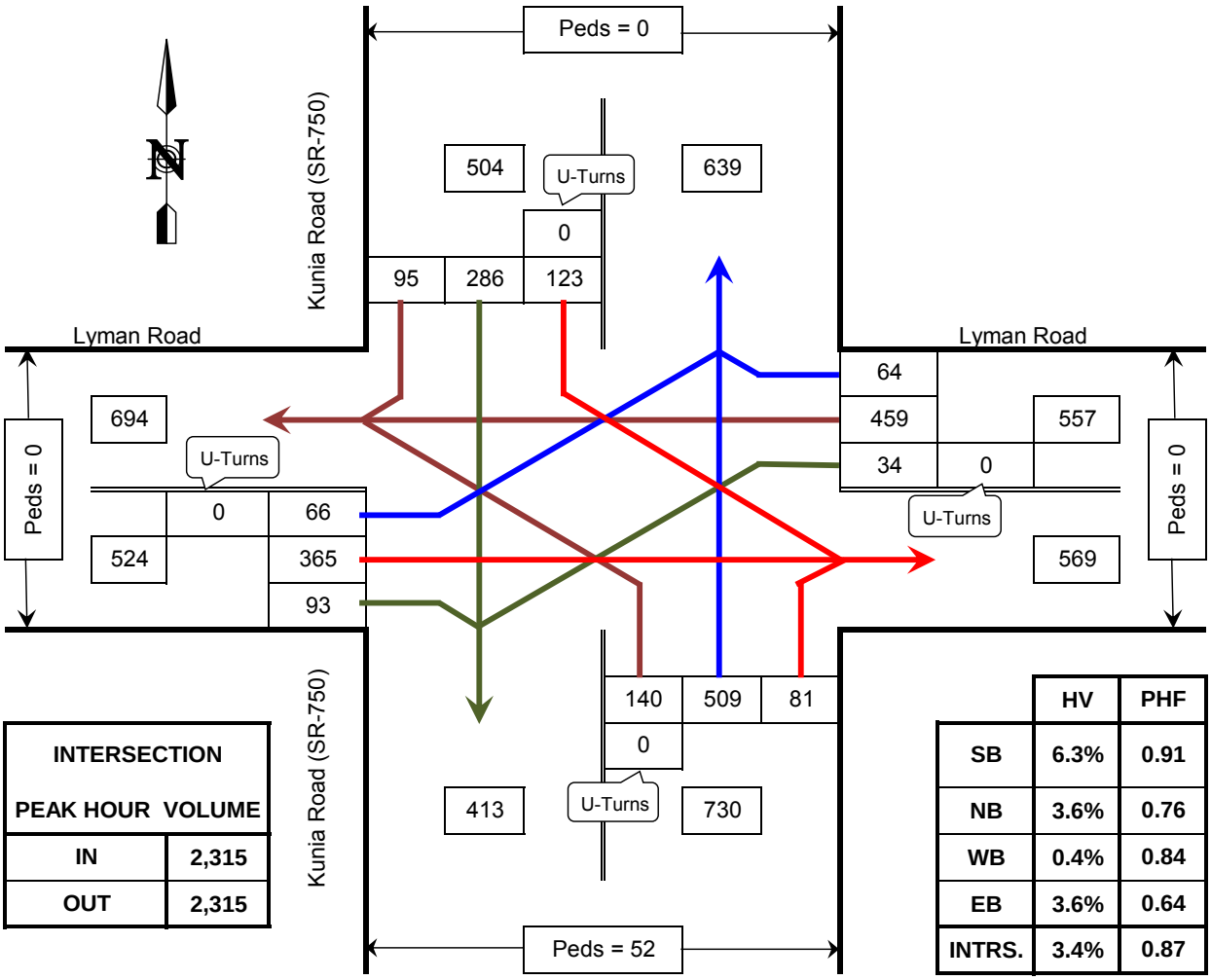
DATE OF REDUCTION: 2/28/2014

	FROM NORTH ON Kunia Road (SR-750)						FROM SOUTH ON Kunia Road (SR-750)						FROM EAST ON						FROM WEST ON Foote Avenue						INTERVAL TOTALS
TIME INTERVAL	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	
1:30 PM - 2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:45 PM - 2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:00 PM - 3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:15 PM - 3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:30 PM - 3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:45 PM - 3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:00 PM - 4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:15 PM - 4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:30 PM - 4:30 PM	1	15	0	0	404	280	0	5	0	70	577	0	0	0	0	0	0	0	0	6	0	776	0	368	**2475**
3:45 PM - 4:45 PM	0	16	0	0	411	285	0	5	0	81	591	0	0	0	0	0	0	0	0	7	0	697	0	287	**2352**
4:00 PM - 5:00 PM	0	13	0	0	390	279	0	7	0	82	501	0	0	0	0	0	0	0	0	6	0	651	0	245	**2148**
4:15 PM - 5:15 PM	0	10	0	0	394	317	0	8	0	88	476	0	0	0	0	0	0	0	0	7	0	645	0	214	**2134**
4:30 PM - 5:30 PM	0	10	0	0	368	289	0	7	0	86	457	0	0	0	0	0	0	0	0	6	0	638	0	206	**2044**

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

7:30 AM - 9:30 AM PEAK HOUR: 7:30 AM TO 8:30 AM



INTERSECTION PEAK HOUR VOLUME	
IN	2,315
OUT	2,315

	HV	PHF
SB	6.3%	0.91
NB	3.6%	0.76
WB	0.4%	0.84
EB	3.6%	0.64
INTRS.	3.4%	0.87

PHF = Peak Hour Factor
HV = Heavy Vehicles

Kunia Road (SR-750) @ Lyman Road

Schofield Barracks, HI

COUNTED BY: CN

REDUCED BY: CN

REDUCTION DATE: Fri. 2/28/14

DATE OF COUNT: Tue. 2/25/14

TIME OF COUNT: 7:30 AM - 9:30 AM

WEATHER: Overcast

TRAFFIC DATA GATHERING

INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: Kunia Road (SR-750) @ Lyman Road
Schofield Barracks, HI

DATE OF COUNT: Tue. 2/25/14
TIME OF COUNT: 7:30 AM - 9:30 AM

COUNTED BY: CN
WEATHER: Overcast

TIME INTERVAL ENDING AT	FROM NORTH ON Kunia Road (SR-750)						FROM SOUTH ON Kunia Road (SR-750)						FROM EAST ON Lyman Road						FROM WEST ON Lyman Road						INTERVAL TOTALS
	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	
05:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
06:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
06:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
06:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
07:45 AM	0	8	0	41	59	29	42	3	0	30	140	20	0	0	0	7	121	12	0	1	0	11	168	26	**664**
08:00 AM	0	9	0	30	68	20	9	7	0	38	168	33	0	0	0	7	141	10	0	6	0	20	100	33	**668**
08:15 AM	0	8	0	29	93	16	1	10	0	40	126	18	0	1	0	14	127	24	0	6	0	18	46	23	**574**
08:30 AM	0	7	0	23	66	30	0	6	0	32	75	10	0	1	0	6	70	18	0	6	0	17	51	11	**409**
08:45 AM	0	11	0	23	65	35	0	5	0	44	123	22	0	2	0	6	99	15	0	3	0	6	45	7	**490**
09:00 AM	0	10	0	23	48	44	0	7	0	31	105	18	0	6	0	6	143	14	0	2	0	8	66	15	**521**
09:15 AM	0	8	0	22	74	47	1	5	0	36	113	18	0	2	0	2	110	16	0	4	0	19	101	17	**575**
09:30 AM	0	16	0	28	60	29	0	8	0	42	103	20	0	4	0	3	89	18	0	7	0	13	83	9	**497**
PEAK HOUR TOTALS	**0**	**32**	**0**	**123**	**286**	**95**	**52**	**26**	**0**	**140**	**509**	**81**	**0**	**2**	**0**	**34**	**459**	**64**	**0**	**19**	**0**	**66**	**365**	**93**	**INTERSECTION**
ALL MOVEMENTS	**504**						**730**						**557**						**524**						**2315**
% HV	**6.3%**						**3.6%**						**0.4%**						**3.6%**						**3.4%**
PEAK HOUR FACTOR	**0.91**						**0.76**						**0.84**						**0.64**						**0.87**

PHF = Peak Hour Factor

7:30 AM - 9:30 AM PEAK HOUR: 7:30 AM TO 8:30 AM

REDUCED BY: CN

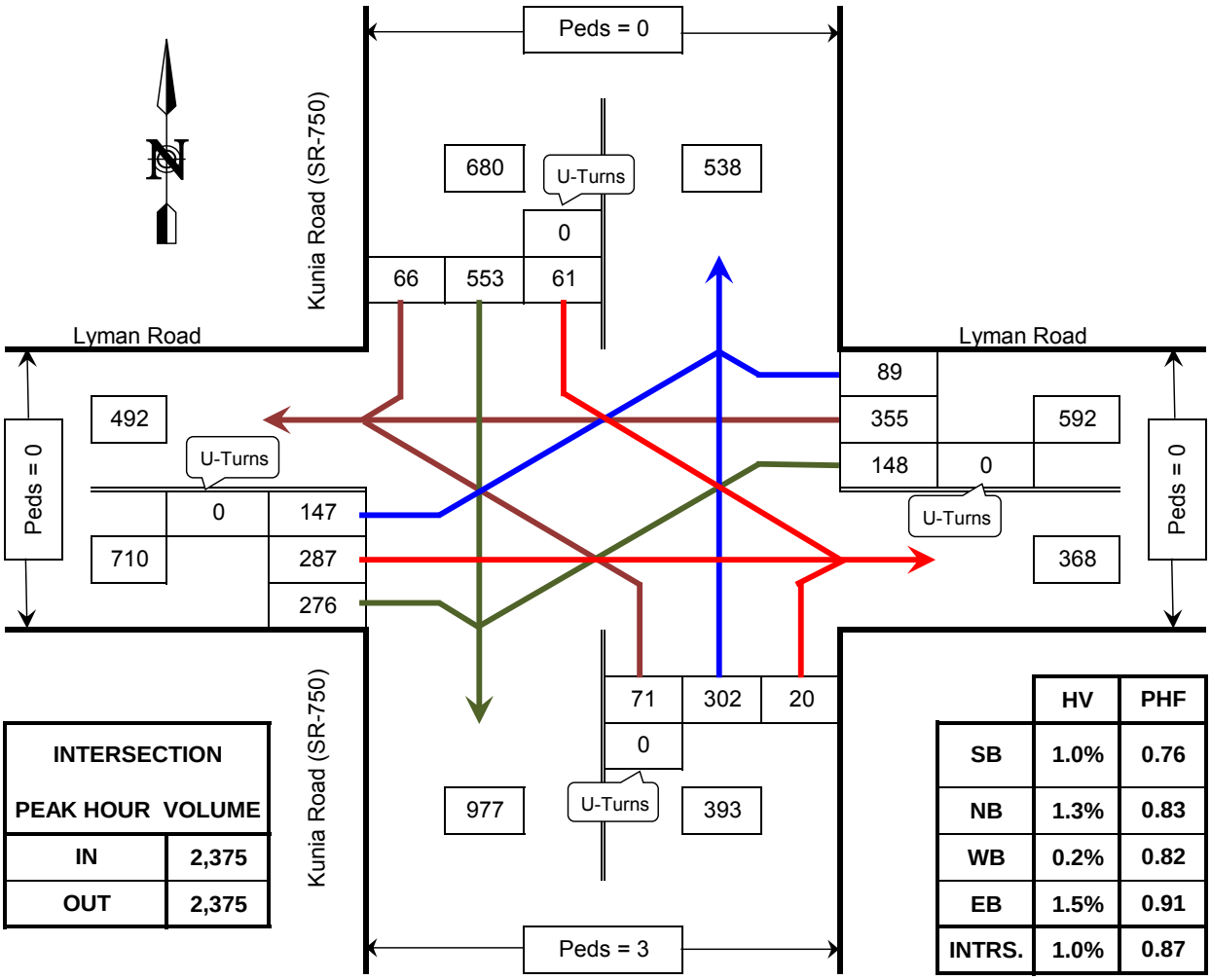
DATE OF REDUCTION: 2/28/2014

	FROM NORTH ON Kunia Road (SR-750)						FROM SOUTH ON Kunia Road (SR-750)						FROM EAST ON Lyman Road						FROM WEST ON Lyman Road						INTERVAL TOTALS
TIME INTERVAL	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	
5:30 AM - 6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5:45 AM - 6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:00 AM - 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:15 AM - 7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:30 AM - 7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
6:45 AM - 7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7:00 AM - 8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7:15 AM - 8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7:30 AM - 8:30 AM	0	32	0	123	286	95	52	26	0	140	509	81	0	2	0	34	459	64	0	19	0	66	365	93	**2315**
7:45 AM - 8:45 AM	0	35	0	105	292	101	10	28	0	154	492	83	0	4	0	33	437	67	0	21	0	61	242	74	**2141**
8:00 AM - 9:00 AM	0	36	0	98	272	125	1	28	0	147	429	68	0	10	0	32	439	71	0	17	0	49	208	56	**1994**
8:15 AM - 9:15 AM	0	36	0	91	253	156	1	23	0	143	416	68	0	11	0	20	422	63	0	15	0	50	263	50	**1995**
8:30 AM - 9:30 AM	0	45	0	96	247	155	1	25	0	153	444	78	0	14	0	17	441	63	0	16	0	46	295	48	**2083**

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

3:30 PM - 5:30 PM PEAK HOUR: 4:30 PM TO 5:30 PM



INTERSECTION PEAK HOUR VOLUME	
IN	2,375
OUT	2,375

	HV	PHF
SB	1.0%	0.76
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WB	0.2%	0.82
EB	1.5%	0.91
INTRS.	1.0%	0.87

PHF = Peak Hour Factor
HV = Heavy Vehicles

Kunia Road (SR-750) @ Lyman Road

Schofield Barracks, HI

COUNTED BY: CN

REDUCED BY: CN

REDUCTION DATE: Fri. 2/28/14

DATE OF COUNT: Tue. 2/25/14

TIME OF COUNT: 3:30 PM - 5:30 PM

WEATHER: Overcast

TRAFFIC DATA GATHERING

INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: Kunia Road (SR-750) @ Lyman Road
Schofield Barracks, HI

DATE OF COUNT: Tue. 2/25/14
TIME OF COUNT: 3:30 PM - 5:30 PM

COUNTED BY: CN
WEATHER: Overcast

TIME INTERVAL ENDING AT	FROM NORTH ON Kunia Road (SR-750)						FROM SOUTH ON Kunia Road (SR-750)						FROM EAST ON Lyman Road						FROM WEST ON Lyman Road						INTERVAL TOTALS
	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
03:45 PM	0	5	0	27	129	23	0	3	0	20	107	11	0	2	0	30	50	18	0	6	0	41	55	30	**541**
04:00 PM	0	3	0	12	147	17	0	2	0	16	134	8	0	1	0	23	47	19	0	2	0	27	63	41	**554**
04:15 PM	0	5	0	13	117	19	1	0	0	18	79	5	0	6	0	36	60	28	0	1	0	28	72	49	**524**
04:30 PM	0	2	0	11	119	18	0	0	0	21	82	3	0	2	0	22	73	29	0	2	0	27	69	61	**535**
04:45 PM	0	1	0	10	130	13	2	1	0	22	73	3	0	1	0	43	62	15	0	5	0	21	69	58	**519**
05:00 PM	0	5	0	14	127	16	0	2	0	9	73	7	0	0	0	32	67	14	0	6	0	48	69	78	**554**
05:15 PM	0	0	0	16	114	15	1	0	0	20	95	3	0	0	0	30	117	31	0	0	0	31	72	78	**622**
05:30 PM	0	1	0	21	182	22	0	2	0	20	61	7	0	0	0	43	109	29	0	0	0	47	77	62	**680**
PEAK HOUR TOTALS	**0**	**7**	**0**	**61**	**553**	**66**	**3**	**5**	**0**	**71**	**302**	**20**	**0**	**1**	**0**	**148**	**355**	**89**	**0**	**11**	**0**	**147**	**287**	**276**	**INTERSECTION**
ALL MOVEMENTS	**680**						**393**						**592**						**710**						**2375**
% HV	**1.0%**						**1.3%**						**0.2%**						**1.5%**						**1.0%**
PEAK HOUR FACTOR	**0.76**						**0.83**						**0.82**						**0.91**						**0.87**

PHF = Peak Hour Factor

3:30 PM - 5:30 PM PEAK HOUR: 4:30 PM TO 5:30 PM

REDUCED BY: CN

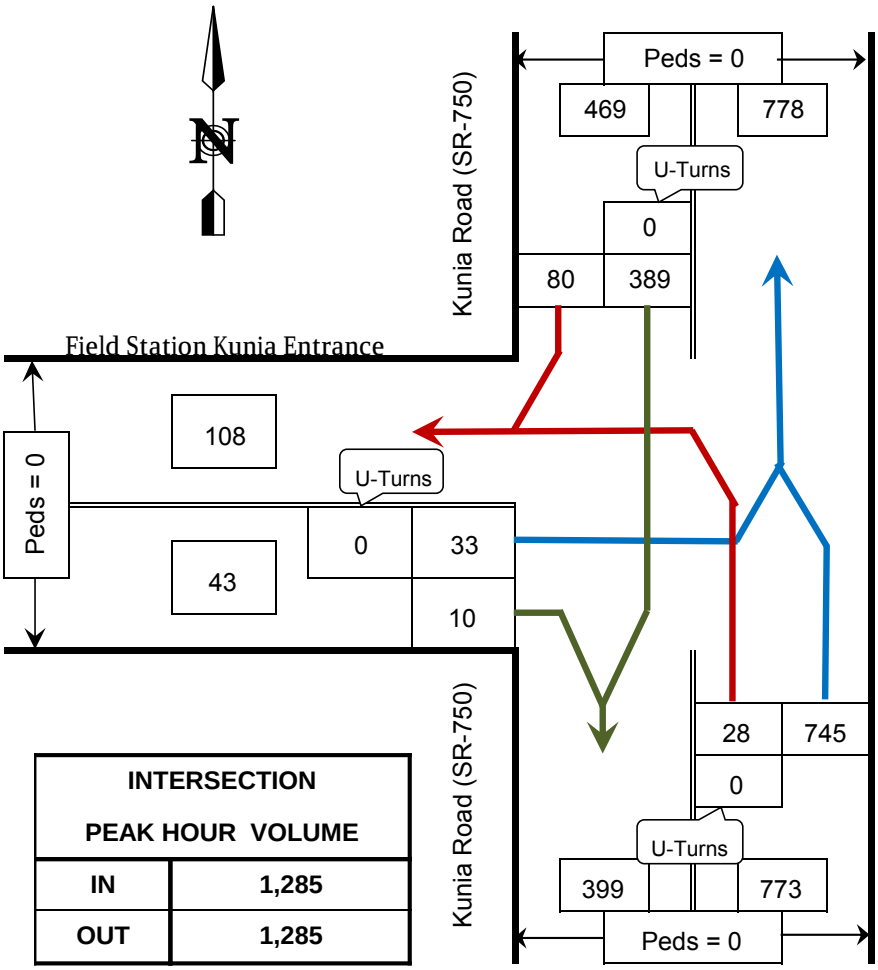
DATE OF REDUCTION: 2/28/2014

	FROM NORTH ON Kunia Road (SR-750)						FROM SOUTH ON Kunia Road (SR-750)						FROM EAST ON Lyman Road						FROM WEST ON Lyman Road						INTERVAL TOTALS
TIME INTERVAL	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	
1:30 PM - 2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:45 PM - 2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:00 PM - 3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:15 PM - 3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:30 PM - 3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:45 PM - 3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:00 PM - 4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:15 PM - 4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:30 PM - 4:30 PM	0	15	0	63	512	77	1	5	0	75	402	27	0	11	0	111	230	94	0	11	0	123	259	181	**2154**
3:45 PM - 4:45 PM	0	11	0	46	513	67	3	3	0	77	368	19	0	10	0	124	242	91	0	10	0	103	273	209	**2132**
4:00 PM - 5:00 PM	0	13	0	48	493	66	3	3	0	70	307	18	0	9	0	133	262	86	0	14	0	124	279	246	**2132**
4:15 PM - 5:15 PM	0	8	0	51	490	62	3	3	0	72	323	16	0	3	0	127	319	89	0	13	0	127	279	275	**2230**
4:30 PM - 5:30 PM	0	7	0	61	553	66	3	5	0	71	302	20	0	1	0	148	355	89	0	11	0	147	287	276	**2375**

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

7:30 AM - 9:30 AM PEAK HOUR: 7:30 AM TO 8:30 AM



INTERSECTION PEAK HOUR VOLUME	
IN	1,285
OUT	1,285

	HV	PHF
SB	4.7%	0.92
NB	4.3%	0.89
EB	14.0%	0.51
INTRS.	4.7%	0.95

HV = Heavy Vehicles
PHF = Peak Hour Factor

Kunia Road (SR-750) @ d Entrance

Schofield Barracks, HI

COUNTED BY: VT

REDUCED BY: CN

REDUCTION DATE: Fri. 2/28/14

DATE OF COUNT: Wed. 2/26/14

TIME OF COUNT: 7:30 AM - 9:30 AM

WEATHER: Overcast

TRAFFIC DATA GATHERING

INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: Kunia Road (SR-750) @ Entrance
Schofield Barracks, HI

DATE OF COUNT: Wed. 2/26/14
TIME OF COUNT: 7:30 AM - 9:30 AM

COUNTED BY: VT
WEATHER: Overcast

TIME INTERVAL ENDING AT	FROM NORTH ON Kunia Road (SR-750)						FROM SOUTH ON Kunia Road (SR-750)						FROM EAST ON						FROM WEST ON Entrance						INTERVAL TOTALS
	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	
05:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	5	0	0	92	25	0	4	0	5	211	0	0	0	0	0	0	0	0	1	0	5	0	1	339
08:00 AM	0	8	0	0	105	23	0	5	0	13	165	0	0	0	0	0	0	0	0	1	0	6	0	1	313
08:15 AM	0	5	0	0	100	20	0	10	0	4	171	0	0	0	0	0	0	0	0	1	0	7	0	2	304
08:30 AM	0	4	0	0	92	12	0	14	0	6	198	0	0	0	0	0	0	0	0	3	0	15	0	6	329
08:45 AM	0	7	0	0	76	12	0	18	0	7	195	0	0	0	0	0	0	0	0	0	0	15	0	2	307
09:00 AM	0	9	0	0	71	9	0	10	0	2	150	0	0	0	0	0	0	0	0	0	0	11	0	0	243
09:15 AM	0	5	0	0	49	16	0	13	0	6	164	0	0	0	0	0	0	0	0	0	0	11	0	3	249
09:30 AM	0	6	0	0	59	18	0	7	0	5	117	0	0	0	0	0	0	0	0	0	0	13	0	1	213
PEAK HOUR TOTALS	0	22	0	0	389	80	0	33	0	28	745	0	0	0	0	0	0	0	0	6	0	33	0	10	INTERSECTION
ALL MOVEMENTS	469						773						0						43						1285
% HV	4.7%						4.3%						#N/A						14.0%						4.7%
PEAK HOUR FACTOR	0.92						0.89						#N/A						0.51						0.95

PHF = Peak Hour Factor

7:30 AM - 9:30 AM PEAK HOUR: 7:30 AM TO 8:30 AM

REDUCED BY: CN

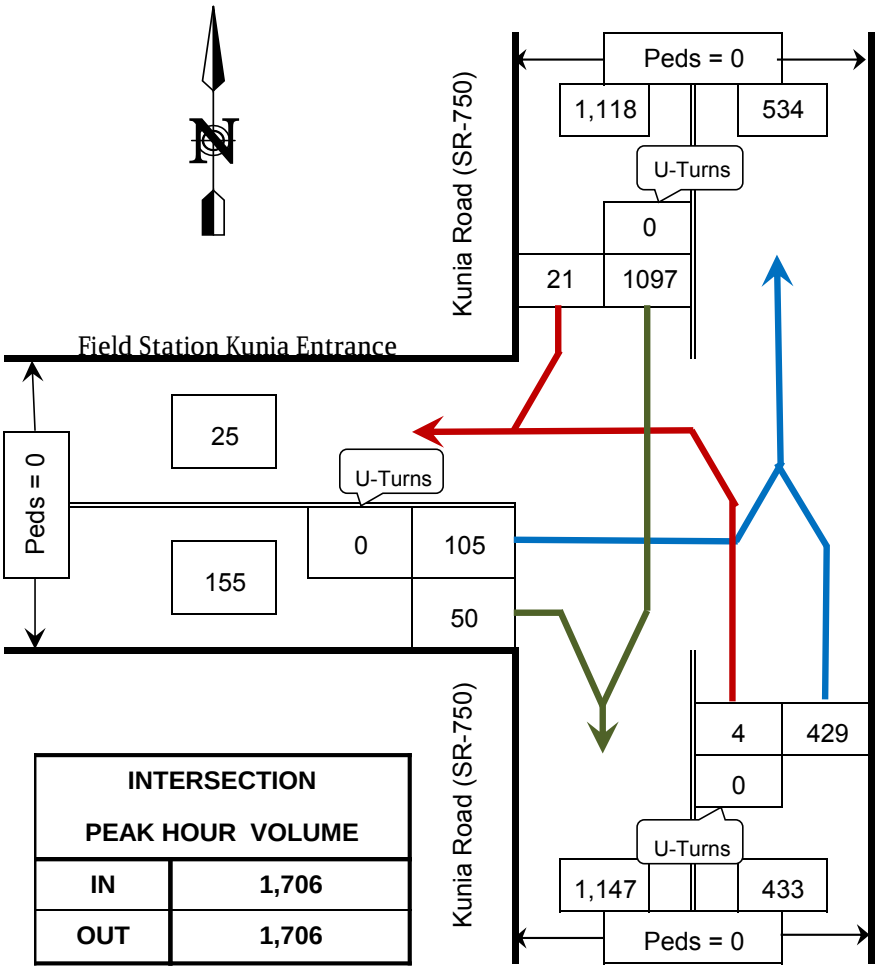
DATE OF REDUCTION: 2/28/2014

	FROM NORTH ON Kunia Road (SR-750)						FROM SOUTH ON Kunia Road (SR-750)						FROM EAST ON						FROM WEST ON Entrance						INTERVAL TOTALS
TIME INTERVAL	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	
5:30 AM - 6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 AM - 6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM - 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM - 7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM - 7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM - 7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM - 8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM - 8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM - 8:30 AM	0	22	0	0	389	80	0	33	0	28	745	0	0	0	0	0	0	0	0	6	0	33	0	10	1285
7:45 AM - 8:45 AM	0	24	0	0	373	67	0	47	0	30	729	0	0	0	0	0	0	0	0	5	0	43	0	11	1253
8:00 AM - 9:00 AM	0	25	0	0	339	53	0	52	0	19	714	0	0	0	0	0	0	0	0	4	0	48	0	10	1183
8:15 AM - 9:15 AM	0	25	0	0	288	49	0	55	0	21	707	0	0	0	0	0	0	0	0	3	0	52	0	11	1128
8:30 AM - 9:30 AM	0	27	0	0	255	55	0	48	0	20	626	0	0	0	0	0	0	0	0	0	0	50	0	6	1012

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

3:30 PM - 5:30 PM PEAK HOUR: 3:30 PM TO 4:30 PM



INTERSECTION PEAK HOUR VOLUME	
IN	1,706
OUT	1,706

	HV	PHF
SB	1.3%	0.87
NB	2.5%	0.87
EB	0.6%	0.97
INTRS.	1.6%	0.90

HV = Heavy Vehicles
PHF = Peak Hour Factor

Kunia Road (SR-750) @ d Entrance

Schofield Barracks, HI

COUNTED BY: VT

DATE OF COUNT: Wed. 2/26/14

REDUCED BY: CN

TIME OF COUNT: 3:30 PM - 5:30 PM

REDUCTION DATE: Fri. 2/28/14

WEATHER: Overcast

TRAFFIC DATA GATHERING

INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: Kunia Road (SR-750) @ Entrance
Schofield Barracks, HI

DATE OF COUNT: Wed. 2/26/14
TIME OF COUNT: 3:30 PM - 5:30 PM

COUNTED BY: VT
WEATHER: Overcast

TIME INTERVAL ENDING AT	FROM NORTH ON Kunia Road (SR-750)						FROM SOUTH ON Kunia Road (SR-750)						FROM EAST ON						FROM WEST ON Entrance						INTERVAL TOTALS
	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	4	0	0	260	6	0	3	0	2	90	0	0	0	0	0	0	0	0	0	0	28	0	12	398
04:00 PM	0	3	0	0	264	6	0	4	0	2	122	0	0	0	0	0	0	0	0	1	0	21	0	18	433
04:15 PM	0	4	0	0	314	6	0	1	0	0	117	0	0	0	0	0	0	0	0	0	0	25	0	13	475
04:30 PM	0	4	0	0	259	3	0	3	0	0	100	0	0	0	0	0	0	0	0	0	0	31	0	7	400
04:45 PM	0	5	0	0	271	2	0	1	0	1	90	0	0	0	0	0	0	0	0	0	0	18	0	8	390
05:00 PM	0	3	0	0	221	4	0	3	0	2	92	0	0	0	0	0	0	0	0	0	0	13	0	9	341
05:15 PM	0	2	0	0	160	3	0	4	0	1	74	0	0	0	0	0	0	0	0	0	0	18	0	4	260
05:30 PM	0	2	0	0	211	1	0	1	0	1	85	0	0	0	0	0	0	0	0	0	0	15	0	3	316
PEAK HOUR TOTALS	0	15	0	0	1097	21	0	11	0	4	429	0	0	0	0	0	0	0	0	1	0	105	0	50	INTERSECTION
ALL MOVEMENTS	1118						433						0						155						1706
% HV	1.3%						2.5%						#N/A						0.6%						1.6%
PEAK HOUR FACTOR	0.87						0.87						#N/A						0.97						0.90

PHF = Peak Hour Factor

3:30 PM - 5:30 PM PEAK HOUR: 3:30 PM TO 4:30 PM

REDUCED BY: CN

DATE OF REDUCTION: 2/28/2014

	FROM NORTH ON Kunia Road (SR-750)						FROM SOUTH ON Kunia Road (SR-750)						FROM EAST ON						FROM WEST ON Entrance						INTERVAL TOTALS
TIME INTERVAL	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	
1:30 PM - 2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM - 2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 PM - 3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM - 3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM - 3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM - 3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM - 4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM - 4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM - 4:30 PM	0	15	0	0	1097	21	0	11	0	4	429	0	0	0	0	0	0	0	0	1	0	105	0	50	1706
3:45 PM - 4:45 PM	0	16	0	0	1108	17	0	9	0	3	429	0	0	0	0	0	0	0	0	1	0	95	0	46	1698
4:00 PM - 5:00 PM	0	16	0	0	1065	15	0	8	0	3	399	0	0	0	0	0	0	0	0	0	0	87	0	37	1606
4:15 PM - 5:15 PM	0	14	0	0	911	12	0	11	0	4	356	0	0	0	0	0	0	0	0	0	0	80	0	28	1391
4:30 PM - 5:30 PM	0	12	0	0	863	10	0	9	0	5	341	0	0	0	0	0	0	0	0	0	0	64	0	24	1307

Traffic Study
Appendix B.

Level of Service (LOS) Definitions

Level of Service (LOS) Definitions

The following sections describe the Level of Service (LOS) definitions for unsignalized and signalized intersection capacity.

The objective of applied traffic analysis is to provide a method of quantifying the degree of expected traffic congestion and compare this to the overall traffic-related performance of the roadway[1].

The capacity of any transportation facility reflects its ability to accommodate a moving stream of people or vehicles. It is a measure of the supply side of transportation facilities. LOS uses qualitative measures that characterize operational conditions within a traffic stream and perception of these conditions by motorists and passengers. The descriptions of individual LOS characterize these conditions in terms of factors such as speed and travel time, freedom to maneuver, traffic interruptions, and driver comfort and convenience[2].

Six LOS are defined for each type of transportation facility for which analysis procedures are available. They are given letter designations, ranging from "A" to "F," with "A" representing the best operating conditions and "F" representing the worst. Each LOS represents a range of operating conditions that are defined by quantitative factors known as measures of effectiveness.

The volume of traffic that can be served under stop-and-go conditions of LOS F is generally accepted as being lower than that possible at LOS E. Typically a facility that operates a LOS E is at the maximum service flow rate. For most design or planning purposes, however, obtaining service flow rates of C are usually the desired norm because they ensure a more acceptable quality of service to all users of the transportation facility.

Unsignalized Intersection Capacity

The LOS for an unsignalized intersection is determined by the amount of delay experienced at the intersection. Delay is measured as the average time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line. The LOS is determined from the length of the average delay experienced at the intersection during the peak commute hour. LOS A indicates short delays associated with very small queues, while LOS F indicates very long delays associated with longer queues.

Unsignalized intersections were evaluated according to the methodologies presented in Chapter 17 of the 2000 update of the *Highway Capacity Manual* (HCM)[3]. For the purposes of this report, the worst movement at each unsignalized intersection was used to compare LOS and delay to other intersections. The following table summarizes the LOS criteria for unsignalized intersections.

[1] *Principals of Highway Engineering and Traffic Analysis*, Mannering and Kilareksi (1997).
[2] *Traffic Engineering Handbook*, Institute of Transportation Engineers (1999).
[3] *Highway Capacity Manual: Special Report 209*, Transportation Research Board (2000 Update).

Unsignalized Intersection LOS Criteria

Average Control Delay (sec/veh)	*Intersection Level of Service*
≤ 10	A
> 10 and ≤ 15	B
>15 and ≤ 25	C
>25 and ≤ 35	D
>35 and ≤ 50	E
> 50	F

Note: sec/veh = seconds per vehicle.

It should be mentioned that equal LOS values at several locations do not necessarily indicate equal overall performance of intersections. One location might experience a higher degree of delay for a considerable period of the day while at another the peak period is of short duration.

In addition, a poor LOS is more tolerable to drivers at a low-volume intersection than at a high-volume intersection. Capacity analysis for any stop sign-controlled approach is based on the assumption that the major street traffic is not affected by the minor street movements, and left turns from the major streets to the minor streets are influenced only by opposing major street traffic flow. The calculated LOS for stop sign-controlled intersections is only for movements on the minor street and left turn movements on the major street.

Signalized Intersection Capacity

LOS for signalized intersections is defined in terms of delay, and is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. The delay a driver experiences is due to a number of factors related to intersection traffic control phasing and timing, roadway geometrics, traffic volumes, and incidents (traffic accidents) or events.

Signalized intersections were evaluated according to the methodologies presented in Chapter 16 of the 2000 update of the HCM[4]. The table below summarizes the intersection LOS criteria for signalized intersections.

Signalized Intersection LOS Criteria

Control Delay per Vehicle (sec/veh)	*Intersection Level of Service*
≤ 10	A
>10 and ≤ 20	B
>20 and ≤ 35	C
>35 and ≤ 55	D
>55 and ≤ 80	E
> 80	F

Note: sec/veh = seconds per vehicle.

[4] *Highway Capacity Manual: Special Report 209*, Transportation Research Board (2000 Update).

Traffic Study
Appendix C.

Synchro Level of Service Analysis Reports

HCM Signalized Intersection Capacity Analysis
1: Kunia Rd & Foote Ave

3/24/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	410	116	202	535	498	398
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1752	1568	1752	3505	3438	1538
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1752	1568	1752	3505	3438	1538
Peak-hour factor, PHF	0.84	0.84	0.92	0.92	0.87	0.87
Adj. Flow (vph)	488	138	220	582	572	457
RTOR Reduction (vph)	0	0	0	0	0	297
Lane Group Flow (vph)	488	138	220	582	572	160
Confl. Peds. (#/hr)	1					
Heavy Vehicles (%)	3%	3%	3%	3%	5%	5%
Turn Type	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	4	1	6	2	
Permitted Phases		6				2
Actuated Green, G (s)	55.6	109.0	19.9	53.4	28.5	28.5
Effective Green, g (s)	55.6	109.0	19.9	53.4	28.5	28.5
Actuated g/C Ratio	0.47	0.92	0.17	0.45	0.24	0.24
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	819	1568	293	1573	823	368
v/s Ratio Prot	c0.28	0.04	c0.13	0.17	c0.17	
v/s Ratio Perm		0.05				0.10
v/c Ratio	0.60	0.09	0.75	0.37	0.70	0.44
Uniform Delay, d1	23.4	0.5	47.2	21.7	41.3	38.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.2	0.0	10.3	0.1	2.6	0.8
Delay (s)	26.6	0.5	57.5	21.8	43.8	39.3
Level of Service	C	A	E	C	D	D
Approach Delay (s)	20.8			31.6	41.8	
Approach LOS	C			C	D	

Intersection Summary			
HCM Average Control Delay	33.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	119.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: Kunia Rd & Foote Ave

3/24/2014

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	488	138	220	582	572	457
v/c Ratio	0.60	0.09	0.75	0.37	0.70	0.69
Control Delay	29.8	0.1	64.4	21.8	46.5	13.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.8	0.1	64.4	21.8	46.5	13.0
Queue Length 50th (ft)	270	0	161	150	211	41
Queue Length 95th (ft)	444	0	272	191	281	139
Internal Link Dist (ft)	1099			1376	2153	
Turn Bay Length (ft)			150			150
Base Capacity (vph)	818	1568	416	2232	1226	799
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.09	0.53	0.26	0.47	0.57

Intersection Summary

HCM Signalized Intersection Capacity Analysis
30: Kunia Rd/Driveway & SR 99

3/24/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	682	178	709	775	6	237	4	704	14	9	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	2.0	3.0	3.0			3.0	3.0		3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00			1.00	0.99		1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.97	
Satd. Flow (prot)	1736	3471	1533	1719	3433			1725	1517		1764	
Flt Permitted	0.34	1.00	1.00	0.95	1.00			0.70	1.00		0.59	
Satd. Flow (perm)	620	3471	1533	1719	3433			1264	1517		1069	
Peak-hour factor, PHF	0.88	0.88	0.88	0.94	0.94	0.94	0.83	0.83	0.83	0.55	0.55	0.55
Adj. Flow (vph)	1	775	202	754	824	6	286	5	848	25	16	2
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	1	775	202	754	830	0	0	291	848	0	42	0
Confl. Peds. (#/hr)			2			3			5	5		
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%	5%	5%	5%	4%	4%	4%
Turn Type	Perm	NA	Free	Prot	NA		Perm	NA	Free	Perm	NA	
Protected Phases		6		5	2			8			4	
Permitted Phases	6		Free				8		Free	4		
Actuated Green, G (s)	47.6	47.6	200.1	89.9	142.5			47.6	200.1		47.6	
Effective Green, g (s)	49.6	49.6	200.1	91.9	144.5			49.6	200.1		49.6	
Actuated g/C Ratio	0.25	0.25	1.00	0.46	0.72			0.25	1.00		0.25	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	154	860	1533	789	2479			313	1517		265	
v/s Ratio Prot		c0.22		c0.44	0.24							
v/s Ratio Perm	0.00		0.13					c0.23	0.56		0.04	
v/c Ratio	0.01	0.90	0.13	0.96	0.33			0.93	0.56		0.16	
Uniform Delay, d1	56.7	72.9	0.0	52.1	10.2			73.5	0.0		58.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.0	12.5	0.2	21.7	0.1			32.6	1.5		0.3	
Delay (s)	56.7	85.4	0.2	73.8	10.3			106.2	1.5		59.2	
Level of Service	E	F	A	E	B			F	A		E	
Approach Delay (s)		67.8			40.5			28.2			59.2	
Approach LOS		E			D			C			E	

Intersection Summary			
HCM Average Control Delay	44.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	200.1	Sum of lost time (s)	9.0
Intersection Capacity Utilization	88.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues
30: Kunia Rd/Driveway & SR 99

3/24/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	1	775	202	754	830	291	848	43
v/c Ratio	0.01	0.90	0.13	0.96	0.33	0.93	0.56	0.16
Control Delay	60.0	88.1	0.2	74.9	10.7	109.0	1.5	62.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.0	88.1	0.2	74.9	10.7	109.0	1.5	62.4
Queue Length 50th (ft)	1	554	0	998	207	399	0	46
Queue Length 95th (ft)	7	624	0	#1288	239	#520	0	52
Internal Link Dist (ft)		1998			2306	2153		237
Turn Bay Length (ft)	150		200	150				
Base Capacity (vph)	162	911	1533	842	2636	332	1517	282
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.85	0.13	0.90	0.31	0.88	0.56	0.15

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Unsignalized Intersection Capacity Analysis
9: Lyman Rd & Flagler Rd

7/17/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	36	379	512	202	117	29
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.84	0.84	0.89	0.89	0.86	0.86
Hourly flow rate (vph)	43	451	575	227	136	34
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						3
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		1279				
pX, platoon unblocked						
vC, conflicting volume	802				1226	689
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	802				1226	689
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	94				27	92
cM capacity (veh/h)	779				186	446

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	494	802	170
Volume Left	43	0	136
Volume Right	0	227	34
cSH	779	1700	233
Volume to Capacity	0.06	0.47	0.73
Queue Length 95th (ft)	4	0	124
Control Delay (s)	1.5	0.0	53.8
Lane LOS	A		F
Approach Delay (s)	1.5	0.0	53.8
Approach LOS			F

Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
44: Kunia Rd & Lyman Rd

7/17/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	76	365	93	34	459	74	140	587	81	150	348	116
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	4.0	3.0	3.0	4.0	3.0	3.0	4.0	3.0	3.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.87	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1736	1827	1356	1787	1881	1599	1736	3471	1553	1703	3406	1524
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1736	1827	1356	1787	1881	1599	1736	3471	1553	1703	3406	1524
Peak-hour factor, PHF	0.64	0.64	0.64	0.84	0.84	0.84	0.76	0.76	0.76	0.91	0.91	0.91
Adj. Flow (vph)	119	570	145	40	546	88	184	772	107	165	382	127
RTOR Reduction (vph)	0	0	15	0	0	12	0	0	41	0	0	67
Lane Group Flow (vph)	119	570	130	40	546	76	184	772	66	165	382	60
Confl. Peds. (#/hr)			52									
Heavy Vehicles (%)	4%	4%	4%	1%	1%	1%	4%	4%	4%	6%	6%	6%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4			8			6			2
Actuated Green, G (s)	16.7	65.4	65.4	6.9	55.6	55.6	23.1	43.8	43.8	21.6	42.3	42.3
Effective Green, g (s)	18.7	67.4	66.4	8.9	57.6	56.6	25.1	45.8	44.8	23.6	44.3	43.3
Actuated g/C Ratio	0.12	0.43	0.42	0.06	0.37	0.36	0.16	0.29	0.28	0.15	0.28	0.27
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	206	781	571	101	687	574	276	1008	441	255	957	418
v/s Ratio Prot	c0.07	0.31		0.02	c0.29		c0.11	c0.22		0.10	0.11	
v/s Ratio Perm			0.10			0.05			0.04			0.04
v/c Ratio	0.58	0.73	0.23	0.40	0.79	0.13	0.67	0.77	0.15	0.65	0.40	0.14
Uniform Delay, d1	65.8	37.6	29.2	71.8	44.8	34.0	62.4	51.1	42.2	63.1	45.9	43.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.9	3.4	0.2	2.5	6.3	0.1	6.0	3.5	0.2	5.6	0.3	0.2
Delay (s)	69.7	41.0	29.4	74.4	51.1	34.1	68.3	54.6	42.4	68.7	46.2	43.3
Level of Service	E	D	C	E	D	C	E	D	D	E	D	D
Approach Delay (s)		43.1			50.3			55.7			51.2	
Approach LOS		D			D			E			D	

Intersection Summary			
HCM Average Control Delay	50.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	157.7	Sum of lost time (s)	9.0
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues
44: Kunia Rd & Lyman Rd

7/17/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	119	570	145	40	546	88	184	772	107	165	382	127
v/c Ratio	0.57	0.73	0.26	0.33	0.81	0.15	0.66	0.76	0.22	0.64	0.40	0.26
Control Delay	84.5	46.4	28.3	89.9	58.5	30.9	79.8	58.9	25.7	81.0	49.9	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	84.5	46.4	28.3	89.9	58.5	30.9	79.8	58.9	25.7	81.0	49.9	18.0
Queue Length 50th (ft)	118	503	81	40	510	48	181	384	38	163	169	26
Queue Length 95th (ft)	167	491	104	97	744	102	282	480	82	313	282	100
Internal Link Dist (ft)		1752			1465			949			1376	
Turn Bay Length (ft)	150		60	240		80	250		200	250		130
Base Capacity (vph)	283	1140	811	145	1021	866	400	1460	676	370	1386	666
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.50	0.18	0.28	0.53	0.10	0.46	0.53	0.16	0.45	0.28	0.19

Intersection Summary

HCM Signalized Intersection Capacity Analysis
16: Humphreys Rd & Lyman Rd

3/24/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	230	4	10	313	176	0	0	0	230	20	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0						5.0	5.0
Lane Util. Factor		1.00			1.00						1.00	1.00
Frt		1.00			0.95						1.00	0.85
Flt Protected		1.00			1.00						0.96	1.00
Satd. Flow (prot)		1781			1705						1781	1583
Flt Permitted		0.93			0.99						0.96	1.00
Satd. Flow (perm)		1660			1693						1781	1583
Peak-hour factor, PHF	0.83	0.83	0.83	0.85	0.85	0.85	0.92	0.92	0.92	0.72	0.72	0.72
Adj. Flow (vph)	28	277	5	12	368	207	0	0	0	319	28	42
RTOR Reduction (vph)	0	1	0	0	30	0	0	0	0	0	0	28
Lane Group Flow (vph)	0	309	0	0	557	0	0	0	0	0	347	14
Heavy Vehicles (%)	6%	6%	6%	6%	6%	6%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA					Split	NA	Perm
Protected Phases		4			8					2	2	
Permitted Phases	4			8								2
Actuated Green, G (s)		21.5			21.5						15.4	15.4
Effective Green, g (s)		21.5			21.5						15.4	15.4
Actuated g/C Ratio		0.46			0.46						0.33	0.33
Clearance Time (s)		5.0			5.0						5.0	5.0
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		761			776						585	520
v/s Ratio Prot											c0.19	
v/s Ratio Perm		0.19			c0.33							0.01
v/c Ratio		0.41			0.72						0.59	0.03
Uniform Delay, d1		8.5			10.2						13.1	10.7
Progression Factor		1.00			1.00						1.00	1.00
Incremental Delay, d2		0.4			3.2						1.6	0.0
Delay (s)		8.8			13.4						14.8	10.7
Level of Service		A			B						B	B
Approach Delay (s)		8.8			13.4			0.0			14.3	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	46.9	Sum of lost time (s)	10.0
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBT	SBT	SBR
Lane Group Flow (vph)	310	587	347	42
v/c Ratio	0.42	0.74	0.61	0.08
Control Delay	11.2	16.8	20.1	5.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	11.2	16.8	20.1	5.9
Queue Length 50th (ft)	48	100	74	0
Queue Length 95th (ft)	116	242	143	12
Internal Link Dist (ft)	2460	1199	1412	
Turn Bay Length (ft)				200
Base Capacity (vph)	1266	1304	1020	925
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.24	0.45	0.34	0.05

Intersection Summary

HCM Unsignalized Intersection Capacity Analysis
3: Lyman Rd & Maili Rd

3/24/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	4	18	65	23	170	27
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.79	0.79	0.88	0.88	0.78	0.78
Hourly flow rate (vph)	5	23	74	26	218	35
Pedestrians			1		1	
Lane Width (ft)			12.0		12.0	
Walking Speed (ft/s)			4.0		4.0	
Percent Blockage			0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	101				122	88
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	101				122	88
tC, single (s)	4.3				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.4				3.5	3.3
p0 queue free %	100				75	96
cM capacity (veh/h)	1369				871	972

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	28	100	253
Volume Left	5	0	218
Volume Right	0	26	35
cSH	1369	1700	884
Volume to Capacity	0.00	0.06	0.29
Queue Length 95th (ft)	0	0	30
Control Delay (s)	1.4	0.0	10.7
Lane LOS	A		B
Approach Delay (s)	1.4	0.0	10.7
Approach LOS			B

Intersection Summary			
Average Delay	7.2		
Intersection Capacity Utilization	22.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
41: Kunia Rd & Field Station Kunia Entrance

7/17/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	33	10	28	775	394	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1583	1417	1736	1827	1768	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1583	1417	1736	1827	1768	
Peak-hour factor, PHF	0.51	0.51	0.89	0.89	0.92	0.92
Adj. Flow (vph)	65	20	31	871	428	88
RTOR Reduction (vph)	0	17	0	0	6	0
Lane Group Flow (vph)	65	3	31	871	510	0
Heavy Vehicles (%)	14%	14%	4%	4%	5%	5%
Turn Type	NA	Perm	Prot	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases		4				
Actuated Green, G (s)	6.5	6.5	2.8	40.2	32.4	
Effective Green, g (s)	8.5	7.5	4.8	42.2	34.4	
Actuated g/C Ratio	0.15	0.13	0.08	0.74	0.61	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	237	187	147	1360	1073	
v/s Ratio Prot	c0.04		0.02	c0.48	0.29	
v/s Ratio Perm		0.00				
v/c Ratio	0.27	0.01	0.21	0.64	0.48	
Uniform Delay, d1	21.4	21.4	24.2	3.5	6.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.6	0.0	0.7	1.0	0.3	
Delay (s)	22.0	21.4	24.9	4.6	6.5	
Level of Service	C	C	C	A	A	
Approach Delay (s)	21.9			5.3	6.5	
Approach LOS	C			A	A	

Intersection Summary			
HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	56.7	Sum of lost time (s)	6.0
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues
41: Kunia Rd & Field Station Kunia Entrance

7/17/2014

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	65	20	31	871	516
v/c Ratio	0.20	0.07	0.10	0.62	0.43
Control Delay	22.1	11.1	22.8	7.2	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	22.1	11.1	22.8	7.2	9.2
Queue Length 50th (ft)	19	0	9	115	48
Queue Length 95th (ft)	29	6	32	263	225
Internal Link Dist (ft)	642			1901	1624
Turn Bay Length (ft)	140		300		
Base Capacity (vph)	936	818	566	1814	1491
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.07	0.02	0.05	0.48	0.35

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Kunia Rd & Foote Ave

3/28/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	776	406	70	577	446	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1599	1787	3574	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1787	1599	1787	3574	3539	1583
Peak-hour factor, PHF	0.81	0.81	0.83	0.83	0.87	0.87
Adj. Flow (vph)	958	501	84	695	513	322
RTOR Reduction (vph)	0	0	0	0	0	237
Lane Group Flow (vph)	958	501	84	695	513	85
Confl. Peds. (#/hr)	1					
Heavy Vehicles (%)	1%	1%	1%	1%	2%	2%
Turn Type	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	4	1	6	2	
Permitted Phases		6				2
Actuated Green, G (s)	70.4	111.3	11.1	40.9	24.8	24.8
Effective Green, g (s)	70.4	111.3	11.1	40.9	24.8	24.8
Actuated g/C Ratio	0.58	0.92	0.09	0.34	0.20	0.20
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1037	1599	164	1205	724	324
v/s Ratio Prot	c0.54	0.18	0.05	c0.19	c0.14	
v/s Ratio Perm		0.13				0.05
v/c Ratio	0.92	0.31	0.51	0.58	0.71	0.26
Uniform Delay, d1	23.0	0.6	52.5	33.1	44.9	40.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.7	0.1	2.7	0.7	3.2	0.4
Delay (s)	37.7	0.7	55.2	33.8	48.1	41.0
Level of Service	D	A	E	C	D	D
Approach Delay (s)	25.0			36.1	45.3	
Approach LOS	C			D	D	

Intersection Summary			
HCM Average Control Delay	33.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	121.3	Sum of lost time (s)	15.0
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: Kunia Rd & Foote Ave

3/28/2014

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	958	501	84	695	513	322
v/c Ratio	0.92	0.31	0.52	0.58	0.71	0.57
Control Delay	40.2	0.5	65.3	34.7	50.7	10.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.2	0.5	65.3	34.7	50.7	10.5
Queue Length 50th (ft)	636	0	63	233	197	15
Queue Length 95th (ft)	#960	0	114	262	257	85
Internal Link Dist (ft)	1138			1376	2153	
Turn Bay Length (ft)			150			150
Base Capacity (vph)	1036	1599	237	1777	1143	713
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.31	0.35	0.39	0.45	0.45

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
30: Kunia Rd/Driveway & SR 99

3/28/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	1255	188	531	769	6	263	6	1084	10	7	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	2.0	3.0	3.0			3.0	3.0		3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00			1.00	0.99		1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.97	
Satd. Flow (prot)	1770	3539	1564	1787	3570			1793	1579		1686	
Flt Permitted	0.35	1.00	1.00	0.95	1.00			0.73	1.00		0.68	
Satd. Flow (perm)	651	3539	1564	1787	3570			1366	1579		1187	
Peak-hour factor, PHF	0.94	0.94	0.94	0.97	0.97	0.97	0.94	0.94	0.94	0.69	0.69	0.69
Adj. Flow (vph)	3	1335	200	547	793	6	280	6	1153	14	10	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	3	1335	200	547	799	0	0	286	1153	0	24	0
Confl. Peds. (#/hr)			1						1			
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	9%	9%	9%
Turn Type	Perm	NA	Free	Prot	NA		Perm	NA	Free	Perm	NA	
Protected Phases		6		5	2			8			4	
Permitted Phases	6		Free				8		Free	4		
Actuated Green, G (s)	79.8	79.8	201.2	62.2	147.0			44.2	201.2		44.2	
Effective Green, g (s)	81.8	81.8	201.2	64.2	149.0			46.2	201.2		46.2	
Actuated g/C Ratio	0.41	0.41	1.00	0.32	0.74			0.23	1.00		0.23	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	265	1439	1564	570	2644			314	1579		273	
v/s Ratio Prot		c0.38		c0.31	0.22							
v/s Ratio Perm	0.00		0.13					c0.21	0.73		0.02	
v/c Ratio	0.01	0.93	0.13	0.96	0.30			0.91	0.73		0.09	
Uniform Delay, d1	35.6	56.9	0.0	67.2	8.7			75.5	0.0		60.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.0	10.6	0.2	27.5	0.1			29.1	3.0		0.1	
Delay (s)	35.6	67.5	0.2	94.7	8.8			104.6	3.0		61.1	
Level of Service	D	E	A	F	A			F	A		E	
Approach Delay (s)		58.6			43.7			23.2			61.1	
Approach LOS		E			D			C			E	

Intersection Summary			
HCM Average Control Delay	42.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	201.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	95.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Queues
30: Kunia Rd/Driveway & SR 99

3/28/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	3	1335	200	547	799	286	1153	25
v/c Ratio	0.01	0.93	0.13	0.96	0.30	0.91	0.73	0.09
Control Delay	37.3	69.1	0.2	95.4	9.2	108.1	3.0	62.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.3	69.1	0.2	95.4	9.2	108.1	3.0	62.3
Queue Length 50th (ft)	3	924	0	756	184	389	0	26
Queue Length 95th (ft)	12	1030	0	#1014	213	#577	0	45
Internal Link Dist (ft)		1998			2306	2153		237
Turn Bay Length (ft)	150		200	150				
Base Capacity (vph)	281	1523	1564	591	2771	335	1579	292
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.88	0.13	0.93	0.29	0.85	0.73	0.09

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Unsignalized Intersection Capacity Analysis
9: Lyman Rd & Flagler Rd

7/17/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	31	653	352	130	144	37
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.90	0.90	0.87	0.87
Hourly flow rate (vph)	34	710	391	144	166	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						3
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		1279				
pX, platoon unblocked						
vC, conflicting volume	536				1241	463
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	536				1241	463
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				11	93
cM capacity (veh/h)	1037				187	599

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	743	536	208
Volume Left	34	0	166
Volume Right	0	144	43
cSH	1037	1700	228
Volume to Capacity	0.03	0.32	0.91
Queue Length 95th (ft)	3	0	192
Control Delay (s)	0.8	0.0	83.9
Lane LOS	A		F
Approach Delay (s)	0.8	0.0	83.9
Approach LOS			F

Intersection Summary			
Average Delay	12.2		
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
44: Kunia Rd & Lyman Rd

3/28/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	129	259	252	154	230	98	75	420	27	63	712	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	4.0	3.0	3.0	4.0	3.0	3.0	4.0	3.0	3.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1556	1787	1881	1599	1787	3574	1599	1787	3574	1599
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1556	1787	1881	1599	1787	3574	1599	1787	3574	1599
Peak-hour factor, PHF	0.91	0.91	0.91	0.82	0.82	0.82	0.83	0.83	0.83	0.76	0.76	0.76
Adj. Flow (vph)	142	285	277	188	280	120	90	506	33	83	937	101
RTOR Reduction (vph)	0	0	70	0	0	36	0	0	18	0	0	20
Lane Group Flow (vph)	142	285	207	188	280	84	90	506	15	83	937	81
Confl. Peds. (#/hr)			3									
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4			8			6			2
Actuated Green, G (s)	17.0	28.0	28.0	20.4	31.4	31.4	12.8	42.0	42.0	12.2	41.4	41.4
Effective Green, g (s)	19.0	30.0	29.0	22.4	33.4	32.4	14.8	44.0	43.0	14.2	43.4	42.4
Actuated g/C Ratio	0.15	0.24	0.24	0.18	0.27	0.26	0.12	0.36	0.35	0.12	0.35	0.35
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	274	456	368	326	512	423	216	1283	561	207	1265	553
v/s Ratio Prot	0.08	c0.15		c0.11	0.15		c0.05	0.14		0.05	c0.26	
v/s Ratio Perm			0.13			0.05			0.01			0.05
v/c Ratio	0.52	0.62	0.56	0.58	0.55	0.20	0.42	0.39	0.03	0.40	0.74	0.15
Uniform Delay, d1	47.6	41.3	41.2	45.8	38.1	35.0	49.9	29.3	26.1	50.3	34.7	27.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	2.7	2.0	2.5	1.2	0.2	1.3	0.2	0.0	1.3	2.4	0.1
Delay (s)	49.3	44.0	43.2	48.2	39.3	35.2	51.2	29.6	26.1	51.5	37.0	27.7
Level of Service	D	D	D	D	D	D	D	C	C	D	D	C
Approach Delay (s)		44.7			41.3			32.5			37.3	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM Average Control Delay	38.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	122.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues
44: Kunia Rd & Lyman Rd

3/28/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	142	285	277	188	280	120	90	506	33	83	937	101
v/c Ratio	0.52	0.63	0.64	0.58	0.55	0.26	0.42	0.40	0.06	0.40	0.75	0.18
Control Delay	60.4	51.5	37.6	58.1	45.7	26.1	63.4	32.3	12.9	64.0	40.8	23.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.4	51.5	37.6	58.1	45.7	26.1	63.4	32.3	12.9	64.0	40.8	23.3
Queue Length 50th (ft)	105	202	132	137	190	43	67	157	3	62	341	38
Queue Length 95th (ft)	221	380	288	246	318	101	141	239	25	121	428	77
Internal Link Dist (ft)		1752			1815			882			1376	
Turn Bay Length (ft)	150		60	240		80	250		200	250		130
Base Capacity (vph)	499	1305	1101	473	1285	1095	305	2015	901	290	1985	888
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.22	0.25	0.40	0.22	0.11	0.30	0.25	0.04	0.29	0.47	0.11

Intersection Summary

HCM Signalized Intersection Capacity Analysis
16: Humphreys Rd & Lyman Rd

3/28/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	212	1	2	190	231	0	0	0	322	5	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0						5.0	5.0
Lane Util. Factor		1.00			1.00						1.00	1.00
Frpb, ped/bikes		1.00			1.00						1.00	1.00
Flpb, ped/bikes		1.00			1.00						1.00	1.00
Frt		1.00			0.93						1.00	0.85
Flt Protected		0.99			1.00						0.95	1.00
Satd. Flow (prot)		1850			1725						1793	1599
Flt Permitted		0.92			1.00						0.95	1.00
Satd. Flow (perm)		1709			1723						1793	1599
Peak-hour factor, PHF	0.75	0.75	0.75	0.92	0.92	0.92	0.92	0.92	0.92	0.85	0.85	0.85
Adj. Flow (vph)	41	283	1	2	207	251	0	0	0	379	6	21
RTOR Reduction (vph)	0	0	0	0	69	0	0	0	0	0	0	13
Lane Group Flow (vph)	0	325	0	0	391	0	0	0	0	0	385	8
Confl. Peds. (#/hr)										5		
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	1%	1%	1%
Turn Type	Perm	NA		Perm	NA					Split	NA	Perm
Protected Phases		4			8					2	2	
Permitted Phases	4			8								2
Actuated Green, G (s)		15.2			15.2						14.9	14.9
Effective Green, g (s)		15.2			15.2						14.9	14.9
Actuated g/C Ratio		0.38			0.38						0.37	0.37
Clearance Time (s)		5.0			5.0						5.0	5.0
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		648			653						666	594
v/s Ratio Prot											c0.21	
v/s Ratio Perm		0.19			c0.23							0.00
v/c Ratio		0.50			0.60						0.58	0.01
Uniform Delay, d1		9.5			10.0						10.1	8.0
Progression Factor		1.00			1.00						1.00	1.00
Incremental Delay, d2		0.6			1.5						1.2	0.0
Delay (s)		10.2			11.5						11.3	8.0
Level of Service		B			B						B	A
Approach Delay (s)		10.2			11.5			0.0			11.1	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	11.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	40.1	Sum of lost time (s)	10.0
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBT	SBT	SBR
Lane Group Flow (vph)	325	460	385	21
v/c Ratio	0.51	0.65	0.59	0.04
Control Delay	13.8	13.4	15.8	5.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	13.8	13.4	15.8	5.5
Queue Length 50th (ft)	49	53	60	0
Queue Length 95th (ft)	111	172	167	10
Internal Link Dist (ft)	2460	1199	1378	
Turn Bay Length (ft)				200
Base Capacity (vph)	1355	1387	1353	1211
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.24	0.33	0.28	0.02

Intersection Summary

HCM Unsignalized Intersection Capacity Analysis
3: Lyman Rd & Maili Rd

3/28/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	19	45	33	76	45	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.57	0.57	0.76	0.76	0.79	0.79
Hourly flow rate (vph)	33	79	43	100	57	15
Pedestrians			2			
Lane Width (ft)			12.0			
Walking Speed (ft/s)			4.0			
Percent Blockage			0			
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	143				241	93
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	143				241	93
tC, single (s)	4.2				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.3				3.6	3.4
p0 queue free %	98				92	98
cM capacity (veh/h)	1403				718	950

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	112	143	72
Volume Left	33	0	57
Volume Right	0	100	15
cSH	1403	1700	757
Volume to Capacity	0.02	0.08	0.10
Queue Length 95th (ft)	2	0	8
Control Delay (s)	2.4	0.0	10.3
Lane LOS	A		B
Approach Delay (s)	2.4	0.0	10.3
Approach LOS			B

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	20.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
41: Kunia Rd & Field Station Kunia Entrance

7/17/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	105	50	4	417	1097	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	1.00	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1787	1599	1752	1845	1876	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1787	1599	1752	1845	1876	
Peak-hour factor, PHF	0.97	0.97	0.87	0.87	0.87	0.87
Adj. Flow (vph)	108	52	5	479	1261	24
RTOR Reduction (vph)	0	46	0	0	1	0
Lane Group Flow (vph)	108	6	5	479	1284	0
Heavy Vehicles (%)	1%	1%	3%	3%	1%	1%
Turn Type	NA	Perm	Prot	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases		4				
Actuated Green, G (s)	8.7	8.7	1.2	66.9	60.7	
Effective Green, g (s)	10.7	9.7	3.2	68.9	62.7	
Actuated g/C Ratio	0.12	0.11	0.04	0.80	0.73	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	223	181	65	1485	1374	
v/s Ratio Prot	c0.06		0.00	c0.26	c0.68	
v/s Ratio Perm		0.00				
v/c Ratio	0.48	0.03	0.08	0.32	0.93	
Uniform Delay, d1	34.9	33.8	39.8	2.2	9.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.7	0.1	0.5	0.1	11.9	
Delay (s)	36.5	33.8	40.3	2.3	21.6	
Level of Service	D	C	D	A	C	
Approach Delay (s)	35.7			2.7	21.6	
Approach LOS	D			A	C	

Intersection Summary			
HCM Average Control Delay	18.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	85.6	Sum of lost time (s)	9.0
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues
41: Kunia Rd & Field Station Kunia Entrance

7/17/2014

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	108	52	5	479	1285
v/c Ratio	0.40	0.19	0.03	0.32	0.87
Control Delay	35.5	11.2	34.8	3.5	18.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	35.5	11.2	34.8	3.5	18.5
Queue Length 50th (ft)	48	0	2	54	340
Queue Length 95th (ft)	102	31	13	106	#1036
Internal Link Dist (ft)	642			1901	1685
Turn Bay Length (ft)	140		300		
Base Capacity (vph)	514	477	263	1652	1477
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.21	0.11	0.02	0.29	0.87

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
1: Kunia Rd & Foote Ave

3/24/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	441	125	217	589	630	428
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1752	1568	1752	3505	3438	1538
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1752	1568	1752	3505	3438	1538
Peak-hour factor, PHF	0.84	0.84	0.92	0.92	0.87	0.87
Adj. Flow (vph)	525	149	236	640	724	492
RTOR Reduction (vph)	0	0	0	0	0	242
Lane Group Flow (vph)	525	149	236	640	724	250
Confl. Peds. (#/hr)	1					
Heavy Vehicles (%)	3%	3%	3%	3%	5%	5%
Turn Type	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	4	1	6	2	
Permitted Phases		6				2
Actuated Green, G (s)	55.5	117.5	21.5	62.0	35.5	35.5
Effective Green, g (s)	55.5	117.5	21.5	62.0	35.5	35.5
Actuated g/C Ratio	0.44	0.92	0.17	0.49	0.28	0.28
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	763	1568	295	1704	957	428
v/s Ratio Prot	c0.30	0.04	c0.13	0.18	c0.21	
v/s Ratio Perm		0.05				0.16
v/c Ratio	0.69	0.10	0.80	0.38	0.76	0.58
Uniform Delay, d1	29.0	0.4	50.9	20.6	42.0	39.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.0	0.0	14.3	0.1	3.5	2.0
Delay (s)	34.0	0.5	65.3	20.7	45.5	41.7
Level of Service	C	A	E	C	D	D
Approach Delay (s)	26.6			32.7	44.0	
Approach LOS	C			C	D	

Intersection Summary			
HCM Average Control Delay	36.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	127.5	Sum of lost time (s)	15.0
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: Kunia Rd & Foote Ave

3/24/2014

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	525	149	236	640	724	492
v/c Ratio	0.69	0.10	0.80	0.38	0.76	0.74
Control Delay	37.2	0.1	71.8	20.8	48.1	20.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.2	0.1	71.8	20.8	48.1	20.1
Queue Length 50th (ft)	358	0	191	168	290	119
Queue Length 95th (ft)	502	0	300	211	361	238
Internal Link Dist (ft)	1099			1376	2153	
Turn Bay Length (ft)			150			150
Base Capacity (vph)	762	1568	374	2080	1170	744
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.10	0.63	0.31	0.62	0.66

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Kunia Rd & Foote Ave

3/25/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	441	125	217	592	634	428
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1752	1568	1752	3505	3438	1538
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1752	1568	1752	3505	3438	1538
Peak-hour factor, PHF	0.84	0.84	0.92	0.92	0.87	0.87
Adj. Flow (vph)	525	149	236	643	729	492
RTOR Reduction (vph)	0	0	0	0	0	240
Lane Group Flow (vph)	525	149	236	643	729	252
Confl. Peds. (#/hr)	1					
Heavy Vehicles (%)	3%	3%	3%	3%	5%	5%
Turn Type	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	4	1	6	2	
Permitted Phases		6				2
Actuated Green, G (s)	55.5	117.9	21.6	62.4	35.8	35.8
Effective Green, g (s)	55.5	117.9	21.6	62.4	35.8	35.8
Actuated g/C Ratio	0.43	0.92	0.17	0.49	0.28	0.28
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	760	1568	296	1710	962	430
v/s Ratio Prot	c0.30	0.04	c0.13	0.18	c0.21	
v/s Ratio Perm		0.05				0.16
v/c Ratio	0.69	0.10	0.80	0.38	0.76	0.59
Uniform Delay, d1	29.3	0.4	51.0	20.5	42.1	39.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.1	0.0	13.8	0.1	3.5	2.0
Delay (s)	34.4	0.5	64.9	20.7	45.5	41.7
Level of Service	C	A	E	C	D	D
Approach Delay (s)	26.9			32.5	44.0	
Approach LOS	C			C	D	

Intersection Summary			
HCM Average Control Delay	36.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	127.9	Sum of lost time (s)	15.0
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: Kunia Rd & Foote Ave

3/25/2014

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	525	149	236	643	729	492
v/c Ratio	0.69	0.10	0.80	0.38	0.76	0.73
Control Delay	37.5	0.1	72.0	20.7	48.0	20.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.5	0.1	72.0	20.7	48.0	20.2
Queue Length 50th (ft)	359	0	192	170	293	120
Queue Length 95th (ft)	502	0	300	212	363	240
Internal Link Dist (ft)	1099			1376	2153	
Turn Bay Length (ft)			150			150
Base Capacity (vph)	759	1568	373	2072	1165	741
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.10	0.63	0.31	0.63	0.66

Intersection Summary

HCM Signalized Intersection Capacity Analysis
30: Kunia Rd/Driveway & SR 99

3/25/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	733	211	841	833	0	259	4	770	15	10	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	2.0	3.0	3.0			3.0	3.0		3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00			1.00	0.99		1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.97	
Satd. Flow (prot)	1736	3471	1533	1719	3438			1725	1517		1766	
Flt Permitted	0.32	1.00	1.00	0.95	1.00			0.69	1.00		0.48	
Satd. Flow (perm)	586	3471	1533	1719	3438			1250	1517		871	
Peak-hour factor, PHF	0.88	0.88	0.88	0.94	0.94	0.94	0.83	0.83	0.83	0.55	0.55	0.55
Adj. Flow (vph)	1	833	240	895	886	0	312	5	928	27	18	2
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	1	833	240	895	886	0	0	317	928	0	46	0
Confl. Peds. (#/hr)			2			3			5	5		
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%	5%	5%	5%	4%	4%	4%
Turn Type	Perm	NA	Free	Prot	NA		Perm	NA	Free	Perm	NA	
Protected Phases		6		5	2			8			4	
Permitted Phases	6		Free				8		Free	4		
Actuated Green, G (s)	47.0	47.0	210.0	101.0	153.0			47.0	210.0		47.0	
Effective Green, g (s)	49.0	49.0	210.0	103.0	155.0			49.0	210.0		49.0	
Actuated g/C Ratio	0.23	0.23	1.00	0.49	0.74			0.23	1.00		0.23	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	137	810	1533	843	2538			292	1517		203	
v/s Ratio Prot		c0.24		c0.52	0.26							
v/s Ratio Perm	0.00		0.16					c0.25	0.61		0.05	
v/c Ratio	0.01	1.03	0.16	1.06	0.35			1.09	0.61		0.23	
Uniform Delay, d1	61.8	80.5	0.0	53.5	9.7			80.5	0.0		65.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.0	39.1	0.2	48.7	0.1			77.4	1.8		0.6	
Delay (s)	61.8	119.6	0.2	102.2	9.8			157.9	1.8		65.8	
Level of Service	E	F	A	F	A			F	A		E	
Approach Delay (s)		92.9			56.2			41.6			65.8	
Approach LOS		F			E			D			E	

Intersection Summary			
HCM Average Control Delay	61.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	210.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	98.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Queues
30: Kunia Rd/Driveway & SR 99

3/25/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	1	833	240	895	886	317	928	47
v/c Ratio	0.01	1.03	0.16	1.06	0.35	1.09	0.61	0.23
Control Delay	62.0	115.2	0.2	98.6	10.1	148.2	1.8	67.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.0	115.2	0.2	98.6	10.1	148.2	1.8	67.5
Queue Length 50th (ft)	1	~644	0	~1355	213	~490	0	52
Queue Length 95th (ft)	8	#754	0	#1624	245	#624	0	58
Internal Link Dist (ft)		1998			2306	2153		237
Turn Bay Length (ft)	150		200	150				
Base Capacity (vph)	137	810	1533	843	2538	292	1517	204
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	1.03	0.16	1.06	0.35	1.09	0.61	0.23

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
30: Kunia Rd/Driveway & SR 99

3/24/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	733	210	838	833	0	258	4	768	15	10	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	2.0	3.0	3.0			3.0	3.0		3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00			1.00	0.99		1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.97	
Satd. Flow (prot)	1736	3471	1533	1719	3438			1725	1517		1766	
Flt Permitted	0.32	1.00	1.00	0.95	1.00			0.69	1.00		0.48	
Satd. Flow (perm)	586	3471	1533	1719	3438			1250	1517		874	
Peak-hour factor, PHF	0.88	0.88	0.88	0.94	0.94	0.94	0.83	0.83	0.83	0.55	0.55	0.55
Adj. Flow (vph)	1	833	239	891	886	0	311	5	925	27	18	2
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	1	833	239	891	886	0	0	316	925	0	46	0
Confl. Peds. (#/hr)			2			3			5	5		
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%	5%	5%	5%	4%	4%	4%
Turn Type	Perm	NA	Free	Prot	NA		Perm	NA	Free	Perm	NA	
Protected Phases		6		5	2			8			4	
Permitted Phases	6		Free				8		Free	4		
Actuated Green, G (s)	47.0	47.0	210.0	101.0	153.0			47.0	210.0		47.0	
Effective Green, g (s)	49.0	49.0	210.0	103.0	155.0			49.0	210.0		49.0	
Actuated g/C Ratio	0.23	0.23	1.00	0.49	0.74			0.23	1.00		0.23	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	137	810	1533	843	2538			292	1517		204	
v/s Ratio Prot		c0.24		c0.52	0.26							
v/s Ratio Perm	0.00		0.16					c0.25	0.61		0.05	
v/c Ratio	0.01	1.03	0.16	1.06	0.35			1.08	0.61		0.23	
Uniform Delay, d1	61.8	80.5	0.0	53.5	9.7			80.5	0.0		65.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.0	39.1	0.2	47.2	0.1			76.3	1.8		0.6	
Delay (s)	61.8	119.6	0.2	100.7	9.8			156.8	1.8		65.7	
Level of Service	E	F	A	F	A			F	A		E	
Approach Delay (s)		92.9			55.3			41.3			65.7	
Approach LOS		F			E			D			E	

Intersection Summary			
HCM Average Control Delay	61.0	HCM Level of Service	E
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	210.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	97.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Queues
30: Kunia Rd/Driveway & SR 99

3/24/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	1	833	239	891	886	316	925	47
v/c Ratio	0.01	1.03	0.16	1.06	0.35	1.08	0.61	0.23
Control Delay	62.0	115.2	0.2	97.2	10.1	147.4	1.8	67.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.0	115.2	0.2	97.2	10.1	147.4	1.8	67.5
Queue Length 50th (ft)	1	~644	0	~1343	213	~487	0	52
Queue Length 95th (ft)	8	#754	0	#1612	245	#622	0	58
Internal Link Dist (ft)		1998			2306	2153		237
Turn Bay Length (ft)	150		200	150				
Base Capacity (vph)	137	810	1533	843	2538	292	1517	204
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	1.03	0.16	1.06	0.35	1.08	0.61	0.23

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	39	437	760	217	126	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1612	1696	1722		1770	1583
Flt Permitted	0.08	1.00	1.00		0.95	1.00
Satd. Flow (perm)	138	1696	1722		1770	1583
Peak-hour factor, PHF	0.84	0.84	0.89	0.89	0.86	0.86
Adj. Flow (vph)	46	520	854	244	147	36
RTOR Reduction (vph)	0	0	7	0	0	28
Lane Group Flow (vph)	46	520	1091	0	147	8
Heavy Vehicles (%)	12%	12%	7%	7%	2%	2%
Turn Type	pm+pt	NA	NA		NA	Perm
Protected Phases	7	4	8		2	
Permitted Phases	4					2
Actuated Green, G (s)	86.2	86.2	74.6		14.2	14.2
Effective Green, g (s)	86.2	86.2	74.6		14.2	14.2
Actuated g/C Ratio	0.78	0.78	0.68		0.13	0.13
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	196	1324	1164		228	204
v/s Ratio Prot	0.01	c0.31	c0.63		c0.08	
v/s Ratio Perm	0.17					0.01
v/c Ratio	0.23	0.39	0.94		0.64	0.04
Uniform Delay, d1	18.5	3.8	15.8		45.7	42.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.6	0.2	13.8		6.1	0.1
Delay (s)	19.1	4.0	29.6		51.8	42.2
Level of Service	B	A	C		D	D
Approach Delay (s)		5.2	29.6		49.9	
Approach LOS		A	C		D	

Intersection Summary			
HCM Average Control Delay	24.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	110.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues
9: Lyman Rd & Flagler Rd

7/17/2014

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	46	520	1098	147	36
v/c Ratio	0.22	0.39	0.93	0.64	0.15
Control Delay	5.7	5.3	32.2	59.0	17.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	5.7	5.3	32.2	59.0	17.8
Queue Length 50th (ft)	6	96	646	101	3
Queue Length 95th (ft)	16	162	#1128	163	30
Internal Link Dist (ft)		1199	1752	1564	
Turn Bay Length (ft)	100				65
Base Capacity (vph)	243	1392	1182	343	332
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.19	0.37	0.93	0.43	0.11

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
44: Kunia Rd & Lyman Rd

3/24/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	96	392	117	37	493	80	267	630	87	161	374	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	4.0	3.0	3.0	4.0	3.0	3.0	4.0	3.0	3.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.86	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1736	1827	1337	1787	1881	1599	1736	3471	1553	1703	3406	1524
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1736	1827	1337	1787	1881	1599	1736	3471	1553	1703	3406	1524
Peak-hour factor, PHF	0.64	0.64	0.64	0.84	0.84	0.84	0.76	0.76	0.76	0.91	0.91	0.91
Adj. Flow (vph)	150	612	183	44	587	95	351	829	114	177	411	242
RTOR Reduction (vph)	0	0	17	0	0	12	0	0	41	0	0	118
Lane Group Flow (vph)	150	612	166	44	587	83	351	829	73	177	411	124
Confl. Peds. (#/hr)			52									
Heavy Vehicles (%)	4%	4%	4%	1%	1%	1%	4%	4%	4%	6%	6%	6%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4			8			6			2
Actuated Green, G (s)	19.8	75.2	75.2	7.1	62.5	62.5	41.1	48.9	48.9	23.0	30.8	30.8
Effective Green, g (s)	21.8	77.2	76.2	9.1	64.5	63.5	43.1	50.9	49.9	25.0	32.8	31.8
Actuated g/C Ratio	0.13	0.44	0.44	0.05	0.37	0.36	0.25	0.29	0.29	0.14	0.19	0.18
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	217	810	585	93	696	583	430	1014	445	244	641	278
v/s Ratio Prot	c0.09	0.33		0.02	c0.31		c0.20	c0.24		0.10	0.12	
v/s Ratio Perm			0.12			0.05			0.05			0.08
v/c Ratio	0.69	0.76	0.28	0.47	0.84	0.14	0.82	0.82	0.16	0.73	0.64	0.45
Uniform Delay, d1	73.0	40.6	31.5	80.2	50.2	37.1	61.8	57.3	46.5	71.3	65.3	63.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.1	4.0	0.3	3.8	9.2	0.1	11.4	5.2	0.2	10.2	2.2	1.1
Delay (s)	82.1	44.6	31.7	84.0	59.4	37.2	73.2	62.5	46.7	81.5	67.5	64.5
Level of Service	F	D	C	F	E	D	E	E	D	F	E	E
Approach Delay (s)		48.1			58.0			64.0			69.6	
Approach LOS		D			E			E			E	

Intersection Summary			
HCM Average Control Delay	60.1	HCM Level of Service	E
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	174.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues
44: Kunia Rd & Lyman Rd

3/24/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	150	612	183	44	587	95	351	829	114	177	411	242
v/c Ratio	0.68	0.75	0.31	0.39	0.86	0.16	0.81	0.81	0.23	0.72	0.64	0.61
Control Delay	95.1	49.8	30.1	99.3	66.6	33.3	80.0	66.3	28.3	93.0	73.6	36.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	95.1	49.8	30.1	99.3	66.6	33.3	80.0	66.3	28.3	93.0	73.6	36.3
Queue Length 50th (ft)	175	631	121	52	655	62	402	491	51	206	242	108
Queue Length 95th (ft)	201	525	128	104	820	109	477	521	90	339	352	241
Internal Link Dist (ft)		1752			1465			949			1376	
Turn Bay Length (ft)	150		60	240		80	250		200	250		130
Base Capacity (vph)	273	1039	743	130	910	774	578	1302	609	309	765	446
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.59	0.25	0.34	0.65	0.12	0.61	0.64	0.19	0.57	0.54	0.54

Intersection Summary

HCM Signalized Intersection Capacity Analysis
16: Humphreys Rd & Lyman Rd

3/25/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	277	4	11	546	189	0	0	0	247	22	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0						5.0	5.0
Lane Util. Factor		1.00			1.00						1.00	1.00
Frt		1.00			0.97						1.00	0.85
Flt Protected		1.00			1.00						0.96	1.00
Satd. Flow (prot)		1782			1730						1781	1583
Flt Permitted		0.91			0.99						0.96	1.00
Satd. Flow (perm)		1625			1720						1781	1583
Peak-hour factor, PHF	0.83	0.83	0.83	0.85	0.85	0.85	0.92	0.92	0.92	0.72	0.72	0.72
Adj. Flow (vph)	30	334	5	13	642	222	0	0	0	343	31	44
RTOR Reduction (vph)	0	1	0	0	17	0	0	0	0	0	0	32
Lane Group Flow (vph)	0	368	0	0	860	0	0	0	0	0	374	12
Heavy Vehicles (%)	6%	6%	6%	6%	6%	6%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA					Split	NA	Perm
Protected Phases		4			8					2	2	
Permitted Phases	4			8								2
Actuated Green, G (s)		34.5			34.5						17.4	17.4
Effective Green, g (s)		34.5			34.5						17.4	17.4
Actuated g/C Ratio		0.56			0.56						0.28	0.28
Clearance Time (s)		5.0			5.0						5.0	5.0
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		906			959						501	445
v/s Ratio Prot											c0.21	
v/s Ratio Perm		0.23			c0.50							0.01
v/c Ratio		0.41			0.90						0.75	0.03
Uniform Delay, d1		7.8			12.1						20.2	16.1
Progression Factor		1.00			1.00						1.00	1.00
Incremental Delay, d2		0.3			10.9						6.0	0.0
Delay (s)		8.1			23.0						26.2	16.1
Level of Service		A			C						C	B
Approach Delay (s)		8.1			23.0			0.0			25.2	
Approach LOS		A			C			A			C	

Intersection Summary			
HCM Average Control Delay	20.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	61.9	Sum of lost time (s)	10.0
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBT	SBT	SBR
Lane Group Flow (vph)	369	877	374	44
v/c Ratio	0.41	0.90	0.75	0.09
Control Delay	10.0	27.3	32.4	6.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.0	27.3	32.4	6.9
Queue Length 50th (ft)	77	275	141	0
Queue Length 95th (ft)	123	#502	171	14
Internal Link Dist (ft)	2460	1199	1412	
Turn Bay Length (ft)				200
Base Capacity (vph)	1053	1129	622	581
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.35	0.78	0.60	0.08

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Unsignalized Intersection Capacity Analysis
3: Lyman Rd & Maili Rd

3/25/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	4	49	280	25	183	29
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.79	0.79	0.88	0.88	0.78	0.78
Hourly flow rate (vph)	5	62	318	28	235	37
Pedestrians			1		1	
Lane Width (ft)			12.0		12.0	
Walking Speed (ft/s)			4.0		4.0	
Percent Blockage			0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	348				407	333
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	348				407	333
tC, single (s)	4.3				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.4				3.5	3.3
p0 queue free %	100				61	95
cM capacity (veh/h)	1103				599	710

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	67	347	272
Volume Left	5	0	235
Volume Right	0	28	37
cSH	1103	1700	612
Volume to Capacity	0.00	0.20	0.44
Queue Length 95th (ft)	0	0	57
Control Delay (s)	0.7	0.0	15.5
Lane LOS	A		C
Approach Delay (s)	0.7	0.0	15.5
Approach LOS			C

Intersection Summary			
Average Delay	6.2		
Intersection Capacity Utilization	34.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	35	11	30	949	441	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1583	1417	1736	1827	1769	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1583	1417	1736	1827	1769	
Peak-hour factor, PHF	0.51	0.51	0.89	0.89	0.92	0.92
Adj. Flow (vph)	69	22	34	1066	479	95
RTOR Reduction (vph)	0	19	0	0	5	0
Lane Group Flow (vph)	69	3	34	1066	569	0
Heavy Vehicles (%)	14%	14%	4%	4%	5%	5%
Turn Type	NA	Perm	Prot	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases		4				
Actuated Green, G (s)	7.0	7.0	2.8	52.6	44.8	
Effective Green, g (s)	9.0	8.0	4.8	54.6	46.8	
Actuated g/C Ratio	0.13	0.11	0.07	0.78	0.67	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	205	163	120	1433	1190	
v/s Ratio Prot	c0.04		0.02	c0.58	0.32	
v/s Ratio Perm		0.00				
v/c Ratio	0.34	0.02	0.28	0.74	0.48	
Uniform Delay, d1	27.6	27.3	30.8	3.9	5.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.0	0.0	1.3	2.1	0.3	
Delay (s)	28.6	27.3	32.1	6.0	5.8	
Level of Service	C	C	C	A	A	
Approach Delay (s)	28.3			6.8	5.8	
Approach LOS	C			A	A	

Intersection Summary			
HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	69.6	Sum of lost time (s)	6.0
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Queues
41: Kunia Rd & Field Station Kunia Entrance

7/17/2014

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	69	22	34	1066	574
v/c Ratio	0.25	0.09	0.13	0.73	0.44
Control Delay	31.3	14.7	32.1	8.7	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	31.3	14.7	32.1	8.7	7.9
Queue Length 50th (ft)	26	0	13	189	60
Queue Length 95th (ft)	41	7	46	410	252
Internal Link Dist (ft)	642			1901	1624
Turn Bay Length (ft)	140		300		
Base Capacity (vph)	620	544	355	1744	1460
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.11	0.04	0.10	0.61	0.39

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Kunia Rd & Foote Ave

3/25/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	441	125	217	589	679	428
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1752	1568	1752	3505	3438	1538
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1752	1568	1752	3505	3438	1538
Peak-hour factor, PHF	0.84	0.84	0.92	0.92	0.87	0.87
Adj. Flow (vph)	525	149	236	640	780	492
RTOR Reduction (vph)	0	0	0	0	0	223
Lane Group Flow (vph)	525	149	236	640	780	269
Confl. Peds. (#/hr)	1					
Heavy Vehicles (%)	3%	3%	3%	3%	5%	5%
Turn Type	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	4	1	6	2	
Permitted Phases		6				2
Actuated Green, G (s)	54.5	118.5	21.6	64.0	37.4	37.4
Effective Green, g (s)	54.5	118.5	21.6	64.0	37.4	37.4
Actuated g/C Ratio	0.42	0.92	0.17	0.50	0.29	0.29
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	743	1568	294	1746	1001	448
v/s Ratio Prot	c0.30	0.04	c0.13	0.18	c0.23	
v/s Ratio Perm		0.05				0.18
v/c Ratio	0.71	0.10	0.80	0.37	0.78	0.60
Uniform Delay, d1	30.4	0.4	51.4	19.8	41.8	39.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.6	0.0	14.6	0.1	3.9	2.3
Delay (s)	36.0	0.5	66.0	19.9	45.7	41.4
Level of Service	D	A	E	B	D	D
Approach Delay (s)	28.2			32.3	44.0	
Approach LOS	C			C	D	

Intersection Summary			
HCM Average Control Delay	36.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	128.5	Sum of lost time (s)	15.0
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: Kunia Rd & Foote Ave

3/25/2014

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	525	149	236	640	780	492
v/c Ratio	0.71	0.10	0.80	0.37	0.78	0.74
Control Delay	39.2	0.1	72.4	20.0	48.2	21.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.2	0.1	72.4	20.0	48.2	21.5
Queue Length 50th (ft)	371	0	194	165	316	137
Queue Length 95th (ft)	509	0	300	207	390	258
Internal Link Dist (ft)	1099			1376	2153	
Turn Bay Length (ft)			150			150
Base Capacity (vph)	742	1568	371	2090	1187	736
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.10	0.64	0.31	0.66	0.67

Intersection Summary

HCM Signalized Intersection Capacity Analysis
30: Kunia Rd/Driveway & SR 99

3/25/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	733	220	877	833	0	258	4	768	15	10	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	2.0	3.0	3.0			3.0	3.0		3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00			1.00	0.99		1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.97	
Satd. Flow (prot)	1736	3471	1533	1719	3438			1725	1517		1766	
Flt Permitted	0.32	1.00	1.00	0.95	1.00			0.69	1.00		0.45	
Satd. Flow (perm)	586	3471	1533	1719	3438			1248	1517		826	
Peak-hour factor, PHF	0.88	0.88	0.88	0.94	0.94	0.94	0.83	0.83	0.83	0.55	0.55	0.55
Adj. Flow (vph)	1	833	250	933	886	0	311	5	925	27	18	2
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	1	833	250	933	886	0	0	316	925	0	46	0
Confl. Peds. (#/hr)			2			3			5	5		
Heavy Vehicles (%)	4%	4%	4%	5%	5%	5%	5%	5%	5%	4%	4%	4%
Turn Type	Perm	NA	Free	Prot	NA		Perm	NA	Free	Perm	NA	
Protected Phases		6		5	2			8			4	
Permitted Phases	6		Free				8		Free	4		
Actuated Green, G (s)	47.0	47.0	210.0	103.0	155.0			45.0	210.0		45.0	
Effective Green, g (s)	49.0	49.0	210.0	105.0	157.0			47.0	210.0		47.0	
Actuated g/C Ratio	0.23	0.23	1.00	0.50	0.75			0.22	1.00		0.22	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	137	810	1533	860	2570			279	1517		185	
v/s Ratio Prot		c0.24		c0.54	0.26							
v/s Ratio Perm	0.00		0.16					c0.25	0.61		0.06	
v/c Ratio	0.01	1.03	0.16	1.08	0.34			1.13	0.61		0.25	
Uniform Delay, d1	61.8	80.5	0.0	52.5	9.0			81.5	0.0		67.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.0	39.1	0.2	56.3	0.1			94.5	1.8		0.7	
Delay (s)	61.8	119.6	0.2	108.8	9.1			176.0	1.8		67.7	
Level of Service	E	F	A	F	A			F	A		E	
Approach Delay (s)		92.0			60.3			46.2			67.7	
Approach LOS		F			E			D			E	

Intersection Summary			
HCM Average Control Delay	64.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	210.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	100.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Queues
30: Kunia Rd/Driveway & SR 99

3/25/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	1	833	250	933	886	316	925	47
v/c Ratio	0.01	1.03	0.16	1.08	0.34	1.13	0.61	0.25
Control Delay	62.0	115.2	0.2	104.7	9.4	161.7	1.8	70.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.0	115.2	0.2	104.7	9.4	161.7	1.8	70.0
Queue Length 50th (ft)	1	~644	0	~1440	205	~504	0	53
Queue Length 95th (ft)	8	#754	0	#1709	235	#639	0	59
Internal Link Dist (ft)		1998			2306	2153		237
Turn Bay Length (ft)	150		200	150				
Base Capacity (vph)	137	810	1533	860	2570	280	1517	185
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	1.03	0.16	1.08	0.34	1.13	0.61	0.25

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
44: Kunia Rd & Lyman Rd

3/25/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	96	392	117	37	493	80	267	630	87	161	423	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	4.0	3.0	3.0	4.0	3.0	3.0	4.0	3.0	3.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.86	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1736	1827	1337	1787	1881	1599	1736	3471	1553	1703	3406	1524
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1736	1827	1337	1787	1881	1599	1736	3471	1553	1703	3406	1524
Peak-hour factor, PHF	0.64	0.64	0.64	0.84	0.84	0.84	0.76	0.76	0.76	0.91	0.91	0.91
Adj. Flow (vph)	150	612	183	44	587	95	351	829	114	177	465	242
RTOR Reduction (vph)	0	0	17	0	0	12	0	0	41	0	0	104
Lane Group Flow (vph)	150	612	166	44	587	83	351	829	73	177	465	138
Confl. Peds. (#/hr)			52									
Heavy Vehicles (%)	4%	4%	4%	1%	1%	1%	4%	4%	4%	6%	6%	6%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4			8			6			2
Actuated Green, G (s)	19.8	75.2	75.2	7.1	62.5	62.5	41.0	49.0	49.0	23.0	31.0	31.0
Effective Green, g (s)	21.8	77.2	76.2	9.1	64.5	63.5	43.0	51.0	50.0	25.0	33.0	32.0
Actuated g/C Ratio	0.13	0.44	0.44	0.05	0.37	0.36	0.25	0.29	0.29	0.14	0.19	0.18
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	217	809	585	93	696	583	428	1016	445	244	645	280
v/s Ratio Prot	c0.09	0.33		0.02	c0.31		c0.20	c0.24		0.10	0.14	
v/s Ratio Perm			0.12			0.05			0.05			0.09
v/c Ratio	0.69	0.76	0.28	0.47	0.84	0.14	0.82	0.82	0.16	0.73	0.72	0.49
Uniform Delay, d1	73.0	40.7	31.5	80.3	50.3	37.1	62.0	57.3	46.5	71.4	66.3	63.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.1	4.1	0.3	3.8	9.2	0.1	11.9	5.1	0.2	10.2	4.0	1.4
Delay (s)	82.2	44.7	31.8	84.0	59.4	37.3	73.9	62.4	46.7	81.6	70.3	65.3
Level of Service	F	D	C	F	E	D	E	E	D	F	E	E
Approach Delay (s)		48.2			58.0			64.2			71.2	
Approach LOS		D			E			E			E	

Intersection Summary			
HCM Average Control Delay	60.7	HCM Level of Service	E
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	174.3	Sum of lost time (s)	9.0
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues
44: Kunia Rd & Lyman Rd

3/25/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	150	612	183	44	587	95	351	829	114	177	465	242
v/c Ratio	0.69	0.75	0.31	0.39	0.86	0.16	0.81	0.81	0.23	0.72	0.72	0.63
Control Delay	95.2	49.9	30.2	99.4	66.7	33.3	80.4	66.2	28.3	93.2	76.4	41.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	95.2	49.9	30.2	99.4	66.7	33.3	80.4	66.2	28.3	93.2	76.4	41.5
Queue Length 50th (ft)	175	631	121	52	655	62	402	491	51	206	278	129
Queue Length 95th (ft)	201	525	128	104	820	109	480	521	90	339	398	265
Internal Link Dist (ft)		1752			1465			949			1376	
Turn Bay Length (ft)	150		60	240		80	250		200	250		130
Base Capacity (vph)	273	1038	743	130	910	774	567	1302	609	309	783	440
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.59	0.25	0.34	0.65	0.12	0.62	0.64	0.19	0.57	0.59	0.55

Intersection Summary

HCM Signalized Intersection Capacity Analysis
41: Kunia Rd & Field Station Kunia Entrance

7/17/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	35	11	30	949	490	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1583	1417	1736	1827	1773	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1583	1417	1736	1827	1773	
Peak-hour factor, PHF	0.51	0.51	0.89	0.89	0.92	0.92
Adj. Flow (vph)	69	22	34	1066	533	95
RTOR Reduction (vph)	0	19	0	0	5	0
Lane Group Flow (vph)	69	3	34	1066	623	0
Heavy Vehicles (%)	14%	14%	4%	4%	5%	5%
Turn Type	NA	Perm	Prot	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases		4				
Actuated Green, G (s)	7.0	7.0	2.8	52.6	44.8	
Effective Green, g (s)	9.0	8.0	4.8	54.6	46.8	
Actuated g/C Ratio	0.13	0.11	0.07	0.78	0.67	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	205	163	120	1433	1192	
v/s Ratio Prot	c0.04		0.02	c0.58	0.35	
v/s Ratio Perm		0.00				
v/c Ratio	0.34	0.02	0.28	0.74	0.52	
Uniform Delay, d1	27.6	27.3	30.8	3.9	5.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.0	0.0	1.3	2.1	0.4	
Delay (s)	28.6	27.3	32.1	6.0	6.2	
Level of Service	C	C	C	A	A	
Approach Delay (s)	28.3			6.8	6.2	
Approach LOS	C			A	A	

Intersection Summary			
HCM Average Control Delay	7.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	69.6	Sum of lost time (s)	6.0
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	69	22	34	1066	628
v/c Ratio	0.25	0.09	0.13	0.73	0.48
Control Delay	31.3	14.7	32.1	8.7	8.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	31.3	14.7	32.1	8.7	8.5
Queue Length 50th (ft)	26	0	13	189	69
Queue Length 95th (ft)	41	7	46	410	289
Internal Link Dist (ft)	642			1901	1624
Turn Bay Length (ft)	140		300		
Base Capacity (vph)	620	544	355	1744	1462
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.11	0.04	0.10	0.61	0.43

Intersection Summary

HCM Unsignalized Intersection Capacity Analysis
5: Kunia Rd & Temp Access

3/24/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	5	5	49	979	452	49
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	0.77	0.77	0.91	0.91
Hourly flow rate (vph)	5	5	64	1271	497	54
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1922	524	551			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1922	524	551			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	93	99	94			
cM capacity (veh/h)	70	557	1019			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	10	1335	551
Volume Left	5	64	0
Volume Right	5	0	54
cSH	124	1019	1700
Volume to Capacity	0.08	0.06	0.32
Queue Length 95th (ft)	6	5	0
Control Delay (s)	36.5	2.5	0.0
Lane LOS	E	A	
Approach Delay (s)	36.5	2.5	0.0
Approach LOS	E		

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	103.3%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	39	441	766	217	126	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1612	1696	1723		1770	1583
Flt Permitted	0.08	1.00	1.00		0.95	1.00
Satd. Flow (perm)	132	1696	1723		1770	1583
Peak-hour factor, PHF	0.84	0.84	0.89	0.89	0.86	0.86
Adj. Flow (vph)	46	525	861	244	147	36
RTOR Reduction (vph)	0	0	7	0	0	28
Lane Group Flow (vph)	46	525	1098	0	147	8
Heavy Vehicles (%)	12%	12%	7%	7%	2%	2%
Turn Type	pm+pt	NA	NA		NA	Perm
Protected Phases	7	4	8		2	
Permitted Phases	4					2
Actuated Green, G (s)	86.2	86.2	74.6		14.2	14.2
Effective Green, g (s)	86.2	86.2	74.6		14.2	14.2
Actuated g/C Ratio	0.78	0.78	0.68		0.13	0.13
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	192	1324	1164		228	204
v/s Ratio Prot	0.01	c0.31	c0.64		c0.08	
v/s Ratio Perm	0.17					0.01
v/c Ratio	0.24	0.40	0.94		0.64	0.04
Uniform Delay, d1	19.0	3.8	16.0		45.7	42.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.6	0.2	14.7		6.1	0.1
Delay (s)	19.7	4.0	30.7		51.8	42.2
Level of Service	B	A	C		D	D
Approach Delay (s)		5.3	30.7		49.9	
Approach LOS		A	C		D	

Intersection Summary			
HCM Average Control Delay	24.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	110.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	46	525	1105	147	36
v/c Ratio	0.22	0.40	0.93	0.64	0.15
Control Delay	5.8	5.3	33.1	59.0	17.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	5.8	5.3	33.1	59.0	17.8
Queue Length 50th (ft)	6	97	658	101	3
Queue Length 95th (ft)	16	164	#1140	163	30
Internal Link Dist (ft)		1199	1752	1564	
Turn Bay Length (ft)	100				65
Base Capacity (vph)	239	1392	1182	343	332
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.19	0.38	0.93	0.43	0.11

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
44: Kunia Rd & Lyman Rd

3/28/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	99	392	118	37	493	80	269	630	87	161	374	224
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	4.0	3.0	3.0	4.0	3.0	3.0	4.0	3.0	3.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.86	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1736	1827	1336	1787	1881	1599	1736	3471	1553	1703	3406	1524
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1736	1827	1336	1787	1881	1599	1736	3471	1553	1703	3406	1524
Peak-hour factor, PHF	0.64	0.64	0.64	0.84	0.84	0.84	0.76	0.76	0.76	0.91	0.91	0.91
Adj. Flow (vph)	155	612	184	44	587	95	354	829	114	177	411	246
RTOR Reduction (vph)	0	0	17	0	0	12	0	0	41	0	0	120
Lane Group Flow (vph)	155	612	167	44	587	83	354	829	73	177	411	126
Confl. Peds. (#/hr)			52									
Heavy Vehicles (%)	4%	4%	4%	1%	1%	1%	4%	4%	4%	6%	6%	6%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4			8			6			2
Actuated Green, G (s)	20.2	75.8	75.8	7.1	62.7	62.7	41.4	49.1	49.1	23.0	30.7	30.7
Effective Green, g (s)	22.2	77.8	76.8	9.1	64.7	63.7	43.4	51.1	50.1	25.0	32.7	31.7
Actuated g/C Ratio	0.13	0.44	0.44	0.05	0.37	0.36	0.25	0.29	0.29	0.14	0.19	0.18
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	220	812	586	93	695	582	431	1014	445	243	636	276
v/s Ratio Prot	c0.09	0.33		0.02	c0.31		c0.20	c0.24		0.10	0.12	
v/s Ratio Perm			0.12			0.05			0.05			0.08
v/c Ratio	0.70	0.75	0.28	0.47	0.84	0.14	0.82	0.82	0.16	0.73	0.65	0.46
Uniform Delay, d1	73.3	40.6	31.5	80.6	50.5	37.3	62.1	57.6	46.8	71.8	65.8	64.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.8	4.0	0.3	3.8	9.2	0.1	11.9	5.2	0.2	10.4	2.3	1.2
Delay (s)	83.1	44.6	31.7	84.4	59.8	37.4	74.0	62.8	47.0	82.2	68.1	65.2
Level of Service	F	D	C	F	E	D	E	E	D	F	E	E
Approach Delay (s)		48.4			58.4			64.5			70.2	
Approach LOS		D			E			E			E	

Intersection Summary			
HCM Average Control Delay	60.5	HCM Level of Service	E
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	175.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues
44: Kunia Rd & Lyman Rd

3/28/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	155	612	184	44	587	95	354	829	114	177	411	246
v/c Ratio	0.70	0.75	0.31	0.39	0.86	0.16	0.82	0.81	0.23	0.72	0.64	0.62
Control Delay	95.4	49.6	30.1	99.7	67.0	33.4	80.6	66.6	28.4	93.6	74.2	36.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	95.4	49.6	30.1	99.7	67.0	33.4	80.6	66.6	28.4	93.6	74.2	36.8
Queue Length 50th (ft)	182	633	122	52	661	62	409	496	52	207	244	112
Queue Length 95th (ft)	209	525	129	104	820	109	480	521	90	339	352	246
Internal Link Dist (ft)		1752			1465			949			1376	
Turn Bay Length (ft)	150		60	240		80	250		200	250		130
Base Capacity (vph)	272	1033	739	129	905	770	575	1295	606	307	760	445
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.59	0.25	0.34	0.65	0.12	0.62	0.64	0.19	0.58	0.54	0.55

Intersection Summary

HCM Signalized Intersection Capacity Analysis
16: Humphreys Rd & Lyman Rd

3/21/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	281	4	11	552	189	0	0	0	247	22	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0						5.0	5.0
Lane Util. Factor		1.00			1.00						1.00	1.00
Frt		1.00			0.97						1.00	0.85
Flt Protected		1.00			1.00						0.96	1.00
Satd. Flow (prot)		1782			1730						1781	1583
Flt Permitted		0.91			0.99						0.96	1.00
Satd. Flow (perm)		1626			1721						1781	1583
Peak-hour factor, PHF	0.83	0.83	0.83	0.85	0.85	0.85	0.92	0.92	0.92	0.72	0.72	0.72
Adj. Flow (vph)	30	339	5	13	649	222	0	0	0	343	31	44
RTOR Reduction (vph)	0	1	0	0	17	0	0	0	0	0	0	32
Lane Group Flow (vph)	0	373	0	0	867	0	0	0	0	0	374	12
Heavy Vehicles (%)	6%	6%	6%	6%	6%	6%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA					Split	NA	Perm
Protected Phases		4			8					2	2	
Permitted Phases	4			8								2
Actuated Green, G (s)		34.9			34.9						17.4	17.4
Effective Green, g (s)		34.9			34.9						17.4	17.4
Actuated g/C Ratio		0.56			0.56						0.28	0.28
Clearance Time (s)		5.0			5.0						5.0	5.0
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		911			964						497	442
v/s Ratio Prot											c0.21	
v/s Ratio Perm		0.23			c0.50							0.01
v/c Ratio		0.41			0.90						0.75	0.03
Uniform Delay, d1		7.8			12.1						20.5	16.3
Progression Factor		1.00			1.00						1.00	1.00
Incremental Delay, d2		0.3			11.0						6.4	0.0
Delay (s)		8.1			23.2						26.8	16.3
Level of Service		A			C						C	B
Approach Delay (s)		8.1			23.2			0.0			25.7	
Approach LOS		A			C			A			C	

Intersection Summary			
HCM Average Control Delay	20.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	62.3	Sum of lost time (s)	10.0
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
3: Lyman Rd & Maili Rd

3/28/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	4	53	286	25	183	29
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.79	0.79	0.88	0.88	0.78	0.78
Hourly flow rate (vph)	5	67	325	28	235	37
Pedestrians			1		1	
Lane Width (ft)			12.0		12.0	
Walking Speed (ft/s)			4.0		4.0	
Percent Blockage			0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	354				418	340
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	354				418	340
tC, single (s)	4.3				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.4				3.5	3.3
p0 queue free %	100				60	95
cM capacity (veh/h)	1096				589	704

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	72	353	272
Volume Left	5	0	235
Volume Right	0	28	37
cSH	1096	1700	603
Volume to Capacity	0.00	0.21	0.45
Queue Length 95th (ft)	0	0	58
Control Delay (s)	0.6	0.0	15.8
Lane LOS	A		C
Approach Delay (s)	0.6	0.0	15.8
Approach LOS			C

Intersection Summary			
Average Delay	6.2		
Intersection Capacity Utilization	35.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	35	11	30	951	442	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1583	1417	1736	1827	1769	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1583	1417	1736	1827	1769	
Peak-hour factor, PHF	0.51	0.51	0.89	0.89	0.92	0.92
Adj. Flow (vph)	69	22	34	1069	480	95
RTOR Reduction (vph)	0	19	0	0	5	0
Lane Group Flow (vph)	69	3	34	1069	570	0
Heavy Vehicles (%)	14%	14%	4%	4%	5%	5%
Turn Type	NA	Perm	Prot	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases		4				
Actuated Green, G (s)	7.0	7.0	2.8	52.9	45.1	
Effective Green, g (s)	9.0	8.0	4.8	54.9	47.1	
Actuated g/C Ratio	0.13	0.11	0.07	0.79	0.67	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	204	162	119	1435	1192	
v/s Ratio Prot	c0.04		0.02	c0.59	0.32	
v/s Ratio Perm		0.00				
v/c Ratio	0.34	0.02	0.29	0.74	0.48	
Uniform Delay, d1	27.7	27.5	30.9	3.9	5.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.0	0.0	1.3	2.1	0.3	
Delay (s)	28.7	27.5	32.2	6.0	5.8	
Level of Service	C	C	C	A	A	
Approach Delay (s)	28.4			6.8	5.8	
Approach LOS	C			A	A	

Intersection Summary			
HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	69.9	Sum of lost time (s)	6.0
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Queues
41: Kunia Rd & Field Station Kunia Entrance

7/17/2014

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	69	22	34	1069	575
v/c Ratio	0.25	0.09	0.13	0.73	0.44
Control Delay	31.4	14.6	32.2	8.7	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	31.4	14.6	32.2	8.7	7.9
Queue Length 50th (ft)	26	0	13	191	60
Queue Length 95th (ft)	41	7	46	411	253
Internal Link Dist (ft)	642			1901	1624
Turn Bay Length (ft)	140		300		
Base Capacity (vph)	617	542	353	1741	1455
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.11	0.04	0.10	0.61	0.40

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Kunia Rd & Foote Ave

3/24/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	834	436	75	715	493	301
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1599	1787	3574	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1787	1599	1787	3574	3539	1583
Peak-hour factor, PHF	0.81	0.81	0.83	0.83	0.87	0.87
Adj. Flow (vph)	1030	538	90	861	567	346
RTOR Reduction (vph)	0	0	0	0	0	210
Lane Group Flow (vph)	1030	538	90	861	567	136
Confl. Peds. (#/hr)	1					
Heavy Vehicles (%)	1%	1%	1%	1%	2%	2%
Turn Type	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	4	1	6	2	
Permitted Phases		6				2
Actuated Green, G (s)	89.0	128.8	9.6	39.8	25.2	25.2
Effective Green, g (s)	89.0	128.8	9.6	39.8	25.2	25.2
Actuated g/C Ratio	0.64	0.93	0.07	0.29	0.18	0.18
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1146	1599	124	1025	643	287
v/s Ratio Prot	c0.58	0.22	0.05	c0.24	0.16	
v/s Ratio Perm		0.12				0.09
v/c Ratio	0.90	0.34	0.73	0.84	0.88	0.47
Uniform Delay, d1	21.1	0.5	63.3	46.5	55.3	50.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.2	0.1	18.9	6.2	13.5	1.2
Delay (s)	32.3	0.6	82.2	52.7	68.8	52.1
Level of Service	C	A	F	D	E	D
Approach Delay (s)	21.4			55.5	62.5	
Approach LOS	C			E	E	

Intersection Summary			
HCM Average Control Delay	41.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	138.8	Sum of lost time (s)	10.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: Kunia Rd & Foote Ave

3/24/2014

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	1030	538	90	861	567	346
v/c Ratio	0.90	0.34	0.73	0.84	0.88	0.69
Control Delay	33.6	0.6	94.8	55.1	71.5	22.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.6	0.6	94.8	55.1	71.5	22.3
Queue Length 50th (ft)	760	0	82	385	266	72
Queue Length 95th (ft)	799	0	#144	420	#328	171
Internal Link Dist (ft)	1138			1376	2153	
Turn Bay Length (ft)			150			150
Base Capacity (vph)	1146	1599	129	1056	663	505
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.34	0.70	0.82	0.86	0.69

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
30: Kunia Rd/Driveway & SR 99

3/24/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	1349	205	582	827	6	302	6	1241	11	8	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	2.0	3.0	3.0			3.0	3.0		3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00			1.00	0.99		1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.97	
Satd. Flow (prot)	1770	3539	1564	1787	3571			1793	1579		1688	
Flt Permitted	0.33	1.00	1.00	0.95	1.00			0.72	1.00		0.56	
Satd. Flow (perm)	614	3539	1564	1787	3571			1348	1579		980	
Peak-hour factor, PHF	0.94	0.94	0.94	0.97	0.97	0.97	0.94	0.94	0.94	0.69	0.69	0.69
Adj. Flow (vph)	3	1435	218	600	853	6	321	6	1320	16	12	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	3	1435	218	600	859	0	0	327	1320	0	28	0
Confl. Peds. (#/hr)			1						1			
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	9%	9%	9%
Turn Type	Perm	NA	Free	Prot	NA		Perm	NA	Free	Perm	NA	
Protected Phases		6		5	2			8			4	
Permitted Phases	6		Free				8		Free	4		
Actuated Green, G (s)	83.0	83.0	210.0	66.0	154.0			46.0	210.0		46.0	
Effective Green, g (s)	85.0	85.0	210.0	68.0	156.0			48.0	210.0		48.0	
Actuated g/C Ratio	0.40	0.40	1.00	0.32	0.74			0.23	1.00		0.23	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	249	1432	1564	579	2653			308	1579		224	
v/s Ratio Prot		c0.41		c0.34	0.24							
v/s Ratio Perm	0.00		0.14					c0.24	0.84		0.03	
v/c Ratio	0.01	1.00	0.14	1.04	0.32			1.06	0.84		0.13	
Uniform Delay, d1	37.4	62.5	0.0	71.0	9.1			81.0	0.0		64.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.0	24.3	0.2	47.1	0.1			68.5	5.4		0.3	
Delay (s)	37.4	86.8	0.2	118.1	9.2			149.5	5.4		64.6	
Level of Service	D	F	A	F	A			F	A		E	
Approach Delay (s)		75.3			54.0			34.0			64.6	
Approach LOS		E			D			C			E	

Intersection Summary			
HCM Average Control Delay	54.6	HCM Level of Service	D
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	210.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	103.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Queues
30: Kunia Rd/Driveway & SR 99

3/24/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	3	1435	218	600	859	327	1320	29
v/c Ratio	0.01	1.00	0.14	1.04	0.32	1.06	0.84	0.13
Control Delay	37.7	85.2	0.2	113.5	9.5	141.5	5.4	64.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.7	85.2	0.2	113.5	9.5	141.5	5.4	64.7
Queue Length 50th (ft)	3	~1053	0	~889	197	~495	0	31
Queue Length 95th (ft)	12	#1216	0	#1147	227	#718	0	51
Internal Link Dist (ft)		1998			2306	2153		237
Turn Bay Length (ft)	150		200	150				
Base Capacity (vph)	249	1432	1564	579	2653	308	1579	225
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	1.00	0.14	1.04	0.32	1.06	0.84	0.13

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	33	912	408	140	155	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1787	1881	1816		1770	1583
Flt Permitted	0.26	1.00	1.00		0.95	1.00
Satd. Flow (perm)	491	1881	1816		1770	1583
Peak-hour factor, PHF	0.92	0.92	0.90	0.90	0.87	0.87
Adj. Flow (vph)	36	991	453	156	178	46
RTOR Reduction (vph)	0	0	13	0	0	37
Lane Group Flow (vph)	36	991	596	0	178	9
Heavy Vehicles (%)	1%	1%	1%	1%	2%	2%
Turn Type	pm+pt	NA	NA		NA	Perm
Protected Phases	7	4	8		2	
Permitted Phases	4					2
Actuated Green, G (s)	38.9	38.9	31.6		11.2	11.2
Effective Green, g (s)	38.9	38.9	31.6		11.2	11.2
Actuated g/C Ratio	0.65	0.65	0.53		0.19	0.19
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	367	1217	955		330	295
v/s Ratio Prot	0.00	c0.53	0.33		c0.10	
v/s Ratio Perm	0.06					0.01
v/c Ratio	0.10	0.81	0.62		0.54	0.03
Uniform Delay, d1	5.7	7.9	10.1		22.1	20.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.1	4.3	1.3		1.7	0.0
Delay (s)	5.8	12.2	11.3		23.8	20.0
Level of Service	A	B	B		C	C
Approach Delay (s)		12.0	11.3		23.0	
Approach LOS		B	B		C	

Intersection Summary			
HCM Average Control Delay	13.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	60.1	Sum of lost time (s)	10.0
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues
9: Lyman Rd & Flagler Road

3/21/2014

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	36	991	609	178	46
v/c Ratio	0.08	0.84	0.60	0.51	0.13
Control Delay	5.1	18.1	14.4	27.2	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	5.1	18.1	14.4	27.2	8.0
Queue Length 50th (ft)	4	222	91	59	0
Queue Length 95th (ft)	14	#571	#361	107	21
Internal Link Dist (ft)		1199	1752	1508	
Turn Bay Length (ft)	100				50
Base Capacity (vph)	539	1311	1016	664	623
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.07	0.76	0.60	0.27	0.07

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
44: Kunia Rd & Lyman Rd

3/24/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	234	278	387	166	247	105	98	452	29	68	765	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	4.0	3.0	3.0	4.0	3.0	3.0	4.0	3.0	3.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1554	1787	1881	1599	1787	3574	1599	1787	3574	1599
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1554	1787	1881	1599	1787	3574	1599	1787	3574	1599
Peak-hour factor, PHF	0.91	0.91	0.91	0.82	0.82	0.82	0.83	0.83	0.83	0.76	0.76	0.76
Adj. Flow (vph)	257	305	425	202	301	128	118	545	35	89	1007	128
RTOR Reduction (vph)	0	0	85	0	0	32	0	0	18	0	0	25
Lane Group Flow (vph)	257	305	340	202	301	96	118	545	17	89	1007	103
Confl. Peds. (#/hr)			3									
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4			8			6			2
Actuated Green, G (s)	29.9	42.6	42.6	24.5	37.2	37.2	16.3	56.5	56.5	13.2	53.4	53.4
Effective Green, g (s)	31.9	44.6	43.6	26.5	39.2	38.2	18.3	58.5	57.5	15.2	55.4	54.4
Actuated g/C Ratio	0.20	0.28	0.28	0.17	0.25	0.24	0.12	0.37	0.37	0.10	0.35	0.35
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	360	530	432	302	470	390	209	1333	586	173	1263	555
v/s Ratio Prot	c0.15	0.16		0.11	0.16		c0.07	0.15		0.05	c0.28	
v/s Ratio Perm			c0.22			0.06			0.01			0.06
v/c Ratio	0.71	0.58	0.79	0.67	0.64	0.25	0.56	0.41	0.03	0.51	0.80	0.18
Uniform Delay, d1	58.2	48.0	52.3	61.0	52.5	47.7	65.5	36.4	31.8	67.3	45.6	35.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.6	1.5	9.1	5.5	3.0	0.3	3.5	0.2	0.0	2.6	3.6	0.2
Delay (s)	64.8	49.5	61.4	66.6	55.5	48.1	69.0	36.6	31.8	69.9	49.2	35.9
Level of Service	E	D	E	E	E	D	E	D	C	E	D	D
Approach Delay (s)		58.6			57.5			41.8			49.3	
Approach LOS		E			E			D			D	

Intersection Summary			
HCM Average Control Delay	51.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	156.8	Sum of lost time (s)	9.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues
44: Kunia Rd & Lyman Rd

3/24/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	257	305	425	202	301	128	118	545	35	89	1007	128
v/c Ratio	0.72	0.58	0.83	0.67	0.64	0.31	0.56	0.41	0.06	0.51	0.80	0.22
Control Delay	75.5	55.7	54.7	79.0	62.8	37.5	85.2	40.1	15.3	88.6	54.6	29.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.5	55.7	54.7	79.0	62.8	37.5	85.2	40.1	15.3	88.6	54.6	29.9
Queue Length 50th (ft)	252	273	313	199	282	72	118	221	4	89	496	64
Queue Length 95th (ft)	449	457	551	331	424	141	219	323	30	160	605	118
Internal Link Dist (ft)		1752			1815			882			1376	
Turn Bay Length (ft)	150		60	240		80	250		200	250		130
Base Capacity (vph)	529	848	760	437	754	655	279	1869	839	218	1747	791
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.36	0.56	0.46	0.40	0.20	0.42	0.29	0.04	0.41	0.58	0.16

Intersection Summary

HCM Signalized Intersection Capacity Analysis
16: Humphreys Rd & Lyman Rd

3/24/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	33	438	1	2	234	248	0	0	0	346	5	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0						5.0	5.0
Lane Util. Factor		1.00			1.00						1.00	1.00
Frpb, ped/bikes		1.00			1.00						1.00	1.00
Flpb, ped/bikes		1.00			1.00						1.00	1.00
Frt		1.00			0.93						1.00	0.85
Flt Protected		1.00			1.00						0.95	1.00
Satd. Flow (prot)		1856			1733						1793	1599
Flt Permitted		0.94			1.00						0.95	1.00
Satd. Flow (perm)		1752			1731						1793	1599
Peak-hour factor, PHF	0.75	0.75	0.75	0.92	0.92	0.92	0.92	0.92	0.92	0.85	0.85	0.85
Adj. Flow (vph)	44	584	1	2	254	270	0	0	0	407	6	22
RTOR Reduction (vph)	0	0	0	0	57	0	0	0	0	0	0	15
Lane Group Flow (vph)	0	629	0	0	469	0	0	0	0	0	413	7
Confl. Peds. (#/hr)										5		
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	1%	1%	1%
Turn Type	Perm	NA		Perm	NA					Split	NA	Perm
Protected Phases		4			8					2	2	
Permitted Phases	4			8								2
Actuated Green, G (s)		24.4			24.4						17.6	17.6
Effective Green, g (s)		24.4			24.4						17.6	17.6
Actuated g/C Ratio		0.47			0.47						0.34	0.34
Clearance Time (s)		5.0			5.0						5.0	5.0
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		822			812						607	541
v/s Ratio Prot											c0.23	
v/s Ratio Perm		c0.36			0.27							0.00
v/c Ratio		0.77			0.58						0.68	0.01
Uniform Delay, d1		11.4			10.0						14.8	11.4
Progression Factor		1.00			1.00						1.00	1.00
Incremental Delay, d2		4.3			1.0						3.1	0.0
Delay (s)		15.7			11.0						17.9	11.4
Level of Service		B			B						B	B
Approach Delay (s)		15.7			11.0			0.0			17.6	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	14.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	52.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBT	SBT	SBR
Lane Group Flow (vph)	629	526	413	22
v/c Ratio	0.78	0.61	0.69	0.04
Control Delay	20.2	12.2	23.5	7.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	20.2	12.2	23.5	7.2
Queue Length 50th (ft)	146	83	106	0
Queue Length 95th (ft)	232	202	218	12
Internal Link Dist (ft)	2460	1199	1378	
Turn Bay Length (ft)				200
Base Capacity (vph)	1232	1249	922	833
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.51	0.42	0.45	0.03

Intersection Summary

HCM Unsignalized Intersection Capacity Analysis
3: Lyman Rd & Maili Rd

3/25/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	20	258	65	82	48	13
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.57	0.57	0.76	0.76	0.79	0.79
Hourly flow rate (vph)	35	453	86	108	61	16
Pedestrians			2			
Lane Width (ft)			12.0			
Walking Speed (ft/s)			4.0			
Percent Blockage			0			
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	193				664	139
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	193				664	139
tC, single (s)	4.2				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.3				3.6	3.4
p0 queue free %	97				85	98
cM capacity (veh/h)	1345				406	895

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	488	193	77
Volume Left	35	0	61
Volume Right	0	108	16
cSH	1345	1700	460
Volume to Capacity	0.03	0.11	0.17
Queue Length 95th (ft)	2	0	15
Control Delay (s)	0.8	0.0	14.4
Lane LOS	A		B
Approach Delay (s)	0.8	0.0	14.4
Approach LOS			B

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	36.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
41: Kunia Rd & Field Station Kunia Entrance

7/17/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	113	54	4	465	1295	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	1.00	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1787	1599	1752	1845	1877	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1787	1599	1752	1845	1877	
Peak-hour factor, PHF	0.97	0.97	0.87	0.87	0.87	0.87
Adj. Flow (vph)	116	56	5	534	1489	26
RTOR Reduction (vph)	0	50	0	0	0	0
Lane Group Flow (vph)	116	6	5	534	1515	0
Heavy Vehicles (%)	1%	1%	3%	3%	1%	1%
Turn Type	NA	Perm	Prot	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases		4				
Actuated Green, G (s)	13.2	13.2	1.3	103.6	97.3	
Effective Green, g (s)	15.2	14.2	3.3	105.6	99.3	
Actuated g/C Ratio	0.12	0.11	0.03	0.83	0.78	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	214	179	46	1537	1470	
v/s Ratio Prot	c0.06		0.00	c0.29	c0.81	
v/s Ratio Perm		0.00				
v/c Ratio	0.54	0.04	0.11	0.35	1.03	
Uniform Delay, d1	52.5	50.2	60.3	2.5	13.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.8	0.1	1.0	0.1	31.6	
Delay (s)	55.3	50.3	61.4	2.6	45.4	
Level of Service	E	D	E	A	D	
Approach Delay (s)	53.7			3.2	45.4	
Approach LOS	D			A	D	

Intersection Summary			
HCM Average Control Delay	35.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	126.8	Sum of lost time (s)	9.0
Intersection Capacity Utilization	82.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Queues
41: Kunia Rd & Field Station Kunia Entrance

7/17/2014

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	116	56	5	534	1515
v/c Ratio	0.52	0.24	0.04	0.35	1.00
Control Delay	59.0	15.1	57.0	3.6	36.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	59.0	15.1	57.0	3.6	36.2
Queue Length 50th (ft)	85	0	4	78	822
Queue Length 95th (ft)	156	41	18	143	#1718
Internal Link Dist (ft)	642			1901	1685
Turn Bay Length (ft)	140		300		
Base Capacity (vph)	336	333	172	1672	1519
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.35	0.17	0.03	0.32	1.00

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
1: Kunia Rd & Foote Ave

3/25/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	834	436	75	764	493	301
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1599	1787	3574	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1787	1599	1787	3574	3539	1583
Peak-hour factor, PHF	0.81	0.81	0.83	0.83	0.87	0.87
Adj. Flow (vph)	1030	538	90	920	567	346
RTOR Reduction (vph)	0	0	0	0	0	210
Lane Group Flow (vph)	1030	538	90	920	567	136
Confl. Peds. (#/hr)	1					
Heavy Vehicles (%)	1%	1%	1%	1%	2%	2%
Turn Type	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	4	1	6	2	
Permitted Phases		6				2
Actuated Green, G (s)	89.0	128.8	9.6	39.8	25.2	25.2
Effective Green, g (s)	89.0	128.8	9.6	39.8	25.2	25.2
Actuated g/C Ratio	0.64	0.93	0.07	0.29	0.18	0.18
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1146	1599	124	1025	643	287
v/s Ratio Prot	c0.58	0.22	0.05	c0.26	0.16	
v/s Ratio Perm		0.12				0.09
v/c Ratio	0.90	0.34	0.73	0.90	0.88	0.47
Uniform Delay, d1	21.1	0.5	63.3	47.5	55.3	50.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.2	0.1	18.9	10.4	13.5	1.2
Delay (s)	32.3	0.6	82.2	57.9	68.8	52.1
Level of Service	C	A	F	E	E	D
Approach Delay (s)	21.4			60.1	62.5	
Approach LOS	C			E	E	

Intersection Summary			
HCM Average Control Delay	43.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	138.8	Sum of lost time (s)	10.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: Kunia Rd & Foote Ave

3/25/2014

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	1030	538	90	920	567	346
v/c Ratio	0.90	0.34	0.73	0.90	0.88	0.69
Control Delay	33.6	0.6	94.8	59.8	71.5	22.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.6	0.6	94.8	59.8	71.5	22.3
Queue Length 50th (ft)	760	0	82	421	266	72
Queue Length 95th (ft)	799	0	#144	455	#328	171
Internal Link Dist (ft)	1138			1376	2153	
Turn Bay Length (ft)			150			150
Base Capacity (vph)	1146	1599	129	1056	663	505
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.34	0.70	0.87	0.86	0.69

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
30: Kunia Rd/Driveway & SR 99

3/25/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	1349	205	582	827	6	312	6	1280	11	8	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	2.0	3.0	3.0			3.0	3.0		3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00			1.00	0.99		1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.97	
Satd. Flow (prot)	1770	3539	1564	1787	3571			1793	1579		1688	
Flt Permitted	0.33	1.00	1.00	0.95	1.00			0.72	1.00		0.57	
Satd. Flow (perm)	614	3539	1564	1787	3571			1348	1579		991	
Peak-hour factor, PHF	0.94	0.94	0.94	0.97	0.97	0.97	0.94	0.94	0.94	0.69	0.69	0.69
Adj. Flow (vph)	3	1435	218	600	853	6	332	6	1362	16	12	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	3	1435	218	600	859	0	0	338	1362	0	28	0
Confl. Peds. (#/hr)			1						1			
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	9%	9%	9%
Turn Type	Perm	NA	Free	Prot	NA		Perm	NA	Free	Perm	NA	
Protected Phases		6		5	2			8			4	
Permitted Phases	6		Free				8		Free	4		
Actuated Green, G (s)	81.0	81.0	210.0	66.0	152.0			48.0	210.0		48.0	
Effective Green, g (s)	83.0	83.0	210.0	68.0	154.0			50.0	210.0		50.0	
Actuated g/C Ratio	0.40	0.40	1.00	0.32	0.73			0.24	1.00		0.24	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	243	1399	1564	579	2619			321	1579		236	
v/s Ratio Prot		c0.41		c0.34	0.24							
v/s Ratio Perm	0.00		0.14					c0.25	0.86		0.03	
v/c Ratio	0.01	1.03	0.14	1.04	0.33			1.05	0.86		0.12	
Uniform Delay, d1	38.6	63.5	0.0	71.0	9.8			80.0	0.0		62.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.0	30.8	0.2	47.1	0.1			64.8	6.5		0.2	
Delay (s)	38.6	94.3	0.2	118.1	9.9			144.8	6.5		63.0	
Level of Service	D	F	A	F	A			F	A		E	
Approach Delay (s)		81.8			54.4			34.0			63.0	
Approach LOS		F			D			C			E	

Intersection Summary			
HCM Average Control Delay	56.7	HCM Level of Service	E
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	210.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	103.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
44: Kunia Rd & Lyman Rd

3/25/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	234	278	387	166	247	105	98	500	29	68	765	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	4.0	3.0	3.0	4.0	3.0	3.0	4.0	3.0	3.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1554	1787	1881	1599	1787	3574	1599	1787	3574	1599
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1554	1787	1881	1599	1787	3574	1599	1787	3574	1599
Peak-hour factor, PHF	0.91	0.91	0.91	0.82	0.82	0.82	0.83	0.83	0.83	0.76	0.76	0.76
Adj. Flow (vph)	257	305	425	202	301	128	118	602	35	89	1007	128
RTOR Reduction (vph)	0	0	85	0	0	32	0	0	17	0	0	25
Lane Group Flow (vph)	257	305	340	202	301	96	118	602	18	89	1007	103
Confl. Peds. (#/hr)			3									
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4			8			6			2
Actuated Green, G (s)	29.9	42.6	42.6	24.5	37.2	37.2	16.3	56.5	56.5	13.2	53.4	53.4
Effective Green, g (s)	31.9	44.6	43.6	26.5	39.2	38.2	18.3	58.5	57.5	15.2	55.4	54.4
Actuated g/C Ratio	0.20	0.28	0.28	0.17	0.25	0.24	0.12	0.37	0.37	0.10	0.35	0.35
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	360	530	432	302	470	390	209	1333	586	173	1263	555
v/s Ratio Prot	c0.15	0.16		0.11	0.16		c0.07	0.17		0.05	c0.28	
v/s Ratio Perm			c0.22			0.06			0.01			0.06
v/c Ratio	0.71	0.58	0.79	0.67	0.64	0.25	0.56	0.45	0.03	0.51	0.80	0.18
Uniform Delay, d1	58.2	48.0	52.3	61.0	52.5	47.7	65.5	37.1	31.8	67.3	45.6	35.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.6	1.5	9.1	5.5	3.0	0.3	3.5	0.2	0.0	2.6	3.6	0.2
Delay (s)	64.8	49.5	61.4	66.6	55.5	48.1	69.0	37.3	31.8	69.9	49.2	35.9
Level of Service	E	D	E	E	E	D	E	D	C	E	D	D
Approach Delay (s)		58.6			57.5			42.0			49.3	
Approach LOS		E			E			D			D	

Intersection Summary			
HCM Average Control Delay	51.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	156.8	Sum of lost time (s)	9.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues
44: Kunia Rd & Lyman Rd

3/25/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	257	305	425	202	301	128	118	602	35	89	1007	128
v/c Ratio	0.72	0.58	0.83	0.67	0.64	0.31	0.56	0.46	0.06	0.51	0.80	0.22
Control Delay	75.5	55.7	54.7	79.0	62.8	37.5	85.2	41.0	16.7	88.6	54.6	29.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.5	55.7	54.7	79.0	62.8	37.5	85.2	41.0	16.7	88.6	54.6	29.9
Queue Length 50th (ft)	252	273	313	199	282	72	118	248	5	89	496	64
Queue Length 95th (ft)	449	457	551	331	424	141	219	360	32	160	605	118
Internal Link Dist (ft)		1752			1815			882			1376	
Turn Bay Length (ft)	150		60	240		80	250		200	250		130
Base Capacity (vph)	529	848	760	437	754	655	279	1869	838	218	1747	791
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.36	0.56	0.46	0.40	0.20	0.42	0.32	0.04	0.41	0.58	0.16

Intersection Summary

HCM Signalized Intersection Capacity Analysis
41: Kunia Rd & Field Station Kunia Entrance

7/17/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	113	54	4	514	1295	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	1.00	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1787	1599	1752	1845	1877	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1787	1599	1752	1845	1877	
Peak-hour factor, PHF	0.97	0.97	0.87	0.87	0.87	0.87
Adj. Flow (vph)	116	56	5	591	1489	26
RTOR Reduction (vph)	0	50	0	0	0	0
Lane Group Flow (vph)	116	6	5	591	1515	0
Heavy Vehicles (%)	1%	1%	3%	3%	1%	1%
Turn Type	NA	Perm	Prot	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases		4				
Actuated Green, G (s)	13.2	13.2	1.3	103.6	97.3	
Effective Green, g (s)	15.2	14.2	3.3	105.6	99.3	
Actuated g/C Ratio	0.12	0.11	0.03	0.83	0.78	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	214	179	46	1537	1470	
v/s Ratio Prot	c0.06		0.00	c0.32	c0.81	
v/s Ratio Perm		0.00				
v/c Ratio	0.54	0.04	0.11	0.38	1.03	
Uniform Delay, d1	52.5	50.2	60.3	2.6	13.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.8	0.1	1.0	0.2	31.6	
Delay (s)	55.3	50.3	61.4	2.8	45.4	
Level of Service	E	D	E	A	D	
Approach Delay (s)	53.7			3.3	45.4	
Approach LOS	D			A	D	

Intersection Summary			
HCM Average Control Delay	35.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	126.8	Sum of lost time (s)	9.0
Intersection Capacity Utilization	82.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Queues
41: Kunia Rd & Field Station Kunia Entrance

7/17/2014

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	116	56	5	591	1515
v/c Ratio	0.52	0.24	0.04	0.39	1.00
Control Delay	59.0	15.1	57.0	3.8	36.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	59.0	15.1	57.0	3.8	36.2
Queue Length 50th (ft)	85	0	4	90	822
Queue Length 95th (ft)	156	41	18	163	#1718
Internal Link Dist (ft)	642			1901	1685
Turn Bay Length (ft)	140		300		
Base Capacity (vph)	336	333	172	1672	1519
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.35	0.17	0.03	0.35	1.00

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Unsignalized Intersection Capacity Analysis
5: Kunia Rd & Temp Access

3/21/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	49	49	0	469	1349	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	0.77	0.77	0.91	0.91
Hourly flow rate (vph)	49	49	0	609	1482	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2092	1482	1482			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2092	1482	1482			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	16	68	100			
cM capacity (veh/h)	58	155	454			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	98	609	1482
Volume Left	49	0	0
Volume Right	49	0	0
cSH	85	454	1700
Volume to Capacity	1.15	0.00	0.87
Queue Length 95th (ft)	173	0	0
Control Delay (s)	234.5	0.0	0.0
Lane LOS	F		
Approach Delay (s)	234.5	0.0	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	10.5		
Intersection Capacity Utilization	91.9%	ICU Level of Service	F
Analysis Period (min)	15		

Appendix D

Agency Coordination under the Coastal Zone Management Act

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DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
DIRECTORATE OF PUBLIC WORKS
947 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5013

REPLY TO
ATTENTION OF:

Directorate of Public Works

OCT 2 2 2014

Mr. Leo Asuncion, Planning Program Manager
Coastal Zone Management Program
Office of Planning
P.O. Box 2359
Honolulu, Hawaii, 96804

Dear Mr. Asuncion:

The US Army Garrison, Hawaii (USAG-HI) proposes to lease 8.13 acres of land and grant a 2.5-acre interconnection easement on Schofield Barracks and Wheeler Army Airfield on Oahu to Hawaiian Electric Company (Hawaiian Electric) to construct, operate, and maintain a 50-megawatt (MW) capacity renewable energy power plant, including associated power poles, high-tension power lines, and related equipment and facilities. The proposed action is referred to as the Schofield Generating Station Project (SGSP). The State of Hawaii Department of Land and Natural Resources would grant a 1.28-acre easement and a 0.7-acre conservation district authorization to Hawaiian Electric to allow for the construction of a 46-kilovolt (kV) electrical power transmission line between the SGSP site and the existing Wahiawa Substation. The Army is currently preparing an Environmental Impact Statement (EIS) that analyzes the potential impacts of the proposed action in accordance with the National Environmental Policy Act of 1969 (NEPA). The Draft EIS is expected to be published in early 2015.

The primary site for the SGSP is on Army-owned property on Schofield Barracks' South Range. The transmission line interconnection easement would be partially on Army-owned property on Schofield Barracks and Wheeler Army Airfield and partially on properties owned or leased by the State of Hawaii. The Wahiawa Substation is on land owned by Hawaiian Electric.

The purposes for leasing the property and constructing the SGSP are to provide improved energy security to the USAG-HI at Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia, and to provide new secure, firm, dispatchable, flexible, and renewable energy generation to the grid on Oahu, Hawaii. The electricity produced by the SGSP would normally supply power to all Hawaiian Electric customers through the island-wide electrical grid. During outages that meet the criteria specified in the Operating Agreement, SGSP output would first be provided to Army facilities at Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia up to their peak demand of 32 MW to meet their missions and would additionally support the grid up to its full capacity. If there were a full island outage, the plant could also be used to blackstart other plants.

The USAG-HI has concluded that the SGSP will be consistent with all enforceable policies of the Hawaii Coastal Zone Management Program. Applicable best management practices and permit requirements will be strictly adhered to during construction and operation of the SGSP. Additionally, no direct, indirect or cumulative effects resulting from the construction and operation of the SGSP are anticipated to impact the state's coastal zone. For further information, please see the enclosed Project Impacts Summary and location map.

A copy this letter will be funished to Hawaiian Electric. If you have any questions, the point of contact is the NEPA Program Manager, Lisa Graham, by telephone at (808) 656.3075 or by email at lisa.m.graham52.civ@mail.mil.

Sincerely,

Steven Raymond
Director of Public Works

Enclosures

Project Impacts Summary
Schofield Generating Station Project
Schofield Barracks, Hawaii

Recreational Resources:
The proposed project would have a temporary minor impact on a recreational area. The new electrical transmission line would be next to Lake Wilson along Kamehameha Highway (Route 80), and the easternmost portion of the proposed transmission line would pass into the Wahiawa Freshwater State Park. However, where it crosses Lake Wilson, the new line would be placed on replacement poles that will carry both the new line and an existing 46-kilovolt electrical line and would terminate at the Wahiawa Substation between Neal Avenue and Walker Avenue. Other than the temporary disturbance for installation of the transmission line, no recreational resources would be impacted by the proposed project.

Historic Resources:
The project site is not within an historic or cultural district. Some transmission poles and portions of the electrical transmission line would be visible from the Schofield Barracks and Wheeler Army Airfield historic districts. The Army is consulting with SHPD regarding these visual effects, and SHPD will be provided with a copy of the draft Environmental Impact Statement for review. If, during construction, any previously unidentified archaeological or historic site was identified, construction activities would be halted in the vicinity and SHPD would be immediately notified. The project site is not listed on or nominated to the Hawaii or National Register of Historic Places. The project site land has been surveyed by an archaeologist, and there was no evidence of traditional Hawaiian or early historic cultural deposition. The project site is not within or near a Hawaiian fishpond or historic settlement area.

Scenic and Open Space Resources:
The project site does not abut a scenic landmark. Various elements of the power generating station would exceed one story in height. The engine hall would be 33 feet tall, engine-generator exhaust systems would each have a 75-foot-tall exhaust gas silencer stack, the switchyard will include a 75 foot tall microwave tower, two 40-foot-high aboveground fuel storage tanks would be installed to store biodiesel and diesel, and forty-seven steel poles would be installed for the overhead transmission line. The poles would be 60 to 80 feet tall. However, the generating station would be installed entirely on an undeveloped parcel of land and the station would be surrounded by undeveloped land on Army and state property. The transmission line poles would be installed on undeveloped property adjacent to an existing electrical transmission line.

Coastal Ecosystems:
The proposed action would not impact coastal ecosystems. Uncontaminated stormwater from the generating station would be discharged to the permitted plant stormwater drainage system. Earthwork would be required for construction of the generating station. A portion of the site would be paved to provide access to project facilities. Sanitary wastewater from the site would discharge to the Army wastewater system. Process wastewater would be passed into an oil/water separator the accumulated sludge would be managed and disposed of appropriately. Waikele Stream is about 100 to 150 feet north of the proposed site for the generating station, and three transmission line poles would be installed near Lake Wilson on the South Fork of Kaukonahua Stream, but the project would have no impacts on these waters.

The project would not have any detrimental impact on wildlife as it will incorporate measures that should avoid any risk of harm. The Hawaiian hoary bat is the only protected species with likelihood to occur in the project area, and though consultation with US Fish and Wildlife Service, the SGSP will incorporate measures that should avoid any risk of harm to the Hawaiian hoary bat. The proposed action would not involve dredge or fill activities, it is not within the Shoreline Setback Area, and is not in and does not abut a Natural Area Reserve, a Marine Life Conservation District, or an estuary.

Economic Uses:
The project would not impact coastal dependent development. The proposed project is to construct, operate, and maintain a 50-megawatt (MW) capacity renewable energy power plant that would be powered by a biofuel blend. The purposes of the generating station will be to provide improved energy security to the U.S. Army Garrison-Hawaii at Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia, and to provide new secure, firm, dispatchable, flexible, and renewable energy generation to the grid on Oahu, Hawaii.

The primary project site is Army-owned land that was previously in agricultural production, but that has been fallow in recent years. The proposed project does not involve a harbor or port, is not within a designated tourist destination area, and does not relate to commercial fishing, seafood production, or seabed mining.

Coastal Hazards:
The project would not increase the risk of life or property to coastal hazards. The project site is not on and does not abut a sandy beach, is not within a potential tsunami inundation area, a potential flood inundation area, or a potential subsidence hazard area, and is not near any shoreline areas.

Managing Development:
The project will require numerous permits and approvals, and the Army and Hawaiian Electric are either in the process of obtaining them or will do so at the appropriate time during the project's development process. The project will conform with State and County land use designations for the site. The public has been notified of the proposed activity (see below, Public Participation), and a draft Environmental Impact Statement for the proposed project is being prepared.

Public Participation:
A public notice announcing the time and location of two public scoping meetings that were held to solicit public input and comments on the scope of the environmental impact statement (EIS) was published in the *Honolulu Star Advertiser* on January 17, 2014. In addition, the EIS public notice (EISPN) was published in the January 8, 2014 issue of *The Environmental Notice*, published by the State of Hawaii Department of Health, Office of Environmental Quality Control. Persons who were known to have a potential interest in the proposed action were notified and invited to participate in the environmental impact analysis process. The public mailing list contained the names of 145 parties. A notice of availability (NOA) of the EIS for the proposed project will be published in the *Federal Register*, the *Honolulu Star Advertiser*, and *The Environmental Notice*. The Army will hold public meetings to following publication of the NOA to provide opportunities for presenting oral and written comments on the Draft EIS.

Beach Protection: The proposed project would not impact any beach areas. The entire project would occur in inland areas and will not involve the construction of private or public beach erosion-protection structures.
Marine Resources: The proposed project would not impact any marine or coastal resources.

LEGEND

- DoD/Federal Land
- State Route
- SGSP Site
- Interconnection Easement

Source: Schofield Barracks GIS 2014, ESRI 2011.

Project Location

Appendix E
Water Characterization Study

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FINAL
Water Characterization Study
Schofield Generating Station Project
USAG-HI Schofield, Oahu, HI

Submitted by:

Tetra Tech
9444 Balboa Ave., Suite 215
San Diego, CA 92123

November 19, 2013

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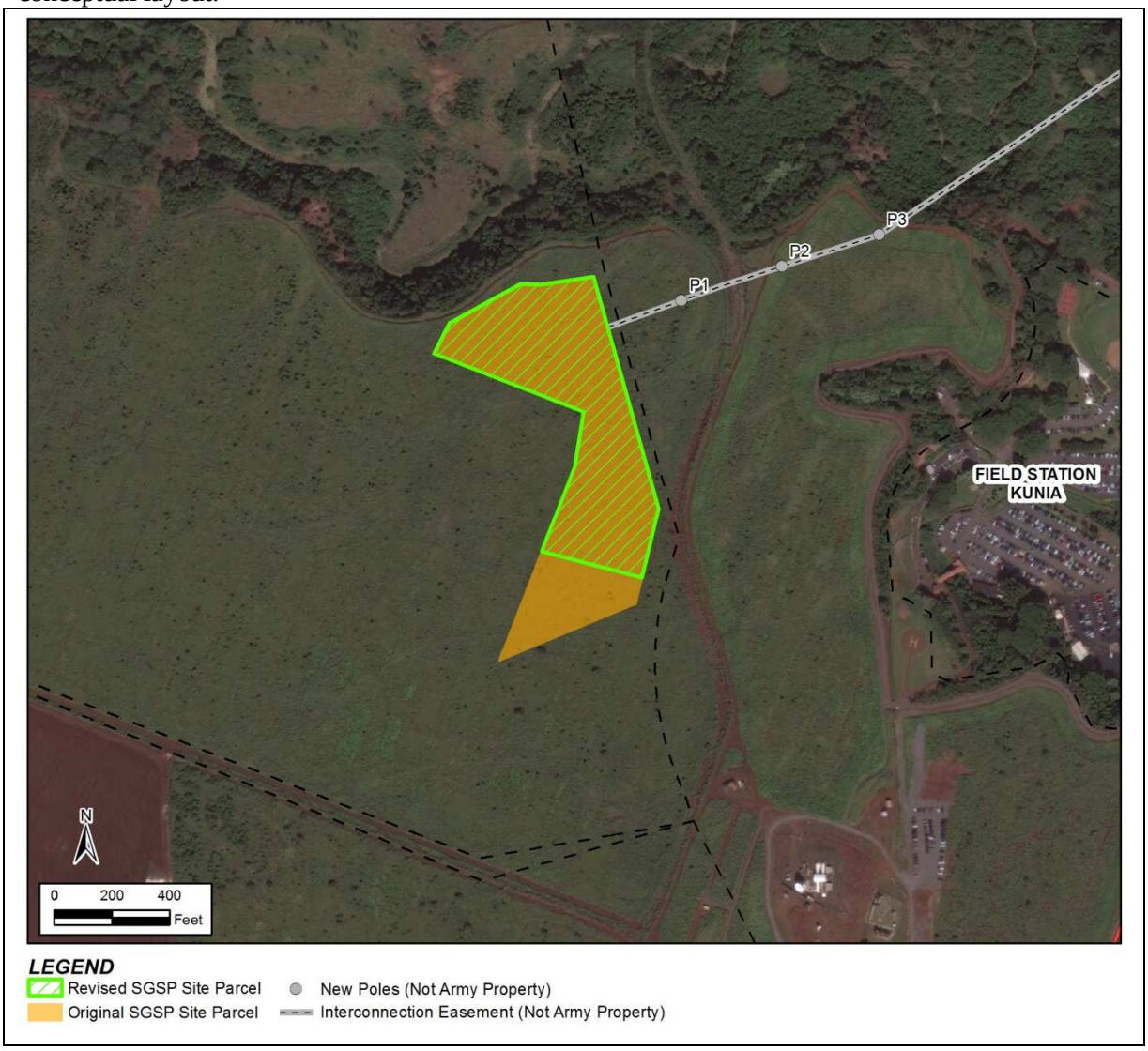
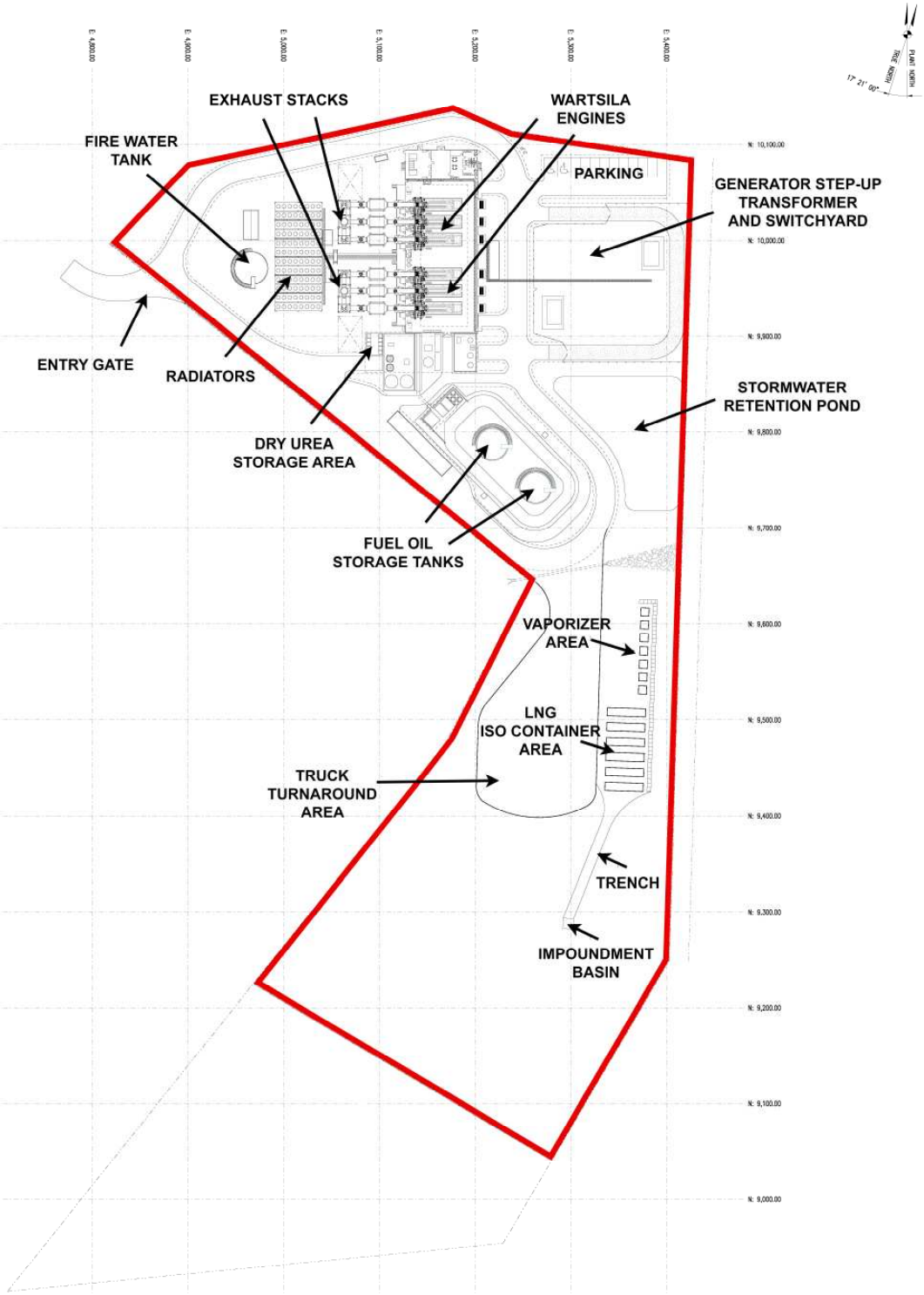
Errata

Prepared on August 18, 2014

After completing the Water Characterization Study, the Army and Hawaiian Electric reduced the size of the parcel on which the generating station will be located and revised the conceptual site layout to accommodate infrastructure associated with use of containerized liquefied natural gas if and when it becomes an available fuel source for the project. The Schofield Generating Station parcel was reduced from 10.3 acres to 8.13 acres. The first map below shows the reduced parcel indicated by hatch marks and the second map shows the revised site conceptual plan. Please note that the figures and discussions within the Water Characterization Study are based on the larger 10.3 parcel and initial conceptual design, and therefore do not match the parcel size and site design discussed in the EIS. However, the reduction in parcel size and revised site layout does not affect the recommendations made in the Water Characterization Study regarding storm water management. In fact, recommendations in the Water Characterization Study were taken into account during the redesign of the site conceptual layout.




EXHAUST STACKS
WARTSILA ENGINES
FIRE WATER TANK
PARKING
GENERATOR STEP-UP TRANSFORMER AND SWITCHYARD
ENTRY GATE
RADIATORS
STORMWATER RETENTION POND
DRY UREA STORAGE AREA
FUEL OIL STORAGE TANKS
VAPORIZER AREA
LNG ISO CONTAINER AREA
TRUCK TURNAROUND AREA
TRENCH
IMPOUNDMENT BASIN

EXECUTIVE SUMMARY

The National Environmental Policy Act (NEPA) requires federal agencies to account for environmental impacts and identify mitigation options by submitting environmental impact statements (EIS) for federal projects. In 2007, Congress passed the Energy Independence and Security Act (EISA), and Section 438 of that legislation establishes strict stormwater runoff requirements for federal development and redevelopment projects. Additional Army policies enacted in 2010 encourage the use of low impact development (LID) to manage stormwater on federal property. The 2010 Army policies also require a potable water use reduction of 30 percent and suggest rainwater harvesting as an option. Further, local regulations require developments to comply with flood control criteria specified in the City and County of Honolulu Rules Relating to Storm Drainage Standards (2000).

The purpose of this study is to:

1) identify cost effective solutions (mitigation measures) to meet compliance with federal and local regulations for the U.S. Army Garrison Hawaii and Hawaii Electric Company's proposed Schofield Generating Station (SGS) near Schofield Barracks on the Hawaiian island of O'ahu, and
2) document these mitigation measures in support of the NEPA EIS for the SGS project.

This characterization study analyzes two options to mitigate post-development runoff for EISA compliance; Option 1 requires retaining the 95th percentile rainfall event on-site (by means of infiltration, evapotranspiration, or reuse), and Option 2 requires maintenance or restoration of predevelopment hydrology on the basis of site-specific conditions through the use of continuous simulation modeling techniques, published data, studies, or other established tools. Modeling results identified Option 1 as the cost-effective compliance solution. When compared to Option 2, Option 1 identified a 34 percent smaller facility that would be required to retain the runoff generated by the 1.8 inch, 95th percentile event.

Once EISA Option 1 was identified as the more cost-effective compliance solution, two alternatives were proposed to select a design that is compliant with EISA Option 1, provides cost-effective stormwater management, and supports the Army's goal for a sustainable future. Alternative 1 proposed the conceptual plan's detention basin as an infiltration basin best management practice (BMP). Alternative 2 included LID implementation of distributed bioretention and cistern BMPs throughout the site. Based on optimization modeling results, Alternative 1 was projected to cost 18% less than Alternative 2, and was selected as the optimal design.

In addition to the EISA requirements, Honolulu City and County Storm Drain Standards state that additional storage would be needed to retain and infiltrate the 10-year design storm excess runoff from post-development conditions. To accommodate this, the proposed Option 1 BMP volume would need to be expanded by 0.071 ac-ft.

Army LID policy requires that rainwater harvesting be considered for new federal site designs. A continuous simulation model was used to guide selection of an optimum cistern size based on a projected daily municipal water use of 500 gallons. A 30-year return on investment (ROI) analysis was also performed to determine the cost-effectiveness of a rainwater harvesting system. Results predicted that rainwater harvesting could offset 71% of long-term potable water demand at SGS by implementing an 8,000-gallon cistern with a backup water supply. The 30-year ROI analysis predicted an 11-year payback period for the recommended system.

Final recommendations for stormwater management at the proposed SGS include meeting EISA compliance and flood control requirements using an infiltration basin BMP. Rainwater harvesting implementation will help reduce potable water use and promote a sustainable future for the Army. These designs are recommended as a cost-effective and sustainable solution to mitigate for potential environmental impacts due to the development of SGS at U.S. Army Garrison-Hawaii, Schofield.

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1 INTRODUCTION

1.1 PURPOSE

The United States Army (Army) Schofield Barracks is located on the island of O'ahu, Hawaii, in Honolulu County. The Army must increase their renewable energy sources to adhere to Federal energy statutes and mandates and ensure 100% energy security to the Schofield Barracks, Wheeler Army Airfield, and Kunia Station. To meet these requirements, the Army is proposing to lease of 10.3 acres of undeveloped land and a related 2.5-acre interconnection easement on Schofield Barracks to Hawaiian Electric, for Hawaiian Electric's construction, ownership, operation, and maintenance of a 50 MW capacity biofuel-capable power generation plant and 46-kilovolt subtransmission line required to connect the Schofield Generating Station to the Hawaiian Electric grid. If implemented, the SGSP would be a source of renewable power that would provide energy security for the installations if loss of service occurs.

The SGSP would benefit Hawaiian Electric and the residents of O'ahu. It would add 50 MW of utility-owned, dispatchable capacity to the O'ahu grid; provide a quick-starting, high-ramp rate facility to help maintain grid stability and compensate for increasing network penetration by variable sources of power generation, such as wind and solar; provide a power generation facility at a higher elevation and away from coastlines, which contributes to grid reliability and continuity of operation if a natural disaster occurs; provide a physically secure power generation facility on a military installation, contributing to grid continuity of operation in cases of a man-made threat; and make progress towards the State Renewable Portfolio Standards.

The project is proposed to be constructed on an undeveloped site (formerly agricultural land), which, if left unmitigated, could have adverse impacts on the environment.

The United States National Environmental Policy Act (NEPA) introduced national environmental considerations and implementations for the federal government. NEPA Title I declared federal agencies to "use all practicable means to create and maintain conditions under which man and nature can exist in productive harmony" (NEPA citation). NEPA requires federal agencies to prepare environmental impact statements (EIS) to analyze potentially significant environmental effects and alternatives for proposed federal projects and decisions. This report addresses stormwater management for the SGSP EIS; in particular, the pre- and post-development hydrology was characterized and environmental solutions were identified to comply with relevant regulations.

The purpose of this study is to:

1) identify cost effective solutions (mitigation measures) to meet compliance with federal and local regulations for the proposed project and
2) document these mitigation measures in support of the NEPA EIS for the proposed project.

1.2 REGULATORY BACKGROUND

The following section outlines the pertinent federal and local regulations and policies governing stormwater management at the proposed project site.

1.2.1 EISA REGULATIONS

Congress enacted the Energy Independence and Security Act (EISA) in December 2007; Section 438 of that legislation establishes strict stormwater runoff requirements for federal development and redevelopment projects. The legislation reads as follows:

> The sponsor of any development or redevelopment project involving a Federal facility with a footprint that exceeds 5,000 square feet shall use site planning, design, construction, and maintenance strategies for the property to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow. (EISA 2007)

Section 438 is intended to address the inadequacies of common approaches to managing stormwater and promote practices that maintain or restore predevelopment site hydrology. Although Congress did not prescribe specific strategies to comply with Section 438, it can be inferred that one of the goals of the act is to promote the use of sustainable stormwater management approaches, designs, and practices that better protect receiving water quality and better address volume control (USEPA 2009). LID is the preferred approach that can be used to meet the criteria of Section 438. To assist federal agencies with compliance, EPA developed Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act. EPA's technical guidance document describes two options for demonstrating compliance with EISA Section 438 requirements, each of which is intended to achieve the outcome of maintaining or restoring predevelopment hydrology. Option 1 is to retain the 95th percentile rainfall event on-site, and Option 2 is to determine predevelopment hydrology on the basis of site-specific conditions through the use of continuous simulation modeling techniques, published data, studies, or other established tools to determine the volume of water to be managed and retained on-site. (USEPA 2009)

1.2.2 ARMY LID POLICIES

In a 2010 memorandum, the Army instated requirements for managing stormwater with LID. This memorandum was distributed as a follow-up to Section 438 of EISA, Department of Defense (DoD) Stormwater Requirements for EISA, and a June 2010 sustainable design and development policy memorandum update. The Army addresses the need to take a more sustainable, innovative approach, like LID, to manage the stormwater runoff from Army-owned land, regardless of size and type of construction projects. The LID guidelines were instated in 2011 for all "sustainment, restoration, and modernization (SRM) funded projects", and all Army construction projects are expected to comply by 2013. The proposed LID requirements also follow LID criteria stated in the LID Unified Facilities Code (UFC) 3-210-10N and EPA Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of EISA.

In addition to the LID Policy, the Army released a policy update in a memorandum on October 27, 2010, regarding sustainable design and development of any facility construction activities in the U.S. at active Army installations, Army Reserve Centers, Army National Guard Facilities, and Armed Force Reserve Centers, regardless of the funding source. In particular, Section 5f pertains to stormwater management and compliance with EISA Section 438, and it reiterates the installation of LID and minimizing site disturbance. Furthermore, Section 5g and 5h respectively state that any facility construction project is

required to reduce its indoor potable water use by 30 percent and outdoor water use by 50% relative to projected baseline rates. Strategies used to reduce the potable water should follow American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) Standard 189.1 Sec 6 guidelines. The policy lists xeriscaping, rainwater retention, and water reuse and recycling as strategies to reduce potable water use. (Army 2010b)

1.2.3 CITY & COUNTY OF HONOLULU REGULATIONS

In addition to federal regulations regarding stormwater management, local flood control standards from Honolulu County also apply to the proposed SGS site. In particular, the Hawaiian Electric request for proposal (RFP) stated that surface drainage systems within SGS boundaries should be sized to convey the 10-year, 24-hour runoff to prevent roadway flooding and 50-year, 24-hour storm event to prevent equipment and building flooding (HECO 2013). The City and County of Honolulu further require development projects that disturb less than 100 acres to maintain predevelopment runoff volume and flow rates from the 10-yr design storm if the site ultimately discharges to a water body other than open coastal waters.

1.2.4 SUMMARY OF RELEVANT STORMWATER CRITERIA

The following summarizes pertinent regulations and policies for stormwater management:

- EISA Section 438 requires maintaining or restoring predevelopment hydrology for developments or redevelopments greater than 5,000 square feet (EISA 2007)

- EPA's Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act provides two options to reach EISA compliance by treating stormwater runoff quantity from:

    - Option 1) 95th percentile storm event or

    - Option 2) pre-development hydrology (EPA 2009). Any construction project on Federal land operated by the Army that requires stormwater management must incorporate LID practices (Army 2010a)

- LID techniques such as rainwater harvesting are encouraged for water reuse for irrigation and/or toilets (Army 2010a)

- A cost-benefit analysis must accompany all rainwater harvesting projects to demonstrate a favorable return on investment (ROI) over a 30-year period (Army 2010a)

- Traditional stormwater practices such as retention and detention ponds are discouraged by the Army (Army 2010a)

- Indoor potable water use should be reduced by 30 percent from baseline conditions in any Army facility (Army 2010b).

- Outdoor potable water use should be reduced by a minimum of 50 percent through strategies such as rainwater retention and water reuse at Army facilities (Army 2010b).

- Meet local flood control standards requiring that runoff volume from the 10-year design storm be limited to predevelopment values (City and County of Honolulu 2000). Furthermore, the 10-year, 24-hour storm discharge should be managed without flooding roadways and the 50-year, 24-hour discharge without flooding equipment and buildings at SGS (HECO 2013).

1.3 PROJECT DESCRIPTION

The proposed Schofield Generating Station is located on the Army's South Range Acquisition Area, which is adjacent to Schofield Barracks Main Post, near Wahiawa, Hawaii, as shown in Figure 1-1. The Army's Energy Initiatives Task Force (EITF), which was established to ensure Army energy security and sustainability, recommended the Schofield Barracks site as an ideal location for cost-effective, secure renewable energy management. The proposed 10.3 acre site is located on federally-owned land that would be leased to Hawaiian Electric for construction, ownership, operation and maintenance of a biodiesel-fired power plant. Six Wartsila multi-fuel capable engines are projected to provide a combined power of about 50 megawatts (MW), which will be transferred into the local grid by a new 46 kilowatt (kW) transmission line. The liquid biofuel will be stored on site in two aboveground fuel storage tanks, which will provide storage for 1.6 million gallons of fuel. In addition to the engines, the site will also contain selective catalytic reduction and oxidation catalyst systems. Stormwater runoff from the diesel tanks and lubricating oil equipment areas at SGS will be routed into water collection sumps. These sumps will routinely be checked for contamination from the equipment and will occasionally be pumped through an on-site oil water separator system. Primary potential contaminants include fuel and oil from the biodiesel engines and their accompanying equipment. Non-contaminated water will be subjected to stormwater management through LID solutions. Trucks will transport toxic stormwater for off-site treatment at an appropriate wastewater disposal facility. (HECO 2103)

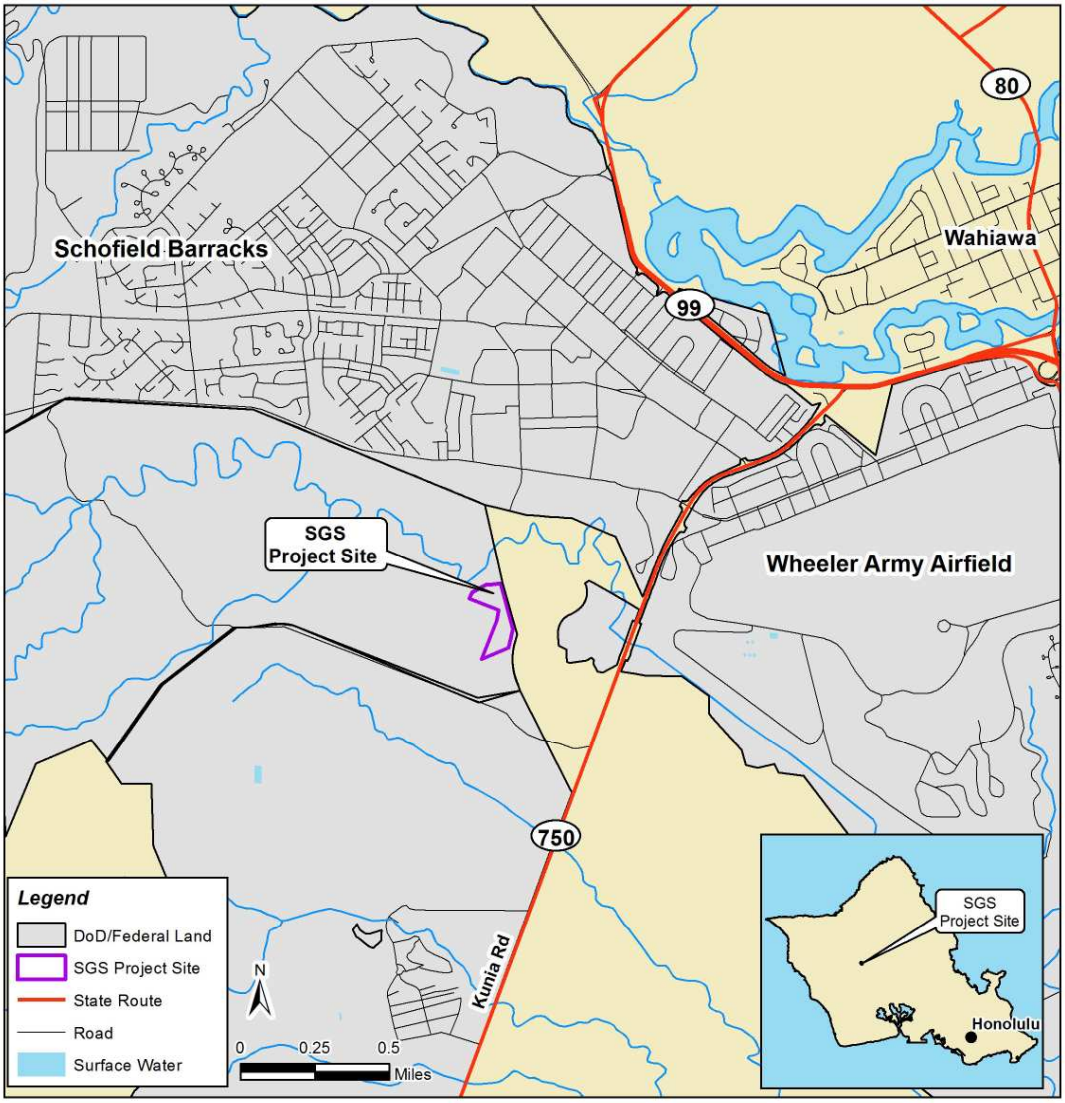


Figure 1-1: Location of proposed Schofield Generating Station

Based on UFC and the Army LID Policy, the Army encourages rainwater harvesting as a sustainable, land-efficient stormwater management option. The proposed SGSP RFP Appendix B Section 2.9 details water use for the site. Potable water will be used for the engine hall, control building, water treatment facility, sinks, men's and women's lavatories, showers, water fountains and emergency eyewash and shower stations. The potable water will be sourced from an existing U.S. Army Base potable water system (HECO 2013). The Initial Scope of Work Planning Package (ISOWPP) estimated that 500 gallons per day of City of Honolulu water would be necessary for service and potable needs for the site (USACE 2012). Per the Army policy updates from 2010, water harvesting will be studied for this site to determine if captured stormwater can be recycled for some of the proposed water uses in a cost-effective manner. In particular, this would help achieve the requirement of a 30 percent potable water reduction for indoor use and 50 percent reduction for outdoor use. This report will further discuss the volume of stormwater that could be captured and reused based on the site's climate and proposed impervious surfaces. Other LID options will also be analyzed to determine the optimal design for SGS.

1.4 RELEVANT LID PRINCIPLES

LID offers numerous benefits and advantages over the conventional approach to stormwater management. In short, LID is a more environmentally sound technology. LID protects environmental assets, protects water quality, and builds community livability by addressing runoff close to the source through intelligent site design to reduce volume and decentralize flows. This is usually best accomplished by creating a series of smaller retention or detention areas that allow localized filtration instead of carrying runoff to a remote collection area to be treated. The natural processes employed by LID practices allow pollutants to be filtered or biologically or chemically degraded before stormwater reaches local water bodies. Relevant LID practices to this study include bioretention BMPs and cistern BMPs for water reuse (Table 1-1).

Table 1-1: Summary of Stormwater Management Practices

Stormwater Management Practice	**Conventional Detention Pond**	**Bioretention and Infiltration Facilities**	**Rain Water Harvesting Cisterns**
Description	Basins designed to capture and slowly release runoff for flood control, channel protection, and water quality.	Basins designed to capture and infiltrate runoff. Engineered soils are often specified to improve infiltration and water quality.	Tanks designed to capture and store stormwater runoff. Water can be slowly drained or reused to offset potable water use.
Pollutant Removal Efficiency			
Sediment	Medium	High	N/A[1]
Metals	Low	High	
Hydrocarbons	Low	High	
Nutrients(TN & TP)	Low	Medium	
Bacteria	Medium	High	
Thermal Load	Medium	High	
Land Use Required	High	High	Low
Peak Runoff Attenuation	Yes	Yes	Yes
Runoff Volume Reduction	No	Yes	Yes
Costs	$-$$	$$-$$$	$-$$
Operation & Maintenance	Medium	Medium-High	Medium-High
LID concept	No	Yes	Yes
Help achieve Army goals for 30% indoor & 50% outdoor potable water reductions?	No	No	Yes

[1]Rainwater harvesting pollutant removal is difficult to quantify since the influent pollutant concentrations from roofs (typical drainage area) are typically low, so the pollutant concentrations entering cisterns are often irreducible.

2 APPROACH & ANALYSIS

The following section presents relevant hydrologic and hydraulic methodologies to address the regulatory requirements summarized in Section 1. Results in this section will be synthesized into compliance recommendations in Section 3.

2.1 EISA COMPLIANCE

This section describes methodology to characterize site hydrology and identify the most cost-effective option for EISA compliance. The EPA's Storm Water Management Model (SWMM), version 5.0, was used to characterize existing and proposed hydrologic conditions and the EPA's System for Urban Stormwater Treatment and Analysis Integration (SUSTAIN), version 1.2, model was used to simulate and optimize stormwater management practice performance. A detailed summary of model inputs and assumptions is provided in Appendix A.

2.1.1 BASELINE CONDITIONS

To evaluate runoff conditions and simulate prospective BMP performance for current and future conditions, several key data sets were processed and formatted for input into the model. The data sets required for this study were identified as land use (current and future), topography, soils, groundwater, and precipitation (Table 2-1).

Table 2-1: Model Input Data

Topography	
Proposed Site Area	10.3 acre
Proposed Site Impervious Area[1]	1.4 acre
Site Elevation Range AMSL[2]	860-886 feet
Average Site Slope	3.2%
Soils[3]	
Current Land Use	Cultivated
Existing Soil	HSG B
Minimum Infiltration Rate	0.2 inch/hour
Maximum Infiltration Rate	2.0 inch/hour
Average Saturated Hydraulic Conductivity	1 inch/hour
Climate Data[4]	
Precipitation Station	Wahiawa Dam 863
Temperature Station	Schofield East

[1] Based on conceptual plans; [2] Above Mean Seal Level (AMSL); [3] Obtained from the National Resources Conservation Services (NRCS) Soil Survey Geographic (SSURGO) database; [4] collected from National Climatic Data Center (NCDC) Climate Data Online

Soil borings conducted onsite confirmed SSURGO classification of site soils as clayey silts (HECO 2013). To ensure conservative analyses, the saturated hydraulic conductivity of site soils was assumed

equal to the minimum infiltration rate for HSG B soils (0.2 inch/hour), as recommended in SWMM User's Manual produced by EPA (Huber and Dickinson 1988). Both of the climate stations' data were combined due to their close proximity to each other and the proposed SGS site to create 11 years (2001-2011) of continuous temperature and precipitation data for modeling purposes. Pan evaporation rates were estimated for the site by averaging the evaporation rates measured at the three closest monitoring stations in Ekern and Change (1985). Pan evaporation was converted to reference evapotranspiration using the formula recommended in Snyder et al. (2005).These data were input to SWMM to generate runoff timeseries data for the baseline (predevelopment) conditions. Hydrology was simulated for an 11-year period from 2001 through 2011 and also for the 10-year, 24-hour average recurrence interval storm event and the 95th percentile storm event.

2.1.2 EISA OPTIONS

<u>EISA Option 1</u>
Option 1 for meeting EISA regulations requires that runoff from the 95th percentile storm be fully contained. Using the local precipitation data, the 95th percentile storm was calculated by sorting the available data from largest to smallest recorded precipitation over a 24-hour period then eliminating values less than or equal to 0.1 inch according to technical guidelines described in EPA's technical guidance document. A statistical analysis was performed on the organized data to find the 95th percentile storm.

To generate a conservative runoff estimate for comparison with Option 2, the impervious surface was assumed to have no depression storage in the Option 1 analysis. The effective BMP volume needed for treating a certain amount of increased imperviousness in a subwatershed was calculated as the area of the increased imperviousness in the conceptual site layout multiplied by the 95th percentile storm depth. For purpose of comparison, all runoff was assumed to be captured by an arbitrary BMP with a uniform surface storage depth of 4 feet (consistent with following Option 2 analyses). The total BMP volume required under Option 1 was compared to results from the following Option 2 analysis.

<u>EISA Option 2</u>
The SUSTAIN model in Option 2 provides a continuous simulation alternative to the 95th percentile storm approach under Option 1. During the continuous simulation, long-term rainfall characteristics, evapotranspiration from BMPs, and detention effects from BMPs are all considered. Runoff from subwatersheds is computed using hydrologic response unit (HRU) timeseries that were generated for each HRU using SWMM.

BMP Representation in SUSTAIN
Infiltration BMPs are effective measures to restore post-development runoff conditions to the predevelopment level. The SUSTAIN model can help quantify the hydrologic benefits from BMP implementation. As subwatershed runoff is routed through an infiltration BMP, porous spaces in BMPs provide total volume and peak flow reduction control. The degree of hydrologic benefit varies as the size of the BMPs change. As BMPs are implemented for continuous simulation, percolation of infiltrated water to the natural soil from the bottom of BMPs must be accounted for. In addition to infiltration BMPs, SUSTAIN simulates rainwater harvesting by using cisterns to capture runoff and control release through orifices. Cisterns can be sized to provide total volume and peak flow reduction control, and specific water volumes can be allocated for reuse for toilet flushing or irrigation, for example. For the purpose of comparing Option 1 to Option 2, runoff generated from the new impervious surfaces proposed

in the conceptual site layout was routed to an arbitrary infiltration BMP consistent with characteristics applied to Option 1 analysis.

Compliance Option Selection

The 95th percentile rainfall depth was calculated to be 1.8 inches (Figure 2-1), which equates to a required BMP storage volume of 0.21 acre-feet to capture and infiltrate all associated runoff from the new impervious surfaces proposed in the conceptual site layout (HECO 2013). Option 2 for meeting EISA regulations requires that future runoff conditions match the pre-development hydrology during long term simulation, and the resulting volume that would need to be captured by BMPs such that the site experiences no net increase in runoff is 0.31 acre-feet (Table 2-2). In order to meet EISA compliance in a cost-effective manner, Option 1 is the optimal criteria because it allows a 34% smaller BMP footprint than Option 2. The required treatment volume for the 95th percentile event is greater than local Honolulu water quality volume requirements (0.146 acre-feet from the 1-inch event, as calculated using the simple method), so the recommended EISA compliance strategy is assumed to satisfy local water quality requirements (City and County of Honolulu 2000).

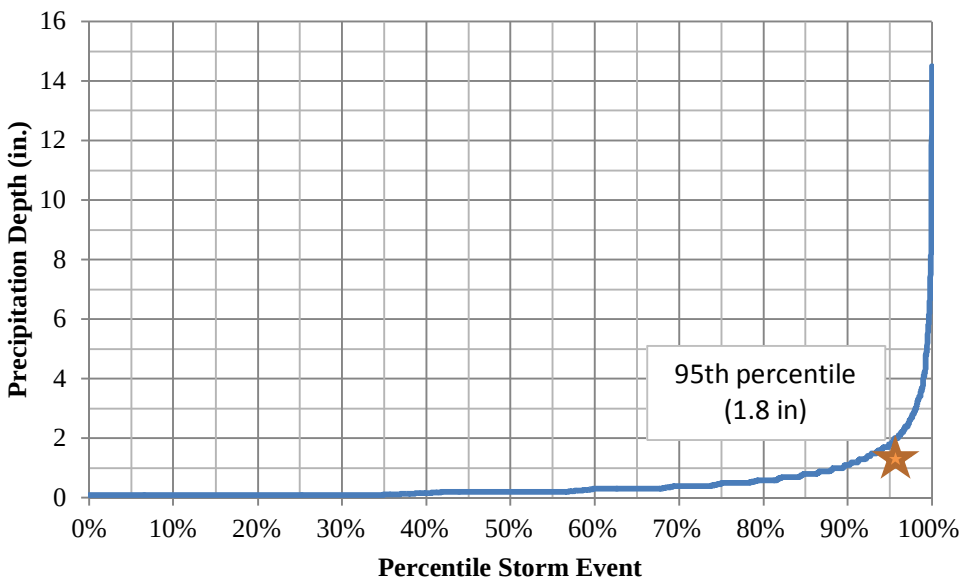


Figure 2-1. Percentile distribution of storm events at proposed SGS (excluding daily rainfall depths < 0.1 inch)

Table 2-2: EISA options comparison for compliance selection

	Option 1 (Retain Onsite 95th Percentile Volume)	Option 2 (Match Predevelopment Hydrology)
Required Storage Volume for Compliance (Arbitrary BMP[1])	0.21 acre-feet	0.31 acre-feet
Normalized BMP Footprint for Compliance (Arbitrary BMP[1])	0.037 acre / acre impervious	0.056 acre / acre impervious

[1]Assumes infiltration into native soils from arbitrary infiltration basin with uniform surface storage depth of 4 feet

2.1.3 EISA COMPLIANCE ALTERNATIVES

The following design options are proposed alternative solutions for stormwater management at the proposed SGS site. Based on modeling results, the two alternative designs were compared to select a best design that is compliant with EISA Option 1, cost-effective for stormwater management, and promotes the Army's goal for a sustainable future.

Alternative 1 – Centralized Infiltration Basin

Original proposed site plans from Hawaiian Electric include a detention pond as the sole design for stormwater management on the proposed SGS site. While this design would capture volume from the proposed impervious surface and reduce stormwater peak discharge, it would provide little *volume* reduction and water quality improvement; therefore, it would not meet EISA requirements. To achieve compliance with EISA Option 1 and provide enhanced water quality treatment, aesthetics, and sustainability, the proposed detention pond was adapted to function as an infiltration basin in Alternative 1. The facility would capture water on the surface and rely on infiltration into native soils. Surface soils would be tilled to a depth of 12 to 24 inches and amended with at least 2 inches of organic or mineral topsoil amendments per USEPA (2011) to enhance the physical structure and the chemical and biological properties critical to infiltration. To determine the most cost effective configuration, SUSTAIN's optimization algorithm was configured to adjust the ponding depth and surface area of the infiltration facility until the minimum cost design (compliant with Option 1) was identified.

Alternative 2 – Distributed LID BMPs

The Alternative 2 design consists of a combination of LID practices (namely bioretention and rainwater harvesting cisterns) distributed throughout the site. SUSTAIN was used to optimize BMP size with the goal of balancing costs and effectiveness for stormwater management. Modeled under this alternative would be multiple BMPs that could be grouped or spread throughout the site to capture runoff and treat it efficiently.

Comparison of Alternatives

Figure 2-2 illustrates the results of modeling Alternative 1 and Alternative 2. Alternative 1 was predicted to cost approximately 18% less than Alternative 2 based on planning-level construction cost functions.

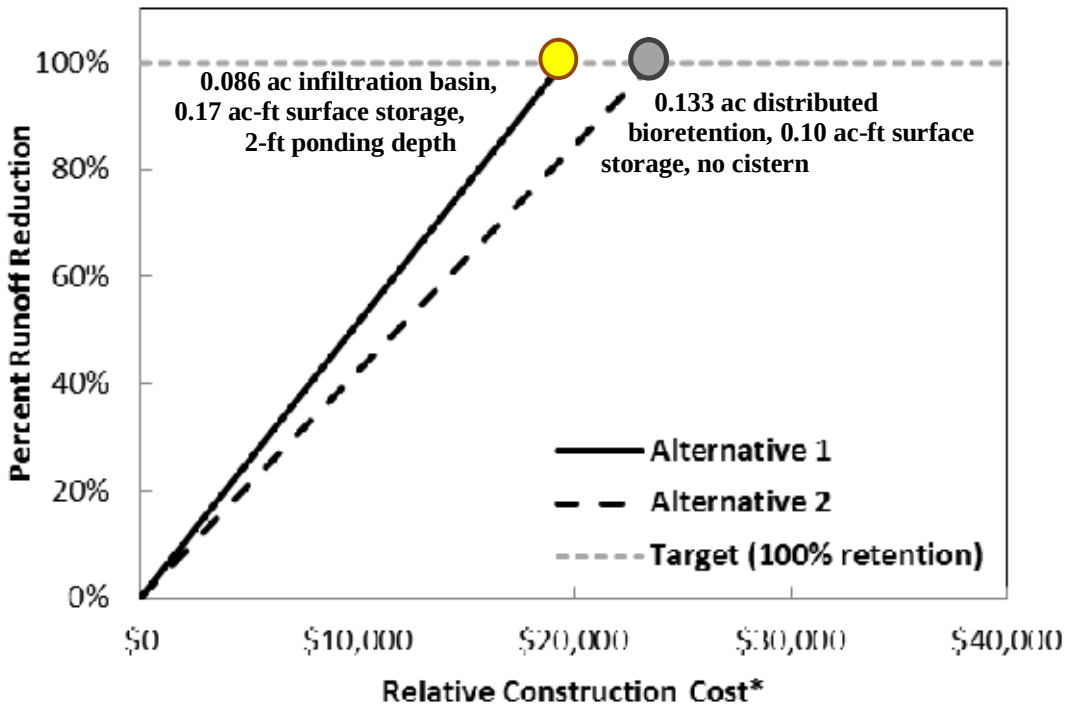


Figure 2-2. Cost effectiveness comparison between Alternative 1 and Alternative 2. *Modeled construction cost functions are relative and should not be used for engineering cost estimation.

2.2 CITY AND COUNTY OF HONOLULU STORM DRAINAGE STANDARDS COMPLIANCE

Additional retention volume will be required to comply with local flood control standards. Per City and County of Honolulu Rules Relating to Storm Drainage Standards (2000), the proposed BMP must be sized to maintain predevelopment runoff volume and discharge from the 10-year design storm event. For discharge-based analyses, the design storm duration should be equivalent to the time of concentration (the duration required for runoff to reach the drainage area outlet from the most hydraulically remote point). The time of concentration for the site was 5 minutes, as calculated using the methods in City and County of Honolulu Rules Relating to Storm Drainage Standards (2000) and the corresponding adjusted 10-year rainfall intensity was 7.6 inch/hour. Runoff coefficients were selected from Table 1 in City and County of Honolulu Rules Relating to Storm Drainage Standards (2000) and the rational method was used to predict the design storm peak discharge from predevelopment and developed conditions. Results are summarized in Table and a detailed summary of model inputs and assumptions is provided in Appendix A.

In addition to discharge, the volume of runoff from the design storm must also be maintained at or below predevelopment conditions to satisfy local regulations. For volume-based analyses, a design storm duration of 1-hour was selected because it is featured prominently throughout the City and County of Honolulu Rules Relating to Storm Drainage Standards (2000). To fully retain and infiltrate the excess

runoff volume from the 10-year design storm associated with post-development conditions, 0.241 acre-feet of surface storage would be required, as summarized in Table 2-3.

Table 2-3. Results of Rational method analyses relating to local flood control requirements

Flow Based Analysis	
Predevelopment 10-year, 5-minute Runoff Discharge	15.7 cfs
Post-development 10-year, 5-minute Runoff Discharge	23.5 cfs
Excess Runoff Discharge	7.8 cfs
Volume-Based Analysis	
Predevelopment 10-year, 1-hour Runoff Volume	0.472 acre-feet
Post-development 10-year, 1-hour Runoff Volume	0.713 acre-feet
Excess Runoff Volume	0.241 acre-feet

2.3 ARMY LID POLICY COMPLIANCE

As previously discussed, Army LID policy updates require the consideration of rainwater harvesting and reuse in all new designs. Furthermore, a 30% reduction in indoor water use and 50% reduction in outdoor water use are mandated under these directives. In order to meet these policies, rainwater harvesting was analyzed as an alternative solution to the proposed water line. According to the Hawaiian Electric RFP, the project is expected to use approximately 500 gallons of service and potable water uses. Currently, the water is to be piped in from a future 2-inch water line in conjunction with the proposed wastewater lift station.

The North Carolina State University Rainwater Harvester Model (NCSU 2008) was used to simulate various long-term continuous water reuse scenarios. Eleven years of rainfall data from 2001 to 2011 were used to drive the model and it was assumed that rooftop runoff would be collected from the approximately 15,000 square foot metal roof of the engine hall specified in the conceptual site layout (HECO 2013). An effectiveness curve was generated comparing cistern size to potable (municipal) water use reduction. The cost-effective cistern volume to comply with Army directives was selected from this curve.

A 30-year ROI analysis was performed assuming an annual linear increase in unit water prices. Future water prices were projected based on published historic rates and fees for nonresidential purposes provided at Honolulu Board of Water Supply (2013). Captured water could be used for toilet/water closet use, irrigation, equipment washing, and possibly emergency firefighting water supply. Filtration and disinfection systems can be used treat harvested water for potable use, but the majority of demand tends to be non-potable.

3 RECOMMENDATIONS

The following design options are proposed solutions for compliance with EISA (2007), City and County of Honolulu Storm Drainage Standards (2000), and Army LID Policy (2010a) at the proposed SGS site.

3.1 EISA COMPLIANCE RECOMMENDATIONS

Analyses summarized in Section 2.1.3 indicated that Alternative 1 (centralized infiltration basin) would likely offer the most cost-effective solution for compliance with EISA Option 1. Figure 3-1 predicts the required infiltration basin footprint depending on the actual imperviousness in the final site plans (the conceptual site layout used for preceding calculations was considered the baseline condition). Note that the required storage volume is greater than the volume indicated in

Table 2-2 because these analyses used the optimum ponding depth of 2 feet (versus the arbitrary 4-foot ponding depth used for comparison of Option 1 and Option 2). The required infiltration basin footprint for the baseline condition is 0.086 acre 67% smaller than the detention basin shown on the current conceptual site layout; HECO 2013).

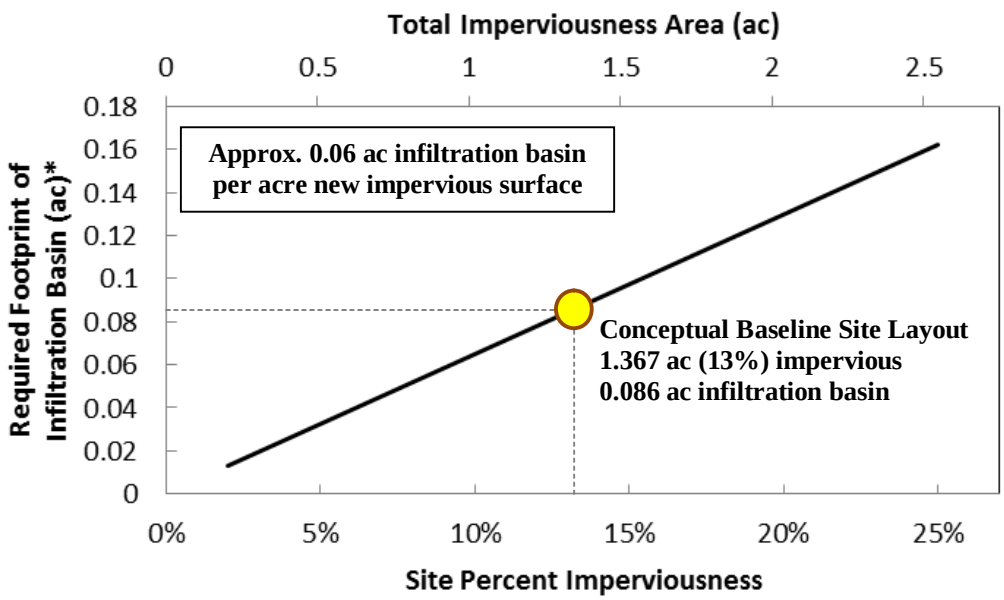


Figure 3-1. Predicted infiltration basin footprint required to retain 95th percentile runoff volume from new impervious surfaces. *Assumes 2-foot surface ponding depth and infiltration into native soils tilled to a depth of 12-24 inches and amended with 2 inches of mineral or organic topsoil amendment.

3.2 CITY AND COUNTY OF HONULULU STORM DRAINAGE STANDARDS COMPLIANCE RECOMMENDATIONS

The retention volume for compliance with local flood control standards (0.24 acre-feet) exceeds the retention volume required for EISA compliance (0.17 acre-feet); therefore, the excess flood control volume (0.071 acre-feet) must be added to the infiltration basin. This additional volume translates to increasing the depth of the proposed basin by 0.83 feet to a total depth of 2.83 feet or increasing the footprint of the basin by 0.036 acre (as illustrated in Figure 3-2 based on the baseline conditions in the current conceptual site layout provided in the Hawaiian Electric RFP dated May 1, 2013). It is recommended that the footprint of the basin be increased in order to maximize the surface area available for infiltration. Flood control retention volume sizing will vary depending upon the final site layout, routing, and preferred infiltration basin design configuration.

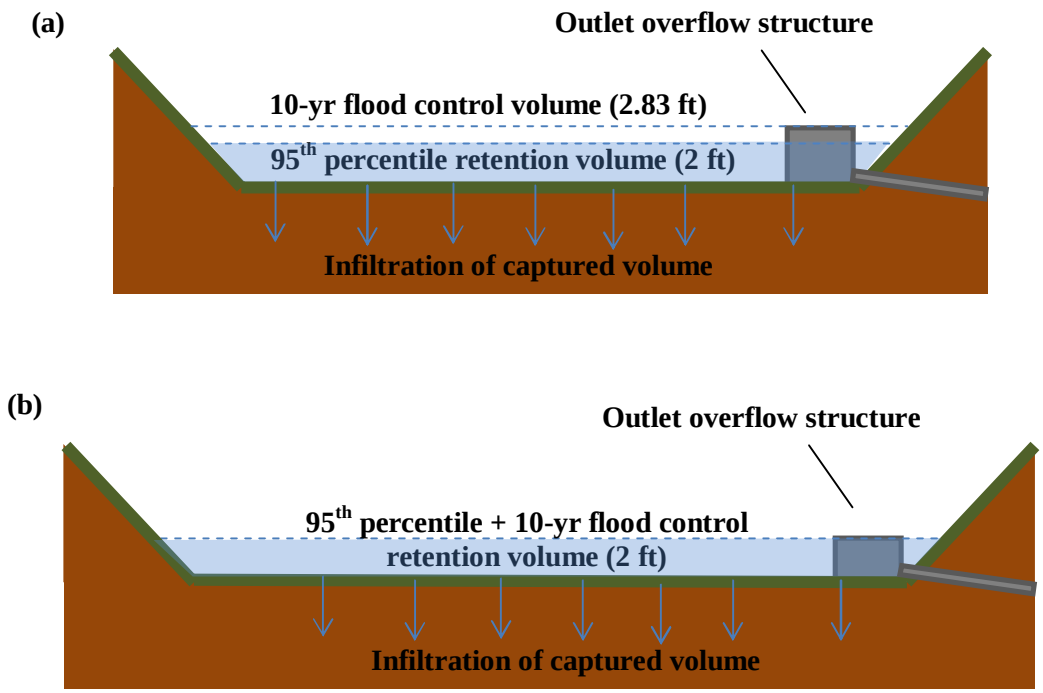


Figure 3-2. Conceptual schematic of possible basin configurations for EISA and flood control compliance, including (a) increased surface ponding depth and (b) increased footprint (recommended). Not to scale.

3.3 ARMY LID POLICY COMPLIANCE RECOMMENDATIONS

Results of rainwater harvesting and reuse optimization modeling are shown in Figure 3-2. The optimum rainwater harvesting solution was predicted to offset 71% of water demand at the facility with no backup (municipal) water (although a backup system is recommended to ensure consistent supply during dry periods).

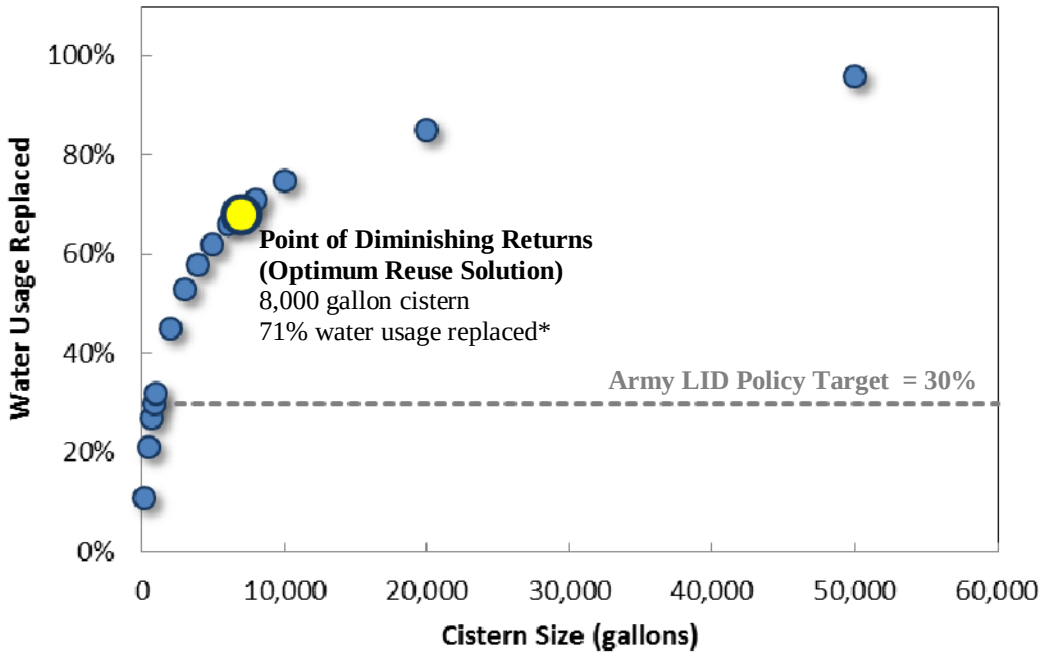


Figure 3-2. Rainwater harvesting and reuse cost effectiveness curve. *Assumes no backup water supply

Because a backup water system will likely be installed to ensure consistent supply, the 8,000-gallon cistern was modeled with a backup water supply, and Figure 3-3 was generated based on extrapolation of Honolulu water cost data (including projected increased costs). The approximate payback period for the optimal cistern size is 11 years.

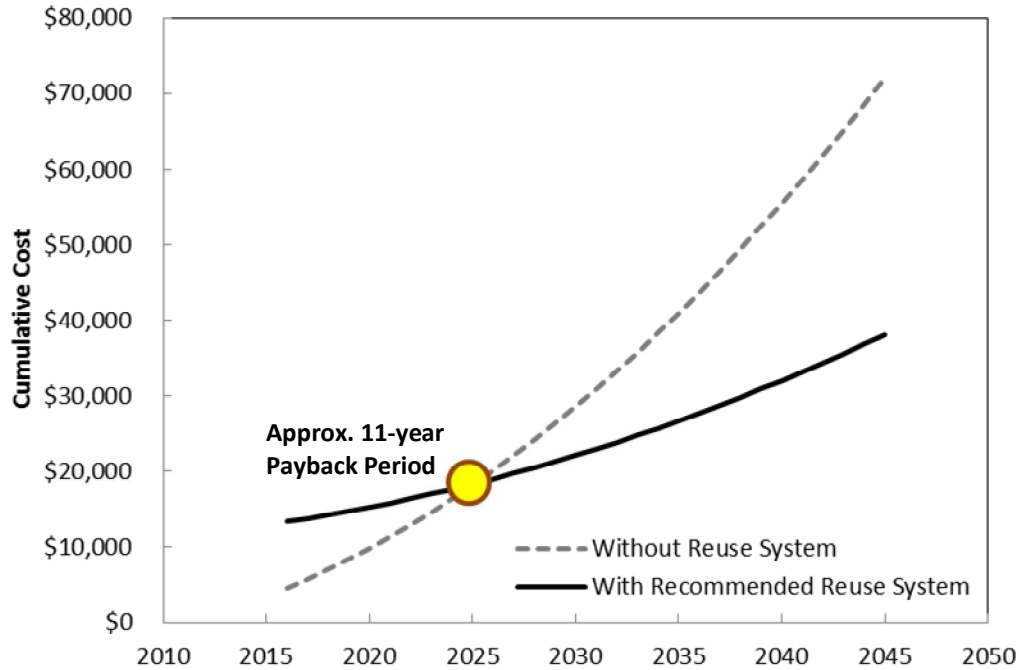


Figure 3-3. 30-year ROI analysis for rainwater harvesting and reuse system.

3.4 SUMMARY OF COMPLIANCE RECOMMENDATIONS

Table 3-1 synthesizes the design configuration that, based on modeling results, would comply with EISA Option 1, meet City and County of Honolulu Storm Drainage Standards for flood control, and follow Army's LID policies on a 30% potable water reduction through to rainwater harvesting. The design configuration of an infiltration basin and cisterns will provide cost-effective stormwater management while promoting the Army's goal of a sustainable future.

Table 3-1. Recommended compliance solution for retaining 95th percentile runoff volume from new impervious surface. New pervious surfaces were assumed to generate no net increase in runoff volume.

	Infiltration Basin[1]			Rainwater Harvesting Cistern
	Min.	Baseline	Max.	
Impervious Drainage Area[2]	0.61 acre (6% of site)	1.4 acre (13% of site)	2.1 acre (21% of site)	0.35 acre rooftop (3.4% of site)
Surface Storage Volume[3]	0.11 acre-feet	0.24 acre-feet	0.36 acre-feet	8,000 gallon
Footprint[3]	0.052 acre	0.12 acre	0.18 acre	varies
Surface Ponding Depth	2 feet			

[1]Assumes amendment of native soils with 2 inches of loamy sand or organic topsoil and ripping or tilling soils to a depth of 12-24 inches.

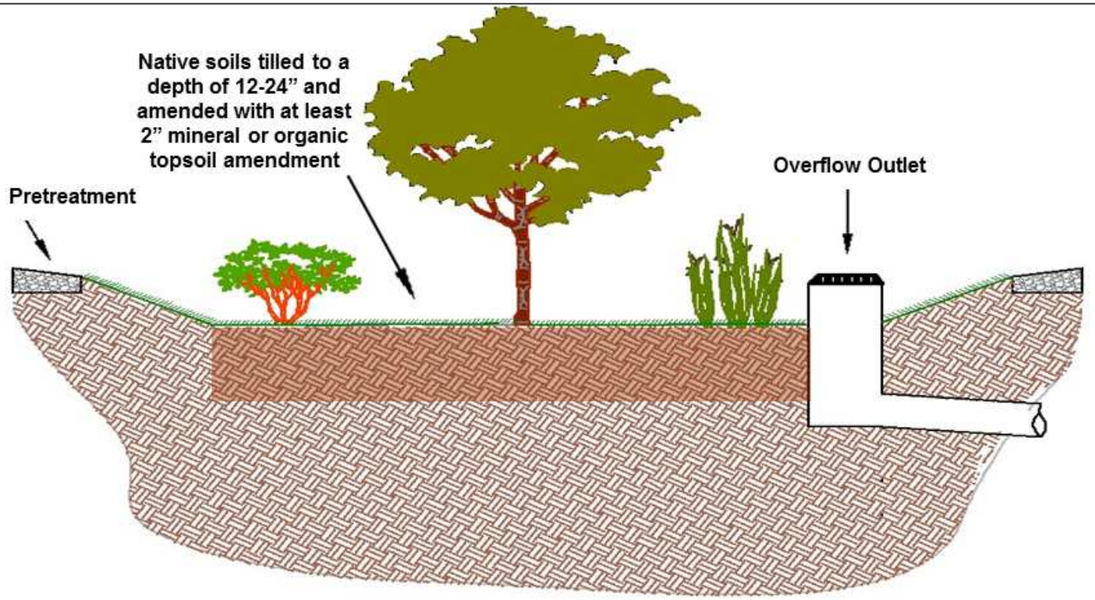
[2]To ensure capture of the 95th percentile runoff volume, the drainage area to the infiltration basin includes rooftop area that directly drains to cistern. In the event that the cistern is full or taken offline for maintenance, the recommended basin dimensions will have sufficient volume to capture the 95th percentile runoff volume from all new impervious surfaces and maintain compliance with EISA criteria.

[3] Surface storage volumes and footprints include additional volume and area for City and County of Honolulu Storm Drainage Standards compliance.

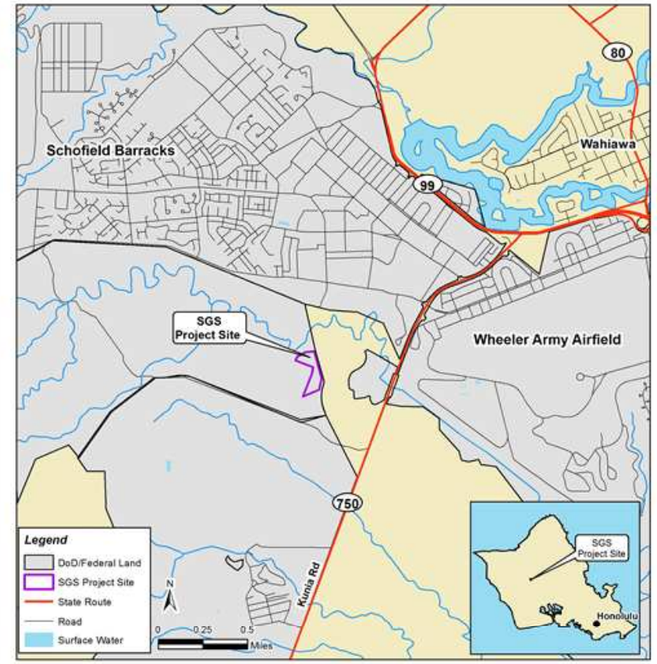
BMP FACT SHEETS

The following fact sheets can be used to guide preliminary and final design of stormwater control and LID features at the SGS site.

BMP Factsheet 1 – Infiltration Basin
EISA COMPLIANCE – ALTERNATIVE 1
SITE: PROPOSED SCHOFIELD GENERATING STATION, U.S. ARMY GARRISON, HAWAII



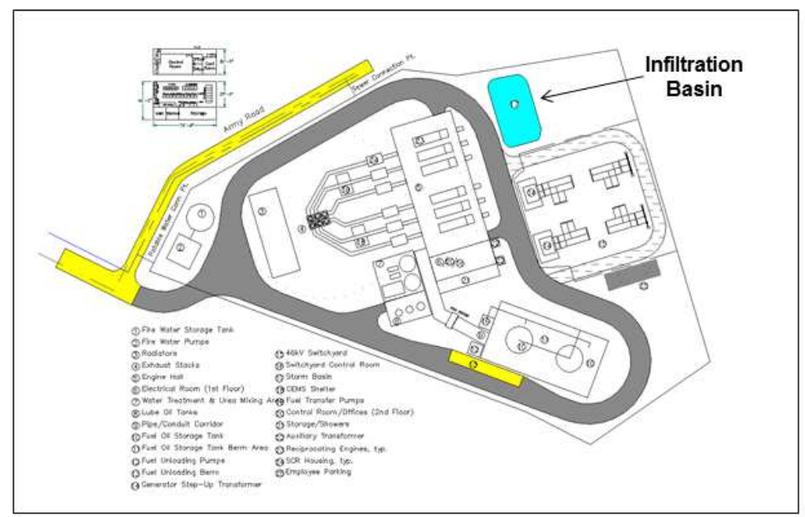
Conceptual Infiltration Basin Side Profile



INFILTRATION BASIN SPECIFICATIONS	
Impervious Drainage Area	1.4 ac (13% of site)
Normalized BMP Footprint for Compliance	0.06 ac / ac impervious
Infiltration Basin Footprint*	0.12 ac
Surface Ponding Depth	2 ft
Surface Storage Volume	0.24 ac-ft
BMP Dimensions	0.12 ac basin with 2 foot ponding depth

Proposed BMP Considerations:
Infiltration basins provide stormwater management by providing large storage area for volume and peak flow control. A pretreatment area allows for stormwater runoff to first be treated through energy dissipation and sediment settling. Pretreatment is typically provided by rocky forebays or vegetated swales and filter strips. Infiltration basins should be routinely maintained and inspected for optimal performance. The basin should include emergency overflow structures for high volume storm and/or frequent events. Surface soils should be amended with at least 2 inches of organic or mineral topsoil amendment, and the soils should be ripped or tilled to a depth of 12 to 24 inches to enhance infiltration and ensure establishment of native plants.

* Infiltration basin footprint includes 0.036 ac for 10-yr storm event excess runoff per City and County of Honolulu Storm Drainage Standards Compliance



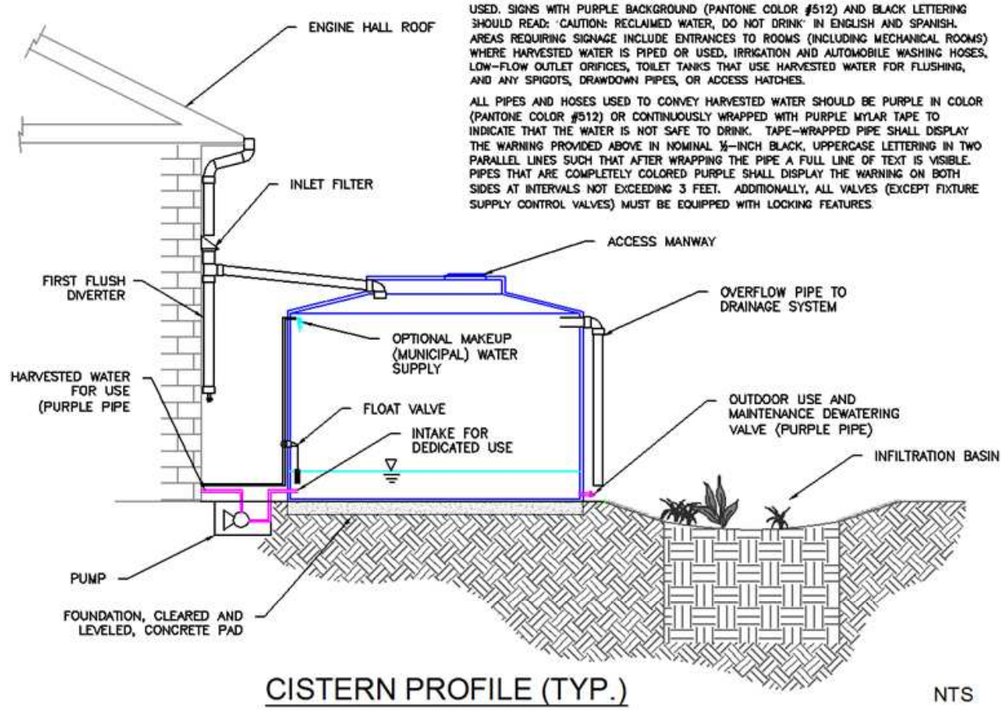
Top Image: Site Location on Oahu Island in Hawaii;
Bottom Image: Proposed Site Plan for Schofield Generating Station

BMP FACTSHEET 2 – RAINWATER HARVESTING
ARMY LID POLICY COMPLIANCE
SITE: PROPOSED SCHOFIELD GENERATING STATION, U.S. ARMY GARRISON, HAWAII

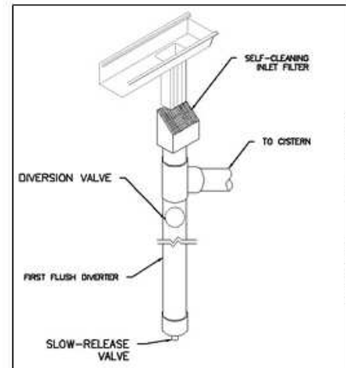
NOTES: CAUTIONARY SIGNAGE, PIPE COLOR, AND LOCKING FEATURES

CLEAR AND OBVIOUS SIGNAGE MUST BE PROVIDED WHEREVER HARVESTED RAINWATER IS USED. SIGNS WITH PURPLE BACKGROUND (PANTONE COLOR #512) AND BLACK LETTERING SHOULD READ: 'CAUTION: RECLAIMED WATER, DO NOT DRINK' IN ENGLISH AND SPANISH. AREAS REQUIRING SIGNAGE INCLUDE ENTRANCES TO ROOMS (INCLUDING MECHANICAL ROOMS) WHERE HARVESTED WATER IS PIPED OR USED, IRRIGATION AND AUTOMOBILE WASHING HOSES, LOW-FLOW OUTLET ORIFICES, TOILET TANKS THAT USE HARVESTED WATER FOR FLUSHING, AND ANY SPIGOTS, DRAWDOWN PIPES, OR ACCESS HATCHES.

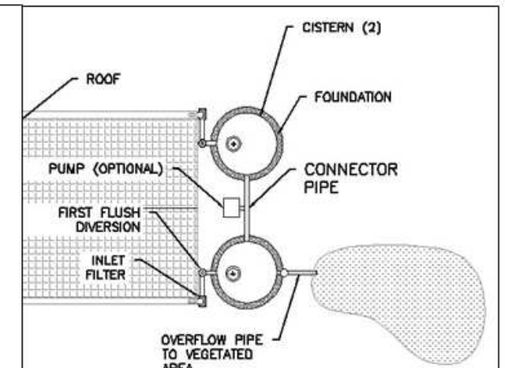
ALL PIPES AND HOSES USED TO CONVEY HARVESTED WATER SHOULD BE PURPLE IN COLOR (PANTONE COLOR #512) OR CONTINUOUSLY WRAPPED WITH PURPLE MYLAR TAPE TO INDICATE THAT THE WATER IS NOT SAFE TO DRINK. TAPE-WRAPPED PIPE SHALL DISPLAY THE WARNING PROVIDED ABOVE IN NOMINAL ½-INCH BLACK, UPPERCASE LETTERING IN TWO PARALLEL LINES SUCH THAT AFTER WRAPPING THE PIPE A FULL LINE OF TEXT IS VISIBLE. PIPES THAT ARE COMPLETELY COLORED PURPLE SHALL DISPLAY THE WARNING ON BOTH SIDES AT INTERVALS NOT EXCEEDING 3 FEET. ADDITIONALLY, ALL VALVES (EXCEPT FIXTURE SUPPLY CONTROL VALVES) MUST BE EQUIPPED WITH LOCKING FEATURES.



CISTERN PROFILE (TYP.) NTS



PRETREATMENT DETAIL (TYP) NTS



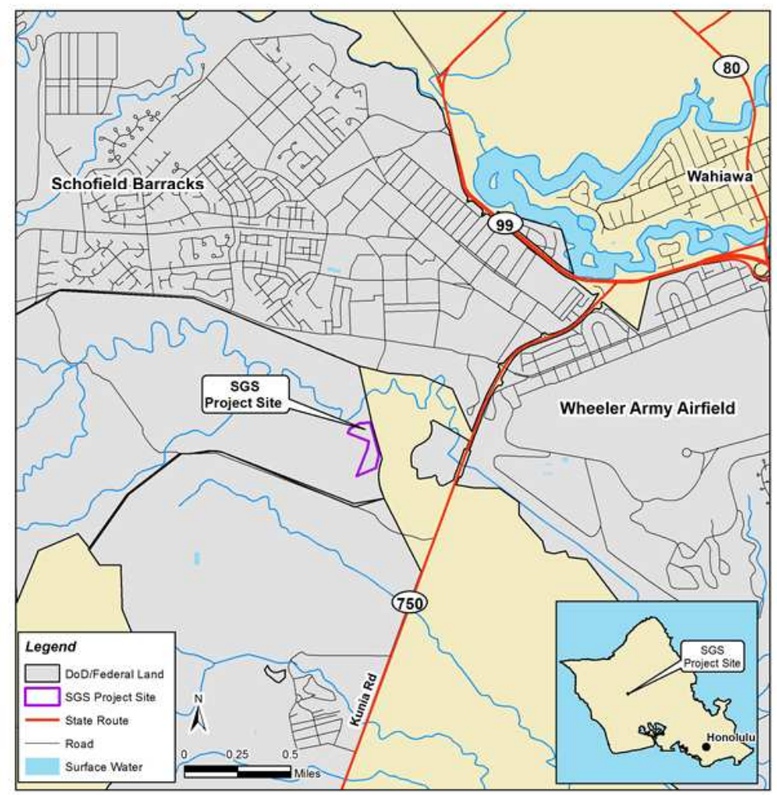
CISTERN PLAN VIEW (TYP) NTS

WATER USE STATISTICS			
Anticipated Potable/ Service Water Demand	500 gal/day	Army Indoor Water Use Reduction Goal	30%
Return on Investment Payback Period	11 years*	Average Annual Water Use Offset by Cistern	71%
Anticipated Water Uses	Lavatory flushing, building and equipment washing, sinks, showers.		

RAINWATER HARVESTING CISTERN SPECIFICATIONS	
Impervious Drainage Area	0.35 ac (3.4% of site) rooftop of engine hall
Cistern Storage Capacity	8,000 gal
BMP Dimensions	Sizing will vary based on final site design plans.

Proposed Retrofit Consideration:
Cisterns should be placed near a roof downspout, but can also be located remotely if a "wet conveyance" configuration is used. The structural capacity of soils should be investigated to determine whether a concrete foundation is needed; generally concrete is required for cisterns exerting greater than 2,000 pounds per square foot. Cisterns are available commercially in numerous sizes, shapes, and materials. The configuration will be determined by available space, intended reuse strategy, and aesthetic preference. An overflow mechanism is important to prevent water from backing up onto rooftops—overflow should be conveyed in a safe direction away from building foundations. Filtration and disinfection systems are commercially available.

*Based on planning-level cost estimate and projected annual increases in Honolulu municipal water unit prices and fees



General site area in relation to Schoefield Barracks; Site location on Oahu Island in Hawaii

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Appendix A. HYDROLOGIC INPUTS & ASSUMPTIONS

This Appendix presents relevant assumptions, inputs, and calculations to support the findings in the preceding report. All hydrologic calculations are based on the data available and should be verified with onsite testing. Assumptions and calculations should be adjusted to reflect the final site layout.

A.1 SWMM LAND SIMULATION ANALYSES

The following inputs were used to generate runoff timeseries data for predevelopment and developed land use conditions. Runoff timeseries files represent runoff generated from a given hydrologic response unit (HRU) over a specified climatic period; these files were ultimately used to drive hydrologic analysis scenarios in SUSTAIN. Tables A1-A5 present the relevant hydrologic inputs and assumptions

Table A2. Input hydrologic parameters for predevelopment HRU runoff timeseries generation

Predevelopment Input Land Parameters – Pineapple Plantation		**Unit**	**Source/Assumption**
Area	1	ac	Time series generated on a per-acre unit basis
Site width	152	ft	Scaled proportionally to actual site length of 430 ft
Slope	3.2	%	Contours in conceptual site plan
Imperviousness	0	%	
Surface Roughness Manning's N	0.13		Range (natural), EPA SWMM Manual
Depressional Storage Depth	0.2	in	Pasture, EPA SWMM Manual
Infiltration Method	Horton		
Horton Max. infiltration	2.0	in/hr	Based on silty HSG B soils from NRCS SSURGO, as verified by site-specific geotechnical analysis from RFP; Wanielista, Kersten, and Eaglin (1997); and Viessman and Lewis (2003)
Horton Min. Infiltration	0.2	in/hr	Based on silty HSG B soils from NRCS SSURGO, as verified by site-specific geotechnical analysis from RFP; Wanielista, Kersten, and Eaglin (1997); and Viessman and Lewis (2003)
Horton Decay Rate Constant	4	/hr	Based on silty HSG B soils from NRCS SSURGO, as verified by site-specific geotechnical analysis from RFP; Wanielista, Kersten, and Eaglin (1997); and Viessman and Lewis (2003)

Table A3. Input hydrologic parameters for generation station engine hall roof HRU runoff timeseries generation

Developed Land Parameters – Engine Hall Roof		Unit	Source/Assumption
Area	1	ac	Time series generated on a per-acre unit basis
Site width	209	ft	Assumed square HRU
Slope	15	%	Scaled from conceptual building layout in RFP
Imperviousness	100	%	
Surface Roughness Manning's N	0.011		Smooth metal roof, EPA SWMM Manual
Depression Storage Depth	0.01	in	EPA SWMM Manual
Infiltration Method	Curve Number		
Runoff Curve Number	98		Impervious

Table A4. Input hydrologic parameters for all other impervious HRU (driveways, parking lots, utility structures) runoff timeseries generation

Developed Land Parameters – Other Impervious		Unit	Source/Assumption
Area	1	ac	Time series generated on a per-acre unit basis
Site width	209	ft	Assumed square HRU
Slope	3.2	%	Assumed average site slope was maintained
Imperviousness	100	%	
Surface Roughness Manning's N	0.011		Smooth metal roofs and smooth asphalt, EPA SWMM Manual
Depressional Storage Depth	0.05	in	EPA SWMM Manual
Infiltration Method	Curve Number		
Runoff Curve Number	98		Impervious

Table A5. Climatology and precipitation inputs

Input	Resolution	Period	Source
Precipitation – Long Term	Hourly	01/01/2001-12/31/2011	NCDC, Wahiawa Dam Weather Station
Precipitation – Design Storm	Hourly	24 hours	Distributed design storm depth over 24-hr period using Type I rainfall distribution
Temperature	Daily minimum/ maximum	01/01/2001-12/31/2011	NCDC, Schofield Barracks Weather Station
Wind Speed	n/a	n/a	Assumed 0, SWMM default

Table A6. Mean daily pan evaporation (in/day) from three closest monthly pan evaporation stations (815.00, 820.20, 851.00; Ekern and Chang 1985)

Jan	Feb	Mar	Apr	May	Jun
0.144	0.163	0.186	0.199	0.226	0.257
Jul	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
0.256	0.255	0.228	0.192	0.153	0.134

A.2 SUSTAIN ANALYSES

SUSTAIN was used to simulate BMP hydrologic performance, compare EISA Option 1 and Option 2, and as a decision support tool for determining the cost-effective BMP configuration. The following site-specific assumptions were incorporated into the modeling framework.

Table A7. Input parameters for SUSTAIN modeling of infiltration BMPs

BMP Parameter	Input		Unit	Source/Assumption
	Infiltration Basin	Bioretention		
Width	75	10	ft	Arbitrary, detention basin width from conceptual site layout
Length	Varied (0-150)	Varied (0-4200)	ft	Decision variable for optimization, range reflects available implementation area at proposed project site
Overflow Outlet Height	Varied (1-4)	0.75	ft	Outlet height was a decision variable for infiltration basin optimization; 9 inches represents recommended average ponding depth for bioretention
Weir Width	36		ft	Arbitrary, assumed flow will not be limited by outlet hydraulics
Soil Media Depth	2		in	Assumed amend top 2-inches with sandy loam topsoil
Soil Media Porosity	0.35		vol/ vol	Based on Brown et al. 2013
Soil Media Field Capacity	0.25		vol/ vol	Based on Brown et al. 2013
Soil Media Wilting Point	0.1		vol/ vol	Based on Brown et al. 2013
Underlying Soil Saturated Hydraulic Conductivity	0.2		in/hr	Minimum in range given by NRCS, as recommended in EPA SWMM Manual
Infiltration Method	Horton			
Horton Max. infiltration	2.0		in/hr	Based on silty HSG B soils from NRCS SSURGO, as verified by site-specific geotechnical analysis from RFP; Wanielista, Kersten, and Eaglin (1997); and Viessman and Lewis (2003)
Horton Min. Infiltration	0.2		in/hr	Based on silty HSG B soils from NRCS SSURGO, as verified by site-specific geotechnical analysis from RFP; Wanielista, Kersten, and Eaglin (1997); and Viessman and Lewis (2003)
Horton Decay Rate Constant	4		/hr	Based on silty HSG B soils from NRCS SSURGO, as verified by site-specific geotechnical analysis from RFP; Wanielista, Kersten, and Eaglin (1997); and Viessman and Lewis (2003)

Table A8. Input parameters for SUSTAIN modeling of cisterns

BMP Parameter – Infiltration Basin		Unit	Source/Assumption
Width	30	ft	Arbitrary
Length	Varied (0-80)	ft	Based on available area along engine hall
Overflow Outlet Height	10	ft	Arbitrary
Weir Width	1	ft	Arbitrary, assumed flow will not be limited by outlet hydraulics
Daily Use	500	gal/day	Based on anticipated potable/service water use specified in RFP

Table A9. Mean daily reference evapotranspiration (in/day) derived from three closest monthly pan evaporation stations (815.00, 820.20, 851.00; Ekern and Chang 1985). Derived using methods in Snyder et al. (2005).

Jan	Feb	Mar	Apr	May	Jun
0.116	0.131	0.149	0.158	0.178	0.200
Jul	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
0.200	0.199	0.180	0.153	0.123	0.108

A.3 LOCAL FLOOD CONTROL & WATER QUALITY VOLUME HYDROLOGIC & HYDRAULIC ANALYSES

The following calculations summarize flood control analyses per recommended methods in City and County of Honolulu Rules Relating to Storm Drainage Standards (2000).

Recurrence interval of 10 years used since the contributing drainage area to the storm water facility is less than 100 acres. Rational method used since the contributing drainage area to the storm water facility is less than 100 acres.

Average 10-year, 1-hour rainfall intensity for site area = 2.75 in/hr (Plate 1)

Runoff coefficient determined by assuming C = 0.95 for impervious areas and C = 0.20 for existing areas.
Pre-development runoff coefficient = 0.20 (Table 1 – Band 4)
Post-development impervious surface = 1.4 acres
Post-development pervious surface = 8.9 acres
Composite post-development runoff coefficient revised = 0.30

Time of concentration (use Plate 5)
Use lower curve (areas with little or no cover)
L = 811 feet
S = 0.032
K = 4,531
Tc = 5 minutes

Design rainfall intensity (use Plate 4)
Average rainfall intensity (from Plate 1) x Correction Factor (from Plate 4)

Design rainfall intensity = 2.75 in/hr x 2.75
Design rainfall intensity = 7.6 in/hr (for 5 minute duration)

Pre-development Q10 = (0.20) x (7.6 in/hr) x (10.3 ac)
Pre-development Q10 = 15.7 cfs

Post-development Q10 = (0.30) x (7.6 in/hr) x (10.3 ac)
Post-development Q10 = 23.5 cfs

If peak flow mitigation is required, then the 10-year peak flow must be mitigated from 23.5 cfs to 15.7 cfs or lower.

*** To determine the required detention volume, the 1-hour rainfall duration was selected for the volumetric calculations since the 1-hour storm is prominently featured in the regulations.

Pre-development 10-year runoff volume = (0.20) * 2.75 in * 10.3 acre
Pre-development 10-year runoff volume = 0.472 acre-feet

Post-development 10-year runoff volume = (0.30) * 2.75 in * 10.3 acre
Post-development 10-year runoff volume = 0.708 acre-feet

*** This analysis approach results in an excess runoff volume of 0.236 acre-feet

This excess runoff volume total is greater than the previously calculated 95th percentile volume of 0.17 acre-feet.

Per the Hawaii regulations, the water quality storage volume is calculated as follows.
WQV = P x C x A x 3630
P = 1 inch
C = 0.05 + 0.009 (% Impervious) = 0.17
A = 10.3 acres
WQV = 6,356 cubic feet
WQV = 0.146 acre-feet

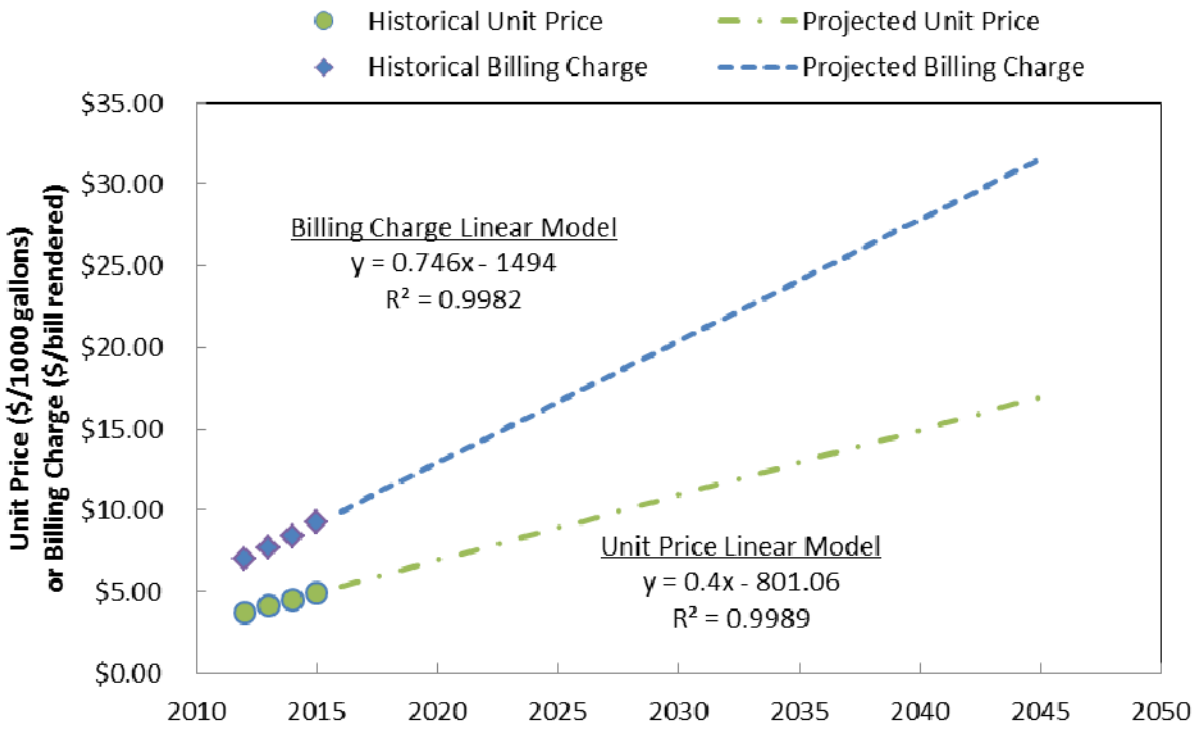
Assumptions

- Site does not drain to sump condition or roadway culvert
- Though downstream conveyance facilities are not known to be significantly under capacity, detention storage has been provided to mitigate the 10-year post-development peak flow to pre-development 10-year peak flow level.
- All offsite drainage to the project site area should be diverted around the proposed storm water BMP facility. Only flow from the project site should drain to the facility.
- It is unlikely that the pre and post-development slope and flow lengths would be exactly the same. These assumptions were made based on a lack of information regarding the proposed developed site. The calculations should eventually be updated based upon the proposed site design.

Drainage area values are the same for pre and post-developed conditions, indicated no diversion of area to or from the project site as a result of development. This assumption should be verified upon review of the proposed site design.

A.4 RAINWATER HARVESTING – FUTURE MUNICIPAL WATER COST PROJECTIONS

The following figure presents the projection of future municipal water costs based on historical data provided by Honolulu Board of Water Supply. These projected costs were used to calculate the return on investment from implementing a rainwater harvesting system.



A.5 REFERENCES

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Appendix F

Agency Coordination under Section 7 of the Endangered Species Act

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DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
745 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Office of the Garrison Commander

Mr. Paul Henson
Acting Field Supervisor
US Fish and Wildlife Service
300 Ala Moana Blvd., Room 3-122
Honolulu, Hawaii 96850

Dear Mr. Henson:

This letter is to inform you that the Army is proposing to lease 8.13 acres of land at Schofield Barracks and grant a 2.5-acre interconnection easement on Schofield Barracks and Wheeler Army Airfield to the Hawaiian Electric Company to construct, operate, and maintain a 50-megawatt capacity renewable energy power plant and associated 46-kilovolt transmission line. The proposed project is referred to as the Schofield Generating Station Project. The Army requests your concurrence with our determination that this project is not likely to affect listed species or adversely modify designated critical habitat.

The Army is in the process of assessing the affects of the proposed action in accordance with the National Environmental Policy Act and the Hawaii Environmental Policy Act. The draft environmental impact statement for the project is expected to be available for public review in early 2015. A map of the proposed action is enclosed.

The purpose of the proposed action is two-fold: 1) to provide improved energy security to the U.S. Army Garrison-Hawaii at Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia and 2) to provide new secure, firm, dispatchable, flexible, and renewable energy generation to the grid on Oahu, Hawaii.

The Army anticipates that six species listed as endangered under the Endangered Species Act could be affected by implementing the proposed action: Hawaiian hoary bat (*Lasiurus cinereus semotus*), nene (*Branta sandvicensis*), Hawaiian stilt (*Himantopus mexicanus knudseni*), Hawaiian coot (*Fulica americana alai*), Hawaiian common moorhen (*Gallinula chloropus sandvicensis*), and Hawaiian duck (*Anas wyvilliana*).

Hawaiian Electric has incorporated the following measures into their design to avoid effects to these listed species:

- To protect the Hawaiian hoary bat, removal or trimming of woody vegetation and trees taller than 15 feet would be done between September 16 and May 31, the period of time outside the pupping season. If tree trimming or removal were to become necessary between June 1 and September 15, Hawaiian Electric would conduct a survey of the trees marked for tree trimming or removal and those within 200 feet, utilizing monitoring techniques similar to those recently implemented by the Kauai Island Utility Cooperative. The protocol involves the use of thermal imaging equipment to identify potential roosting bats. The trees identified for removal would be monitored in the morning, prior to tree trimming or

removal, to look for warm-blooded animals. If warm-blooded animals are detected, personnel will confirm the species and will be treated as bats if confirmation is not possible. If bats are found, the tree occupied by the bat would be avoided (i.e., not removed or trimmed), if feasible. If avoidance of the tree were not feasible, Hawaiian Electric will consult with the US Fish and Wildlife Service. Personnel will be trained in accordance to a program set up and reviewed by a qualified biologist.

- Hawaiian Electric would install a system that will deter waterfowl from landing or nesting in the stormwater detention basin at the power plant, such as netting over the basin, floating "bird balls," or an equivalent system.

- Outdoor lighting would utlize cut-off lenses or shields to minimize effects on migratory birds.

The Army and Hawaiian Electric Company met with your agency on November 6, 2014, to discuss the effectiveness of these measures to avoid the potential for adverse effects on listed species. At that time, Hawaiian Electric Company was considering using barbed wire as part of the power plant fence. Since then, however, Hawaiian Electric has determined that for this particular project the use of barbed wire is unnecessary due to its location within a secured military installation. The power plant will be enclosed by a chain-link fence.

The Army is confident that these design measures will prevent adverse effects to listed species and their habitat, and has therefore determined that the project is not likely to adversely affect any listed species or modify designated critical habitat. The Army requests your agency's concurrence in this determination.

If you have any questions or would like to meet to further discuss this project, please call Ms. Michelle Mansker, Chief, Natural Resource Section, Directorate of Public Works Environmental Division at (808) 655-9189.

Sincerely,

Richard A. Fromm
Colonel, US Army
Commanding

Enclosure

New Pole on Army Land
New Pole on State Land
Existing 46kV line
Existing 46kV line Dual Circuit
Schofield Generating Station
Substations as labeled
New 46kvExpress Line
Existing 46kV line

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Honolulu, Hawai`i 96850

JAN 2 9 2015

In Reply Refer To:
2015-I-0113

Colonel Richard A. Fromm
Office of the Garrison Commander
U.S. Army Installation Management Command, Pacific Region
Headquarters, United States Army Garrison, Hawaii
745 Wright Avenue, Wheeler Army Airfield
Schofield Barracks, Hawaii 96857-5000

Subject: Informal Consultation for the Schofield Generating Station Project, O'ahu

Dear Colonel Fromm:

The U.S. Fish and Wildlife Service (Service) received your letter on December 30, 2014, requesting our concurrence with your determination that the proposed Schofield Generating Station at Schofield Barracks, O'ahu, will not adversely affect the following listed species, pursuant to the Endangered Species Act of 1973 [16 U.S.C. 1531 et seq.; 87 Stat. 884], as amended (ESA): the Hawaiian hoary bat or ope'ape'a (*Lasiurus cinereus semotus*), Hawaiian goose or nēnē (*Branta sandvicensis*), Hawaiian stilt or ae'o (*Himantopus mexicanus knudseni*), Hawaiian coot or 'alae ke'oke'o (*Fulica alai*), Hawaiian moorhen or 'alae 'ula (*Gallinula chloropus sandvicensis*), and the Hawaiian duck or koloa maoli (*Anas wyvilliana*). Prior to your letter, on November 6, 2014 the Service met with U.S. Army (Army) and Hawaiian Electric Company, Inc. (HECO) representatives to discuss the proposed Schofield Generating Station (SGS) project and ways to modify the action to reduce or remove adverse effects to listed species or critical habitats. The purpose for the SGS project is to meet the common needs of the Army and HECO for secure, reliable and renewable power generation on the island of O'ahu.

The findings and recommendations in this consultation are based on: (1) meeting conversations and email correspondences, including materials received from November 6, 2014 – January 6, 2015; (2) previous Army consultations; and (3) other biological information available to us. Copies of pertinent materials and documentation are maintained in an administrative record in the Service's Pacific Islands Fish and Wildlife Office in Honolulu, Hawai'i. This response is in accordance with section 7 of the ESA, and other authorities mandating Department of the Interior concern for environmental values.

Project Description

The Army is proposing to lease approximately 8.13 acres of land to HECO to construct, operate and maintain the Schofield Generating Station. The Army would also grant a 2.5-acre interconnection easement to HECO on Schofield Barracks and Wheeler Army Airfield for a

portion of the associated 46-kilovolt transmission line. The new 46-kilovolt transmission line would connect SGS to the island's electrical grid and would be approximately four kilometers, running primarily alongside an existing roadway. The SGS would burn biofuels, diesel, and biofuels/diesel blends. The Service provided technical assistance to HECO regarding potential impacts of fuel emissions, in a letter dated March 12, 2013 (Service File# 2013-TA-0127). Following Service recommendations to HECO, the SGS will include selective catalytic reduction equipment to control and reduce fuel emissions to meet proposed emission standards. On January 6, 2015, the Service was informed via email that the proposed project would also include a 30-foot tall meteorological tower at the facility site, required by the State of Hawaii Department of Health, Clean Air Branch and Federal Environmental Protection Agency, for related emissions monitoring.

Previous SGS project plans included the use of a three-strand barb wire fence securing the 8.13-acre facility. During our November 6, 2014 meeting, the Service recommended eliminating the use of barb wire due to potential entanglement risk to the Hawaiian hoary bat. After our November meeting, HECO determined that for this particular project the use of barb wire is unnecessary due to its location within a secured military installation. The Army confirmed in writing on December 30, 2014 that the SGS project will not include barb wire and the facility will be enclosed by a chain-link fence.

Conservation Measures

The following conservation measures are further designed to avoid or minimize effects to the listed species reviewed in this informal consultation and is considered part of the project description. Any changes to, modification of, or failure to implement these conservation measures may result in a need to reinitiate this consultation. During our November 6, 2014 meeting and confirmed in writing on December 30, 2014, you formally agreed to the following conservation measures:

- To avoid impacts to the Hawaiian hoary bat, removal or trimming of woody vegetation and trees taller than 15 feet will be done between September 16 and May 31, the period of time outside the bat pupping season. If tree trimming or removal were to become necessary between June 1 and September 15, the Army will ensure that HECO has submitted protocols to the Service and the Service has approved such protocols to survey for potential roosting bats using thermal imaging equipment, prior to any tree removal or tree trimming between June 1 and September 15.

- To avoid impacts to the Hawaiian goose, stilt, moorhen, coot, and Hawaiian duck (hereinafter collectively referred to as "Hawaiian Water birds"), the Army will ensure that the SGS facility includes the installation of netting, floating bird deterrent balls, or an equivalent system to prevent Hawaiian Water birds from landing or nesting at the SGS facility storm water detention basin.

- All outdoor lighting at the SGS facility will be fully shielded with full cut-off luminary lights.

- The 30-foot meteorological tower at the facility site will be free-standing (no guy-wires) and no lights will be used or required on the structure.

Conclusion

Based on the implementation of the above avoidance and minimization measures, the Service concurs with your determination that the construction, operation, and maintenance of the Schofield Generating Station may effect, but is not likely to adversely affect the Hawaiian hoary bat, and Hawaiian Water birds. Based on the location of the proposed project, there is no designated critical habitat at or adjacent to the proposed Schofield Generating Station project. Unless the project description changes or new information reveals that the action may affect listed species or designated critical habitat in a manner or to an extent not considered, no further action pursuant to section 7 of the ESA is necessary.

We appreciate your efforts to conserve endangered species. If you have questions regarding this letter, please contact Lasha-Lynn Salbosa, Fish and Wildlife Biologist (phone: 808-792-9400 or email: Lasha-Lynn_Salbosa@fws.gov).

Sincerely,

Aaron Nadig
O'ahu, Kaua'i, Northwestern Hawaiian Islands, and American Samoa Island Team Manager

cc: U.S. Army Garrison Hawaii, Directorate of Public Works, Environmental Division, Natural Resource Section
Hawaiian Electric Company, Inc.

Appendix G

Agency Coordination under Section 106 of the National Historic Preservation Act

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DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

OCT 09 2014

Office of the Garrison Commander

Mr. William Aila
State Historic Preservation Officer
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawai'i 96707

Dear Mr. Aila:

The Office of the Garrison Commander, United States Army Garrison-Hawaii, is writing to open consultation with you pursuant to Section 106 of The National Historic Preservation Act of 1966, as amended (16 USC 470f), on the proposed construction of a new power plant on the south range of Schofield Barracks which is located on the central plateau on the Island of Oahu, Hawaii. The construction of this power plant is a joint venture between the US Army Garrison in Hawaii and the Hawaiian Electric Company. This venture will allow the Army bases in central Oahu to have better energy security as well as providing Oahu with a power plant located more inland in case the more coastal energy plants are compromised. The Tax Map Key designation for Schofield Barracks and Wheeler Army Airfield (WAAF) is 1-07-07-001.

The proposed undertaking involves the US Army's lease of 8.13 acres of land and the related granting of a 2.5 acre interconnection easement, on Schofield Barracks and WAAF to Hawaiian Electric Company (Hawaiian Electric) for the purpose of the construction, operation, and maintenance of a 50-megawatt (MW) capacity renewable energy power plant to include associated power poles, high-tension power lines, and related equipment and facilities by Hawaiian Electric. The lease would be under the authority of Title 10 of the United States Code (USC) §2667. The project also calls for The State of Hawaii Department of Land and Natural Resources granting of a 1.28 acre easement and a 0.7 acre conservation district authorization allowing for the construction of a 46 kV electrical power transmission line between the power plant site and the existing Wahiawa Substation. Hawaiian Electric's construction, ownership, operation, and maintenance of a 50 megawatt capacity, biofuel-capable power generation plant and 46 kV sub-transmission line are required to connect the Schofield Generating Station to the Hawaiian Electric grid. Hawaiian Electric would be the sole owner of the plant and the electrical power transmission facilities. The proposed facilities would be constructed and operated in accordance with all applicable laws, with approval of the Hawaii Public Utilities Commission (PUC).

The Area of Potential Effect (APE) for this undertaking is approximately 882 acres of land which includes the National Register District at Schofield Barracks, the National Historic Landmark District at WAAF as well as the National Register eligible district at WAAF. The enclosed map illustrates the the APE (Enclosure 1).

Wheeler Army Airfield has a National Historic Landmark District that was created in 1986-87 when a thematic series of districts were created in Hawaii associated with World War II history and the attack on Oahu by the Empire of Japan on the December 7th, 1941. The National Register District at Schofield Barracks was created in 1998. The district's significance is based upon its historic architecture, early 20th century military installation planning, its historic landscape, and the events related to the history of the US Army in Hawaii, particularly from the early Territorial Period through World War II. The Period of Significance is defined as 1908-1945. In the absence of an extensive report on the historic districts of Schofield Barracks and Wheeler Army Airfield, a summary of the historic resources is enclosed for your review (Enclosure 2).

The proposed Schofield Generating Station building is still in its early stages of planning. Information regarding its size, height and other details will be forthcoming. Color conceptual renderings of the structure are enclosed for your review (Enclosure 3).

The undertaking will involve in part the placement of 80' electrical poles along Kunia Road and Wilikina Drive that will be directly adjacent to the National Register District at Schofield Barracks and the historic Garden City neighborhoods at Wheeler Army Airfield (NR eligible). The existing power poles on Kunia Road and Wilikina Drive are approximately 45' tall.

The new poles associated with the project will be placed somewhat close to General's Loop that is within the boundaries of the historic district. However, it is anticipated that the visual impacts may be minimal to the homes at General's Loop due to the large trees that are in the area. The new poles will, however, be placed close to the small two bedroom stucco/mission style homes adjacent to Ralston Field, on Dickman and Kona Road, which have been determined eligible for inclusion on the National Register. These homes were constructed by the Federal Works Program/Works Progress Administration in 1932-33 while the same style homes were built at the Canby neighborhood at Schofield Barracks and at WAAF. The new poles (pole numbers 42, 43 and 44) and lines may be visible from the historic neighborhood.

The new poles and wires proposed for the project may cause negative visual impacts to the Garden City Loops (Langley Loop with the placement of poles 14-18 and at Sperry Loop with the placement of poles 23-27). Poles 11-13 and 28-30 may have visual impacts on the 1936 historic neighborhoods that flank the loops at Wheeler Army Airfield. There may be the potential to have visual impacts on the Landmark district at its western end by the new poles and wires.

A 3D rendering of the proposed poles and wires is included to assist in the visualization of the end results of the undertaking (Enclosure 4).

In compliance with 36 CFR 800.4, the Army in its identification efforts, commissioned the *Archaeological Inventory Survey for Schofield Generating Station Project, Waianae Uka, Honouliuli, and Waikele Ahupua'a in Wahiawa and 'Ewa Districts, Oahu Island, Hawaii* (Garcia & Assoc.—June, 2014). A copy of the report is enclosed for your review (Enclosure 5).

The Army is preparing an Environmental Impact Statement (EIS) to satisfy the National Environmental Policy Act requirements for this undertaking. The Army will transmit a copy of the EIS once it becomes available. A public draft of the EIS is expected to be released in the first quarter of 2015.

A copy of the initial Section 106 consultation regarding this project from 2011 is enclosed for your review (Enclosure 6).

The Army looks forward to consulting with you on the proposed undertaking. We ask for your initial comments on the proposed undertaking. If you have any questions regarding architectural/landscape issues, please contact Kenneth Hays, with the Cultural Resources Section of the Directorate of Public Works at 808-656-6790. If you have any questions pertaining to archeological issues, you may contact Richard Davis, with the Cultural Resources Section of the Directorate of Public Works at 808-655-9709.

Sincerely,

Richard A. Fromm
Colonel, US Army
Commanding

Enclosures

Distribution List for the Section 106 Letter –Schofield Barracks Power Station

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State Historic Preservation Division
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Ka Pouhana, Chief Executive Officer
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560 N. Nimitz Hwy, Suite 200
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Advisory Council on Historic Preservation
Old Post Office Building
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P. O. Box 365
Ho'olehua, Hawai'i 96729

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Hui Mālama I Na Kūpuna O Hawai'i Nei
C/O Mr. Edward Halealoha Ayau, Po'o
P. O. Box 365
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Mr. Tom Lenchanko
Hawaiian National, Kahuakai Ola Ko Laila Waha Olelo 'Aha Kūkaniloko
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Distribution List for the Section 106 Letter –Schofield Barracks Power Station

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Wai'anae, Hawai'i 96792

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2426 O'ahu Avenue
Honolulu, Hawai'i 96822

Mr. Kalahikiola Keliinoi
'Ohana Keliinoi

Distribution List for the Section 106 Letter –Schofield Barracks Power Station

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Haleʻiwa, Hawaiʻi 96712

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Historic Hawaii Foundation
680 Iwilei Road
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Ms. Marti Townsend
The Outdoor Circle
1314 S King Street, Suite 306
Honolulu, Hawaii 96814

Mr. Glen Makakauali'i Kila, Kahu Kulaiwi, Ko'a Mana
Kupuka'aina O Wai'anae Moku, O'ahu
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Wai'anae, Hawai'i 96792

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AFSC Hawaii
2426 Oahu Avenue
Honolulu, Hawaii 96822

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

OCT 09 2014

Office of the Garrison Commander

Mr. John Fowler
Advisory Council on Historic Preservation
Old Post Office Building
1100 Pennsylvania Avenue NW
Suite 809
Washington D.C. 20004

Dear Mr. Fowler:

The Office of the Garrison Commander, United States Army Garrison-Hawaii, is writing to open consultation with you pursuant to Section 106 of The National Historic Preservation Act of 1966, as amended (16 USC 470f), on the proposed construction of a new power plant on the south range of Schofield Barracks which is located on the central plateau on the Island of Oahu, Hawaii. The construction of this power plant is a joint venture between the US Army Garrison in Hawaii and the Hawaiian Electric Company. This venture will allow the Army bases in central Oahu to have better energy security as well as providing Oahu with a power plant located more inland in case the more coastal energy plants are compromised. The Tax Map Key designation for Schofield Barracks and Wheeler Army Airfield (WAAF) is 1-07-07-001.

The proposed undertaking involves the US Army's lease of 8.13 acres of land and the related granting of a 2.5 acre interconnection easement, on Schofield Barracks and WAAF to Hawaiian Electric Company (Hawaiian Electric) for the purpose of the construction, operation, and maintenance of a 50-megawatt (MW) capacity renewable energy power plant to include associated power poles, high-tension power lines, and related equipment and facilities by Hawaiian Electric. The lease would be under the authority of Title 10 of the United States Code (USC) §2667. The project also calls for The State of Hawaii Department of Land and Natural Resources granting of a 1.28 acre easement and a 0.7 acre conservation district authorization allowing for the construction of a 46 kV electrical power transmission line between the power plant site and the existing Wahiawa Substation. Hawaiian Electric's construction, ownership, operation, and maintenance of a 50 megawatt capacity, biofuel-capable power generation plant and 46 kV sub-transmission line are required to connect the Schofield Generating Station to the Hawaiian Electric grid. Hawaiian Electric would be the sole owner of the plant and the electrical power transmission facilities. The proposed facilities would be constructed and operated in accordance with all applicable laws, with approval of the Hawaii Public Utilities Commission (PUC).

The Area of Potential Effect (APE) for this undertaking is approximately 882 acres of land which includes the National Register District at Schofield Barracks, the National Historic Landmark District at WAAF as well as the National Register eligible district at WAAF. The enclosed map illustrates the the APE (Enclosure 1).

Wheeler Army Airfield has a National Historic Landmark District that was created in 1986-87 when a thematic series of districts were created in Hawaii associated with World War II history and the attack on Oahu by the Empire of Japan on the December 7th, 1941. The National Register District at Schofield Barracks was created in 1998. The district's significance is based upon its historic architecture, early 20th century military installation planning, its historic landscape, and the events related to the history of the US Army in Hawaii, particularly from the early Territorial Period through World War II. The Period of Significance is defined as 1908-1945. In the absence of an extensive report on the historic districts of Schofield Barracks and Wheeler Army Airfield, a summary of the historic resources is enclosed for your review (Enclosure 2).

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The undertaking will involve in part the placement of 80' electrical poles along Kunia Road and Wilikina Drive that will be directly adjacent to the National Register District at Schofield Barracks and the historic Garden City neighborhoods at Wheeler Army Airfield (NR eligible). The existing power poles on Kunia Road and Wilikina Drive are approximately 45' tall.

The new poles associated with the project will be placed somewhat close to General's Loop that is within the boundaries of the historic district. However, it is anticipated that the visual impacts may be minimal to the homes at General's Loop due to the large trees that are in the area. The new poles will, however, be placed close to the small two bedroom stucco/mission style homes adjacent to Ralston Field, on Dickman and Kona Road, which have been determined eligible for inclusion on the National Register. These homes were constructed by the Federal Works Program/Works Progress Administration in 1932-33 while the same style homes were built at the Canby neighborhood at Schofield Barracks and at WAAF. The new poles (pole numbers 42, 43 and 44) and lines may be visible from the historic neighborhood.

The new poles and wires proposed for the project may cause negative visual impacts to the Garden City Loops (Langley Loop with the placement of poles 14-18 and at Sperry Loop with the placement of poles 23-27). Poles 11-13 and 28-30 may have visual impacts on the 1936 historic neighborhoods that flank the loops at Wheeler Army Airfield. There may be the potential to have visual impacts on the Landmark district at its western end by the new poles and wires.

A 3D rendering of the proposed poles and wires is included to assist in the visualization of the end results of the undertaking (Enclosure 4).

In compliance with 36 CFR 800.4, the Army in its identification efforts, commissioned the *Archaeological Inventory Survey for Schofield Generating Station Project, Waianae Uka, Honouliuli, and Waikele Ahupua'a in Wahiawa and 'Ewa Districts, Oahu Island, Hawaii* (Garcia & Assoc.—June, 2014). A copy of the report is enclosed for your review (Enclosure 5).

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The Army looks forward to consulting with you on the proposed undertaking. We ask for your initial comments on the proposed undertaking. If you have any questions regarding architectural/landscape issues, please contact Kenneth Hays, with the Cultural Resources Section of the Directorate of Public Works at 808-656-6790. If you have any questions pertaining to archeological issues, you may contact Richard Davis, with the Cultural Resources Section of the Directorate of Public Works at 808-655-9709.

Sincerely,

Richard A. Fromm
Colonel, US Army
Commanding

Enclosures

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

OCT 09 2014

Office of the Garrison Commander

Ms. Marti Townsend
The Outdoor Circle
1314 S King Street, Suite 306
Honolulu, Hawaii 96814

Dear Ms. Townsend:

The Office of the Garrison Commander, United States Army Garrison-Hawaii, is writing to open consultation with you pursuant to Section 106 of The National Historic Preservation Act of 1966, as amended (16 USC 470f), on the proposed construction of a new power plant on the south range of Schofield Barracks which is located on the central plateau on the Island of Oahu, Hawaii. The construction of this power plant is a joint venture between the US Army Garrison in Hawaii and the Hawaiian Electric Company. This venture will allow the Army bases in central Oahu to have better energy security as well as providing Oahu with a power plant located more inland in case the more coastal energy plants are compromised. The Tax Map Key designation for Schofield Barracks and Wheeler Army Airfield (WAAF) is 1-07-07-001.

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Commanding

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US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

OCT 09 2014

Office of the Garrison Commander

Ms. Melia Lane-Kamehele
The National Park Service
300 Ala Moana Blvd.
Honolulu, Hawaii 96850

Dear Ms. Lane-Kamehele:

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Richard A. Fromm
Colonel, US Army
Commanding

Enclosures

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO ATTENTION OF:

OCT 09 2014

Office of the Garrison Commander

Mr. Tom Lenchanko
Hawaiian National, Kahuakai Ola Ko Laila Waha Olelo 'Aha Kukaniloko
Ko'a Mana Mea Ola Kanaka Mauli
932 Uakaniko'o Street
Wahiawa, Hawaii 96796

Dear Mr. Lenchanko:

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Sincerely,

Richard A. Fromm
Colonel, US Army
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US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

OCT 09 2014

Office of the Garrison Commander

Dr. Kamana'opono M. Crabbe
Ka Pouhana, Chief Executive Officer
Office of Hawaiian Affairs
560 N. Nimitz Highway, Suite 200
Honolulu, Hawaii 96817

Dear Dr. Crabbe:

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The proposed undertaking involves the US Army's lease of 8.13 acres of land and the related granting of a 2.5 acre interconnection easement, on Schofield Barracks and WAAF to Hawaiian Electric Company (Hawaiian Electric) for the purpose of the construction, operation, and maintenance of a 50-megawatt (MW) capacity renewable energy power plant to include associated power poles, high-tension power lines, and related equipment and facilities by Hawaiian Electric. The lease would be under the authority of Title 10 of the United States Code (USC) §2667. The project also calls for The State of Hawaii Department of Land and Natural Resources granting of a 1.28 acre easement and a 0.7 acre conservation district authorization allowing for the construction of a 46 kV electrical power transmission line between the power plant site and the existing Wahiawa Substation. Hawaiian Electric's construction, ownership, operation, and maintenance of a 50 megawatt capacity, biofuel-capable power generation plant and 46 kV sub-transmission line are required to connect the Schofield Generating Station to the Hawaiian Electric grid. Hawaiian Electric would be the sole owner of the plant and the electrical power transmission facilities. The proposed facilities would be constructed and operated in accordance with all applicable laws, with approval of the Hawaii Public Utilities Commission (PUC).

The Area of Potential Effect (APE) for this undertaking is approximately 882 acres of land which includes the National Register District at Schofield Barracks, the National Historic Landmark District at WAAF as well as the National Register eligible district at WAAF. The enclosed map illustrates the the APE (Enclosure 1).

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The undertaking will involve in part the placement of 80' electrical poles along Kunia Road and Wilikina Drive that will be directly adjacent to the National Register District at Schofield Barracks and the historic Garden City neighborhoods at Wheeler Army Airfield (NR eligible). The existing power poles on Kunia Road and Wilikina Drive are approximately 45' tall.

The new poles associated with the project will be placed somewhat close to General's Loop that is within the boundaries of the historic district. However, it is anticipated that the visual impacts may be minimal to the homes at General's Loop due to the large trees that are in the area. The new poles will, however, be placed close to the small two bedroom stucco/mission style homes adjacent to Ralston Field, on Dickman and Kona Road, which have been determined eligible for inclusion on the National Register. These homes were constructed by the Federal Works Program/Works Progress Administration in 1932-33 while the same style homes were built at the Canby neighborhood at Schofield Barracks and at WAAF. The new poles (pole numbers 42, 43 and 44) and lines may be visible from the historic neighborhood.

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A 3D rendering of the proposed poles and wires is included to assist in the visualization of the end results of the undertaking (Enclosure 4).

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Sincerely,

Richard A. Fromm
Colonel, US Army
Commanding

Enclosures

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

OCT 09 2014

Office of the Garrison Commander

Ms. Kiersten Faulkner, Executive Director
Historic Hawaii Foundation
680 Iwilei Road
Suite 690
Honolulu, Hawaii 96817

Dear Ms. Faulkner:

The Office of the Garrison Commander, United States Army Garrison-Hawaii, is writing to open consultation with you pursuant to Section 106 of The National Historic Preservation Act of 1966, as amended (16 USC 470f), on the proposed construction of a new power plant on the south range of Schofield Barracks which is located on the central plateau on the Island of Oahu, Hawaii. The construction of this power plant is a joint venture between the US Army Garrison in Hawaii and the Hawaiian Electric Company. This venture will allow the Army bases in central Oahu to have better energy security as well as providing Oahu with a power plant located more inland in case the more coastal energy plants are compromised. The Tax Map Key designation for Schofield Barracks and Wheeler Army Airfield (WAAF) is 1-07-07-001.

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The Area of Potential Effect (APE) for this undertaking is approximately 882 acres of land which includes the National Register District at Schofield Barracks, the National Historic Landmark District at WAAF as well as the National Register eligible district at WAAF. The enclosed map illustrates the the APE (Enclosure 1).

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Sincerely,

Richard A. Fromm
Colonel, US Army
Commanding

Enclosures

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

OCT 09 2014

Office of the Garrison Commander

Mr. Alika Poe Silva
Kahu Kulāiwi, Ko'a Mana
Kupuka'āina O Wai'anae Moku, O'ahu
85-140 Maiu'u Road
Wai'anae, Hawai'i 96792

Dear Mr. Silva:

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Colonel, US Army
Commanding

Enclosures

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US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO ATTENTION OF:

OCT 09 2014

Office of the Garrison Commander

Mr. JR Keoneakapu Williams
'Ohana Kapu
85-1029 Mahi'aina St
Wai'anae, Hawai'i 96792

Dear Mr. Williams:

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Sincerely,

Richard A. Fromm
Colonel, US Army
Commanding

Enclosures

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US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

OCT 09 2014

Office of the Garrison Commander

Mr. Kimball Kekaimalino Kaopio
'Ohana Naihe
85-1029 Mahi'aina St.
Wai'anae, Hawai'i 96792

Dear Mr. Kaopio:

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Richard A. Fromm
Colonel, US Army
Commanding

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HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
861 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

OCT 09 2014

Office of the Garrison Commander

Mr. Norman Mana Kaleilani Caceres
'Ohana Huihui
91-225 Pilipiliula Place
Kapolei, Hawai'i 96707

Dear Mr. Caceres:

The Office of the Garrison Commander, United States Army Garrison-Hawaii, is writing to open consultation with you pursuant to Section 106 of The National Historic Preservation Act of 1966, as amended (16 USC 470f), on the proposed construction of a new power plant on the south range of Schofield Barracks which is located on the central plateau on the Island of Oahu, Hawaii. The construction of this power plant is a joint venture between the US Army Garrison in Hawaii and the Hawaiian Electric Company. This venture will allow the Army bases in central Oahu to have better energy security as well as providing Oahu with a power plant located more inland in case the more coastal energy plants are compromised. The Tax Map Key designation for Schofield Barracks and Wheeler Army Airfield (WAAF) is 1-07-07-001.

The proposed undertaking involves the US Army's lease of 8.13 acres of land and the related granting of a 2.5 acre interconnection easement, on Schofield Barracks and WAAF to Hawaiian Electric Company (Hawaiian Electric) for the purpose of the construction, operation, and maintenance of a 50-megawatt (MW) capacity renewable energy power plant to include associated power poles, high-tension power lines, and related equipment and facilities by Hawaiian Electric. The lease would be under the authority of Title 10 of the United States Code (USC) §2667. The project also calls for The State of Hawaii Department of Land and Natural Resources granting of a 1.28 acre easement and a 0.7 acre conservation district authorization allowing for the construction of a 46 kV electrical power transmission line between the power plant site and the existing Wahiawa Substation. Hawaiian Electric's construction, ownership, operation, and maintenance of a 50 megawatt capacity, biofuel-capable power generation plant and 46 kV sub-transmission line are required to connect the Schofield Generating Station to the Hawaiian Electric grid. Hawaiian Electric would be the sole owner of the plant and the electrical power transmission facilities. The proposed facilities would be constructed and operated in accordance with all applicable laws, with approval of the Hawaii Public Utilities Commission (PUC).

The Area of Potential Effect (APE) for this undertaking is approximately 882 acres of land which includes the National Register District at Schofield Barracks, the National Historic Landmark District at WAAF as well as the National Register eligible district at WAAF. The enclosed map illustrates the the APE (Enclosure 1).

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The new poles associated with the project will be placed somewhat close to General's Loop that is within the boundaries of the historic district. However, it is anticipated that the visual impacts may be minimal to the homes at General's Loop due to the large trees that are in the area. The new poles will, however, be placed close to the small two bedroom stucco/mission style homes adjacent to Ralston Field, on Dickman and Kona Road, which have been determined eligible for inclusion on the National Register. These homes were constructed by the Federal Works Program/Works Progress Administration in 1932-33 while the same style homes were built at the Canby neighborhood at Schofield Barracks and at WAAF. The new poles (pole numbers 42, 43 and 44) and lines may be visible from the historic neighborhood.

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A 3D rendering of the proposed poles and wires is included to assist in the visualization of the end results of the undertaking (Enclosure 4).

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Sincerely,

Richard A. Fromm
Colonel, US Army
Commanding

Enclosures

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

OCT 09 2014

Office of the Garrison Commander

Mrs. Leimaile Quitevis
84-695 Farrington Highway
B-212
Waianae, Hawaii 96792

Dear Mrs. Quitevis:

The Office of the Garrison Commander, United States Army Garrison-Hawaii, is writing to open consultation with you pursuant to Section 106 of The National Historic Preservation Act of 1966, as amended (16 USC 470f), on the proposed construction of a new power plant on the south range of Schofield Barracks which is located on the central plateau on the Island of Oahu, Hawaii. The construction of this power plant is a joint venture between the US Army Garrison in Hawaii and the Hawaiian Electric Company. This venture will allow the Army bases in central Oahu to have better energy security as well as providing Oahu with a power plant located more inland in case the more coastal energy plants are compromised. The Tax Map Key designation for Schofield Barracks and Wheeler Army Airfield (WAAF) is 1-07-07-001.

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Sincerely,

Richard A. Fromm
Colonel, US Army
Commanding

Enclosures

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

OCT 09 2014

Office of the Garrison Commander

Ms. Mahealani Cypher, President
C/O Mr. Shad Kane
O'ahu Council of Hawaiian Civic Clubs
92-1309 Uahanai Street
Kapolei, Hawai'i 96707

Dear Ms. Cypher:

The Office of the Garrison Commander, United States Army Garrison-Hawaii, is writing to open consultation with you pursuant to Section 106 of The National Historic Preservation Act of 1966, as amended (16 USC 470f), on the proposed construction of a new power plant on the south range of Schofield Barracks which is located on the central plateau on the Island of Oahu, Hawaii. The construction of this power plant is a joint venture between the US Army Garrison in Hawaii and the Hawaiian Electric Company. This venture will allow the Army bases in central Oahu to have better energy security as well as providing Oahu with a power plant located more inland in case the more coastal energy plants are compromised. The Tax Map Key designation for Schofield Barracks and Wheeler Army Airfield (WAAF) is 1-07-07-001.

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Sincerely,

Richard A. Fromm
Colonel, US Army
Commanding

Enclosures

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US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

OCT 09 2014

Office of the Garrison Commander

Ms. Paulette Ka'anohiokalani Kaleikini
'Ohana Keaweamahi
89-107 Nanaikala Street
Wai'anae, Hawai'i 96792

Dear Ms. Kaleikini:

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Commanding

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US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

OCT 09 2014

Office of the Garrison Commander

Mr. Edward Halealoha Ayau, Po'o
Hui Malama I Na Kumpuna O Hawaii Nei
P.O. Box 365
Ho'olehua, Hawaii 96729

Dear Mr. Ayau, Po'o:

The Office of the Garrison Commander, United States Army Garrison-Hawaii, is writing to open consultation with you pursuant to Section 106 of The National Historic Preservation Act of 1966, as amended (16 USC 470f), on the proposed construction of a new power plant on the south range of Schofield Barracks which is located on the central plateau on the Island of Oahu, Hawaii. The construction of this power plant is a joint venture between the US Army Garrison in Hawaii and the Hawaiian Electric Company. This venture will allow the Army bases in central Oahu to have better energy security as well as providing Oahu with a power plant located more inland in case the more coastal energy plants are compromised. The Tax Map Key designation for Schofield Barracks and Wheeler Army Airfield (WAAF) is 1-07-07-001.

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Richard A. Fromm
Colonel, US Army
Commanding

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HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

OCT 09 2014

Office of the Garrison Commander

Mr. Kalahikiola Keliinoi
'Ohana Keliinoi
89-107 Nanaikala Street
Wai'anae Hawai'i 96792

Dear Mr. Keliinoi:

The Office of the Garrison Commander, United States Army Garrison-Hawaii, is writing to open consultation with you pursuant to Section 106 of The National Historic Preservation Act of 1966, as amended (16 USC 470f), on the proposed construction of a new power plant on the south range of Schofield Barracks which is located on the central plateau on the Island of Oahu, Hawaii. The construction of this power plant is a joint venture between the US Army Garrison in Hawaii and the Hawaiian Electric Company. This venture will allow the Army bases in central Oahu to have better energy security as well as providing Oahu with a power plant located more inland in case the more coastal energy plants are compromised. The Tax Map Key designation for Schofield Barracks and Wheeler Army Airfield (WAAF) is 1-07-07-001.

The proposed undertaking involves the US Army's lease of 8.13 acres of land and the related granting of a 2.5 acre interconnection easement, on Schofield Barracks and WAAF to Hawaiian Electric Company (Hawaiian Electric) for the purpose of the construction, operation, and maintenance of a 50-megawatt (MW) capacity renewable energy power plant to include associated power poles, high-tension power lines, and related equipment and facilities by Hawaiian Electric. The lease would be under the authority of Title 10 of the United States Code (USC) §2667. The project also calls for The State of Hawaii Department of Land and Natural Resources granting of a 1.28 acre easement and a 0.7 acre conservation district authorization allowing for the construction of a 46 kV electrical power transmission line between the power plant site and the existing Wahiawa Substation. Hawaiian Electric's construction, ownership, operation, and maintenance of a 50 megawatt capacity, biofuel-capable power generation plant and 46 kV sub-transmission line are required to connect the Schofield Generating Station to the Hawaiian Electric grid. Hawaiian Electric would be the sole owner of the plant and the electrical power transmission facilities. The proposed facilities would be constructed and operated in accordance with all applicable laws, with approval of the Hawaii Public Utilities Commission (PUC).

The Area of Potential Effect (APE) for this undertaking is approximately 882 acres of land which includes the National Register District at Schofield Barracks, the National Historic Landmark District at WAAF as well as the National Register eligible district at WAAF. The enclosed map illustrates the the APE (Enclosure 1).

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Sincerely,

Richard A. Fromm
Colonel, US Army
Commanding

Enclosures

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

OCT 09 2014

Office of the Garrison Commander

Ms. Kehaulani Souza
94-115 Puanane Loop
Mililani, Hawaii 96789

Dear Ms. Souza:

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Sincerely,

Richard A. Fromm
Colonel, US Army
Commanding

Enclosures

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US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

OCT 09 2014

Office of the Garrison Commander

Ms. Keona Mark
'Ohana Mahu
PO Box 2
Hale'iwa, Hawai'i 96712

Dear Ms. Mark:

The Office of the Garrison Commander, United States Army Garrison-Hawaii, is writing to open consultation with you pursuant to Section 106 of The National Historic Preservation Act of 1966, as amended (16 USC 470f), on the proposed construction of a new power plant on the south range of Schofield Barracks which is located on the central plateau on the Island of Oahu, Hawaii. The construction of this power plant is a joint venture between the US Army Garrison in Hawaii and the Hawaiian Electric Company. This venture will allow the Army bases in central Oahu to have better energy security as well as providing Oahu with a power plant located more inland in case the more coastal energy plants are compromised. The Tax Map Key designation for Schofield Barracks and Wheeler Army Airfield (WAAF) is 1-07-07-001.

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Commanding

Enclosures

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US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

OCT 09 2014

Office of the Garrison Commander

Mr. Kihei Nahale-a
Hui Malama I Na Kupuna O Hawaii Nei
c/o Mr. Edward Halealoha Ayau, Po'o
P.O. Box 365
Ho'olehua, Hawaii

Dear Mr. Nahale-a:

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Sincerely,

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US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

OCT 09 2014

Office of the Garrison Commander

Ms. Terrilee Keko'olani
AFSC Hawaii
2426 Oahu Avenue
Honolulu, Hawaii 96822

Dear Ms. Keo'olani:

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Sincerely,

Richard A. Fromm
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Commanding

Enclosures

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US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

OCT 09 2014

Office of the Garrison Commander

Ms. Hinaleimoana Wong-Kalu
Chairperson
Oahu Island Burial Council
Honolulu, Hawaii 96817

Dear Ms. Wong-Kalu:

The Office of the Garrison Commander, United States Army Garrison-Hawaii, is writing to open consultation with you pursuant to Section 106 of The National Historic Preservation Act of 1966, as amended (16 USC 470f), on the proposed construction of a new power plant on the south range of Schofield Barracks which is located on the central plateau on the Island of Oahu, Hawaii. The construction of this power plant is a joint venture between the US Army Garrison in Hawaii and the Hawaiian Electric Company. This venture will allow the Army bases in central Oahu to have better energy security as well as providing Oahu with a power plant located more inland in case the more coastal energy plants are compromised. The Tax Map Key designation for Schofield Barracks and Wheeler Army Airfield (WAAF) is 1-07-07-001.

The proposed undertaking involves the US Army's lease of 8.13 acres of land and the related granting of a 2.5 acre interconnection easement, on Schofield Barracks and WAAF to Hawaiian Electric Company (Hawaiian Electric) for the purpose of the construction, operation, and maintenance of a 50-megawatt (MW) capacity renewable energy power plant to include associated power poles, high-tension power lines, and related equipment and facilities by Hawaiian Electric. The lease would be under the authority of Title 10 of the United States Code (USC) §2667. The project also calls for The State of Hawaii Department of Land and Natural Resources granting of a 1.28 acre easement and a 0.7 acre conservation district authorization allowing for the construction of a 46 kV electrical power transmission line between the power plant site and the existing Wahiawa Substation. Hawaiian Electric's construction, ownership, operation, and maintenance of a 50 megawatt capacity, biofuel-capable power generation plant and 46 kV sub-transmission line are required to connect the Schofield Generating Station to the Hawaiian Electric grid. Hawaiian Electric would be the sole owner of the plant and the electrical power transmission facilities. The proposed facilities would be constructed and operated in accordance with all applicable laws, with approval of the Hawaii Public Utilities Commission (PUC).

The Area of Potential Effect (APE) for this undertaking is approximately 882 acres of land which includes the National Register District at Schofield Barracks, the National Historic Landmark District at WAAF as well as the National Register eligible district at WAAF. The enclosed map illustrates the the APE (Enclosure 1).

Wheeler Army Airfield has a National Historic Landmark District that was created in 1986-87 when a thematic series of districts were created in Hawaii associated with World War II history and the attack on Oahu by the Empire of Japan on the December 7th, 1941. The National Register District at Schofield Barracks was created in 1998. The district's significance is based upon its historic architecture, early 20th century military installation planning, its historic landscape, and the events related to the history of the US Army in Hawaii, particularly from the early Territorial Period through World War II. The Period of Significance is defined as 1908-1945. In the absence of an extensive report on the historic districts of Schofield Barracks and Wheeler Army Airfield, a summary of the historic resources is enclosed for your review (Enclosure 2).

The proposed Schofield Generating Station building is still in its early stages of planning. Information regarding its size, height and other details will be forthcoming. Color conceptual renderings of the structure are enclosed for your review (Enclosure 3).

The undertaking will involve in part the placement of 80' electrical poles along Kunia Road and Wilikina Drive that will be directly adjacent to the National Register District at Schofield Barracks and the historic Garden City neighborhoods at Wheeler Army Airfield (NR eligible). The existing power poles on Kunia Road and Wilikina Drive are approximately 45' tall.

The new poles associated with the project will be placed somewhat close to General's Loop that is within the boundaries of the historic district. However, it is anticipated that the visual impacts may be minimal to the homes at General's Loop due to the large trees that are in the area. The new poles will, however, be placed close to the small two bedroom stucco/mission style homes adjacent to Ralston Field, on Dickman and Kona Road, which have been determined eligible for inclusion on the National Register. These homes were constructed by the Federal Works Program/Works Progress Administration in 1932-33 while the same style homes were built at the Canby neighborhood at Schofield Barracks and at WAAF. The new poles (pole numbers 42, 43 and 44) and lines may be visible from the historic neighborhood.

The new poles and wires proposed for the project may cause negative visual impacts to the Garden City Loops (Langley Loop with the placement of poles 14-18 and at Sperry Loop with the placement of poles 23-27). Poles 11-13 and 28-30 may have visual impacts on the 1936 historic neighborhoods that flank the loops at Wheeler Army Airfield. There may be the potential to have visual impacts on the Landmark district at its western end by the new poles and wires.

A 3D rendering of the proposed poles and wires is included to assist in the visualization of the end results of the undertaking (Enclosure 4).

In compliance with 36 CFR 800.4, the Army in its identification efforts, commissioned the *Archaeological Inventory Survey for Schofield Generating Station Project, Waianae Uka, Honouliuli, and Waikele Ahupua'a in Wahiawa and 'Ewa Districts, Oahu Island, Hawaii* (Garcia & Assoc.—June, 2014). A copy of the report is enclosed for your review (Enclosure 5).

The Army is preparing an Environmental Impact Statement (EIS) to satisfy the National Environmental Policy Act requirements for this undertaking. The Army will transmit a copy of the EIS once it becomes available. A public draft of the EIS is expected to be released in the first quarter of 2015.

A copy of the initial Section 106 consultation regarding this project from 2011 is enclosed for your review (Enclosure 6).

The Army looks forward to consulting with you on the proposed undertaking. We ask for your initial comments on the proposed undertaking. If you have any questions regarding architectural/landscape issues, please contact Kenneth Hays, with the Cultural Resources Section of the Directorate of Public Works at 808-656-6790. If you have any questions pertaining to archeological issues, you may contact Richard Davis, with the Cultural Resources Section of the Directorate of Public Works at 808-655-9709.

Sincerely,

Richard A. Fromm
Colonel, US Army
Commanding

Enclosures

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

OCT 09 2014

Office of the Garrison Commander

Mr. Christophor Oliveira
Ko'a Mana
84-255 Makaha Valley Road
Wai'anae, Hawai'i 96792

Dear Mr. Oliveira:

The Office of the Garrison Commander, United States Army Garrison-Hawaii, is writing to open consultation with you pursuant to Section 106 of The National Historic Preservation Act of 1966, as amended (16 USC 470f), on the proposed construction of a new power plant on the south range of Schofield Barracks which is located on the central plateau on the Island of Oahu, Hawaii. The construction of this power plant is a joint venture between the US Army Garrison in Hawaii and the Hawaiian Electric Company. This venture will allow the Army bases in central Oahu to have better energy security as well as providing Oahu with a power plant located more inland in case the more coastal energy plants are compromised. The Tax Map Key designation for Schofield Barracks and Wheeler Army Airfield (WAAF) is 1-07-07-001.

The proposed undertaking involves the US Army's lease of 8.13 acres of land and the related granting of a 2.5 acre interconnection easement, on Schofield Barracks and WAAF to Hawaiian Electric Company (Hawaiian Electric) for the purpose of the construction, operation, and maintenance of a 50-megawatt (MW) capacity renewable energy power plant to include associated power poles, high-tension power lines, and related equipment and facilities by Hawaiian Electric. The lease would be under the authority of Title 10 of the United States Code (USC) §2667. The project also calls for The State of Hawaii Department of Land and Natural Resources granting of a 1.28 acre easement and a 0.7 acre conservation district authorization allowing for the construction of a 46 kV electrical power transmission line between the power plant site and the existing Wahiawa Substation. Hawaiian Electric's construction, ownership, operation, and maintenance of a 50 megawatt capacity, biofuel-capable power generation plant and 46 kV sub-transmission line are required to connect the Schofield Generating Station to the Hawaiian Electric grid. Hawaiian Electric would be the sole owner of the plant and the electrical power transmission facilities. The proposed facilities would be constructed and operated in accordance with all applicable laws, with approval of the Hawaii Public Utilities Commission (PUC).

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Sincerely,

Richard A. Fromm
Colonel, US Army
Commanding

Enclosures

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

OCT 09 2014

Office of the Garrison Commander

Mr. Glen Makakauali'i Kila, Kahu Kulaiwi, Ko'a Mana
Kupuka'aina O Wai'anae Moku, O'ahu
84-255 Makaha Valley Road
Wai'anae, Hawai'i 96792

Dear Mr. Makakauali'i Kila:

The Office of the Garrison Commander, United States Army Garrison-Hawaii, is writing to open consultation with you pursuant to Section 106 of The National Historic Preservation Act of 1966, as amended (16 USC 470f), on the proposed construction of a new power plant on the south range of Schofield Barracks which is located on the central plateau on the Island of Oahu, Hawaii. The construction of this power plant is a joint venture between the US Army Garrison in Hawaii and the Hawaiian Electric Company. This venture will allow the Army bases in central Oahu to have better energy security as well as providing Oahu with a power plant located more inland in case the more coastal energy plants are compromised. The Tax Map Key designation for Schofield Barracks and Wheeler Army Airfield (WAAF) is 1-07-07-001.

The proposed undertaking involves the US Army's lease of 8.13 acres of land and the related granting of a 2.5 acre interconnection easement, on Schofield Barracks and WAAF to Hawaiian Electric Company (Hawaiian Electric) for the purpose of the construction, operation, and maintenance of a 50-megawatt (MW) capacity renewable energy power plant to include associated power poles, high-tension power lines, and related equipment and facilities by Hawaiian Electric. The lease would be under the authority of Title 10 of the United States Code (USC) §2667. The project also calls for The State of Hawaii Department of Land and Natural Resources granting of a 1.28 acre easement and a 0.7 acre conservation district authorization allowing for the construction of a 46 kV electrical power transmission line between the power plant site and the existing Wahiawa Substation. Hawaiian Electric's construction, ownership, operation, and maintenance of a 50 megawatt capacity, biofuel-capable power generation plant and 46 kV sub-transmission line are required to connect the Schofield Generating Station to the Hawaiian Electric grid. Hawaiian Electric would be the sole owner of the plant and the electrical power transmission facilities. The proposed facilities would be constructed and operated in accordance with all applicable laws, with approval of the Hawaii Public Utilities Commission (PUC).

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Sincerely,

Richard A. Fromm
Colonel, US Army
Commanding

Enclosures

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
947 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Directorate of Public Works

MAR 2 4 2015

SUBJECT: Construction of a Power Plant and Installation of Power Poles at Schofield Barracks and Wheeler Army Airfield; TMK: 1-07-07-001;Waianae Uka Honouliuli and Waikele Ahupua'a in Wahiawa and 'Ewa Districts, Oahu Island.

Dr. Alan Downer, Deputy State Historic Preservation Officer
State Historic Preservation Division
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, HI 96707

Dear Dr. Downer:

The Directorate of Public Works, United States Army Garrison, Hawaii (USAG-HI) is writing to continue consultation with you pursuant to Section 106 of The National Historic Preservation Act of 1966, as amended (54 USC §306108), on the proposed construction of a new power plant on the South Range of Schofield Barracks (SB), located on the central plateau on the Island of Oahu, Hawaii. The construction of this power plant is a joint venture between the USAG-HI and the Hawaiian Electric Company (HECO). The full description of the undertaking and supporting information is contained in our initial consultation letter to you (October 14, 2014, Enclosure 1).

The proposal includes leasing 8.13 acres of US Army land and granting a 2.5-acre interconnection easement on SB and Wheeler Army Airfield (WAAF) to HECO to construct, operate, and maintain a 50-megawatt-capacity, renewable energy power plant. HECO will install power poles, high-tension power lines, and related equipment and facilities. The Area of Potential Effect for this undertaking is approximately 882 acres of land which includes the SB Historic District (listed on July 31, 1998), the WAAF National Historic Landmark District (listed 1987), and the adjacent WAAF Garden City Historic District, considered eligible (2010).

SHPD responded in a letter dated November 18, 2014 (Enclosure 2) with a request for additional details and a meeting between HECO, SHPD, USAG-HI, the Historic Hawaii Foundation, and interested parties to discuss design alternatives on the placement of the 47 steel electrical poles. The Advisory Council on Historic Preservation requested to be informed of the outcome of consultation to make a decision on their participation (Enclosure 3).

Consulting parties agreed at a meeting (December 5, 2014) that the only remaining issues of potential effect were those questions regarding potential intrusive visual effects to the historic districts along the route of the electrical lines to be upgraded. SHPD staff expressed particular concerns about the visual effect of the

poles along Kunia Road and Wilikina Drive (Enclosure 4). These concerns centered on: Poles 11-13 along the Stryker Avenue neighborhood; Poles 14-18 at the WAAF historic Garden City Loops (Langley Loop); Poles 21-22 next to Building E at Wheeler Elementary and Intermediate School (School); and Poles 23-30 next to the Sperry Loop neighborhood. Furthermore, Poles 42-47 are located near to the small, two-bedroom stucco/mission style homes adjacent to Ralston Field at SB.

SHPD staff inquired why Poles 11-28 along Kunia Road and Wilikina Road could not be relocated to other areas or underground. HECO explained that relocating them was precluded by existing infrastructure, technical, and code reasons. HECO provided alternatives that SHPD staff found acceptable to avoid adverse visual effects, such as painting the poles to blend in with the environment, and planting trees compatible with the historic districts to limit and screen their views. The Army recommends using colors and trees that are appropriate for the WAAF neighborhoods. USAG-HI will submit a list of colors for the poles and a tree-location plan for your review.

Although the SHPD staff has not expressed concerns that the power plant will affect any historic properties since it is not in close proximity to the historic districts, we would like to inform you that the originally proposed 75-foot-high power plant exhaust stacks will now be 95 feet high (Enclosure 5). Furthermore, Pole 18 that was originally on the School's property was moved to another location on the opposite side of Kunia Road, and the pole heights were changed from 80 feet to 60 feet. These changes will further diminish visual impacts to the historic neighborhoods. Since the Ralston neighborhood has existing 60-foot-tall poles to be changed with poles of the same height, we do not foresee visual impacts to this neighborhood.

The Army determined that with the incorporated measures to diminish the potential visual prominence of the new poles and electric lines in the vicinity of the historic districts, the proposed project will have *no adverse effect* per 36 CFR 800.5(b). We request your concurrence with this determination. If you have any questions, you may contact Richard Davis, the Cultural Resources Manager of the Directorate of Public Works at 808-655-9709.

Sincerely,

Steven M. Raymond
Director of Public Works

Enclosures

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

OCT 09 2014

Office of the Garrison Commander

Mr. William Aila
State Historic Preservation Officer
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawai'i 96707

Dear Mr. Aila:

The Office of the Garrison Commander, United States Army Garrison-Hawaii, is writing to open consultation with you pursuant to Section 106 of The National Historic Preservation Act of 1966, as amended (16 USC 470f), on the proposed construction of a new power plant on the south range of Schofield Barracks which is located on the central plateau on the Island of Oahu, Hawaii. The construction of this power plant is a joint venture between the US Army Garrison in Hawaii and the Hawaiian Electric Company. This venture will allow the Army bases in central Oahu to have better energy security as well as providing Oahu with a power plant located more inland in case the more coastal energy plants are compromised. The Tax Map Key designation for Schofield Barracks and Wheeler Army Airfield (WAAF) is 1-07-07-001.

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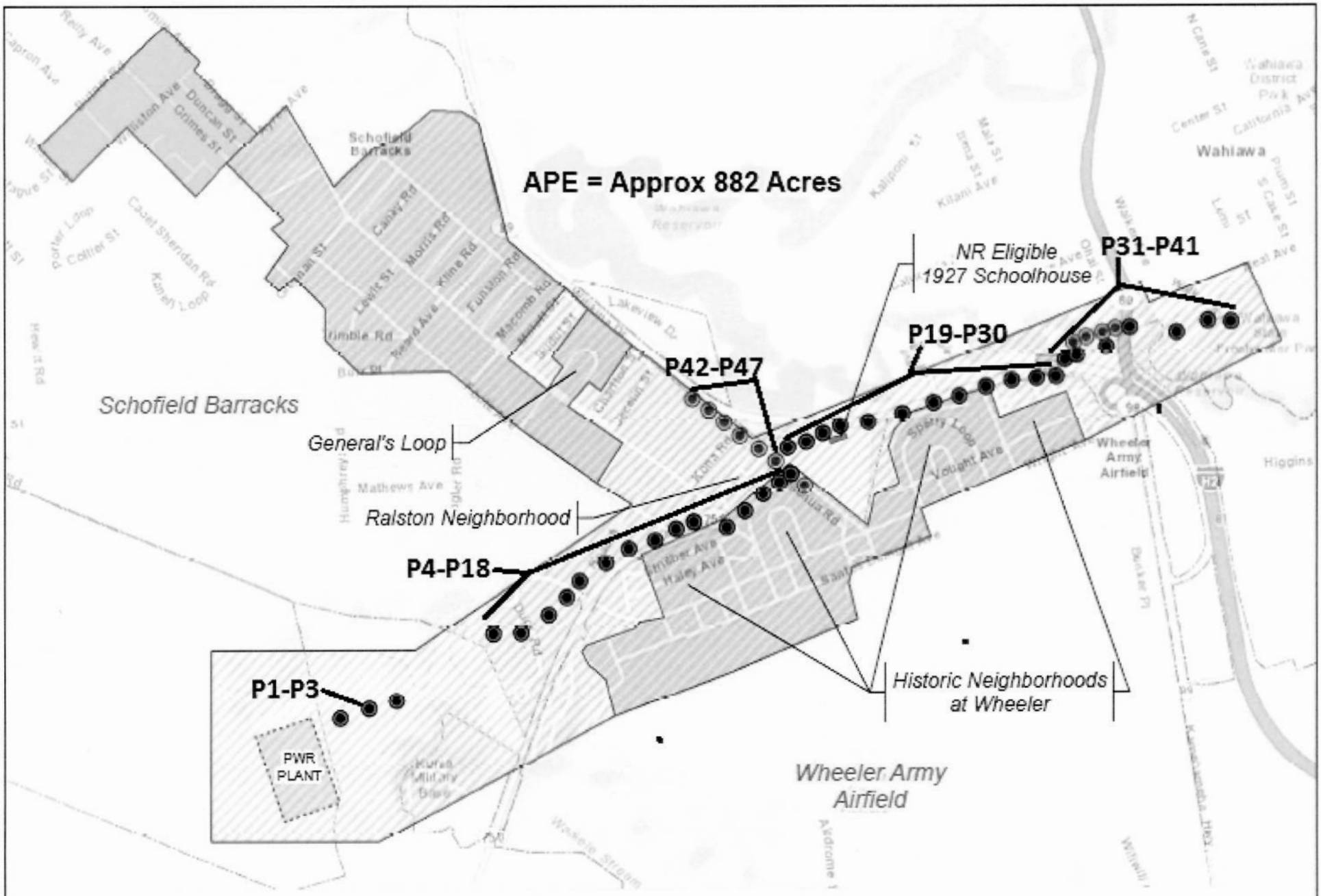


AREA OF POTENTIAL EFFECT FOR
VISUAL IMPACTS TO THE HISTORIC RESOURCES
AT SCHOFIELD BARRACKS AND
WHEELER ARMY AIRFIELD

HECO Poles
- Existing
- Proposed

- Future Power Plant
- Historic District
- Installation Area
- Area of Potential Effect

Feet
0 750 1,500 3,000

U.S. Army Garrison-Hawaii, DPW-Environmental
September 2014
Source: "Streets" Basemap (ESRI et al. 2013)
APE information may be reviewed and updated

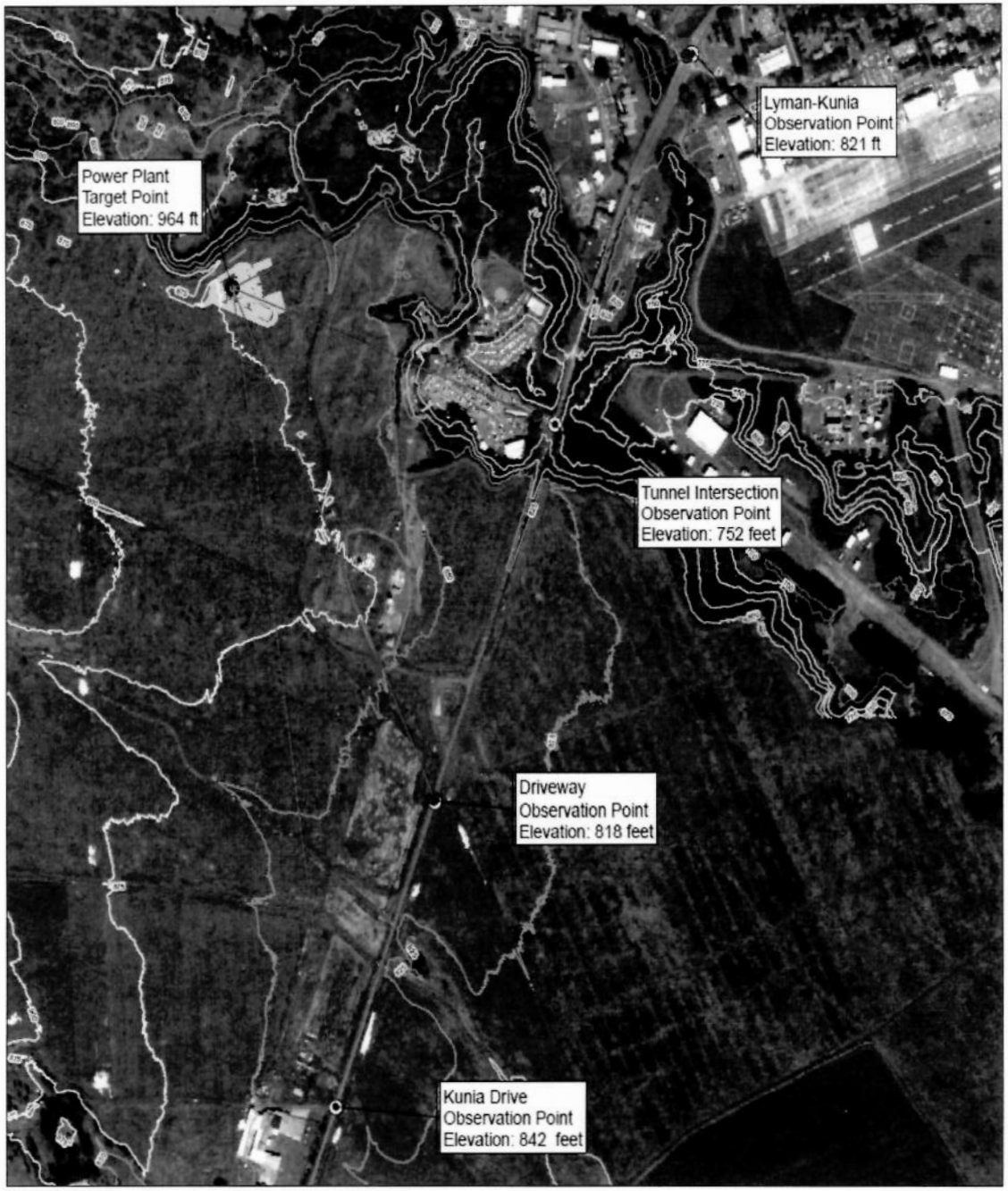
ENCL 1

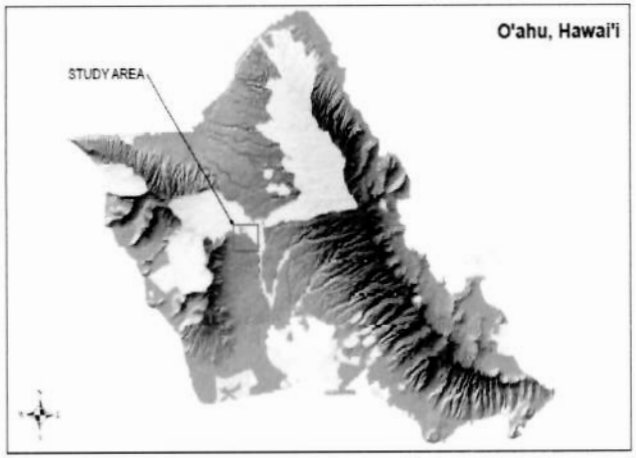
Schofield Generating Station
Preferred Overhead 46kV Route

- New Pole on Army Land
- New Pole on State Land
- Existing 46kV line
- Existing 46kV line Dual Circuit
- Schofield Generating Station
- Substations as labeled
- New 46kvExpress Line
- Existing 46kV line

Project Features

Figure 2-2





Schofield Power Plant

Line of Sight Analysis

LEGEND

- Target Location
- Observer Location
- Obstruction Point
- Not Visible
- Visible
- Power Plant

Contour Lines

- 700 feet
- 750 feet
- 800 feet
- 850 feet
- 900 feet

N

0 500 1,000 2,000 Feet

US Army Corps of Engineers®
Honolulu District

NOAA 2013 LIDAR Oahu Collection Source of elevation data from MSL
Coordinate System: NAD 1983 HARN StatePlane Hawaii 3 FIPS 5103 Feet
Projection: Transverse Mercator
Horizontal Datum: North American 1983 HARN

Schofield Power Plant Methodology

1) Coordinate System

The Line of Sight analysis and the associated data were created using ArcGIS's ArcCatalog and ArcMap software. A new file based geodatabase was created in ArcCatalog. The Coordinate System used is NAD 1983 HARN StatePlane Hawaii 3 FIPS 5103, in feet. Projection is the Transverse Mercator, and the Horizontal Datum is the North American 1983 HARN. No Z-factor was used.

2) Terrain to TIN

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ASPRS Standard LiDAR Point Classes

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10	Reserved for ASPRS Definition
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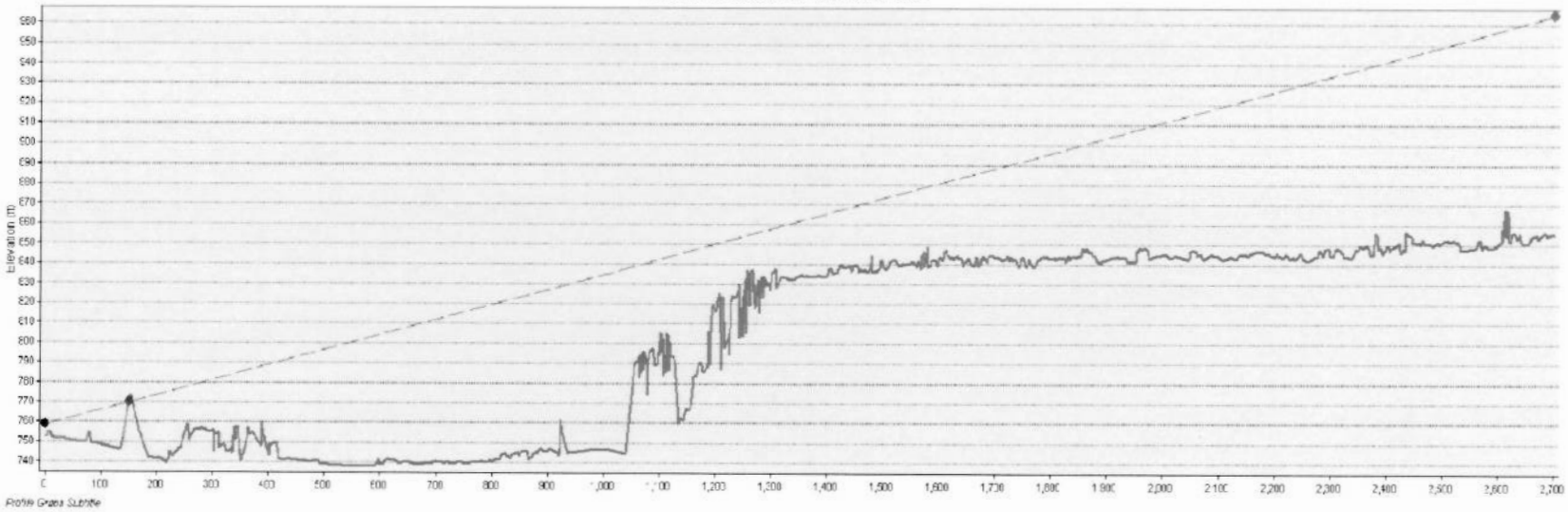
12	Overlap Points
13-31	Reserved fro ASPRS Definition

Figure 1. ASPRS Standard LiDAR Point Class Codes (ESRI Support)

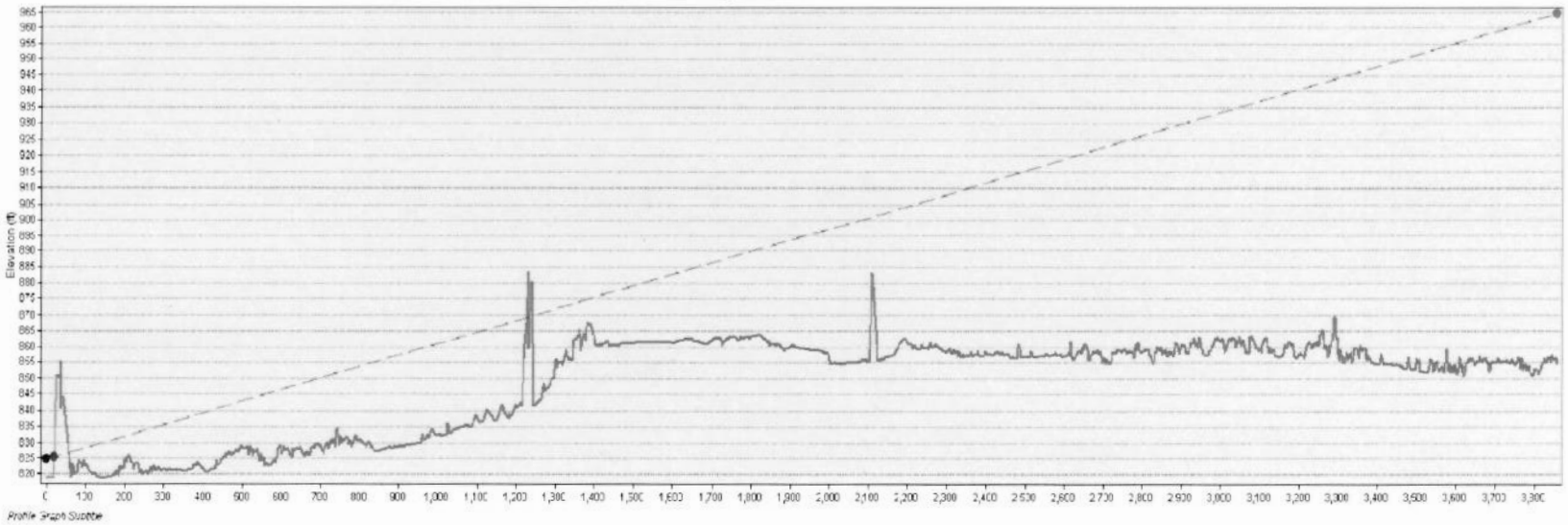
In order to do a Line of Sight analysis, the first return terrain was converted into a triangulated irregular network (TIN) using the 3DAnalyst tool. The TIN was created by triangulating the terrain's surface using nodes.

Lyman-Kunia Observation Point Profile

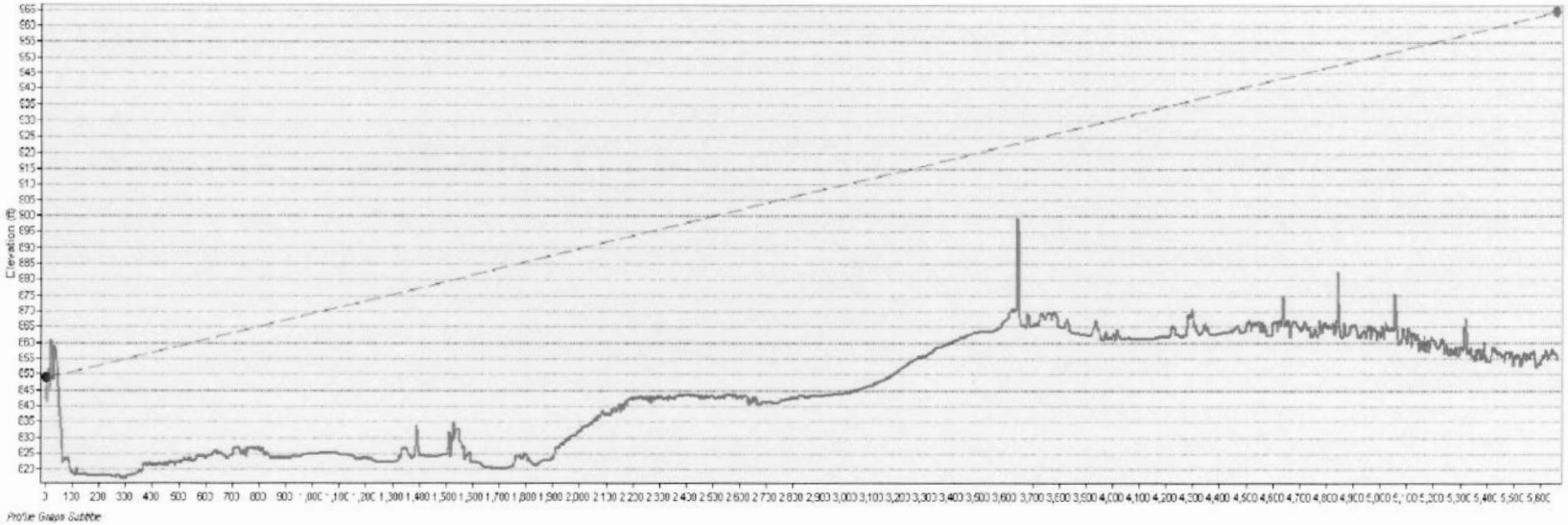
Tunnel Intersection Observation Point Profile



Driveway Observation Point Profile



Kunia Drive Observation Point Profile



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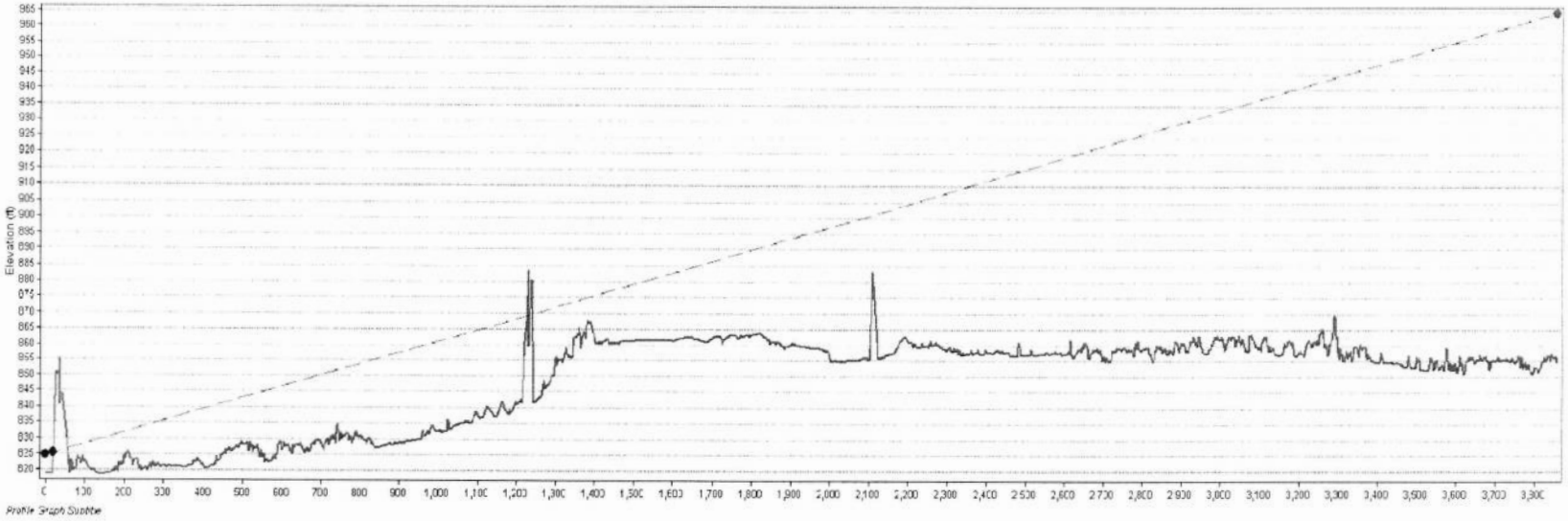
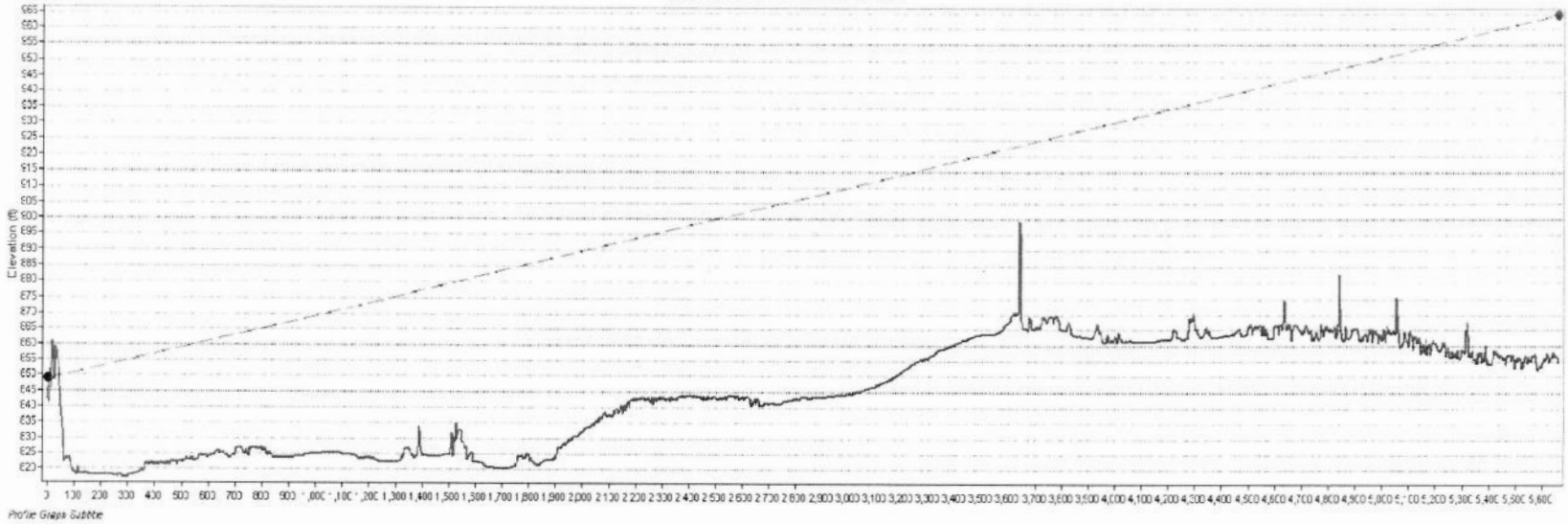


Kunia Drive Observation Point Profile



DAVID Y. IGE
GOVERNOR OF HAWAII

CARTY S. CHANG
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DANIEL S. QUINN
INTERIM FIRST DEPUTY

W. ROY HARDY
ACTING 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

April 27, 2015

IN REPLY REFER TO:
LOG: 2015.01198
DOC: 1504JLP45
"no adverse effect with conditions"

Steven M. Raymond
Director of Public Works
Department of the Army
US Army Installation Management Command,
Pacific Region Headquarters,
United States Army Garrison, Hawaii
947 Wright Avenue
Wheeler Army Airfield
Schofield Barracks, HI 96857-5000

RE: Section: Section 106 – Cultural Resources Management
Agency: Department of the Army (ARMY)
Project Name: Construction of a Power Plant and Installation of Power Poles at Schofield Barracks and Wheeler Army Airfield
Location: Schofield Barracks and Wheeler Army Airfield, Oahu

Dear Steven Raymond:

On March 27, 2015, the State Historic Preservation Division (SHPD) received a submittal from ARMY for construction of a power plant and power poles at Schofield Barracks and Wheeler Army Airfield. Per Section 106 of the National Historic Preservation Act of 1966, as amended, we have reviewed the undertaking at Schofield Barracks and Wheeler Army Airfield (TMK (1) 1-7-007:001). It is the determination of the State Historic Preservation Officer (SHPO) that the proposed undertaking will have **no adverse effect** on historic properties within the area of potential effects for the above-cited undertaking **provided the following condition is met:**

- Submit detailed plans and specifications of the proposed tree location plan once these have been developed.

If ARMY concurs with the condition outlined above, please submit to SHPD a letter of concurrence. **If ARMY disagrees with this condition, then consultation with this office shall be reopened.**

The ARMY is the office of record for this undertaking. You are therefore asked to maintain a copy of this letter with your environmental review record for this undertaking. If you have any questions or if the scope of work changes in any way, please contact Jessica Puff, Architectural Historian, at (808) 692-8023 or by email at jessica.l.puff@hawaii.gov. If you have any questions regarding archaeology, please contact Dr. Susan Lebo, Acting Archaeology Branch Chief and Oahu Lead Archaeologist at (808) 692-8019 or by email at Susan.A.Lebo@hawaii.gov.

Sincerely,

Dr. Alan Downer
Deputy State Historic Preservation Officer

In the event that historic resources, including human skeletal remains, cultural layers, cultural deposits, features, artifacts, or sinkholes, lava tubes or lava blisters/bubbles are identified during construction activities, all work should cease in the immediate vicinity of the find, the find should be protected from additional disturbance, and the State Historic Preservation Division should be contacted immediately at (808) 692-8015.

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
745 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Directorate of Public Works MAR 2 4 2015

SUBJECT: Construction of a Power Plant and Installation of Power Poles at Schofield Barracks (SB) and Wheeler Army Airfield (WAAF); Tax Map Key: 1-07-07-001;Waianae Uka Honouliuli and Waikele Ahupua'a in Wahiawa and 'Ewa Districts, Oahu Island.

Ms. Caroline D. Hall, Assistant Director, Federal Property Management Section
Office of Federal Agency Programs, Advisory Council on Historic Preservation
401 F Street, Suite 308
Washington, DC 20001-2637

Dear Ms. Hall:

The Directorate of Public Works, United States Army Garrison, Hawaii (USAG-HI) is writing to continue consultation with you pursuant to Section 106 of The National Historic Preservation Act of 1966, as amended (54 USC §306108), on the proposed construction of a new power plant on the South Range of SB which is located on the central plateau on the Island of Oahu, Hawaii. The construction of this power plant is a joint venture between the USAG-HI and the Hawaiian Electric Company (HECO). The full description of the undertaking and supporting information is contained in our initial consultation letter to you (December 17, 2014). The Advisory Council on Historic Preservation requested to be informed of the outcome of consultation to make a decision on your participation (Enclosure 1).

The proposal includes leasing 8.13 acres of US Army land and granting a 2.5-acre interconnection easement on SB and WAAF to HECO to construct, operate, and maintain a 50-megawatt-capacity, renewable energy power plant. HECO will install power poles, high-tension power lines, and related equipment and facilities. The Area of Potential Effect for this undertaking is approximately 882 acres of land which includes the SB Historic District (listed on July 31, 1998), the WAAF National Historic Landmark District (listed 1987), and the adjacent WAAF Garden City Historic District, considered eligible (2010).

The State Historic Preservation Division (SHPD) responded in a letter dated November 18, 2014 (Enclosure 2) with a request for additional details and a meeting between HECO, SHPD, USAG-HI, the Historic Hawaii Foundation (HHF), and interested parties to discuss design alternatives on the placement of the 47 steel electrical poles.

Consulting parties agreed at a meeting (December 5, 2014) that the only remaining issues of potential effect were those questions regarding potential intrusive visual effects to the historic districts along the route of the electrical lines to be upgraded. SHPD and HHF staff expressed particular concerns about the visual effect

of the poles along Kunia Road and Wilikina Drive (Enclosure 3). These concerns centered on: Poles 11-13 along the Stryker Avenue neighborhood; Poles 14-18 at the WAAF historic Garden City Loops (Langley Loop); Poles 21-22 next to Building E at Wheeler Elementary and Intermediate School (School); and Poles 23-30 next to the Sperry Loop neighborhood. Furthermore, Poles 42-47 are located near to the small, two-bedroom stucco/mission style homes adjacent to Ralston Field at SB.

SHPD and HHF staff inquired why Poles 11-28 along Kunia Road and Wilikina Road could not be relocated to other areas or underground. HECO explained that relocating them was precluded by existing infrastructure, technical, and code reasons. HECO provided alternatives that SHPD staff found acceptable to avoid adverse visual effects, such as painting the poles to blend in with the environment, and planting trees compatible with the historic districts to limit and screen their views. The Army recommends using colors and trees that are appropriate for the WAAF neighborhoods. USAG-HI will submit a list of colors for the poles and a tree-location plan for your review.

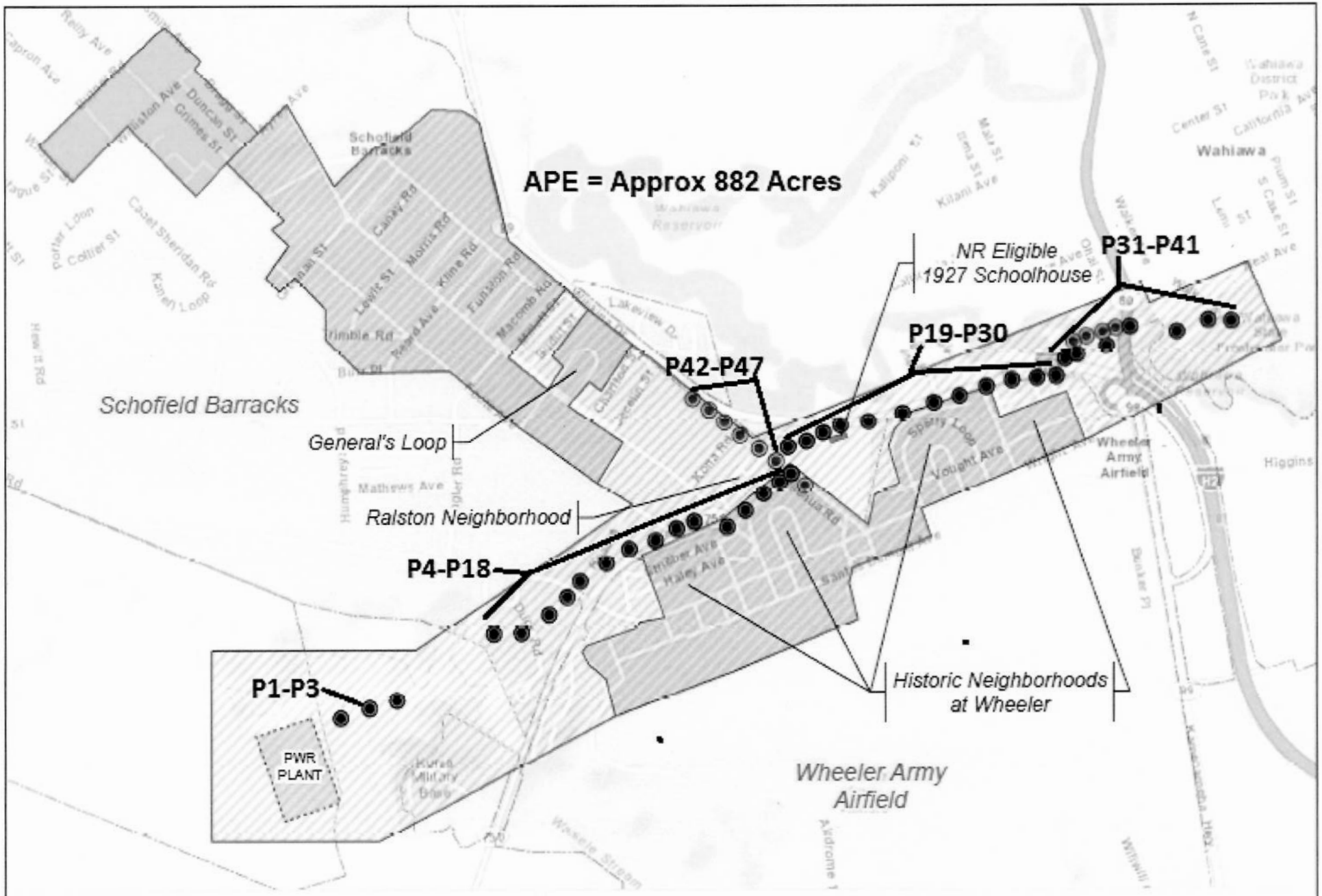
Although the SHPD and HHF staff has not expressed concerns that the power plant will affect any historic properties since it is not in close proximity to the historic districts, we would like to inform you that the originally proposed 75-foot-high power plant exhaust stacks will now be 95 feet high (Enclosure 4). Furthermore, Pole 18 that was originally on the School's property was moved to another location on the opposite side of Kunia Road, and the pole heights were changed from 80 feet to 60 feet. These changes will further diminish visual impacts to the historic neighborhoods. Since the Ralston neighborhood has existing 60-foot-tall poles to be changed with poles of the same height, we do not foresee visual impacts to this neighborhood.

The Army determined that with the incorporated measures to diminish the potential visual prominence of the new poles and electric lines in the vicinity of the historic districts, the proposed project will have *no adverse effect* per 36 CFR 800.5(b). We request your comments on this determination. If you have any questions, you may contact Richard Davis, the Cultural Resources Manager of the Directorate of Public Works at 808-655-9709.

Sincerely,

Steven M. Raymond
Director of Public Works

Enclosures



AREA OF POTENTIAL EFFECT FOR
VISUAL IMPACTS TO THE HISTORIC RESOURCES
AT SCHOFIELD BARRACKS AND
WHEELER ARMY AIRFIELD

HECO Poles
- Existing
- Proposed

- Future Power Plant
- Historic District
- Installation Area
- Area of Potential Effect

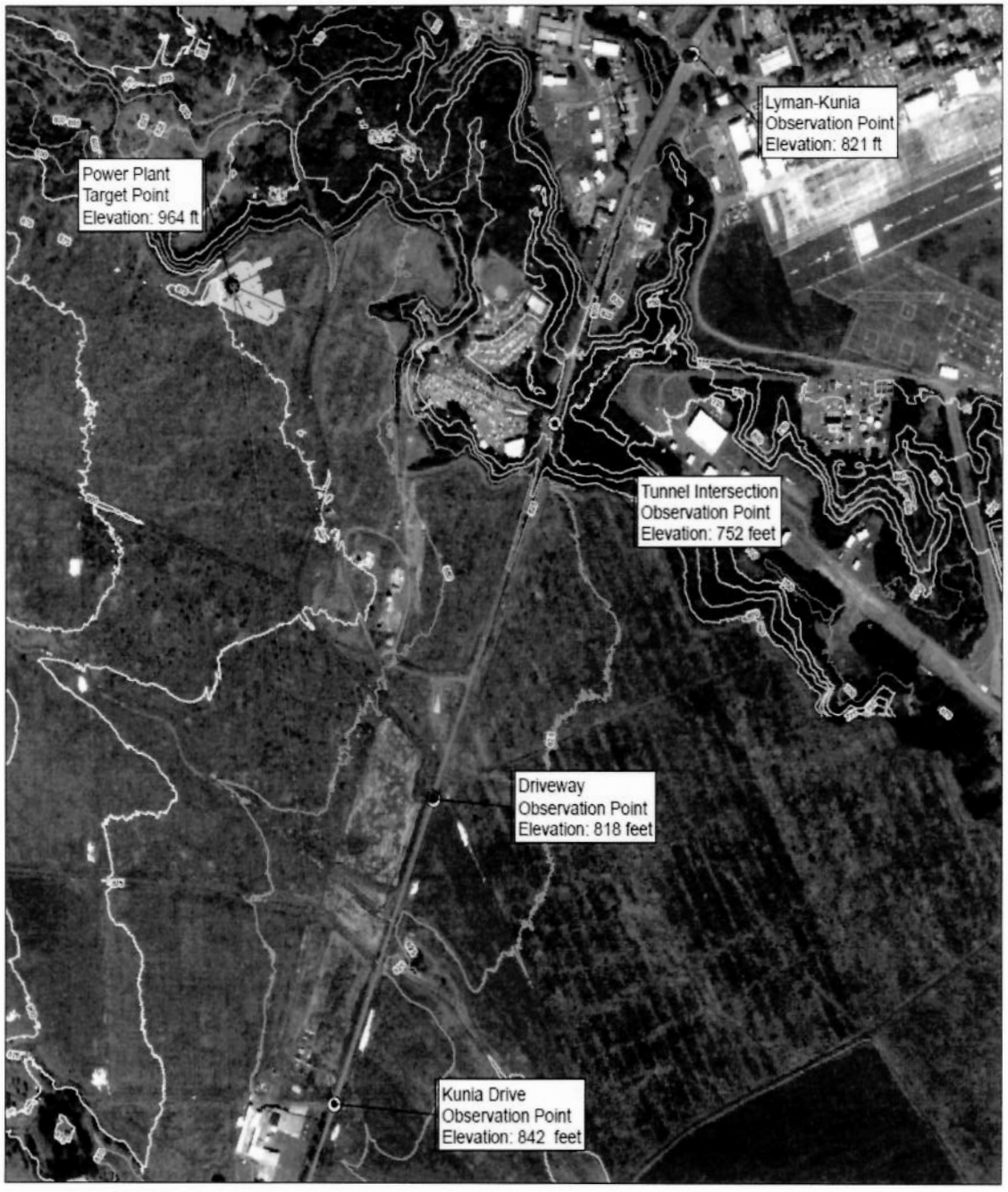
ENCL 1

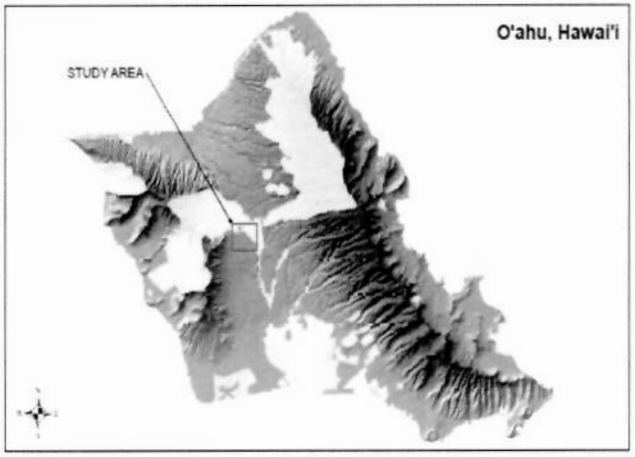
Schofield Generating Station
Preferred Overhead 46kV Route

- New Pole on Army Land
- New Pole on State Land
- Existing 46kV line
- Existing 46kV line Dual Circuit
- Schofield Generating Station
- Substations as labeled
- New 46kvExpress Line
- Existing 46kV line

Project Features

Figure 2-2





Schofield Power Plant

Line of Sight Analysis

LEGEND

- Target Location
- Observer Location
- Obstruction Point
- Not Visible
- Visible
- Power Plant

Contour Lines

- 700 feet
- 750 feet
- 800 feet
- 850 feet
- 900 feet

N

0 500 1,000 2,000 Feet

US Army Corps of Engineers®
Honolulu District

NOAA 2013 LIDAR Oahu Collection Source of elevation data from MSL
Coordinate System: NAD 1983 HARN StatePlane Hawaii 3 FIPS 5103 Feet
Projection: Transverse Mercator
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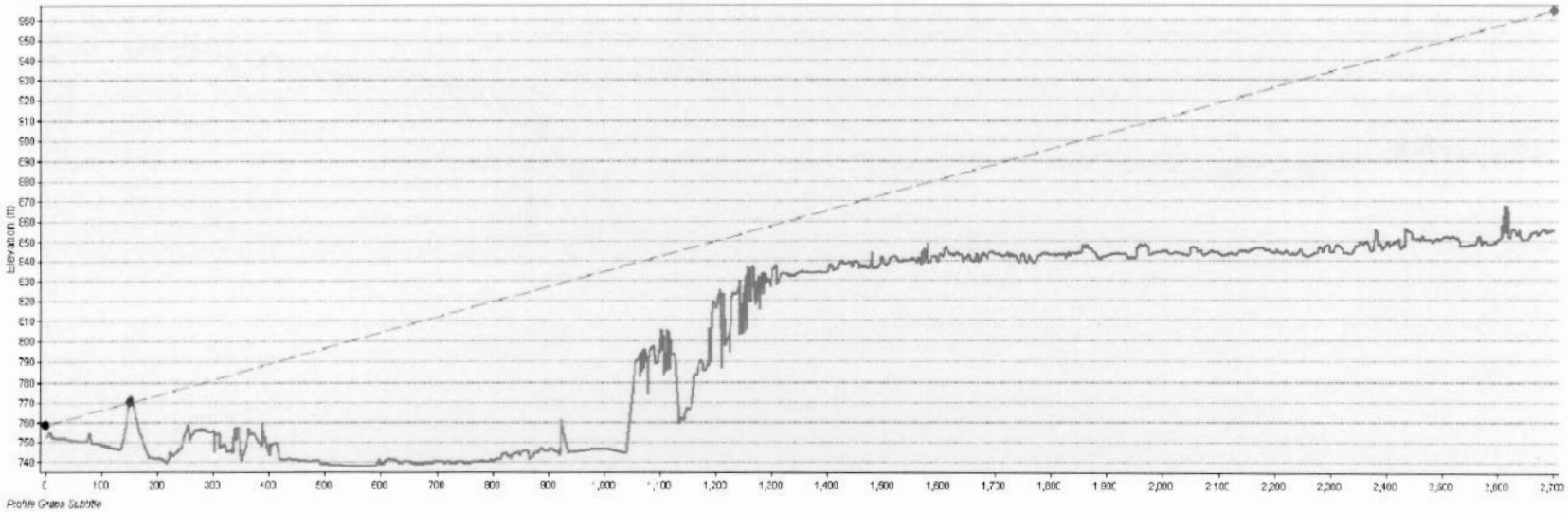

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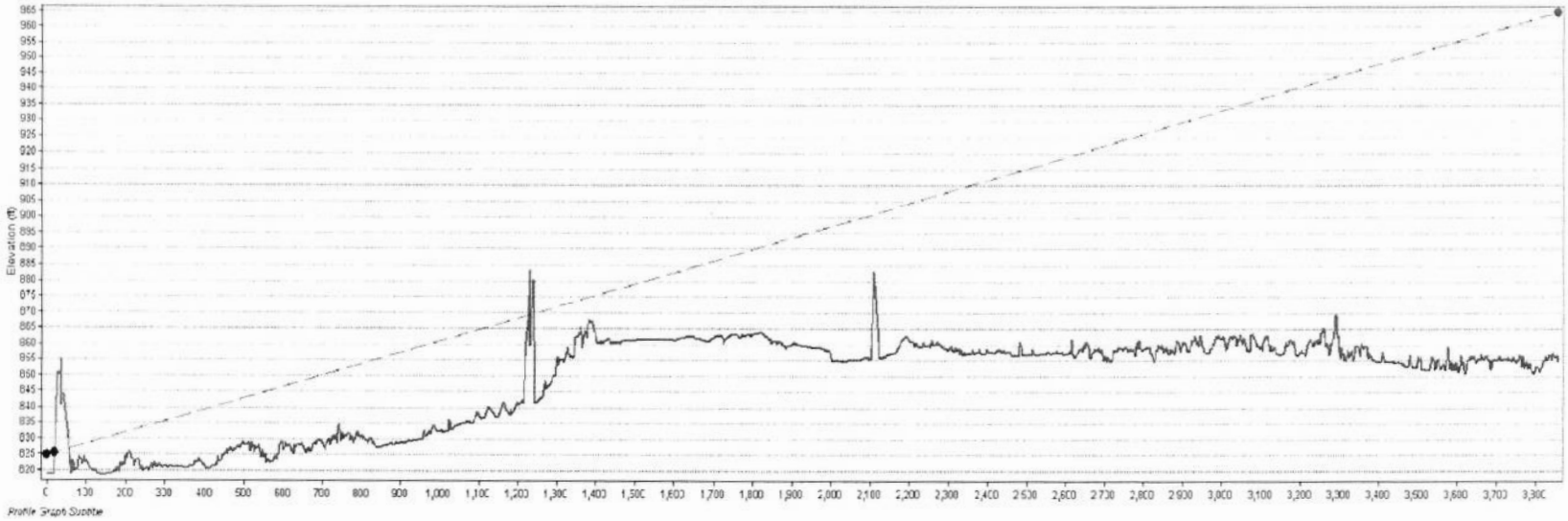

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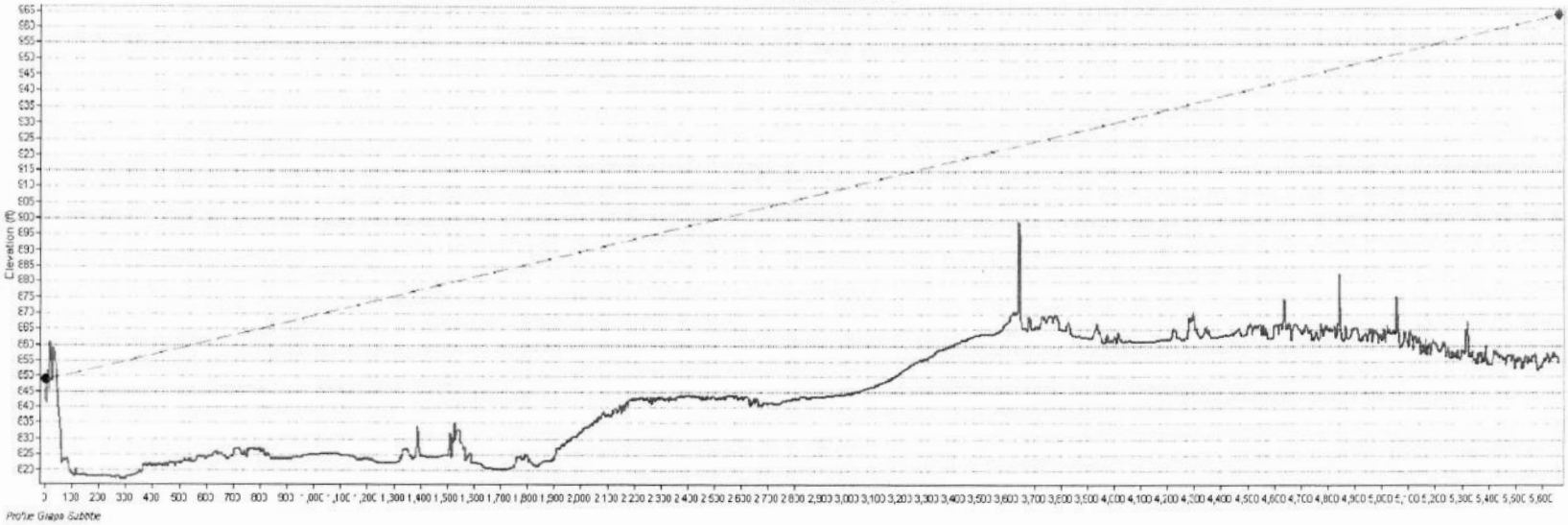

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
745 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

Directorate of Public Works

MAR 2 4 2015

SUBJECT: Construction of a Power Plant and Installation of Power Poles at Schofield Barracks (SB) and Wheeler Army Airfield (WAAF); Tax Map Key: 1-07-07-001;Waianae Uka Honouliuli and Waikele Ahupua'a in Wahiawa and 'Ewa Districts, Oahu Island.

Ms. Kiersten Faulkner, Executive Director
Historic Hawaii Foundation
The Dole Cannery, 680 Iwilei Road
Dole Office Building Tower, Suite 690
Honolulu, HI 96817

Dear Ms. Faulkner:

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If you have any questions, you may contact Richard Davis, the Cultural Resources Manager of the Directorate of Public Works at 808-655-9709.

Sincerely,

Steven M. Raymond
Director of Public Works

Enclosures

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND, PACIFIC REGION
HEADQUARTERS, UNITED STATES ARMY GARRISON, HAWAII
851 WRIGHT AVENUE, WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HAWAII 96857-5000

REPLY TO
ATTENTION OF:

JUL 0 6 2011

Office of the Garrison Commander

Ms. Kirsten Faulkner
Executive Director
Historic Hawaiian Foundation
681 Iwilei Road, Suite 690
Honolulu, HI 96817

Dear Ms. Faulkner:

On behalf of the Commander of the US Army Garrison, Hawaii (USAG-HI), I am writing to open consultation with you under Section 106 of the National Historic Preservation Act of 1966, as amended, for an undertaking involving an outgrant of an approximately 10-acre parcel to Hawaiian Electric Company (HECO) for construction of a 52 megawatt (MW) power generation plant and a fuel storage system located at Schofield Barracks, South Range Land Acquisition Area (SRLA), Wahiawā, O'ahu Island, TMK: 1-9-2-005:011. An outgrant is an easement, lease or real estate agreement to allow the use of Army land by a third party. The HECO outgrant term will be 25 years with options to renew. The area of potential effect (APE) is shown in Enclosure 1.

Archaeological inventory survey of the SRLA (delineated in black in Enclosure 1) was conducted by Scientific Consultant Services/Cultural Resources Management Services (SCS/CRMS) in 1996, Garcia and Associates (GANDA) in 2002 and 2003 and Cultural Surveys Hawaii, Inc. (CSH) from March to April 2009. Archaeological inventory survey of the APE was conducted by CSH during their 2009 survey. No archaeological or cultural resources other than historic plantation equipment were identified within the CSH survey area. Additionally, 30 test units were hand excavated within the CSH survey area. No subsurface archaeological/cultural resources were identified.

There are no known archaeological/cultural resources located in the vicinity of the APE. A total of 45 sites were identified within SRLA during the SCS/CRMS and GANDA surveys, of which Site 6463, a post-contact complex, is located more than 4,593 feet (1,400 meters) from the APE. The closest known site to the APE, a terrace facing, Site 3 (not designated a SIHP number), is located more than 1,312 feet (400 meters) north of the APE. Additionally, the post cemetery, which is not designated a SIHP number, is also located approximately 1,312 feet (400 meters) north of the APE. Site 3 and the post cemetery are shown in Enclosure 1.

ENC.1

Preserving America's Heritage

December 17, 2014

Colonel Richard A. Fromm
Office of the Garrison Commander
U.S. Army Garrison-Hawaii
851 Wright Avenue, Building 106
Schofield Barracks, HI 96857

Ref: Leasing of Land to, Granting an Interconnection Easement to, and the Construction, Operation, and Maintenance of a 50-Megawatt Schofield Generating Station by the Hawaiian Electric Company, United States Army Garrison- Hawaii
Schofield Barracks and Wheeler Army Airfield, Honolulu County, Hawaii

Dear COL Fromm:

The Advisory Council on Historic Preservation (ACHP) is in receipt of notification by the United States Army Garrison, Hawaii (USAG-HI) for the leasing of 8.13 acres, granting a 2.5 acre interconnection easement, and the construction, operation, and maintenance of a new 50-megawatt (MW) capacity renewable energy power plant, to be known as the Schofield Generating Station. Documentation provided included a letter regarding a similar project proposed by the Hawaiian Electric Company in 2011.

The ACHP is requesting additional information regarding the outcome of the 2011 consultation, including information on the apparent suspension of project development at that time. In addition, we require clarification regarding the current effect finding for this undertaking. Specifically, please clarify if USAG-HI is making a determination of effect or if this is an early notification to the ACHP. This information will enable the ACHP to determine if our participation is warranted. Upon receipt of the additional information, we will notify you within 15 days of our decision on participation.

If you have any questions, please contact Ms. Katharine R. Kerr who can be reached at (202) 517-0216 or via email at kkerr@achp.gov.

Sincerely,

Caroline D. Hall
Assistant Director
Federal Property Management Section
Office of Federal Agency Programs

ADVISORY COUNCIL ON HISTORIC PRESERVATION
401 F Street, Suite 308 • Washington, DC 20001-2637
Phone: 202-517-0200 • Fax: 202-517-6381 • achp@achp.gov • www.achp.gov

ENC. 2

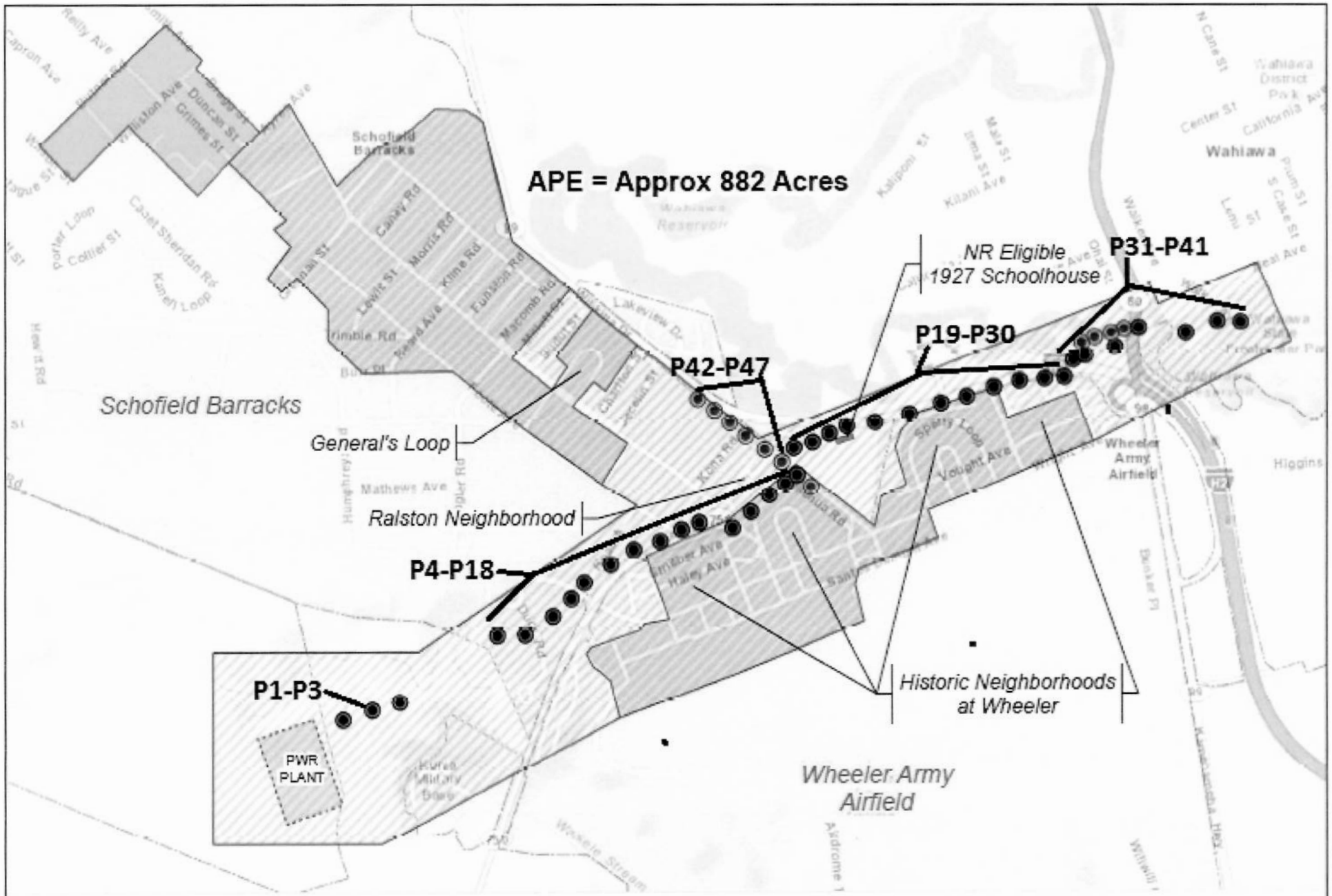
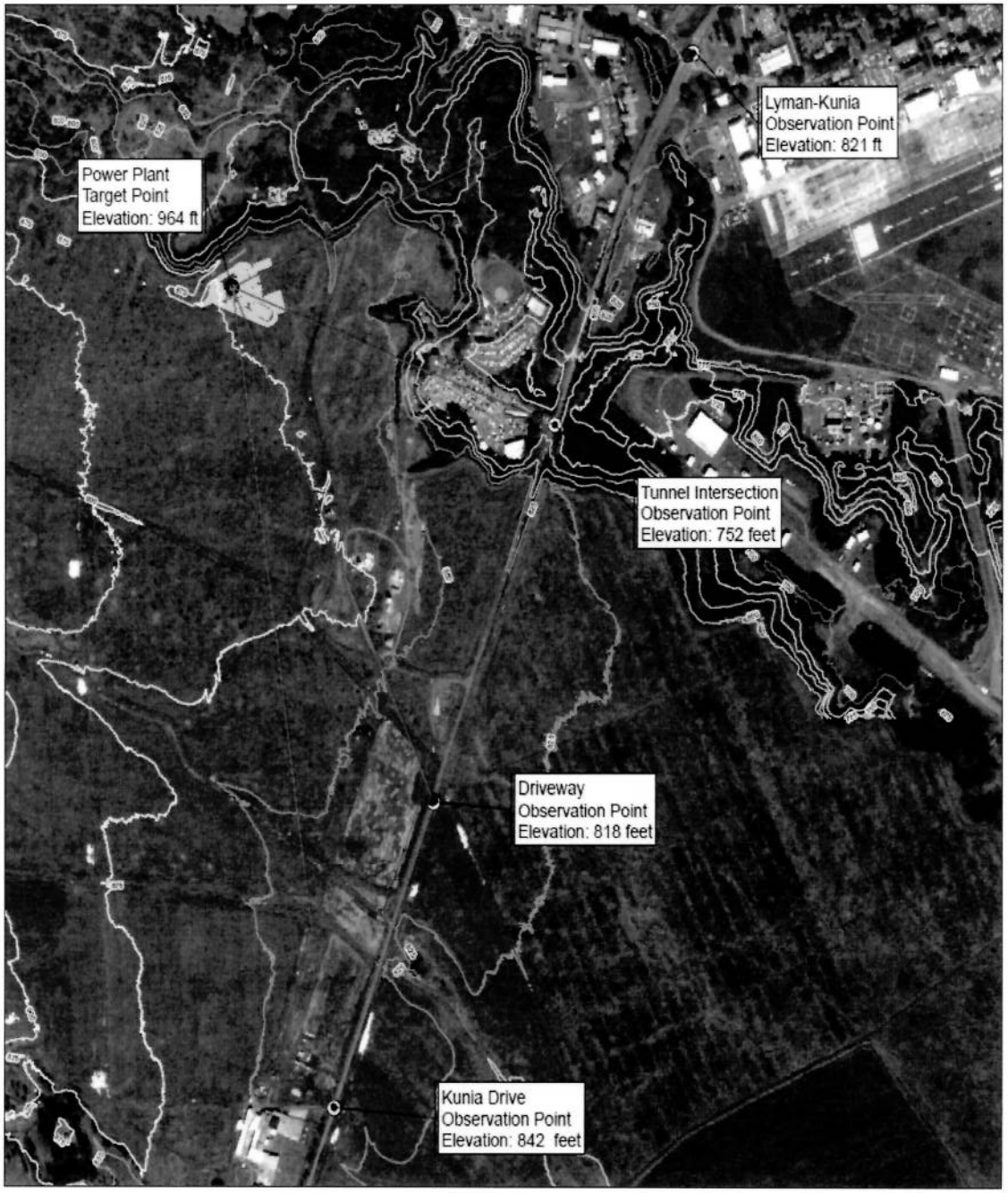
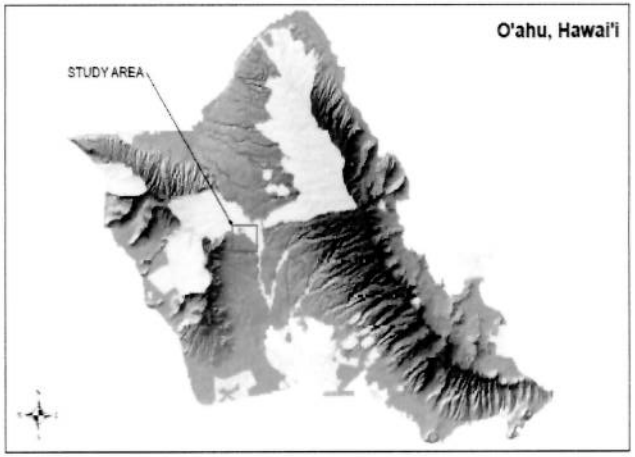

APE = Approx 882 Acres
Schofield Barracks
General's Loop
Ralston Neighborhood
NR Eligible
1927 Schoolhouse
P1-P3
P4-P18
P19-P30
P31-P41
P42-P47
PWR PLANT
Historic Neighborhoods at Wheeler
Wheeler Army Airfield
Wahiawa
Wheeler Army Airfield
Wahiawa Reservoir
Wahiawa District Park
Schofield Barracks
Duncan St
Crimes St
Canby Rd
Morris Rd
Kime Rd
Funston Rd
Macomb Rd
Lewitt St
Trimble Rd
Reed Ave
Lakeview Dr
Mathews Ave
Humphrey Rd
Kolekole Ave
Timber Ave
Haley Ave
Vought Ave
Spitty Loop
Kaala Rd
Kunia Rd
Kaala Stream
Wheeler Stream
Aerodrome
Kaala Military Dump
Kaala Hwy
Kamehameha Hwy
Wilikina Dr
Dillingham Blvd
Kaala Ave
Kilani Ave
Kaliponi St
Mililani St
Ema St
Mililani Ave
Lanu St
Plum St
S Cane St
N Cane St
Center St
California Ave
Higgins
Dunkle Pl
Wahiawa Hwy

Figure 2. Area of Potential Effect for Schofield Generating Station, including transmission corridor improvements.





Schofield Power Plant

Line of Sight Analysis

LEGEND

- Target Location
- Observer Location
- Obstruction Point
- Not Visible
- Visible
- Power Plant

Contour Lines

- 700 feet
- 750 feet
- 800 feet
- 850 feet
- 900 feet

N

0 500 1,000 2,000 Feet

US Army Corps of Engineers
Honolulu District

NOAA 2013 LIDAR Oahu Collection Source of elevation data from MSL
Coordinate System: NAD 1983 HARN StatePlane Hawaii 3 FIPS 5103 Feet
Projection: Transverse Mercator
Horizontal Datum: North American 1983 HARN

ENC 4

Schofield Power Plant Methodology

1) Coordinate System

The Line of Sight analysis and the associated data were created using ArcGIS's ArcCatalog and ArcMap software. A new file based geodatabase was created in ArcCatalog. The Coordinate System used is NAD 1983 HARN StatePlane Hawaii 3 FIPS 5103, in feet. Projection is the Transverse Mercator, and the Horizontal Datum is the North American 1983 HARN. No Z-factor was used.

2) Terrain to TIN

A feature dataset was created in the new geodatabase. The study area boundary feature was imported into the feature dataset. The boundary feature was used as a hard clip surface feature to limit the area that contained the LiDAR data. The LiDAR data (LAS files) were converted into multipoints, a collection of points that can be used to store a collection of point-based information, using 3DAnalyst tool in ArcCatalog. Multipoints for bare earth and first returns were converted from the same LAS files. For the bare earth terrain, class code 2 was the only one used in the conversion of multipoints. For the first returns, class codes 1, 4,5,6 were used (See Figure 1). A bare earth and first return terrain were produced using the boundary feature and the multipoints.

ASPRS Standard LiDAR Point Classes

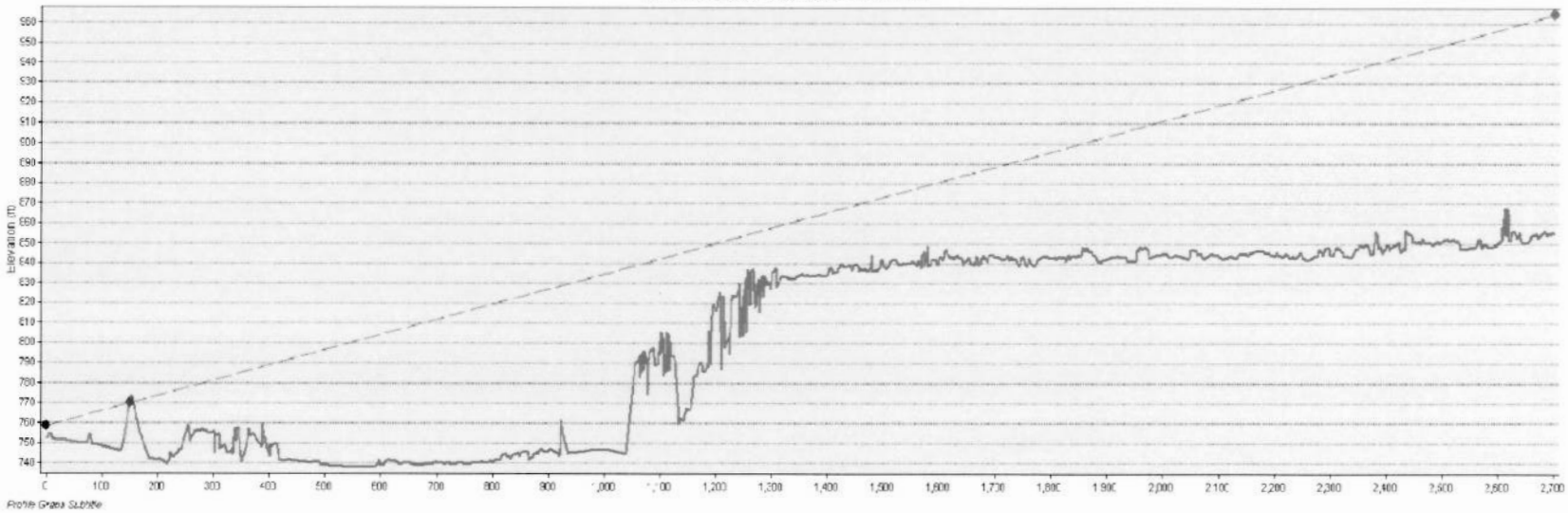
Classification Value	Meaning
0	Created, never classified
1	Unclassified
2	Ground
3	Low Vegetation
4	Medium Vegetation
5	High Vegetation
6	Building
7	Low Points (noise)
8	Model Key-Points (mass points)
9	Water
10	Reserved for ASPRS Definition
11	Reserved for ASPRS Definition
12	Overlap Points
13-31	Reserved fro ASPRS Definition

Figure 1. ASPRS Standard LiDAR Point Class Codes (ESRI Support)

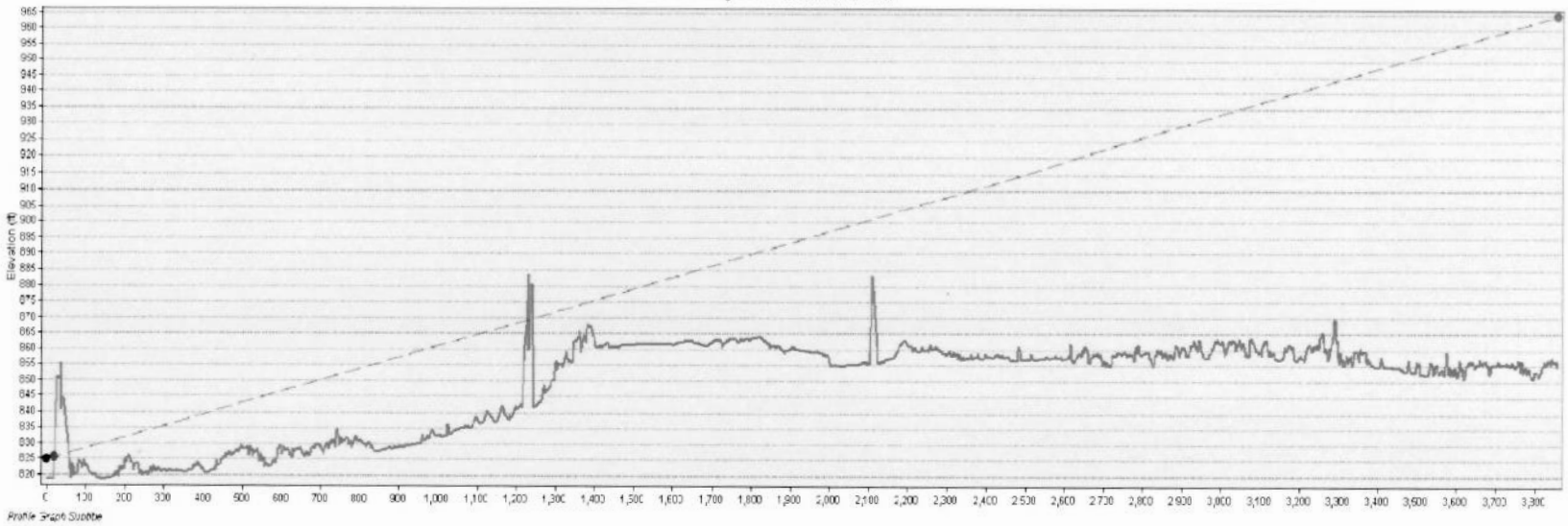
In order to do a Line of Sight analysis, the first return terrain was converted into a triangulated irregular network (TIN) using the 3DAnalyst tool. The TIN was created by triangulating the terrain's surface using nodes.

Lyman-Kunia Observation Point Profile

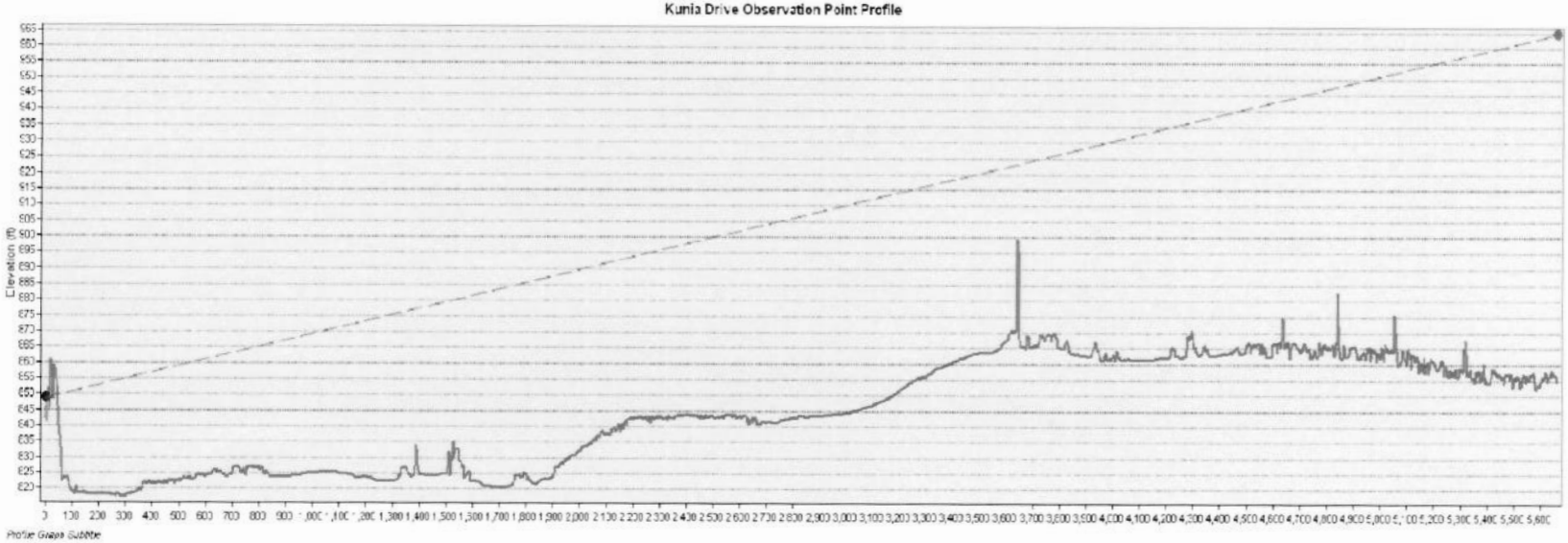
Tunnel Intersection Observation Point Profile



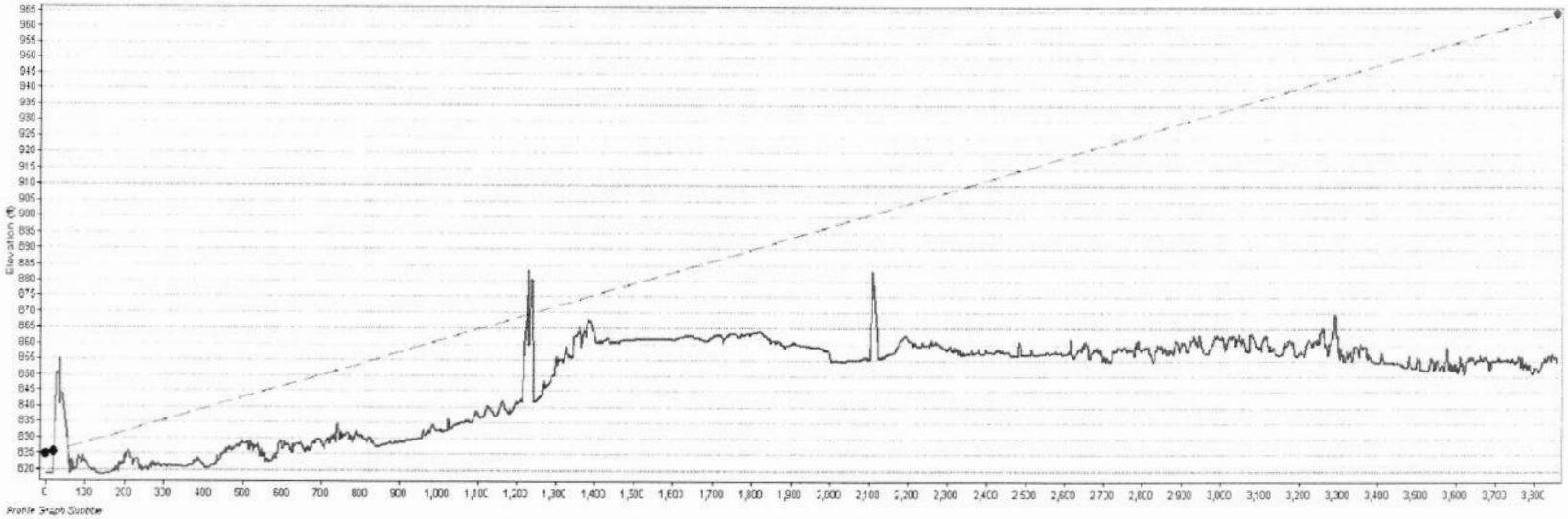
Driveway Observation Point Profile



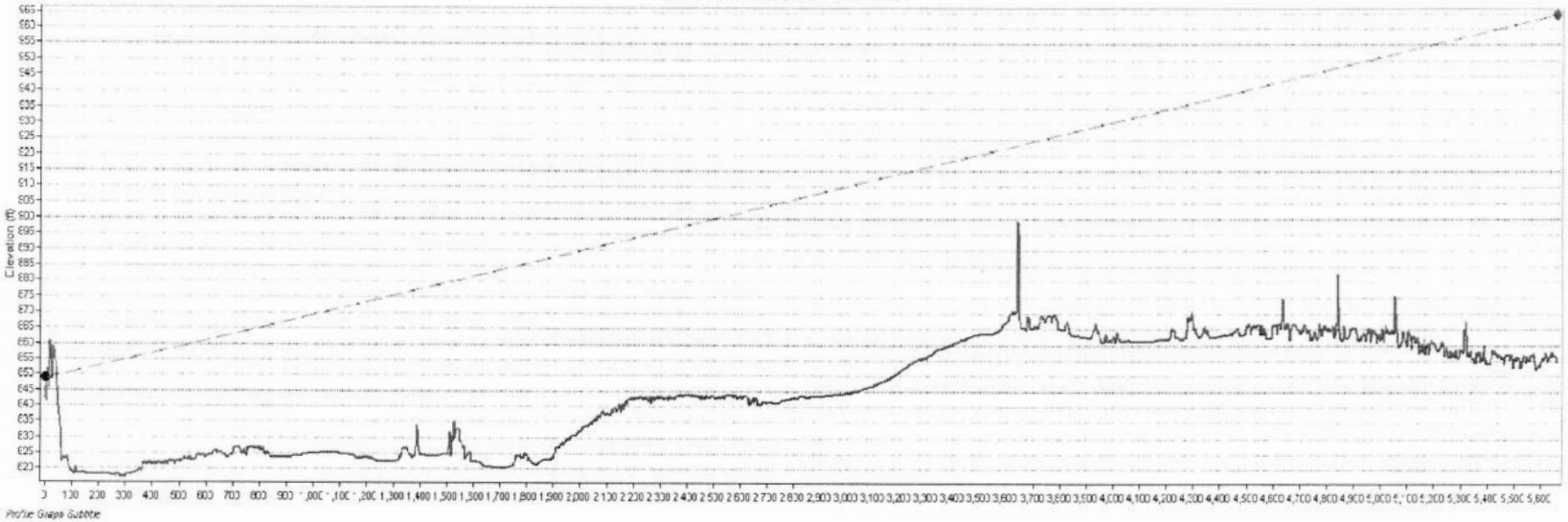
Kunia Drive Observation Point Profile



Driveway Observation Point Profile



Kunia Drive Observation Point Profile



DRAFT—Archaeological Inventory Survey for Schofield Generating Station Project, Waiʻanae Uka, Honouliuli, and Waikele Ahupuaʻa in Wahiawā and ʻEwa Districts, Oʻahu Island, Hawaiʻi

TMKs (1) 7-7-001:001, 9-2-005:026, and 9-4-012:003

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MANAGEMENT SUMMARY

At the request of Tetra Tech, Inc., Garcia and Associates conducted an archaeological inventory survey (AIS) in support of a joint Federal/State Environmental Impact Statement (EIS) for the Schofield Generating Station Project in the western portion of O‘ahu’s central plateau. The AIS included excavation of eight test trenches in a 8.1-acre generating station parcel and 13 test pits along a 3.7-kilometer transmission corridor. Test trenches and test pits produced no evidence of traditional Hawaiian or early historic cultural deposition.

AIS data indicate that the Schofield Generating Station Project is very unlikely to affect archaeological sites. Test excavation results confirm that the Area of Potential Effect (APE) has a very low probability for containing archaeological deposits. Extensive land modifications associated with a century of commercial cultivation, ranching, U.S. military activity, and urbanization has likely destroyed most of the tangible evidence of the traditional Hawaiian and early historic past in this area.

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1.0 INTRODUCTION

At the request of Tetra Tech, Inc., Garcia and Associates conducted an archaeological inventory survey (AIS) in support of a joint Federal/State Environmental Impact Statement (EIS) for the Schofield Generating Station Project. The Schofield Generating Station Project is in the western portion of Oʻahu's central plateau and includes portions of Waiʻanae Uka Ahupuaʻa in Waiʻanae District and Waikele and Honouliuli Ahupuaʻa in ʻEwa District (TMKs (1) 7-7-001:001, 9-2-005:026, and 9-4-012:003) (Figure 1). The primary objective of the AIS was to identify and document pre-Contact and post-Contact properties within the project's Area of Potential Effect (APE) using a sampling strategy proportionate to the archaeological sensitivity of the area.

1.1 Proposed Action

The Schofield Generating Station Project, a project of the U.S. Army's Energy Initiatives Task Force is being undertaken in furtherance of the state of Hawaiʻi's and the Army's renewable energy goals and to enhance energy security for Army installations as well as the island of Oʻahu. U.S. Army Garrison-Hawaii proposes to lease Hawaiian Electric Company a 8.1-acre parcel on Schofield Barracks Military Reservation's (SBMR) Kunia Maneuver Training Area (KMTA) to construct a 50-megawatt biofuel-capable power generation plant (Figure 2).

To connect the generating station to the existing Hawaiian Electric Company grid at Wheeler Army Airfield (WAAF) and Wahiawā substations, U.S. Army Garrison-Hawaii and the State of Hawaiʻi will provide Hawaiian Electric Company a 3.7-kilometer interconnection easement for a 46-kilovolt aboveground transmission line. The transmission line will extend from the east side of the new power plant, across Waiʻeli Gulch, and onto the southwest corner of Schofield Barracks' cantonment. The line will then continue along the southwestern extremity of the cantonment, and cross Duck Road, Lyman Road, and Lyman Gate following the Schofield Barracks-Kunia Road fenceline. It will then cross Kunia Road and enter WAAF between Waiʻanae Avenue and Eastman Road. At the U.S. Army's Wheeler Substation, the line will split with one line running northwest onto the Schofield Barracks cantonment (terminating at Ralston Field) and the other running east along Wilikina Drive. The Wilikina line will extend over the south fork of Wahiawā Reservoir (Lake Wilson) and terminate at Hawaiian Electric Company's Wahiawā Substation.

A series of 47 electrical poles will support the transmission line. The poles will be 60 to 80 feet high and 24 inches in diameter. Of the 47 poles, 36 will be newly installed, 7 will be replacements for existing poles, and 4 will be existing poles (Figure 2).

1.2 Regulatory Authority

Evaluation of impacts to cultural and historic resources for the Schofield Generating Station Project is required by the U.S. Army's implementing regulations (Title 32 of the *Code of Federal Regulations* [CFR] Part 651, *Environmental Analysis of Army Actions*) of the National Environmental Policy Act (NEPA) [Title 42 of *United States Code* (U.S.C.) Sections 4321 to 4370 (f)], NEPA regulations (40 CFR Parts 1500-1508), and the Hawaiʻi Environmental Policy Act (HEPA) as codified in Hawaiʻi Revised Statues Chapter 343, *Environmental Impact Statements*.

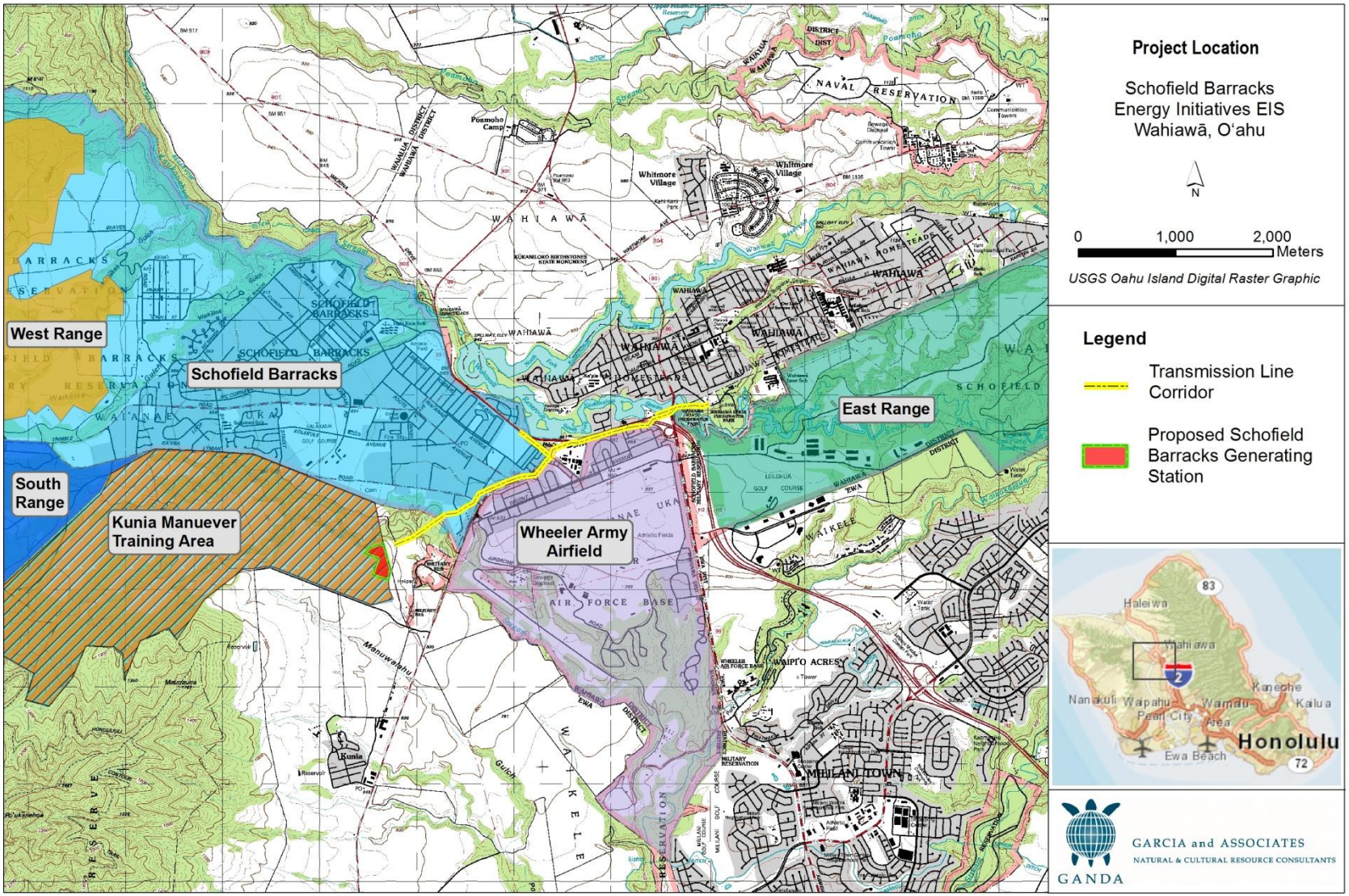

Figure 1. Location of the Schofield Generating Station Project.

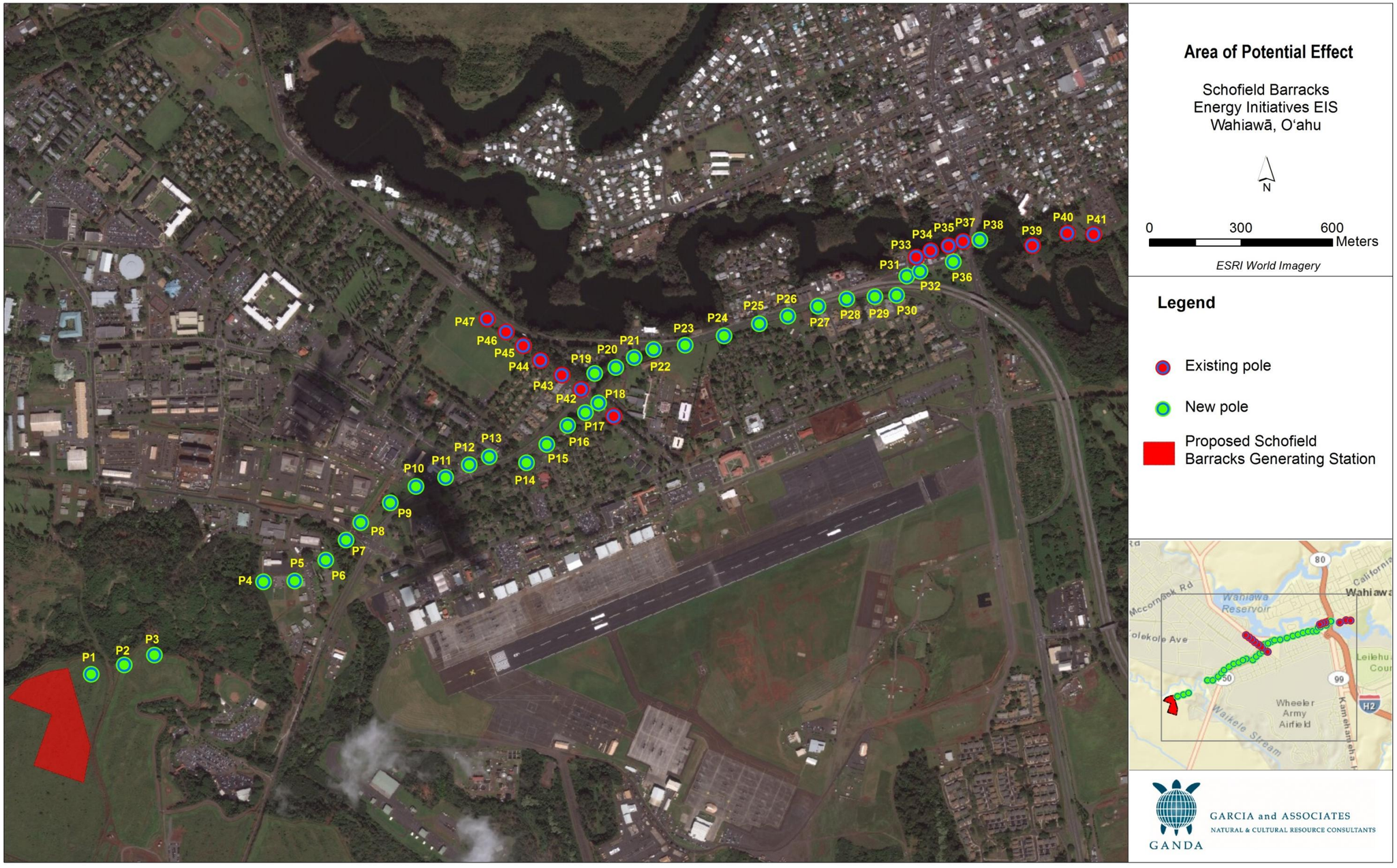

Figure 2. Area of Potential Effect for Schofield Generating Station, including transmission corridor improvements.

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Under NEPA and HEPA regulations, an EIS must consider the effects of the proposed action on the *human environment*, which 40 CFR 1508.14 defines as "the natural and physical environment and the relationship of people with that environment." The human environment, therefore, includes important scientific, archaeological, and other tangible and intangible cultural resources, including historic properties listed or eligible for the National Register of Historic Places (NRHP) and sacred sites (Executive Order 13007).

Under the contractual and organizational arrangements negotiated for this project, Tetra Tech, Inc. and Garcia and Associates are responsible for the cultural resources component of the EIS, and U.S. Army Garrison-Hawaii is responsible for compliance with Section 106 of the National Historic Preservation Act (NHPA). This AIS is, however, designed to assist U.S. Army Garrison-Hawaii in their Section 106 consultation and to provide data suitable for both NEPA/HEPA and NHPA compliance.

1.3 Area of Potential Effect

The APE for the Schofield Generating Station Project falls largely within SBMR property, but also extends onto properties owned or leased by the State of Hawai'i's Departments of Agriculture, Transportation, and Land and Natural Resources. As stated above, the generating station will be sited on a 8.1-acre parcel on the western edge of KMTA in Honouliuli Ahupua'a, and a 3.7-kilometer overhead transmission line will connect the power plant to the Army's WAAF and the Hawaiian Electric Company's Wahiawā substations (Figure 1).

The project's APE includes the generating station's footprint as well as all locations at which new power poles will be installed. Although the APE for direct effects of generating station construction is technically limited to the construction footprint, this AIS evaluates the entire 8.1-acre parcel for archaeological sites to account for potential design changes. New pole installation will involve excavating boreholes sufficiently wide to support 24-inch-diameter power pole bases. The boreholes will extend 2.75 meters (9 feet) beneath the surface. As mentioned previously, there will be 36 new poles installed at the locations shown in Figure 2. These 36 pole locations, in addition to the generating station footprint, constitute the APE for direct effects of the project. Installation of replacement poles will utilize the holes remaining from the removal of old poles and will not involve new ground disturbance.

To keep construction impacts to a minimum, there will be no vegetation grubbing during new pole installation or during periodic line maintenance. No roads will be constructed through the gully to access pole installation locales. Indirect effects are therefore not anticipated for new pole installation or maintenance.

With respect to U.S. Army Garrison-Hawaii's NHPA consultation, it should be noted that the project's Section 106 APE also includes the viewshed within which the new poles and lines are visible. Evaluation of the visual effects of new poles and lines on historic properties and historic districts is being undertaken by U.S. Army Garrison-Hawaii concurrent with this AIS.

1.4 Personnel and Schedule

Archaeological fieldwork was conducted over a 4-day period between 18 February and 4 March 2014. Jolie Liston, PhD, served as the project's Principal Investigator, and Amanda Sims,

BA, conducted the field investigations. Dr. Liston meets the Secretary of the Interior's Professional Qualifications Standards for Archaeology (36 CFR Part 61) as well as the professional qualifications outlined in Hawai‘i Administrative Rules Section 13-281-3. She is permitted to conduct archaeological investigations in Hawai‘i under State Historic Preservation Division Permit No. 14-12.

2.0 ENVIRONMENTAL, HISTORICAL, AND ARCHAEOLOGICAL CONTEXT

This section presents the environmental, ethnohistorical, and archaeological context of the project area. Anticipated archaeological findings based on a critical assessment of the archival research are presented. A more detailed description of the historic context of O'ahu's central plateau is found in Desilets et al. (2011), Tomonari-Tuggle (1997), and Tomonari-Tuggle and Bouthillier (1994).

The contextual research focuses on the lowlands of Oʻahu's central plateau in Waiʻanae Uka Ahupuaʻa in the Waiʻanae District, and Waikele and Honouliuli Ahupuaʻa in the ʻEwa District where the project is located. However, the traditional history of the upland region of the central plateau and the surrounding plains are included to provide a more thorough context.

2.1 Environment

The APE is on the fairly level central plateau of Oʻahu Island within the broad saddle between the Koʻolau and Waiʻanae mountain ranges. The project area ranges in elevation from approximately 160 to 268 meters (525 to 880 feet) above mean sea level.

Annual rainfall averages 96 centimeters (Giambelluca et al. 2013), with temperatures ranging from 59 to 87 degrees Fahrenheit (Armstrong 1983:56). Significant annual rainfall along the upper elevations of the Waiʻanae Range exceeding 250 centimeters contributes to the tributaries descending the steep, amphitheater-headed slopes of the mountains to form meandering and incised valleys within the lower plateau lands. Although represented on the U.S. Geological Survey (USGS) quadrangle maps as permanent watercourses, these streams flow intermittently in response to heavy rains.

The gulch formed by Waiʻeli Stream separates KMTA, on the south, from Schofield Barracks cantonment to the north. This seasonal stream flows southeast to join with Waikakalaua Stream at WAAF's southern border and become Waikele Stream. Construction of WAAF altered the stream course east and downstream of the project area (Tomonari-Tuggle and Bouthillier 1994:9). Waikele continues on to Oʻahu's south coast to empty into Pearl Harbor's western embayment (the West Loch).

Kaukonahua Stream roughly bounds Schofield Barracks cantonment's northeast edge before flowing northward to drain into the ocean at Waialua. In about 1905, a dam was constructed across the convergence of the north and south forks of the Kaukonahua Stream to supply irrigation water to the surrounding cultivated fields. This resulted in the formation of Lake Wilson (Wahiawā Reservoir), Oʻahu's largest freshwater impoundment. At the east end of the APE, along the south fork of Lake Wilson and Kaukonahua Stream, is the Department of Land and Natural Resources-managed Wahiawā State Freshwater Park.

The project area contains the following major soil series: Wahiawa silty clay (WaA), Manana silty clay (MoB), Helemano silty clay (HLMG), Kunia silty sands (KyA, KyC), and Kawaihapai clay loam (KlB) (Figure 3). The Wahiawa Series is the most prevalent, extending across the APE, with the Manana Series near the middle of the transmission corridor, and the Helemano Series

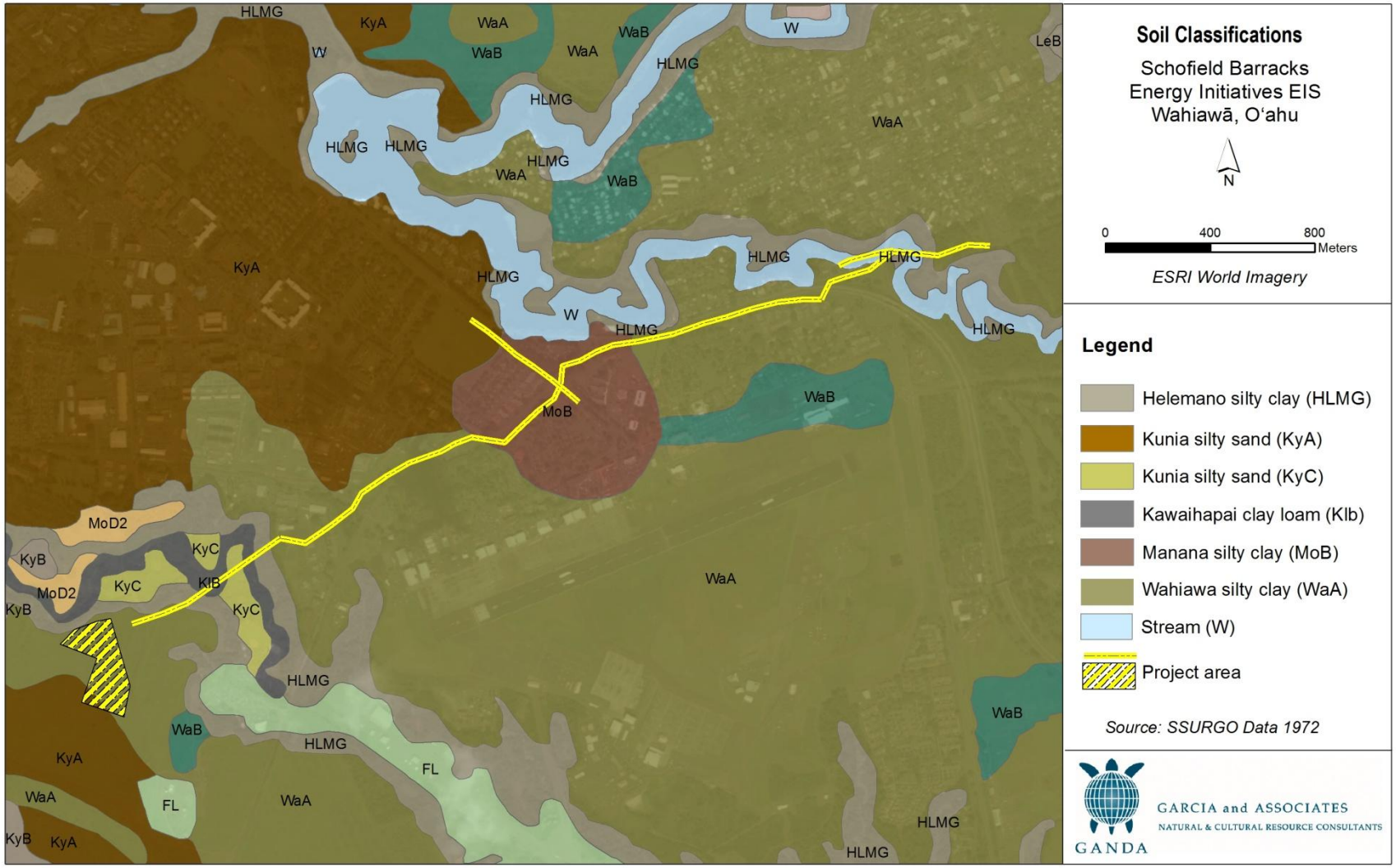

Figure 3. Soil types in the vicinity of the Area of Potential Effect.

found around the streams and gulches. The Kunia Series and Kawaihapai Series are in the western portion of the project area.

All the soils in the APE are well drained and have a fine texture. The Wahiawa silty clays develop in residuum and old alluvium derived from basic igneous rocks and form nearly level to moderately steep soils (Foote et al. 1972). Runoff is slow with very little erosion. The Manana silty clays develop in material weathered from basic igneous rocks. Runoff is medium with a moderate amount of erosion. The Helemano Series is found on alluvial fans and colluvial slopes in gulches. Developing in alluvium and colluvium derived from basic igneous rock, these silty clays are often steep to extremely steep and form extremely eroded areas.

The Kunia Series develops in old gravelly alluvium and tends to develop on upland terraces and fans. Kunia silty sand (KyA) is found on the cantonment's flat lands while Kunia silty sand (KyC) occurs along the banks of Waiʻeli Gulch. The Kawaihapai Series is found at the base of Waiʻeli Gulch.

The plateau lands were likely once covered in native forest, including *koa* (*Acacia koa)* and sandalwood (*Santalum* spp.), and used for bird hunting and collecting wood and other forest products. Because of the highly disturbed and artificially landscaped environment, current vegetation in the APE is largely composed of introduced species.

Historically, KMTA was under pineapple cultivation with its termination only after the recent military acquisition of the land. Regrowth consists of mostly non-native shrubs, grasses, and secondary saplings. The lands on or near the military installations are manicured and landscaped grounds consisting of non-native grasses, trees, and shrubs with a few stands of ti (*Cordyline terminalis*) near residential houses. The right-of-way along the major thoroughfares is manicured lawn while the Wahiawā State Freshwater Park is wooded in both native and introduced species.

2.2 Traditional History

Traditional history, along with archaeological evidence, indicates that Oʻahu's central plateau is politically and spiritually important. The ancient lands of Līhuʻe—south of Schofield Barracks on the eastern slopes of the Waiʻanae Range—and portions of Wahiawā overlap in the lower reaches of the central plateau to encompass the entire APE.

The Chant for Kapawa exemplifies the connectedness of the various central plateau regions and sites:[1]

ʻO Kapawa, ʻo ke aliʻi o Waiʻalua	Kapawa, the chief of Waiʻalua,
I hanau i Kūkaniloko	Was born at Kūkaniloko;
ʻO Wahiawā ke kahua	Wahiawā the foundation;
ʻO Līhuʻe ke ewe	At Līhuʻe the placenta, (taken away)

[1] Chant and translation provided by the historian of the Wahiawā Hawaiian Civic Club, August 2009 (Desilets et al. 2011:40).

ʻO Kaʻala ka piko	At Kaʻala the navel cord, (buried)
ʻO Kapukapuakea ka aʻa	At Kapukapuakea (Heiau) the caul,
ʻO Kaiaka i Maeaea	(Heiau) of Kaiaka at Maeaea;
Haʻulei i Nukea i Wainakia	He died at Nukea at Wainakia
IʻAʻaka i Haleu	Through (the surf of) ʻAʻaka at Haleu,
I ka laʻi malino o Hauola	Through the calm stillness of Hauola,
Ke liʻi ʻo Kapawa hoʻi no	The chief Kapawa was taken,
Hoʻi no i uka ka waihona	Returning the organs to the uplands of Iʻao
Hoʻi no i ka pali kapu o na liʻi	Taken to the sacred pali of the chiefs,
He kiaʻi Kalahiki no Kakaʻe	Kalahiki is the "Watchman" of Kakaʻe,
ʻO Heleipawa ke keiki a Kapawa	Heleipawa was the son of Kapawa,
He keiki aliʻi no Waiʻalua i Oʻahu	A chiefly child of Waiʻalua, Oʻahu

Līhuʻe is most often referred to as the "uplands," although that could mean the whole central plateau, which, relative to coastal areas, is upland. In its literal translation, *Līhuʻe* means "cold chill" (Pukui et al. 1974:132), a quality often referred to in the traditional literature of Līhuʻe, Kalena, and Haleʻauʻau. Although not evidence of a strictly upland, mountainous boundary, it does point to a tendency in the literature to focus on the higher elevation upland portion of the Līhuʻe lands.

Honouliuli Ahupuaʻa, whose northern tip will support the proposed Schofield Generating Station, is Oʻahu's largest *ahupuaʻa*, encompassing most of the western half of the ʻEwa District. *Honouliuli* means "dark bay" (Pukui et al. 1974:51), apparently named after the West Loch bordering what is now Pearl Harbor. Honouliuli is known as the first place where human beings landed on Oʻahu (Beckwith 1970:343) and a place where *ʻulu* (breadfruit; *Artocarpus altilis*) was first introduced to Hawaiʻi (Burgett and Rosendahl 1992: Appendix E).

The proposed generating station and the west end of the transmission line are in two historically referenced *ʻili*[2], Paupauwela in Honouliuli Ahupuaʻa and Pouhala in Waikele Ahupuaʻa (Figure 4). Paupauwela is also written as *Popouwela* or *Poupowela* (Sterling and Summers 1978; ʻĪʻī 1959:97). *Pouhala ʻIli*, translated as "pandanus post," (Pukui et al. 1974:190), is also a named place in southern Waikele next to "an important fishpond" and *loʻi* or *kalo* patches called Kapalaha (Sterling and Summers 1978:29). The upland *ʻili* is referenced as "Pouhala Uka" in late 19th century land documents (Tomonari-Tuggle and Bouthillier 1994:20).

Waikele, translated as "muddy water," also refers to a stream formed by the convergence of Waiʻeli Stream north of the generating station and Waikakalaua Stream to the southeast. Waiʻeli Stream is sometimes written as *Waikele Stream* on more recent USGS maps and as Waieli, meaning "dug water" (Pukui et al. 1974:221), on a late 19th century Oʻahu Island map (Hawaiian Government Survey 1881).

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[2] An *ʻili* is a traditional land unit that is within the larger *ahupuaʻa*.

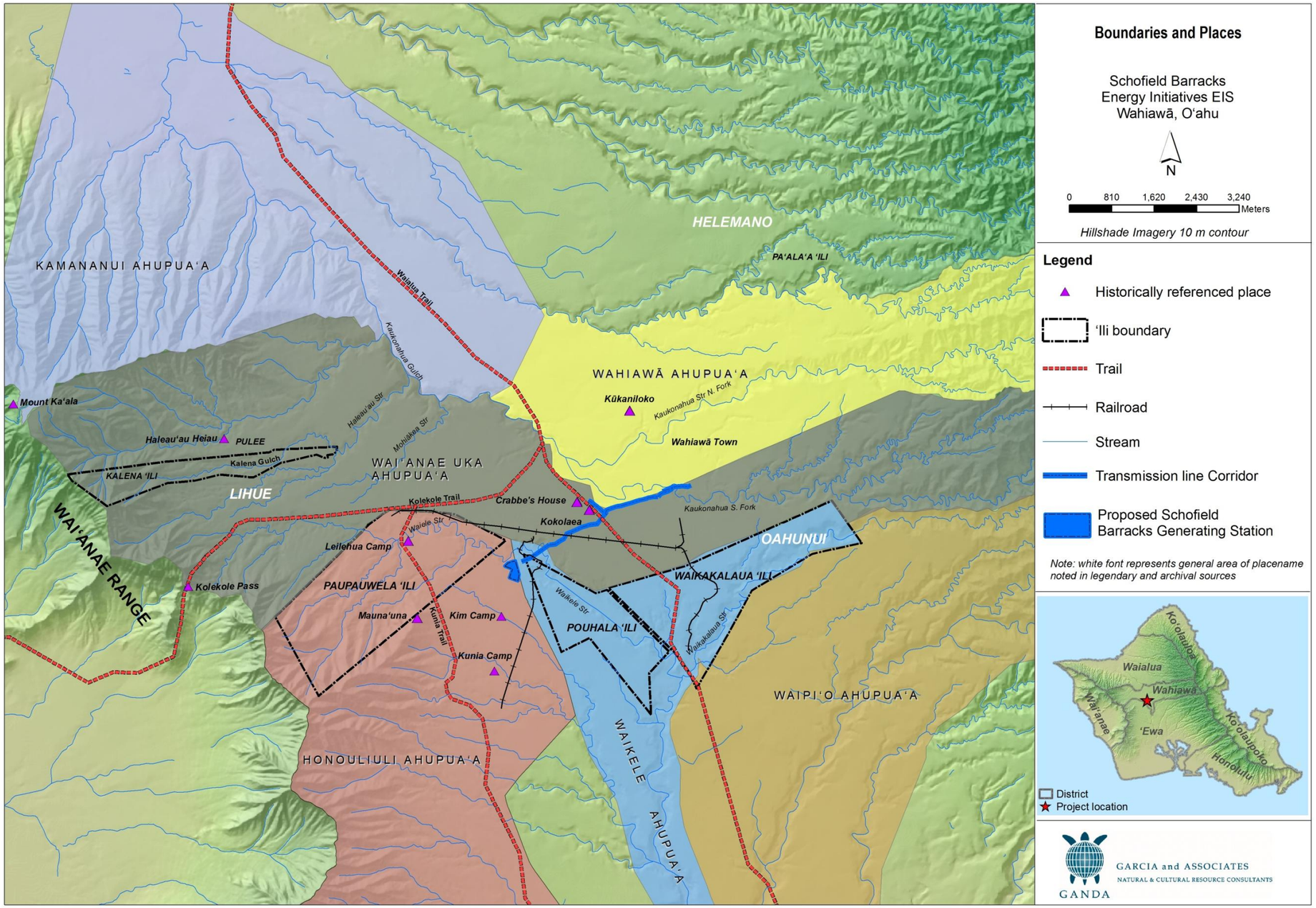

Figure 4. Traditional and historic boundaries and place names near the Schofield Generating Station Project.

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The majority of the transmission line is in the lower elevations of Waiʻanae Uka Ahupuaʻa. The names and borders of any smaller traditional divisions once in this area are unknown. One of Oʻahu's largest *ahupuaʻa*, Waiʻanae Uka Ahupuaʻa, is landlocked and extends from the tablelands across the crests of the Waiʻanae and Koʻolau mountain ranges. Hawaiian deities guarded the boundary between Waiʻanae Uka and the *ahupuaʻa* to the west (Lualualei and Waiʻanae Uka). Mount Kaʻala is the home of the kind goddess Kaiona who harmed no one. The mountain goddess Kolekole protected the mountain pass (Sterling and Summers 1978:133–135). A likely ancient pass through the saddle is afforded at Kolekole (ʻĪʻī 1959:99), by Mount Kaʻala, the highest point on the island.

2.2.1 Settlement

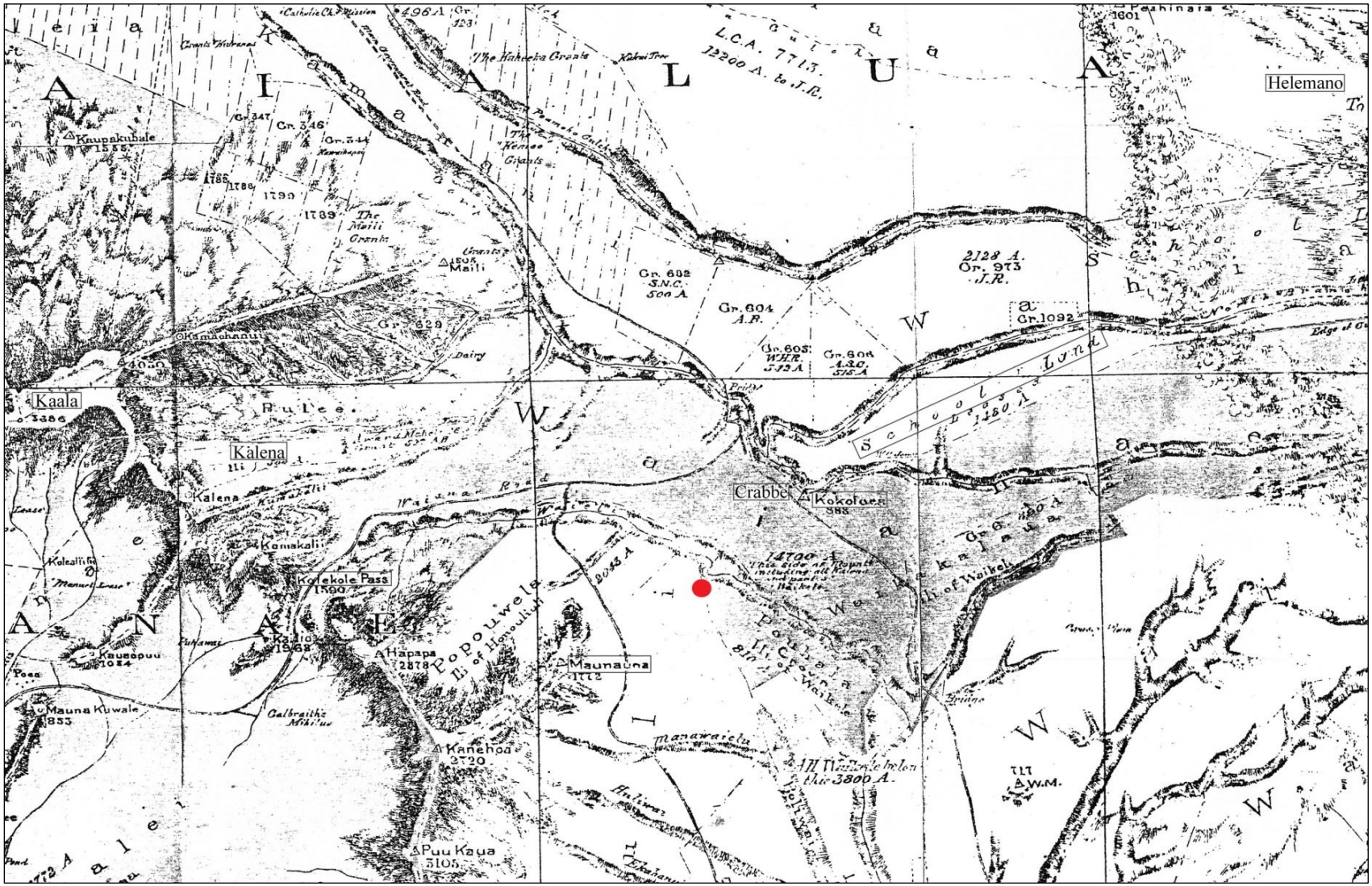
Traditionally, Honouliuli Ahupuaʻa contained a large permanent settlement around what is now the West Loch, scattered fishing encampments elsewhere on the coast, and small permanent settlements and associated agricultural plots (Tuggle 1995:100). Initial settlement on the eastern slopes of the Waiʻanae Mountains and the central plains was likely mainly temporary and might have been related to the collection of forest and inland resources.

Permanent Hawaiian settlement of Waiʻanae Uka might have started as early as AD 1250, as populations expanded into central Oʻahu (Roberts et al. 2004:6). Two charcoal samples derived from pondfield contexts in an irrigated agricultural complex (State Inventory of Historic Places [SIHP] No. 5394) in upland Līhuʻe produced calibrated date ranges of AD 1120–1430 and AD 1280–1420 (Carson and Yeomans 2000:18). A similar calibrated date range of AD 1290–1470 was returned from agricultural deposits at nearby SIHP No. 5392 (Robins and Spear 2002a: Appendix C-2).

These dates suggest that by about the 13th century, irrigated pondfields were developed along Waiʻeli Stream (and in other similar stream valleys) (Robins and Spear 1997b:7). Although a variety of ceremonial, habitation, burial, and agricultural sites have been identified in the uplands west of the APE, the distribution of sites suggest that intensive agriculture in the stream valleys was a focus of Hawaiian activity. Despite the lack of direct archaeological evidence resulting from extensive historic land disturbances, traditional Hawaiian land use in the neighboring tablelands of Honouliuli, Waiʻanae Uka, and Waikele are presumed to have followed the same pattern of cultivation and associated permanent habitation.

Handy et al. (1972:465) refer to a famous traditional place named Kukui-o-Lono, where the high chief Kūkaniloko is said to have made the first *loʻi*. Kukui-o-Lono might correspond to one of the cultivated watersheds in western Waiʻanae Uka (such as Kalena, Mohiākea, or Haleʻauʻau Streams) because the location is described as "above and west" of the present Wahiawā Town.

Another traditional place name near the APE is Kokoloea, the location of a benchmark in the late 1800s Crown Lands surveys and a USGS benchmark (271 meters, or 888 feet, above sea level) (Figure 4). Located on the south side of what is now Lake Wilson, near Wilikina Drive, the 1876 Boundary Commission testimonies describe an ancient *ʻulu maika* field or *kahua maika* named Kapalauauai (ʻĪʻī 1959:99) as being at Kokoloea (Figure 5). Kokoloea was the name of a chief of the *Lo* class and the site of the "old Dowsett ranch house" (Tomonari-Tuggle 1997:13).


Helemano
Kaala
Kalena
Crabbe
Kokolau
Kuupakubale
Maili
Kanuchanui
Kamakali
Kolekole Pass
Kaupopuu
Hapapa
Maunauna
Mauna Kuwale
Kanehoa
Puu Kaua
Popouwela
Calbraith
Manawaiolu
Halawa
Ehahana
W.M.
L.C.A. 7713.
12200 A. to J.R.
2128 A.
Gr. 973
J.R.
Gr. 602
S.N.C.
500 A
Gr. 604
A.R.
Gr. 605
W.H.R.
Gr. 606
A.R.
Gr. 1092
School Land
Gr. 347
Gr. 346
Gr. 629
Dairy
Rules
Kalena
Kealiiki
Kaala
Kaala
Kaala

Traditional access to the settlement areas in central Oʻahu was provided by the three main travel routes recorded by mid-18th century Hawaiian scholar John Papa ʻĪʻī (1959) (Figure 4). One of the routes (Kolekole Trail) passed through western Waiʻanae Uka across the Waiʻanae Mountains at Kolekole Pass. The other two trails extended in northerly directions from the south coast of the island to Waialua (Waialua Trail) and Waiʻanae Uka (Kunia Trail). On its way to Kūkaniloko, Waialua Trail passes under the transmission line just west of the intersection of Kunia Road and Wilikina Drive. The following extended excerpt explains the trail system, and references a number of important cultural sites and place names. Some of the place names are found in the 1881 Hawaiian Government (Figure 5) and 1902 Hawaiʻi Territory Survey (Figure 6) maps.

> They went down to the water and up, going above the group of taro patches of Waiau, to the stream of Kukehi, up to the two maika fields, Puehulunui and Haupuu. Puehulu lies at the crossroads, where one [trail] leads to Waialua and the other branches off to Honouliuli, and to Waianae. . . . There were three roads there at Puuokapolei, Pohakea, and **Kolekole**, from Kunia, the plain of Keahumoa, up to **Maunauna** and by Paupauwela where they join with the road from **Wahiawā** and the one from Waialua**,** on the west side of Mahu to Malamanui, to which spot one can look down from **Kolekole**, to Pokiʻi and Waianae-uka. There was a long cliff road, Eloui, from **Kalena** and **Haleʻauʻau**, on the east side of **Kaʻala**, coming down here to Waianae. There was also a trail going up and then down Makaha-uka, called Kumaipo. Below that trail was a fortress in the olden days, named Kawiwi. At the time of battle a boy was set as a guard every night [with no food--which led to turning over to rebels] . . . From the stream of Anahulu and from Kamani, above the homes, and taro patches a trail lies in front of Kuokoa's houselot and the church, which goes on to meet the creeks of Opaeula and **Halemano**, the sources of the stream of **Paalaa**, on down to the stream of Pooamoho, and go to the crossroad which branches from Mokuleia to Kamananui and Kewaaihe, The kukui grove of Kahewahewa lies below the trail to **Kūkaniloko** where visitors gathered. It goes to the stream of Paka, and the maika playing field of Kapalauauai which lies above the pond belonging to the village. There the trail meets with the one from **Kolekole** and goes on to the stream of Waikakalaua, Piliamoo, the plain of Punaluu to a rise, then down to Kïpapa to Kehaulele, A trail runs off from this long trail to Kalakoa, **Oahunui** and other places much visited, like **Kūkaniloko**, and from there to the digging place of Kahalo. [ʻĪʻī 1959:99; emphasis added]

2.2.2 The Lō Aliʻi and Kūkaniloko

Oʻahu's central plateau has long been an important Hawaiian religious center with the establishment of an *aliʻi* birthplace at Kūkaniloko, *heiau*, such as Haleʻauʻau and Kalena Heiau in western Waiʻanae Uka, and the Maunauna site in Waikele Ahupuaʻa east of the project parcel (Figure 4). The *lō aliʻi*, in conjunction with Kūkaniloko, are central to the traditional Hawaiian lore of the Līhuʻe-Wahiawā region of the central plateau and its mountainous periphery. The *lō aliʻi* were a specific class of *aliʻi* tied by birth and practice of strict *kapu* to the Līhuʻe-Wahiawā-Helemano region of Oʻahu's central plateau. A description of the *lō aliʻi* class is provided by Kamakau (1964):

> The chiefs of Līhuʻe, Wahiawā, and Halemano on Oʻahu were called *lō aliʻi*. Because the chiefs at these places lived there continually and guarded their

Figure 6. Enlarged detail of 1902 O'ahu Island map with proposed Schofield Generating Station marked in red and boxes around place names mentioned in text (Hawai'i Territory Survey, Walter E. Wall – Surveyor).

> *kapu*, they were called *lō ali‘i* [from whom a “guaranteed” chief might be obtained, *loa‘a*]. They were like gods, unseen, resembling men. [Kamakau 1964:40]
>
> The chiefs of Lihue, Wahiawa, and Halemano on Oahu were called *Lo* chiefs, *Po‘e Lo Ali‘i* {“people from whom to obtain a chief”}, because they preserved their chiefly kapus. The men had kapus, and the women had kapus, and when they joined their kapus and children were born, the children preserved their kapus. They lived in the mountains (*i kuahiwi*); and if the kingdom was without a chief, there in the mountains could be found a high chief (*ali‘i nui*) for the kingdom. Or if a chief was without a wife, there one could be found—one from chiefly ancestors. Kauakahi‘ailani, Ma‘ilikukahi, Kalona, Piliwale, Kukaniloko, Pa‘akakanilea {Pa‘akanilea}, Ka‘akauualani, Ka‘au, Lale, Paoakalani, Pakapakakuaua, Nononui, Kokoloea, and a great many others were *Lo* chiefs. [Kamakau 1964:5][3]

The emergence of the *lō ali‘i* in central O‘ahu probably has its origin in the sacred birthing site of Kūkaniloko, on the Waialua side of Kaukonahua Gulch. Around the 13th and 14th centuries, Kūkaniloko was established by Nanakāoko and his wife Kahihiokalani for the birth of their son, Kapawa. In a chant commemorating Kapawa, Līhu‘e and nearby lands are referenced as metaphors for his birth at Kūkaniloko (Kamakau 1991:136):

> Kapawa, the chief of Wai‘alua
> Was born at Kukaniloko
> Wahiawa the site;
> At Lihue the placenta
> At Ka‘ala the naval cord,
> At Kapukapuakea [heiau] the caul

Kūkaniloko was one of two sacred places in the Hawaiian Islands where *kapu* chiefesses went to give birth (Handy et al. 1972:465; McAllister 1933:134–135; see also Cordy 1996:596; Fornander 1996:20; Kamakau 1991:136). Kūkaniloko can be translated as "an inland area from which great events are heralded" and "to anchor the cry within." According to Kamakau (1991:53), “Chiefs born at Kūkaniloko were the *akua* [gods, spirits] of the land and were *ali‘i kapu* as well.”

The sacred drums of Opuku and Hawea, which announced the birth of an *ali‘i*, were stored in the nearby *heiau* Ho‘olonopahu. By 1933, however, pineapple cultivation had obliterated the *heiau* (McAllister 1933:137). Remnants of the *heiau* are said to be in the gulch to the south of the birth site (D. Au, personal communication), although McAllister (1933:57) places the *heiau* to the north of Kıkaniloko.

During the long period of island-wide rule by Līhu‘e chiefs, and continuing into the succeeding years, birth at Kūkaniloko remained a powerful status symbol. In 1797 Kamehameha arranged to have his son Liholiho born at Kūkaniloko, but the plan was foiled by the sickness of

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[3] An almost identical passage is found in the Appendix of *Kepelino’s Traditions of Hawaii* (Beckwith 2007:196).

Queen Keopuolani. It is notable that even by this date, the site had already "fallen into decay" (Sterling and Summers 1978:140).

Kūkaniloko also served as a *pu'uhonua*, or place of refuge. According to 'Ī'ī (1959:138), ". . . Kūkaniloko in Wahiawa, Oahu; and Holoholoku in Wailua, Kauai, were places to which one who had killed could run swiftly and be saved." Other evidence is present in the story of Lā'ieikawai. Early in this story we learn that, "Now, Kapukaihaoa took Laielohelohe to the uplands of Wahiawa, to the place called Kukaniloko" (Haleole 2006). Kapukaihaoa, a priest, took Laielohelohe to Kūkaniloko because the baby girl would have been killed by her father (or his executioner) if he discovered she had been born.

Another story of the central plateau's traditional importance is set in Helemano, at O'ahunui (east of the project area), said to have been a residence of high chiefs. However, it was abandoned during the reign of the chief, O'ahunui, who was turned to stone when he became a cannibal and ate the two sons of his brother-in-law, Lehuanui (Nakuina 1897:90).

> Lo-Aikanaka is the name given to a family of South Sea chiefs who are driven from the plains of Mokuleia into the hills to a place called Hele-mano, where they are received by the chief Oahu-nui east of that locality and the two chiefs exchange courtesies. Oahu-nui develops a passion for human flesh and finally the two chubby sons of his sister Kilikiliula, wife of Lehua-nui, are sacrificed to his appetite during the absence of their father. Warned by a vision, the father returns, puts to death the chief and his sister, and abandons the place with his men. A curse hangs over the place...None has ever dared to live there since (T. Thrum quoted in Beckwith 1970:342).

Desilets et al. (2011:13) describe the sociopolitical and cultural importance of O'ahu's central plateau:

> Around AD 1300, district (*moku*) level organization appears to have arisen on O'ahu. By about AD 1320 to 1340, the *moku* of 'Ewa, Kona, and Ko'olaupoko were ruled by the sons of Maweke (Cordy 2002:22). 'Ewa, including not only 'Ewa proper, but Wai'anae and Wai'alua as well, was ruled by the Maweke-Kumuhonua line. It is possible that Maweke's grandson, Kumuhonua, ruled the entirety of O'ahu between AD 1340 and 1360 from his seat of power in Līhu'e on the central plateau. Kumuhonua's 'Ewa lands would have included the sacred birthing place Kūkaniloko and it is likely that Līhu'e was the primary ruling center for all of O'ahu. Although most chiefly classes were not regionally based, Līhu'e was exceptional and was home to chiefs with the specific designation of *lō ali'i* during this time. This class of chiefs populated the Central Plateau between the Ko'olau and Wai'anae ranges, including all of what is today referred to as Wai'anae Uka Ahupua'a. The high status of the *lō ali'i* chiefs was likely derived from birthing at Kūkaniloko, interbreeding, and strict *kapu* observance.

2.2.3 Warfare

Paupauwela, Kalena, Pulee, and Malamanui were noted battlefields between the island chief Kuali'i and rival island chiefs from the 'Ewa and Waialua districts (Fornander 1996:280–281).

Fornander (1996:393) provides a translation of *Ka inoa o Kualiʻi* or Chant of Kualiʻi recounting the famous battle at Kalena:

> Where, where was the field
> [on which] the warriors fought?
> Lo! The field is at Kalena;
> Scattered about, overflowing
> Poured out is the godly fluid

At Maunaʻuna, the Waiʻanae chief Kuiaia avoided a battle with Kualiʻi, as well as impending slaughter, by heeding a warning from his advisor and performing a chant to the god Kū:

> Mauna-una…Kuiaia, the chief of Wai-anae, came with his forces to meet Kualii on the battleground here mentioned. His kahu, forewarned, told him when coming to battle he should find a knotted ti leaf on the road he would know he was in danger and surrounded by an ambush which would cut off his whole force. On finding this knotted ti leaf, he began and chanted this mele from the beginning to end, to the honor of Ku. All on both sides laid down in reverence. Ku gave the signal of reconciliation, and the slaughter was averted. [Fornander 1969, cited in Sterling and Summers 1978:38]

According to the Legend of Kualiʻi (Beckwith 1970:395), it was after the battles in Malamanui, Pulee, and Paupauwela that Kualiʻi "subdues the whole island" and reestablishes paramount rule between around AD 1720 and 1740 (Cordy 2002:32). Beckwith (1970:396–398) suggests the Kualiʻi tradition might represent a political movement led in the name of Kū, rather than signifying the efforts of a single chief.

The chiefly residents of Līhuʻe were recognized for their skills in spear throwing and were known as excellent teachers of the skill (Kamakau 1991:50). *Lua*, a battle method of dislocating joints of opponents, was also practiced on unsuspecting travelers crossing over the western boundary of Waiʻanae Uka at Kolekole Pass (Sterling and Summers 1978:134–135), as well as on the "plains of Leilehua" (Stokes n.d., cited in Sterling and Summers 1978:135), an historic reference to Western Waiʻanae Uka.

2.3 Post-Contact History

2.3.1 Initial Impacts

By western contact, when history started being recorded, the central Oʻahu plateau was dotted with villages. The location of schools provides insight into the size of central plateau settlements soon after contact.

> Kamakau (1992:424) writes that during the reign of Kamehameha III (1825-1854), "schools were built in the mountains and in the crowded settlements...At Kahalepoʻai, Hauone, Kalakoa, Wahiawa, Halemano, and Kanewai, there were large villages with teachers and schoolhouses; so at Lihuʻe, Kalena, Maunauna, Kake, and Puʻukuʻu." This probably occurred sometime after 1840 when a law establishing government schools was passed. This law required "that a school should be maintained in every community where there were fifteen or more children of suitable age" (Kuykendall 1968:347). Given that rural areas throughout the islands were

> being abandoned in the early 1800s as a result of factors such as population collapse or out-migration to Honolulu, the fact that these settlements could support government schools at mid-century suggests that they had been of substantial size and/or stability at contact. [Tomonari-Tuggle 1997:15]

School land, leased to W.C. Jones, is shown in the 1881 O‘ahu map drafted as part of the Hawaiian Government Survey by W.D. Alexander, General Surveyor, in the area of what would become Wahiawā Town, north of the project area (Figure 5). The map also displays much of the plateau as undeveloped and devoid of forest land.

Like elsewhere in the Hawaiian Islands, the native population of central O‘ahu experienced a major decline due to the spread of foreign diseases and movement away from remote localities to the shipping ports and business centers, such as Honolulu. Reverend Artemis Bishop recounts the quick and devastating effects of a measles epidemic he observed in 1848–1849 on the Wai‘anae and ‘Ewa residents:

> The past has been a year of trials and sorrows among my people in passing through scenes of sickness and death, beyond what I had ever witnessed…how strikingly their former athletic frames and warlike habits contrast with their enfeebled and effeminate corpses.
>
> Middle of October the measles broke out like wildfire…burning the dead was the great work, all other occupations were suspended and people staggered about like walking corpses. [Bishop 1849 and 1851: Mission letters]

Not long after western contact (ca. 1815–1826), ‘*iliahi* or sandalwood was extensively harvested from the Hawaiian Islands, resulting in the decimation of much of the native forests, particularly in the lower, more accessible elevations. Central O‘ahu was undoubtedly affected by the over-harvesting of sandalwood because Wahiawā was famous for its large sandalwood trees (Kamakau 1992:251–252). In pursuit of the riches gained in the sandalwood trade, chiefs ordered the *maka‘āinana* (commoners) to devote all their time to cutting sandalwood. As a consequence, subsistence practices were abandoned, such as farming and fishing, and famine was experienced throughout the islands (McGrath et al. 1973:18). Foreign contact also led to the over-harvesting of other forest trees used as fuel on whaling ships to render whale blubber into oil (Cuddihy and Stone 1990:38).

The establishment of Christian mission stations in Waialua, Wai‘anae, and ‘Ewa resulted in transportation route improvements for easier travel between settlements. In 1837 Reverend Emerson reported improvements to the Kolekole Trail:

> During the year past, a number of patches of road have been made, which considerably facilitate our access to some remote parts of the station and to Waianae. The pali between Waialua and Waianae, which formerly rendered the latter place inaccessible from Waialua except on foot, has been so improved that a horse can be rode up and down without difficulty (Emerson 1837: Mission letters).

Historical documents and archival data for the central Oʻahu region indicate that Native Hawaiians continued to live and cultivate crops during the mid- to late-1800s, particularly along Mohiākea and Kalena ʻIli, and along Wai'eli Stream which runs through the study area (Robins and Spear 2002a:23, 24, 31, and 32). An 1886 photograph with Kolekole Pass in the background shows the location of a homestead and active pondfields (likely *loʻi kalo*) along a portion of Waiʻeli Stream to the west of the project area (Figure 7). It is presumed that the rectangular features represent fenced boundaries of traditional features, such as dwellings and active or recently active croplands.

2.3.2 Land Tenure

In the mid-1800s Māhele, all of Waiʻanae Uka Ahupuaʻa, with the exclusion of Kalena ʻIli, was designated as Crown Land. Honouliuli Ahupuaʻa was awarded to Kekauʻohoni, grandchild of Kamehameha I. Upon her death in 1851, her husband Levi Haʻalelea inherited the majority of the land, and later (1864) passed it on to his wife at the time, Amoe Haʻalelea. Haʻalelea sold it to her brother-in-law John Harvey Coney. The land has since been passed on through ranching, cultivation practices, and U.S. military activities.

2.3.3 Ranching

Honoluliuli

In 1877 James Campbell purchased the portion of Honouliuli retained by John Harvey Coney (about 43,640 acres) and established a cattle ranch under the namesake of Honouliuli Ranch. Before the purchase, John Meek and James Dowsett leased portions of Honouliuli for cattle grazing and stock running. Meek and Dowsett "introduced grazing in areas too high or dry for agriculture" (Burgett and Rosendahl 1992:E-7). Meek was known to have leased over 3,000 acres in the ʻEwa District, including Waikakalaua Gulch, and had 4,000–5,000 head of cattle (Tomonari-Tuggle and Bouthillier 1994:19). By 1881 Honouliuli Ranch was a successful ranch with 10,000 acres devoted to agriculture. Some of the cultivated land may have encompassed the project area.

Waiʻanae Uka

Meek was the first individual to ranch cattle at Waiʻanae Uka. In 1851 Kalena ʻIli was conveyed to Meek by Reverend Bishop (Bureau of Conveyances, Book 17:148), who described the parcel as having "taro patches for 4 or 5 families" (Department of the Interior, n.d.). By 1875 his heirs leased the entire *ahupuaʻa* of Waiʻanae Uka.

Meek's affluence in Oʻahu society is remembered by A.P. Taylor (1922:223):

> The days are recalled, also, when Captain Meek controlled Lihue and Wahiawa on Oahu under lease from the government. He raised thoroughbred horses, and his daughters rode the finest in the islands…

A ranch house once likely occupied by Meek's daughter Elizabeth Meek Crabbe and husband Horation Crabbe is shown on a late 19th century map as "Crabbe" (Hawaiian Government Survey 1881) (Figure 4, Figure 5). Between the period of 1875 and 1889, Waiʻanae Uka was leased to various westerners for cattle ranching, including a shared lease between Meek (and his heirs) and Dowsett.

Figure 7. 1886 photograph showing homestead and active crops in Wai‘eli Stream (Bishop Museum Archives, Neg. CP117, 503), from Robins and Spear (2002a:31).

In 1882 King Kalākaua and C.H. Judd purchased two-thirds of Wai‘anae Uka, under whom the lands were named Leilehua Ranch (Tomonari-Tuggle and Bouthillier 1994:22; Figure 4, Figure 6). Kalākaua and Judd built a hunting lodge, Malamanui, to use as a retreat and place to entertain influential people (Nedbalek 1984:13). In 1889 Dowsett purchased the lease and Leilehua Ranch assets, which consisted of more than 20,000 acres and 3,000 head of cattle and other stock (Tomonari-Tuggle and Bouthillier 1994:24). Wai‘anae Uka remained under Dowsett Ranch until the U.S. military took over in the early 1900s.

Tomonari-Tuggle (1997:24) describes the significant effect of more than 20 years of cattle ranching on the central plateau as follows:

> the probable final demise of native plants as the dominant vegetation of the area. Cattle are known to have opened up native forests through foraging, trampling of the forest understory, and spreading of alien grasses. In addition, associated human activities exacerbated the actions of the cattle. Logging often preceded ranch operations or was used to expand existing pastures. Timber was cut for fencing or ranch buildings. Some native plants were considered “noxious” and removed to encourage pasture growth and facilitate the movement of cattle (Cuddihy and Stone 1990:62).

2.3.4 Commercial Agriculture

In 1897 the Oahu Sugar Company was established on the ‘Ewa Plains by the predecessor of Amfac, H. Hackfield & Co. (Wilcox 1996:98). In 1898 a group of homesteaders began settling the

Wahiawā Colony Tract, which the Land Act of 1895 designated as a homestead land (Nedbalek 1984:18). Clearly shown in the 1902 survey map, W.C. Jones' leased land has been split into 17 homesteads roughly bounded by the north and south forks of Kaukonahua Stream (Figure 6).

James B. Dole began growing pineapple in the Wahiawā Tract in 1900 for his canning operation, the Hawaiian Pineapple Company. The east part of the military reservation, as well as the school land leased to W.C. Jones, is shown as pineapple land in the 1902 map (Figure 6).

The Wahiawā Colony organized the Wahiawa Water Company, which by 1902 built a network of flumes, ditches, and tunnels to provide water to the homesteads and cultivated fields (Nedbalek 1984:28). The water company completed a dam across Kaukonahua Gulch in 1906 to form the reservoir now known as Lake Wilson (Haile 1976). By the 1920s more than 71 artesian wells had been dug in Honouliuli, which produced more than 100 million gallons of water per day (Burgett and Rosendahl 1992: Appendix E). Within a decade, thousands of acres of pineapple fields were being cultivated in central O'ahu.

In 1906 the Oahu Rail and Land Company (OR&L) extended their railway from Waipahu to Wahiawā, through what would become WAAF, so that pineapples could be transported from the fields to the new Dole cannery constructed at Iwilei in Honolulu. These rail lines expanded over the decades to keep up with the commercial growth of the central plateau (Figure 4).

Between 1910 and 1920 a number of smaller plantations were established in central O'ahu, mostly by Japanese immigrants. Masanari Saito was one of the independent growers who, in 1913, first planted pineapple on leased fields near Kunia using pineapple tops discarded by another grower (Nedbalek 1984:56). Saito decided to move his plantation from Kunia to "Leilehua…in the valley west of Schofield," which proved to be a difficult undertaking:

> He and his friend Tamotsu Ono traveled by horse and began clearing a path as they moved along. At Leilehua first he built something that looked like a chicken coop and slept there. Then he built a kitchen and slept there and finally he made the main rooms. After the land had been cleared, plowed and planted he bought passage on a ship and returned to Japan for the woman who would be his bride. [Nedbalek 1984:56]

North of the project area, a plantation camp labeled as "Leilehua" might correspond to Saito's early plantation that Nedbalek (1984) also refers to as Leilehua (Figure 6).

Large corporations, including Dole and Hawaiian Islands Packing Company, established labor camps near the fields, including the Kim and Kunia Camps located southeast of the present study area. Small stores and itinerant peddlers served these outlying communities and isolated plantations.

By the 1920s mechanized pineapple farming and military occupation of the central plateau at Schofield Barracks and WAAF contributed to economic expansion centered in Wahiawā that gradually promoted infilling development and an even greater expansion of pineapple farming throughout the central plateau. USGS maps from the 1920s to 1953 indicate that all of the upper

plateau lands and broad ridge tops were cultivated in pineapple, and a network of roads were established for access between the fields (Figure 8, Figure 9).

Pineapple cultivation continued in and around KMTA under various companies (Roberts et al. 2004:6) until Del Monte Pineapple Company abruptly shut down operations in November 2006. An aerial photo of Schofield Barracks cantonment dated to 1926 shows the area of the Schofield Generating Station, in the left foreground below Waiʻeli Stream, planted in pineapple (Figure 10). A photo of anti-aircraft training amidst pineapple fields in Oʻahu's central plateau during World War II also shows the extent of commercial cultivation (Figure 11).

2.3.5 U.S. Military

Following annexation of the Hawaiian Islands by the United States, former Crown Lands, including Waiʻanae Uka, became the property of the federal government. In 1899 Waiʻanae Uka (excluding Kalena ʻIli) was set aside as a military reservation. In the 1902 Hawaiʻi Territory Survey map by Walter E. Wall, Surveyor, much of the central plateau, with the exception of Kalena, is shown as U.S. Military Reservation (Figure 6). The military reservation was not occupied until 1909 when it was mandated to be the base for Oʻahu's mobile defense troops because of its strategic central location.

The landscape of the project area is described in a report on the adequacy of the central plateau for a military post:

> The main road across the island runs across the tract, cutting it into two pieces of 8,000 and 6,000 acres respectively. The west section is cultivated with pineapples and is the smaller of the two and in my opinion the other tract is amply large for all purposes and not having been broken up, is covered with sod which is a very great advantage as the red dirt here is beastly dusty in dry weather and equally vile in wet. The site is an ideal one for a post being a level or practically level place, but there is not a tree on the tract. [Foster 1908, cited in Tomonari-Tuggle 1997:25]

Initially called either Leilehua Barracks or Castner Village, the latter named for the construction supervisor Captain Castner, Schofield Barracks was first occupied by 473 soldiers from the 5th Cavalry Regiment (Alvarez 1982:16). In April 1909 the military base was formally named Schofield Barracks in honor of Lt. General John M. Schofield, a former Civil War hero and Commander of the Army's Pacific Division. Although World War I halted construction, most major construction for Schofield Barracks (General Officers housing, new barracks for artillery troops, new infantry barracks, and additional Officers Quarters for the infantry and cavalry sections) was finished in the early 1920s (Robins and Spear 1997a:39–42). A 1909–1919 military survey map suggests initial development of Schofield Barracks was centered immediately north of the study area at a place called Leilehua along the north boundary. An OR&L railroad track terminating at several structures in Leilehua might be the original track that was extended into the military reservation in 1906.

During early development of Schofield Barracks, water was scarce and was apparently derived from one primary source at a "spring on the slopes of the Waianae Mountains Range"

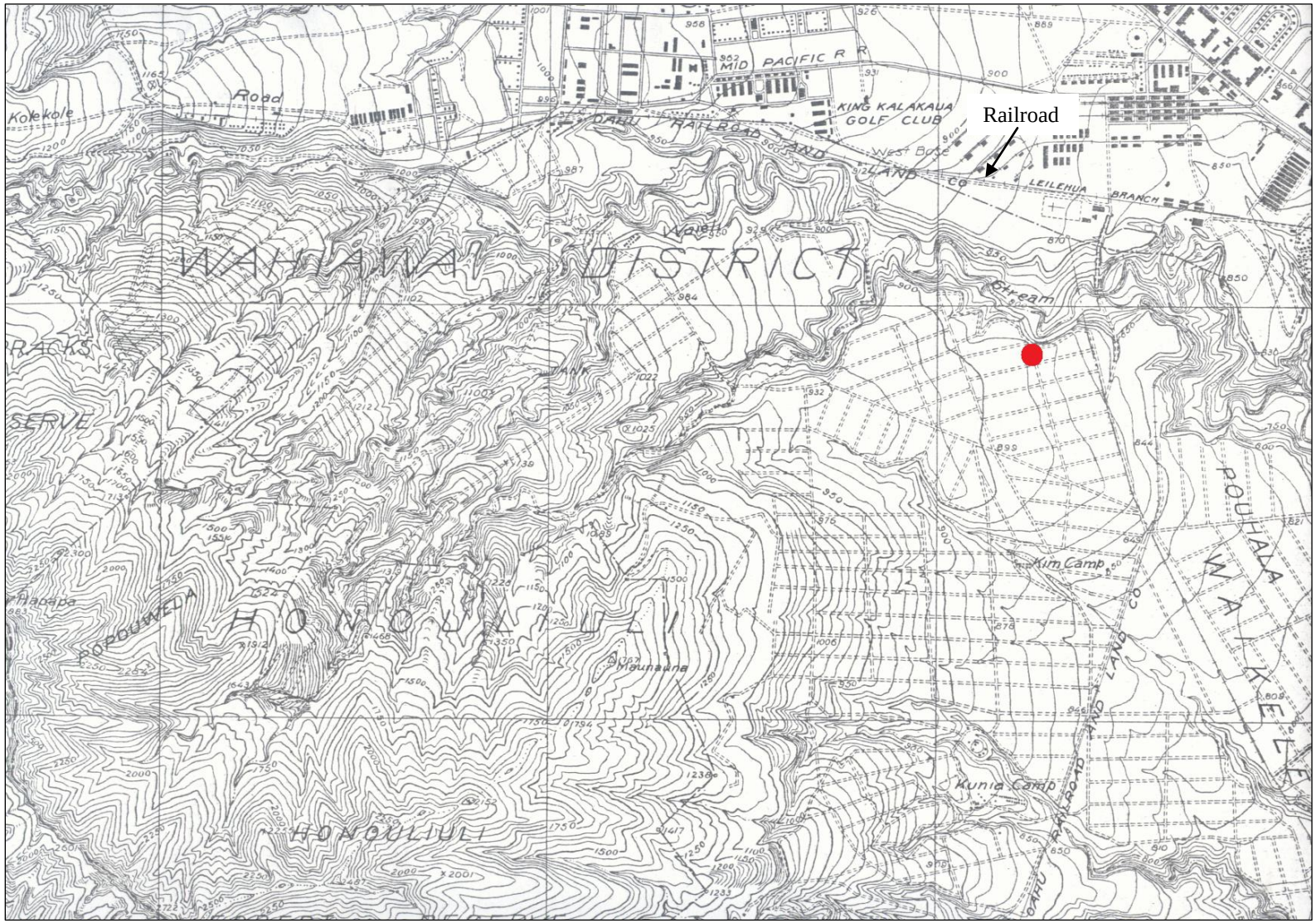

Figure 8. Enlarged detail of the 1927–1930 USGS Schofield Quadrangle with proposed Schofield Generating Station marked. Dashed lines around marked area indicate one-lane roads through cultivated fields.

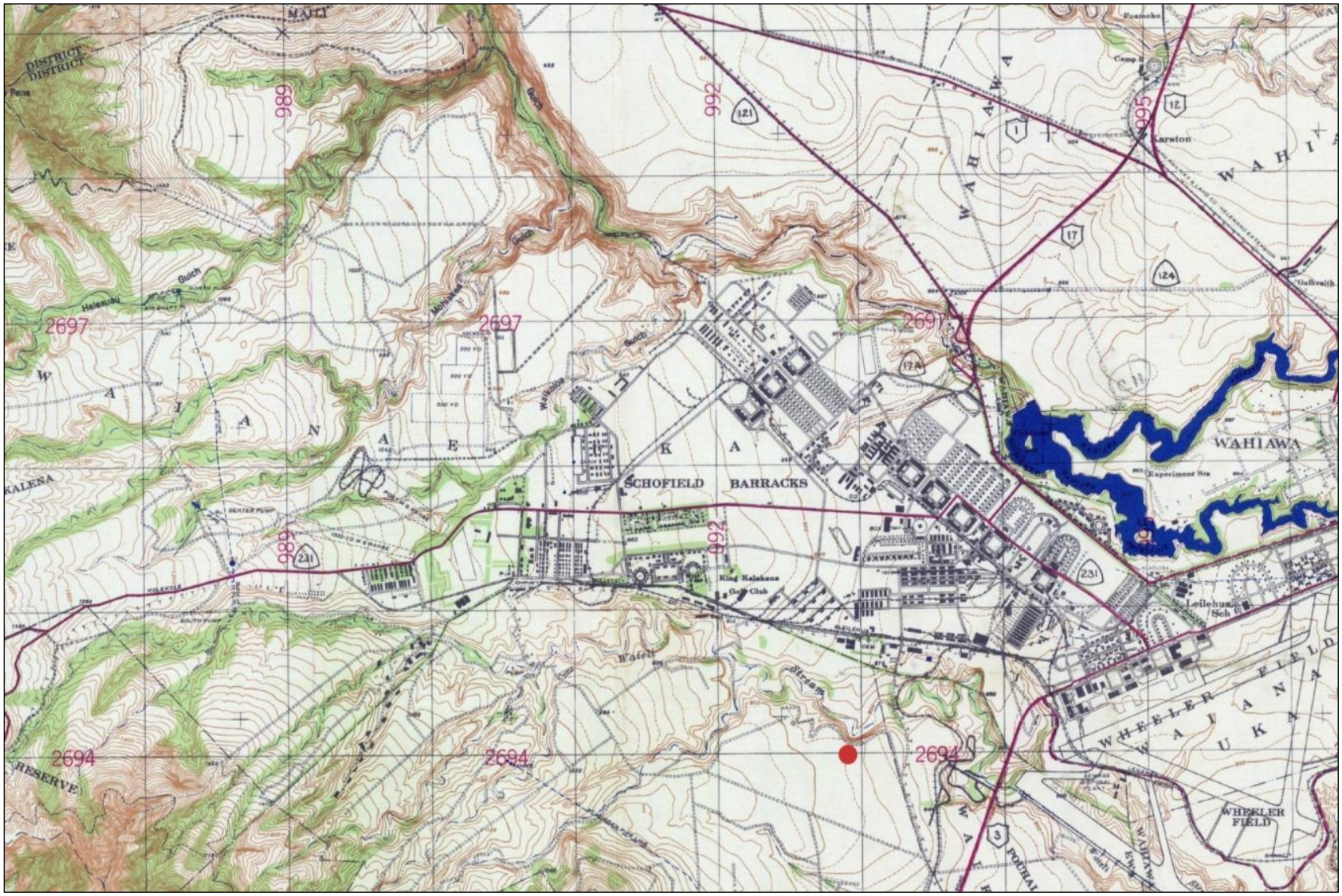

Figure 9. Enlarged detail of the 1943 USGS Schofield Quadrangle with proposed Schofield Generating Station marked.

Figure 10. 1936 aerial photograph of Schofield Barracks showing surrounding pineapple fields (Tropic Lighting Museum).

Figure 11. Anti-aircraft training amidst pineapple fields in central O‘ahu during World War II (From Paradise of the Pacific 1944:49).

(Nedbalek 1984:59). Photographs taken in 1909 show water tanks and a water supply camp in western Wai‘anae Uka that might correlate with the location of a probable pump house identified as SIHP Site No. 6557 in Hale‘au‘au Stream (Robins et al. 2005:16). A water shortage continued at Schofield Barracks until 1925 when Ku Tree Reservoir was constructed in eastern Wai‘anae Uka (Nedbalek 1984:60) and a deep well was excavated in 1938 (Addleman 1940, cited in Spencer Mason Architects 1997).

A northwestern extension of the OR&L line connected the lower post with the artillery area in the 1920s and 1930s. The USGS Schofield Barracks Quadrangle map of 1927–1930 displays two rail companies extending through the plateau; the OR&L and the Mid Pacific Railroad (Figure 8). Both companies have rails leading to the cantonment area. The same shows the Leilehua Ranch house is now identified as the King Kalākaua Golf Club.

WAAF was established as a military installation in 1922 on land included in the 1909 Executive Order establishing Schofield Barracks. Initially used for mounted cavalry training, WAAF was constructed in the 1920s by a detachment from the Army Air Service based at Luke Field on Ford Island. During the 1930s the field was upgraded and new buildings were constructed, including houses, hangars, and a fire station. At the same time, the OR&L relocated their railroad tracks to avoid the aviation field that was under construction.

During the 7 December 1941 Japanese attack on Pearl Harbor, Schofield Barracks was subject to Japanese air fire. Troops returned fire from the quadrangle roofs, shooting down two Japanese planes and one U.S. plane (Alvarez 1982:64). No significant damage was incurred at Schofield Barracks during the attack; however, nearby WAAF was hit hard. Schofield Barracks was used as a major training camp during the Pacific campaign of World War II. The Ranger Combat Training School at Schofield Barracks was established in 1942 and was intended to train the troops for jungle warfare (Alvarez 1982:68). In 1947 WAAF was moved to U.S. Air Force control and then put in caretaker status from 1948 until 1951, when the Korean War began.

While the number of troops and level of activity at Schofield Barracks has varied considerably since the close of World War II, the reservation has continued in its importance as a training center and post for the U.S. Army’s 25th Infantry Division. WAAF remained in U.S. Air Force control until 1993, when it was returned to the U.S. Army. The 1943 USGS map displays few changes from the 1930 USGS map (Figure 9). There are a few more permanent structures. Mid Pacific Railroad is no longer displayed; and WAAF is established.

In 2005 the U.S. Army purchased 1,402 acres south of the Schofield Barracks cantonment and east of the South Range from the Campbell Estate. The northernmost of the three parcels, composing the South Range Acquisition Area, would become KMTA. At the time of purchase, the lands, including broad ridges and stream floors, were still under pineapple cultivation as they had been for almost a century.

2.4 Previous Archaeological Investigations

Largely stimulated by SBMR’s Federal Section 106 requirements, a number of archaeological investigations have occurred in the APE. These began with McAllister’s (1933) first archaeological investigations of O‘ahu and culminated with the recent assessment of the

potential for portions of the SBMR to be a NRHP archaeological district, ethnographic landscape, or traditional cultural property (Desilets et al. 2011). The following overview of previous archaeological investigations focuses on those projects directly related to the APE (Table 1; Figure 12). Robins et al. (2007) and Desilets et al. (2011) provide a comprehensive summary of SBMR archaeological investigations.

Sterling and Summers (1978) compiled information on O‘ahu’s recorded cultural and archaeological sites. For the central plateau, they summarized McAllister’s archaeological survey (McAllister 1933), government documents, and ethnohistoric records. One of the most significant of these sites is the Kūkaniloko birthstones (SIHP No. 50-80-04-218) and Ho‘olonopahu Heiau (SIHP No. 50-80-04-219) to the north of the project area on the east side of Kaukonahua Stream (Figure 4). Tomonari-Tuggle and Bouthillier (1994:75) suggest that Kūkaniloko might have extended as far south as Waikalalaua and would therefore encompass some of the project area. Listed on the NRHP (Register No. 73000674), the Kūkaniloko birthstones was one of two places for the birth of children of high chiefs (Henry et al. 1992; McAllister 1933:134). The sacred drums that announced the birth of *ali‘i* children were kept at Ho‘olonopahu Heiau, which is now destroyed (McAllister 1933:137).

2.4.1 Schofield Barracks Cantonment and Wheeler Army Airfield

Work in the Schofield Barracks cantonment and WAAF area has primarily involved recording and assessment of the 20th century historic structures. The SBMR was first archaeologically surveyed by the B.P. Bishop Museum as a component of an EIS for several of Hawai‘i’s U.S. Army installations (Rosendahl 1977). A mostly vehicular reconnaissance survey of 741 acres documented six of McAllister’s sites as being destroyed; relocated the Kolekole Pass Stone (Site 214); and recorded two new historic sites (SIHP No. 50-80-08-9527 and 9528), both in poor condition.

As a component of a master planning effort, a thorough cultural assessment of WAAF accompanied by a historical building and other resources survey was conducted (Tomonari-Tuggle and Bouthillier 1994). Four of the five archaeological sites identified are U.S. military features, although they might be recently modified ranching or traditional features. Only the remains of the OR&L Waipahu-to-Wahiawā line were evaluated as historically significant. Fifty-four buildings were assessed for their historic architectural value, with five considered of major importance and 25 important. The study concluded that WAAF is significant as a U.S. military installation, although the traditional Hawaiian and ranching period significance of the area relates to “its context within a larger geographic area” (Tomonari-Tuggle and Bouthillier 1994:75) due to the modern military-related landscape disturbance.

McIntosh et al. (1995a) conducted archaeological survey and subsurface testing at the McMahon and Ayres sites along the upper south bank of Kaukonahua Stream. No traditional cultural remains were encountered; however, the McMahon site contained modern construction debris along with railroad material that was probably related to the historic OR&L line. Descending to a depth of 1.2 to 2.0 meters, the 15 shovel test pits and 14 backhoe trenches revealed a heavily bulldozed landscape. Additional shovel tests placed in the southeast corner of

Table 1. Archaeological Investigations In and Near the Area of Potential Effect

Reference	General Location	Study	Findings
McAllister 1933	Waiʻanae Range	Survey	Seven sites: Sacred stones (Kolekole Pass, Oahunui), *heiau*, fishpond
Rosendahl 1977	SBMR	Survey	Six sites previously discovered and reported destroyed: SIHP No. 204, 213, 215, 216, 217, 9516; Two historic sites: SIHP No. 9527, 9528; Kolekole Pass Stone: Site 214
Griffin and Yent 1977	Wahiawā Freshwater State Park	Survey	Railroad trestle, nonagricultural terraces
Watanabe 1987	Field Station Kunia	Survey	No findings
O'Hare et al. 1993	SBMR	Survey	Documentation of 374 historic structures
Tomonari-Tuggle and Bouthillier 1994	Wheeler Army Airfield (WAAF)	Survey, assessment	Historic buildings, railroad bed (SIHP No. 9714), military structures
McIntosh et al. 1995a, 1995b	SBMR and WAAF	Survey, excavation	Bunker (SIHP No. 5082)
Bouthillier et al. 1995	SBMR	Survey, excavation	Historic dump site
Williams et al. 1995	SBMR	Survey, excavation	Historic debris
Tomonari-Tuggle 1997	Schofield Barracks Cantonment	Assessment	-
Carson and Yeomans 2000	Schofield Barracks East and South Ranges	Excavation, detailed recording	Phase III Excavation of 15 Hawaiian sites recorded and tested by Robins and Spear (2002a, 2002b)
Robins and Spear 2002a, 2002b	Schofield Barracks South, portions of, East and West Ranges	Survey, testing	73 primarily traditional sites: habitations, burials, irrigated and nonirrigated agriculture, historic roads, reservoir, military structures
Roberts et al. 2004	Schofield Barracks South Range	Survey	43 Hawaiian, post-Contact, military sites: habitations, ceremonial, agriculture, possible burials, homesteads, roads, military structures
Robins et al. 2007	South Range Land Acquisition	Survey	45 Hawaiian, post-Contact, military sites: agriculture, habitation, ceremony, possible burial
Desilets et al. 2011	SBMR, Helemano Military Reservation	Assessment	Western SBMR (Līhuʻe), above ca. 1,000 feet elevation, qualifies as NRHP-eligible traditional cultural places (TCP), ethnographic landscape, and archaeological district
Tulchin and Hammatt 2013	South Range Land Acquisition	Survey, testing	No findings

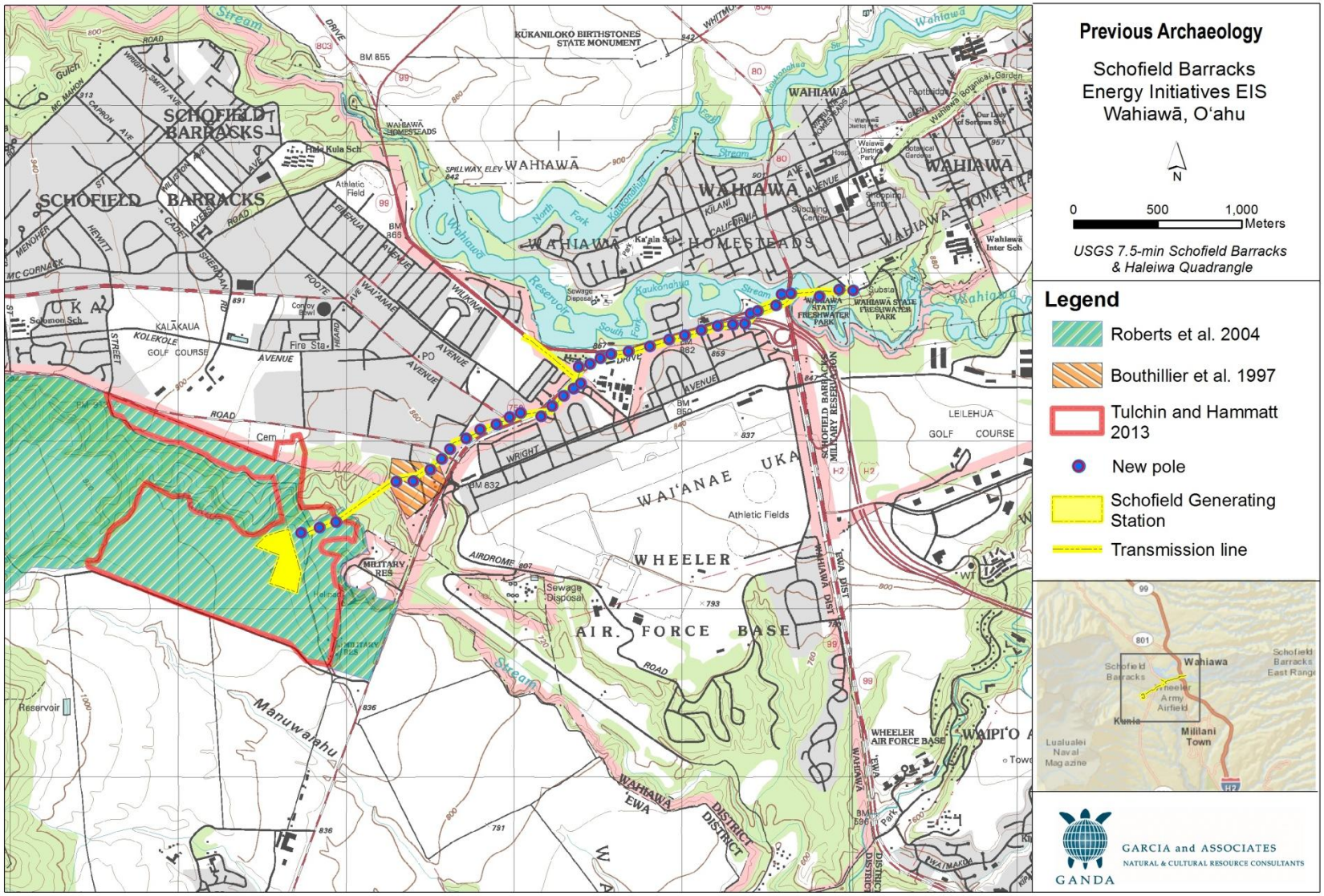

Figure 12. Previous archaeological investigations overlapping the west portion of the Area of Potential Effect.

the cantonment, in the vicinity of Carter Gate, which was Schofield Barracks' original entrance, unearthed modern trash relating to the recently demolished family housing (McIntosh et al. 1995b).

In 1995 Williams et al. (1995) conducted archaeological survey and testing of seven locations in the cantonment. They encountered a 20th century rock facing (Site 3) on the Waiʻeli Stream bank south of Martinez Field and a localized area of coral fill that they interpreted as a potential historic house foundation. Despite the significant amount of concrete debris and gravel deposits identifying considerable historic land alteration, Williams et al. (1995) propose that isolated traditional or early military deposits might remain in the cantonment's developed areas.

Bouthillier et al. (1995) conducted archaeological survey and augur boring of three housing areas (A, U, and V) and Duck Field (west of Lyman Gate). The investigations encountered a large post-Contact trash deposit at the top edge of a slope leading to Waikele Stream at the west end of Duck Field. Although having just been pot hunted, the glass bottles and fragments, ceramics, metal, and recent trash were interpreted as associated with a 1908 campsite occupied during the initial construction of Schofield Barracks (Bouthillier et al. 1995:54). Auger tests indicated that construction fill deposits descend up to a meter deep and overlie truncated B horizon soils. Like Williams et al. (1995), Bouthillier et al. (1995) concluded that the extensive land alterations in the cantonment have dramatically affected the subsurface deposits.

Tomonari-Tuggle (1997) conducted background archival research, limited field assessment, and data analysis of the Schofield Barracks containment area. She examined three areas of historical interest during the survey: (1) a 1918 culvert under Waiʻanae Avenue, (2) the post cemetery, and (3) the area around the Kalkaua Golf Course clubhouse. Tomonari-Tuggle (1997:iv) concluded that:

> virtually all of the cantonment (even open space areas) has been intensively developed over 85 years of military use, and that the likelihood of intact and significant archaeological remains is extremely low . . . . Only those areas adjacent to gulches and ravines in the cantonment are evaluated to be archaeologically sensitive.

Cultural Surveys Hawaiʻi Inc. (CSH) examined the post-Contact trash deposit recorded by Bouthillier et al. (1995) and the stacked-stone terrace and concrete ditch documented by Williams et al. (1995). The historic trash feature was determined to be a secondary deposit and the latter site (Site 3) a group of mid-20th century drainage control features significantly impacted by modern development, trash dumping, and natural processes. Because neither cultural resource retained their integrity, they were evaluated as not meeting the significance criteria for inclusion on the Hawaiʻi Register or the NRHP.

2.4.2 South and East Ranges, and Kunia Maneuver Training Area

Griffin and Yent (1977) conducted an archaeological survey in anticipation of construction of the Wahiawā Freshwater State Park. They encountered a portion of the OR&L railroad trestle and a series of low step-terraces containing a concrete stair and a basalt alignment among the historic debris littering the parcel. A core was placed in the lower terrace to determine if the terraces were used for agriculture. The continuous layer of red silty clay encountered in the core suggests that the terraces were not cultivated and might have been constructed to prevent erosion.

Watanabe's (1987) survey of five areas in the U.S. Army Field Station Kunia on the south slopes of Waikele Stream found the parcels to have been graded or filled. No cultural remains remained in these areas impacted by historic and modern development and cultivation.

Scientific Consultant Services, Inc. (SCS) completed surveys and site excavation at select areas of the South Range, West Range, and East Range (Carson and Yeomans 2000; Robins and Spear 2002a; 2002b). The SCS surveys identified 92 sites associated with Hawaiian habitation, agriculture and burial, historic roads, and military structures. Radiocarbon assays suggest these sites were occupied on a temporary basis from AD 1290 to 1450 and on a permanent basis from AD 1440 to 1950 (Carson and Yeomans 2000:84–85; Robins and Spear 2002a:248). Although the occupational date ranges overlap into the post-Contact and modern era, the absence of post-Contact cultural materials suggests the occupation was primarily pre-Contact and early post-Contact in use. Radiocarbon dating of agricultural soils from three wetland and two dryland sites indicates the development of croplands began as early as AD 1170 and cultivation continued throughout the pre-Contact and post-Contact era (Carson and Yeomans 2000:79–80; Robins and Spear 2000b:244).

Following the SCS work, Garcia and Associates conducted Phase I and II archaeological investigations in the South Range Land Acquisition Area (Roberts et al. 2004; Robins et al. 2007). During the initial work, many of the pineapple fields in the South Range were still being cultivated. Forty-five sites including more than 261 features and feature clusters were recorded in the project area. These sites include 28 traditional Hawaiian sites, 12 commercial pineapple (plantation) sites, two U.S. military training sites, and three sites with undetermined cultural affiliations. The Hawaiian sites include structural components indicative of dryland agriculture, habitation, ceremony, and a possible burial feature.

All of the properties recorded by Garcia and Associates are on the west half of KMTA in the higher elevations that were not under historic and modern cultivation. Although some sites were in the gulches, Roberts et al. (2004:85) noted, "historic and modern land alterations have contributed to increases in slope erosion, accelerated siltation and down cutting of stream channels that have affected site formation processes and integrity within the valleys."

Garcia and Associates assessed the SBMR and the Helemano Military Reservation for their potential to contain NRHP-eligible traditional cultural places (TCP), ethnographic landscapes, or archaeological districts (Desilets et al. 2011). Their findings indicate that the western portion of the SBMR, above ca. 1,000 feet elevation, can be defined as a Līhuʻe Uplands TCP, or as a discontiguous archaeological district, within the historic context of Hawaiian Occupation and *Lō Aliʻi* Social Organization AD 1100–1778. This same upland area, and potentially a larger region including Kūkaniloko to the east, might also qualify as an NRHP-eligible ethnographic landscape. Desilets et al. (2011) found no evidence to support the presence of NRHP-eligible TCPs, ethnographic landscapes, or archaeological districts within the lower elevations of Līhuʻe—where the current project is located—or within the Helemano Military Reservation.

CSH conducted an AIS for construction-related activities associated with the Grow the Army initiative in the SBMR (Tulchin and Hammatt 2013). Their investigations included a pedestrian survey and excavation of a series of test units in the former pineapple fields in KMTA, and further

examination of two previously documented post-Contact sites in the cantonment (Section 2.4.1). Pedestrian survey of the formerly cultivated tablelands identified no surface cultural resources.

CSH's subsurface testing of these tablelands did not encounter any buried cultural resources (Tulchin and Hammatt 2013). Their Test Units 10, 11, and 13 are within the proposed generating station parcel, while Test Units 8 and 9 are close to Poles 1 and 2 in the Department of Agriculture land. These units displayed a similar stratigraphic sequence consisting of naturally deposited clay loam impacted by decades of agricultural grading and plowing overlying the same natural deposit that was not impacted by previous cultivation activities, all of which capped decomposing basalt bedrock.

2.4.3 Assessment of Archaeological Resources

Commercial pineapple cultivation and residential, commercial, and military development have made it unlikely that archaeological and cultural sites are present in the Schofield Barracks cantonment, WAAF, the lower elevations of the South and East Ranges, and KMTA. Archaeological investigations have encountered no remaining surface or subsurface pre-Contact or 19th century cultural properties in these lowland areas. The few identified archaeological sites all appear to relate to military development, with a substantial number of historic structures found in the cantonment and in WAAF.

Although not yet thoroughly investigated, even the lower gulches and drainages show no evidence of traditional Hawaiian modification for agricultural use or occupation. Some of the broader gulch bottoms were also planted in pineapple, thus destroying any features that might have once been present.

Despite portions of the uplands being subjected to artillery bombardment, the remote location and restricted development of much of the uplands west of the APE has resulted in the preservation of many traditional cultural properties, particularly in the deep, upper elevation gulches and valleys. Here, documented cultural sites comprise mostly Hawaiian structures associated with habitation, animal husbandry, wetland and dryland agriculture, ceremonial activities, and possible burials. Historic roads and military structures were also identified that were associated with training and development of Schofield Barracks.

Desilets et al. (2011) conclude that:

> The best site preservation is found in the deep, upper elevation gulches within both the South and West Ranges. Phase I and II surveys of the newly acquired South Range area (Roberts et al. 2004; Robins et al. 2007) indicate that the lower reaches, which were almost entirely in pineapple until very recently, have no remaining surface features. This is also true of some of the broad, upper elevation ridges. Pineapple was planted on any commercially feasible acreage within the South Range, extending right up to the current forest reserve boundary. Within the more inaccessible parts of the South Range, however, such as deep drainages, Hawaiian sites are quite plentiful and, in some cases, form extended complexes. Higher elevation valleys in the South Range also contain relatively large and well-preserved ceremonial sites (e.g., Site 50-80-08-6479). [Desilets et al. 2011:69]

3.0 FIELD METHODOLOGY

The AIS included excavation of eight test trenches at the proposed generator site in KMTA and thirteen test pits along the transmission line. The intensity of the archaeological testing effort was based on the results of the archaeological background research and consultation with U.S. Army Garrison-Hawaii and the Hawai‘i State Historic Preservation Division. Because the region surrounding the project APE has been shown to have a very low probability for subsurface archaeological deposits, the AIS sampling strategy was designed to provide broad coverage, but not to including every individual locale at which ground-disturbing construction activities might occur. Testing along the transmission line, in particular, was designed to sample the route generally and includes specific evaluation of 13 of the 28 new pole locations (a 46 percent sample).

3.1 Generating Station

Archaeological testing at the generator site included excavating eight test trenches using a Komatsu PC35MR excavator (Figure 13). Test trenching was completed on 18 and 19 February 2014. All excavated sediment was inspected for evidence of cultural material and the sidewalls of all excavations were inspected for evidence of cultural deposition. A representative stratigraphic profile was recorded for each trench. Trench dimensions averaged 7.40 meters long, 0.57 meters wide, and 1.26 meters deep.

Trenches were distributed across the generating station parcel as evenly as possible. Heavy vegetation growth, large polyvinyl chloride (PVC) pipes, soil piles, and trees blocked entry to large areas. As Figure 14 shows, trenches are concentrated along the northern and eastern perimeter of the parcel. Despite the somewhat uneven coverage, the trench results are more than sufficient to evaluate the archaeological potential of the parcel.

Test trenches were excavated down to intact native subsoil and were terminated at a depth the archaeologist determined to be beyond the reasonable potential for archaeological deposits, typically well into intact B-horizon or saprolite layers.

3.2 Transmission Line

Archaeological testing along the transmission line included excavation of 13 test pits using a Komatsu PC35MR excavator. Fieldwork for the pits was completed on 21 February and 4 March 2014. As with the test trenches, all excavated sediment was inspected for evidence of cultural material, and the sidewalls of all excavations were inspected for evidence of cultural deposition. Pit dimensions averaged 1.06 centimeters long, 0.88 meters wide, and 0.79 meters deep.

Test pits were excavated near new pole locations spaced evenly along the 3.7-kilometer transmission line (Figure 15). In addition to even spacing, pole locations that exhibited a lower likelihood of previous ground disturbance were preferred during the selection process. Finally, Test Pits 1, 2, and 3 were selected because of their location on the edge of Wai‘eli Gulch. Background research indicates that such gulches were the preferred locations for pre-Contact and early historic habitation and subsistence. They therefore may have a relatively higher probability for containing archaeological resources.

Figure 13. Komatsu PC35MR backhoe excavating at Trench 3.

As with the test trenches, test pits were generally excavated to intact native subsoil and were terminated at a depth the archaeologist determined to be beyond the reasonable potential for archaeological deposits. Some of the excavations did not reach native subsoil because electrical conduits were unexpectedly encountered.

3.3 Documentation

Standards of documentation, recording, and analysis were in accordance with Hawai‘i Administrative Rules Section 13-276 and with the Secretary of the Interior’s Standards for Archaeological Documentation. Field recording included drawing stratigraphic profiles and digital photography of exposed sidewalls. Stratigraphic profiles were recorded to document archaeological deposition and to convey the general stratigraphy of the area. All profiles were prepared according to National Soil Survey Center standards and using the Munsell Color Notation reference system.

Figure 14. Test trenches at generating station parcel.

Figure 15. Test pits along transmission line.

4.0 FIELDWORK RESULTS

This section presents the results of the AIS fieldwork including documentation and findings for eight test trenches at the proposed generator site and 13 test pits along the transmission line.

4.1 Trenches

Eight trenches were excavated to test for the presence or absence of traditional Hawaiian or historic cultural material (Figure 14). Each trench is discussed below in sequential order.

Table 2 provides technical soil descriptions for all trenches and Figure 16 illustrates all recorded trench profiles. Each description concludes with a statement of cultural material findings.

Trench 1

Trench 1 measured 8.3 meters long by 0.6 meters wide and was excavated to a maximum depth of 1.0 meter. The trench contained three stratigraphic layers designated Layers I–III (Figure 17).

Layer I extended from 0 to 50 centimeters below surface (cmbs). The layer was dark reddish-brown silty clay with a few basalt pebbles, charcoal, and fragments of black plastic. Layer II extended from 50 to 95 cmbs. The layer was compact, dark red silty clay mottled with orange clay at its lower boundary. Layer III extended from 90 to 100 cmbs. The layer was dark red silty clay mottled with yellowish-brown clay chunks.

Trench 1 produced no evidence of traditional Hawaiian or early historic cultural deposition.

Trench 2

Trench 2 measured 8.0 meters long and 0.6 meters wide and was excavated to a maximum depth of 156 cmbs. The trench contained three stratigraphic layers, designated Layers I through III (Figure 18).

Layer I extended from 0 to 50 cmbs. The Layer was dark reddish-brown silty clay with charcoal fragments and black plastic. Layer II extended from 50 to 143 cmbs. It was dark reddish-brown silty clay mottled orange clay at the lower boundary. Layer III extended from 143 to 156 cmb. It was a reddish-brown silty clay mottled with yellowish-brown clay.

Trench 2 produced no evidence of traditional Hawaiian or early historic cultural deposition.

Trench 3

Trench 3 measured 7.3 meters long by 0.6 meters wide and was excavated to a maximum depth of 127 cmbs. The trench contained three stratigraphic layers, designated Layers I through III (Figure 19).

Layer I extended from 0 to 46 cmbs. It was dark reddish-brown silty clay with charcoal fragments and black plastic material. Layer II extended from 46 to 114 cmbs. It was compact, dark

Table 2. Backhoe Trench Stratigraphy

Trench	Layer	Depth (cmbs)	Description	Interpretation
1	I	0–50	2.5YR 2.5/4 (dark reddish-brown) silty clay; moist; cohesive; med. plasticity; fine to medium subangular blocky; few basalt pebbles; some small roots; bits of charcoal and plastic; humic material; distinct lower boundary.	Culturally modified - pineapple farming remnants
	II	50–95	2.5YR 3/6 (dark red) silty clay; moist; compact; cohesive; med. plasticity; fine subangular blocky; no cobbles or roots; some orange clay mixed in bottom 15centimeters; diffuse lower boundary.	Intact native soil
	III	90–100	2.5YR 3/6 (dark red) silty clay modeled with 10YR 5/8 (yellowish-brown) clay chunks (40%); compact; cohesive; low plasticity; fine subangular blocky; no cobbles or roots.	Saprolite
2	I	0–50	2.5YR 2.5/4 (dark reddish-brown) silty clay; moist; cohesive; med. plasticity; fine to medium subangular blocky; few basalt pebbles; some small roots; bits of charcoal and plastic; humic material; distinct lower boundary.	Culturally modified - pineapple farming remnants
	II	50–143	2.5YR 3/4 (dark reddish-brown) silty clay; moist; compact; cohesive; med. plasticity; fine subangular blocky; no cobbles or roots; some orange clay mixed in bottom 10 centimeters; diffuse lower boundary.	Intact native soil
	III	143–156	2.5YR 3/4 (dark reddish-brown) silty clay modeled with 10YR 5/8 (yellowish-brown) clay chunks (25%); compact; cohesive; low plasticity; fine subangular blocky; no cobbles or roots.	Saprolite
3	I	0–46	2.5YR 2.5/4 (dark reddish-brown) silty clay; moist; cohesive; med. plasticity; fine to medium subangular blocky; few basalt pebbles; lots of small roots; bits of charcoal and plastic; humic material; distinct lower boundary.	Culturally modified - pineapple farming remnants
	II	46–114	2.5YR 3/4 (dark reddish-brown) silty clay; moist; compact; cohesive; med. plasticity; fine subangular blocky; some roots; no cobbles; some orange clay mixed in bottom 10 centimeters; diffuse lower boundary.	Intact native soil
	III	114–127	2.5YR 3/4 (dark reddish-brown) silty clay modeled with 10YR 5/8 (yellowish-brown) clay chunks (25%); compact; cohesive; low plasticity; fine subangular blocky; no cobbles or roots.	Saprolite
4	I	0–42	2.5YR 2.5/4 (dark reddish-brown) silty clay; moist; cohesive; med. plasticity; fine to medium subangular blocky; few basalt pebbles; lots of small roots; bits of charcoal and plastic; humic material; distinct lower boundary.	Culturally modified - pineapple farming remnants
	II	42–130	2.5YR 3/6 (dark red) silty clay; moist; compact; cohesive; med. plasticity; fine subangular blocky; some roots; no cobbles; diffuse lower boundary.	Intact native soil
	III	130–136	2.5YR 3/6 (dark red) silty clay modeled with 10YR 5/8 (yellowish-brown) clay chunks (25%); compact; cohesive; low plasticity; fine subangular blocky; no cobbles or roots.	Saprolite

Table 2. (cont.)

Trench	Layer	Depth (cmbs)	Description	Interpretation
5	I	0–46	2.5YR 3/3 (dark reddish-brown) silty clay; moist; cohesive; med. plasticity; fine to medium subangular blocky; few basalt pebbles; lots of small roots; bits of charcoal and plastic; humic material; distinct lower boundary.	Culturally modified – pineapple farming remnants
	II	46–124	2.5YR 3/6 (dark red) silty clay; moist; compact; cohesive; med. plasticity; fine subangular blocky; few roots in top 10 centimeters; no cobbles; some orange clay mixed in bottom 10 centimeters; diffuse lower boundary.	Intact native soil
	III	124–136	2.5YR 3/6 (dark red) silty clay modeled with 10YR 5/8 (yellowish-brown) clay chunks (40%); compact; cohesive; low plasticity; fine subangular blocky; no cobbles or roots.	Saprolite
6	I	0–47	2.5YR 2.5/4 (dark reddish-brown) silty clay; moist; cohesive; med. plasticity; fine to medium subangular blocky; few basalt pebbles; lots of small roots; bits of charcoal and plastic; humic material; distinct lower boundary.	Culturally modified – pineapple farming remnants
	II	47–108	2.5YR 3/4 (dark reddish-brown) silty clay; moist; compact; cohesive; med. plasticity; fine subangular blocky; few roots in top 10 centimeters; no cobbles; diffuse lower boundary.	Intact native soil
	III	108–114	2.5YR 3/4 (dark reddish-brown) silty clay modeled with 10YR 5/8 (yellowish-brown) clay chunks (20%); compact; cohesive; low plasticity; fine subangular blocky; no cobbles or roots.	Saprolite
7	I	0–40	2.5YR 2.5/4 (dark reddish-brown) silty clay; moist; cohesive; med. plasticity; fine to medium subangular blocky; few basalt pebbles; lots of small roots; bits of charcoal and plastic; humic material; distinct lower boundary.	Culturally modified – pineapple farming remnants
	II	40–100	2.5YR 3/6 (dark red) silty clay; moist; compact; cohesive; med. plasticity; fine subangular blocky; few small roots in top 10 centimeters; no cobbles.	Intact native soil
8	I	0–15	2.5YR 2.5/3 (dark reddish-brown) silty clay; moist; cohesive; med. plasticity; fine to medium subangular blocky; few basalt pebbles; lots of small roots; bits of charcoal and plastic; humic material; distinct lower boundary.	Culturally modified – pineapple farming remnants
	II	15–125	2.5YR 3/4 (dark reddish-brown) silty clay; moist; compact; cohesive; med. plasticity; fine subangular blocky; few small roots in top 20 centimeters; no cobbles; diffuse lower boundary.	Intact native soil
	III	125–135	2.5YR 3/3 (dark reddish-brown) silty clay; moist; compact and gets more compact in bottom 10 centimeters; cohesive; med. plasticity; fine subangular blocky; no cobbles or roots; some orange clay mixed in bottom 5 centimeters.	Intact native soil

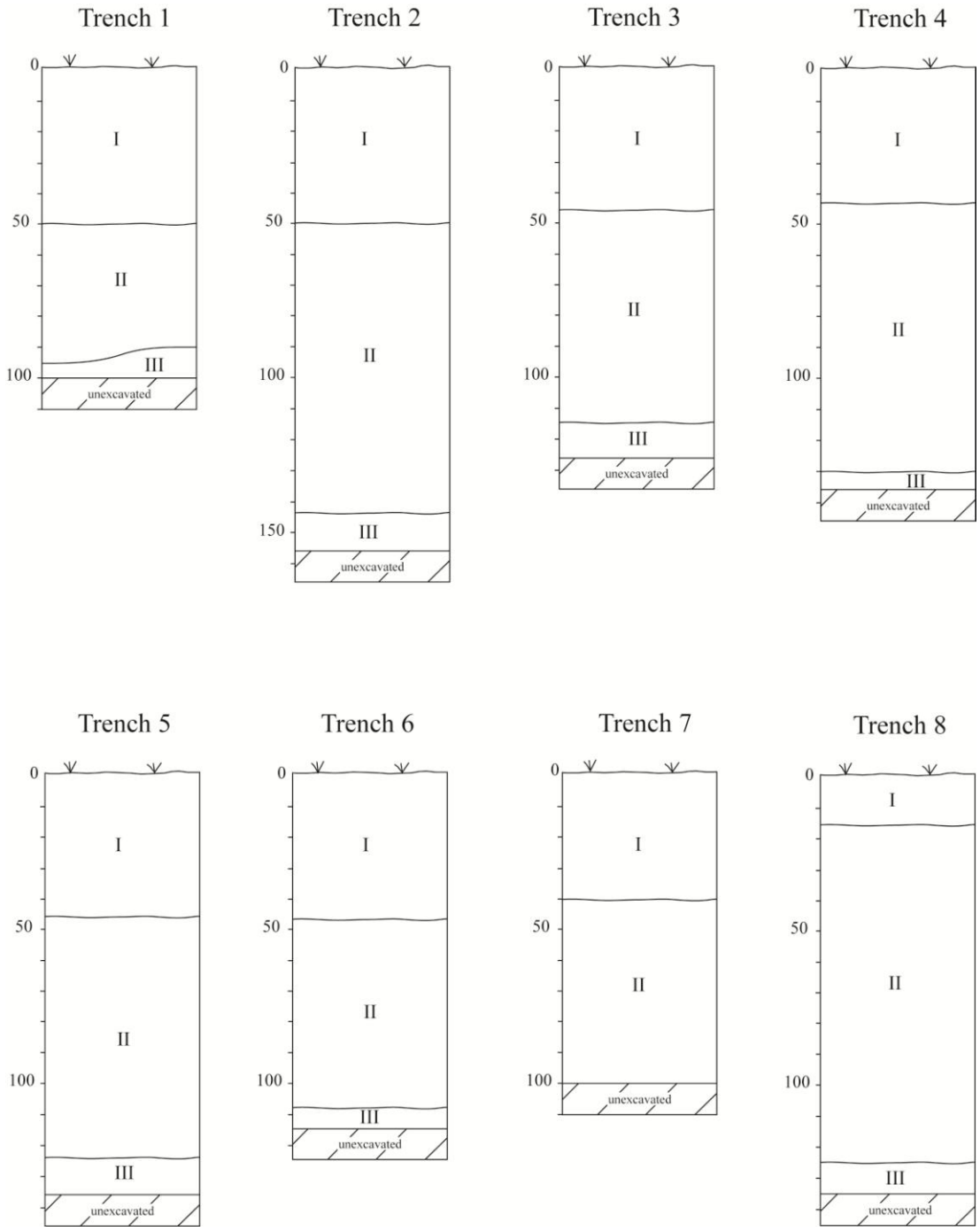

Figure 16. Trench profiles.

Figure 17. Trench 1, facing north.

Figure 18. Trench 2, facing north.

Figure 19. Trench 3, facing north.

reddish-brown silty clay mottled with orange clay at the lower boundary. Layer III extended from 114 to 127 cmbs. It was compact, dark reddish-brown silty clay mottled with yellowish-brown clay.

Trench 3 produced no evidence of traditional Hawaiian or early historic cultural deposition.

Trench 4

Trench 4 measured 7.2 meters long by 0.6 meters wide and was excavated to a maximum depth of 136 cmbs Three stratigraphic layers were identified in the trench and designated Layers I through III (Figure 20).

Layer I extended from 0 to 42 cmbs. It was dark reddish-brown silty clay with charcoal and fragments of black plastic. Layer II extended from 42 to 130 cmbs. It was compact, dark red silty clay. Layer III extended from 130 to 136 cmbs. It was compact, dark red silty clay mottled with yellowish-brown clay.

Trench 4 produced no evidence of traditional Hawaiian or early historic cultural deposition.

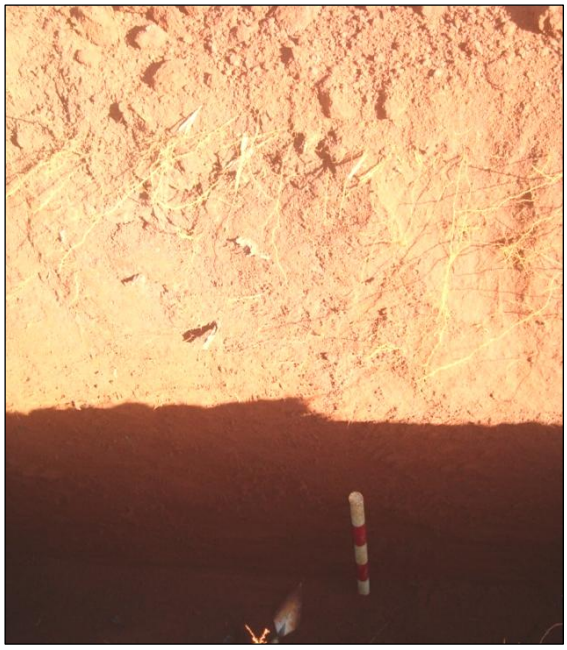

Figure 20. Trench 4, facing north.

Trench 5

Trench 5 measured 7.5 meters long by 0.5 meters wide and was excavated to a maximum depth of 136 cmbs. The trench contained three stratigraphic layers, designated Layers I through III (Figure 21).

Layer I extended from 0 to 46 cmbs. It was dark reddish-brown silty clay with charcoal and fragments of black plastic. Layer II extended from 46 to 124 cmbs. It was compact, dark red silty clay mottled with orange clay at the lower boundary. Layer III extended from 124 to 136 cmbs. It was compact, dark red silty clay mottled with yellowish-brown clay.

Trench 5 produced no evidence of traditional Hawaiian or early historic cultural deposition.

Trench 6

Trench 6 measured 7.2 meters long by 0.6 meters wide and was excavated to a maximum depth of 114 cmbs. The trench contained three stratigraphic layers, designated Layers I through III (Figure 22).

Layer I extended from 0 to 47 cmbs. It was dark reddish-brown silty clay charcoal and fragmented black plastic. Layer II extended from 47 to 108 cmbs. It was compact dark reddish-brown silty clay. Layer III extended from 108 to 114 cmbs. It was compact, dark reddish-brown silty clay mottled with yellowish-brown clay.

Trench 6 produced no evidence of traditional Hawaiian or early historic cultural deposition.

Figure 21. Trench 5, facing north.

Figure 22. Trench 6, facing north.

Trench 7

Trench 7 measured 6.5 meters long by 0.5 meters wide and was excavated to a maximum depth of 100 cmbs. The trench contained two stratigraphic layers, designated Layers I through III (Figure 23).

Layer I extended from 0 to 40 cmbs. It was dark reddish-brown silty clay with charcoal and fragments of black plastic. Layer II extended from 40 to 100 cmbs. It was compact, dark red silty clay.

Trench 7 produced no evidence of traditional Hawaiian or early historic cultural deposition.

Trench 8

Trench 8 measured 7.0 meters long by 0.6 meters wide and was excavated to a maximum depth of 135 cmbs. The trench contained three stratigraphic layers, designated Layers I through III (Figure 24).

Layer I extended from 0 to 15 cmbs. It was dark reddish-brown silty clay with charcoal and fragments of black plastic. Layer II extended 15 to 125 cmbs and consisted of dark reddish-brown silty clay. Layer III extended 125 to 135 cmbs. It was compact, dark reddish-brown silty clay mottled with orange clay at the lower boundary.

Trench 8 produced no evidence of traditional Hawaiian or early historic cultural deposition.

Figure 23. Trench 7, facing northeast.

Figure 24. Trench 8, facing northwest.

4.2 Test Pits

Thirteen test pits were excavated along the transmission line corridor near proposed new pole locations (Figure 15). The test pits are designated in sequential order from east to west (1–13) (Table 3).

Test Pit 1

Test Pit 1 was on Hawai‘i Department of Agriculture land, 50 meters south of Waikele Stream gulch and 1.5 meters west of a dirt cane road running the perimeter of the field. It measured 126 centimeters long and 96 centimeters wide, with a depth of 102 cmbs. The profile contained three stratigraphic layers (Layers I–III) (Figure 25).

Layer I, from 0 to 81 cmbs, is composed of moist, cohesive, dark reddish-brown silty clay. It has medium plasticity, fine to medium subangular blocky peds, a few basalt pebbles, abundant small roots, bits of charcoal and plastic, humic material, and a distinct lower boundary. Layer II is a compact layer from 81 to 90 cmbs and is composed of moist, cohesive, dark red silty clay. It has medium plasticity, fine subangular blocky peds, no cobbles or roots, and a distinct lower boundary. Layer III is a hard, crumbly layer from 90 to 102 cmbs and is composed of non-cohesive, dark red silty clay modeled with yellowish-brown clay chunks (10 percent). It has low plasticity, fine to medium subangular blocky peds, some degraded basalt, and no roots.

Test Pit 1 produced no evidence of traditional Hawaiian or early historic cultural deposition.

Table 3. Test Pit Stratigraphy

Test Pit	Layer	Depth (cmbs)	Description	Interpretation
1	I	0–81	2.5YR 3/3 (dark reddish-brown) silty clay; moist; cohesive; med. plasticity; fine to medium subangular blocky; few basalt pebbles; lots of small roots; bits of charcoal and plastic; humic material; distinct lower boundary.	Culturally modified – pineapple farming remnants
	II	81–90	2.5YR 3/6 (dark red) silty clay; moist; compact; cohesive; med. plasticity; fine subangular blocky; no cobbles or roots; distinct lower boundary.	Intact native soil
	III	90–102	2.5YR 3/6 (dark red) silty clay modeled with 10YR 5/8 (yellowish-brown) clay chunks (10%); crumbly; hard; non-cohesive; low plasticity; fine to medium subangular blocky; degraded lava rock pieces; no roots.	Saprolite
2	I	0–27	5YR 2.5/2 (dark reddish-brown) silty clay; dry; cohesive; low plasticity; fine to medium subangular blocky; lots of small roots and one large root; distinct lower boundary.	Topsoil
	II	14–59	2.5YR 3/4 (dark reddish-brown) silty clay; moist; compact; cohesive; med. plasticity; fine to medium subangular blocky; some small roots; few cobbles; mixed with Layer III; diffuse lower boundary.	Intact native soil
	III	53–75	5YR 3/3 (dark reddish-brown) silty clay; moist; compact; cohesive; med. plasticity; medium subangular blocky; no roots; hard red chunks.	Eroded bedrock
3	I	0–10	5YR 3/2 (dark reddish-brown) silty clay; dry; cohesive; low plasticity; fine to medium subangular blocky; lots of small roots; distinct lower boundary.	Topsoil
	II	10–67	2.5YR 2.5/4 (dark reddish-brown) silty clay; moist; compact; cohesive; med. plasticity; fine to medium subangular blocky; few tiny roots; no cobbles.	Intact native soil
4	I	0–12	5YR 3/2 (dark reddish-brown) silty clay; dry; cohesive; low plasticity; fine to medium subangular blocky; lots of small roots; distinct lower boundary.	Topsoil
	II	12–62	2.5YR 2.5/4 (dark reddish-brown) silty clay; moist; compact; cohesive; med. plasticity; fine to medium subangular blocky; few tiny roots; no cobbles.	Intact native soil
5	I	0–24	2.5YR 2.5/4 (dark reddish-brown) silty clay mixed with Layer II in lower 12 centimeters; moist; cohesive; medium plasticity; fine to medium subangular blocky; some coral fill; lots of small roots; diffuse lower boundary.	Topsoil and introduced material for landscaping
	II	24–64	7.5YR 2.5/2 (very dark brown) silty clay; hard; non-cohesive; low plasticity; fine to medium subangular blocky; few small black rocks and glass; 30% crushed coral and coarse sand throughout with coral fill band between 41–46 centimeters; very few roots; distinct lower boundary.	Fill material to level ground surface
	III	64–84	2.5YR 2.5/4 (dark reddish-brown) silty clay; moist; compact; cohesive; med. plasticity; fine to medium subangular blocky; few tiny roots; no cobbles.	Intact native soil

Table 3. (cont.)

Test Pit	Layer	Depth (cmbs)	Description	Interpretation
6	I	0–22	2.5YR 2.5/4 (dark reddish-brown) silty clay; moist; cohesive; med. plasticity; fine to medium subangular blocky; lots of small to medium roots; few pebbles; distinct lower boundary.	Topsoil and introduced material for landscaping
	II	22–27	7.5YR 3/1 (very dark gray) silt; crumbly; non-cohesive; low plasticity; fine subangular blocky; some coarse sand (20%); ash-like; few small roots; many gray pebbles; distinct lower boundary.	Fill
	III	27–35	10YR 8/4 (very pale brown) coral fill with coarse sand; dry; crumbly; non-cohesive; low plasticity; fine to medium subangular blocky; few gray pebbles and small roots; wavy lower boundary.	Fill
	IV	30–55	5YR 3/4 (dark reddish-brown) (70%), 2.5YR 2.5/4 (dark reddish-brown) (20%), 5YR 5/8 (yellowish-red) (10%) silty clay; mottled; cohesive; medium plasticity; fine to medium subangular blocky; few small roots; distinct lower boundary.	Fill material to level ground surface
	V	55–63	7.5YR 2.5/1 (black) degraded asphalt; dry; chunky; non-cohesive; low plasticity; medium subangular blocky; no roots; distinct lower boundary.	Asphalt surface
	VI	58–71	7.5YR 3/1 (very dark gray) silt; crumbly; non-cohesive; low plasticity; fine subangular blocky; ash-like; no roots; many gray pebbles; diffuse lower boundary.	Fill
	VII	71–90	2.5YR 2.5/4 (dark reddish-brown) silty clay; moist; compact; cohesive; medium plasticity; fine to medium subangular blocky; no roots or cobbles.	Intact native soil
7	I	0–11	2.5YR 2.5/3 (dark reddish-brown) silty clay; moist; cohesive; medium plasticity; fine to medium subangular blocky; 30% gravel; lots of small roots; few coral pieces; diffuse lower boundary.	Topsoil
	II	11–14	7.5YR 4/1 (dark gray) gravel (80%) mixed with Layer I; dry; crumbly; non-cohesive; low plasticity; fine to medium subangular blocky; lots of small roots; diffuse lower boundary.	Introduced material to stabilize ground surface
	III	14–32	2.5YR 2.5/3 (dark reddish-brown) silty clay; moist; cohesive; medium plasticity; fine to medium subangular blocky; 5% gravel; few small roots; few coral pieces; distinct lower boundary.	Introduced material to stabilize ground surface
	IV	23–75	2.5YR 2.5/4 (dark reddish-brown) silty clay; moist; cohesive; medium plasticity; fine to medium subangular blocky; few small roots.	Intact native soil
8	I	0–14	2.5YR 3/3 (dark reddish-brown) silty clay; moist; cohesive; medium plasticity; fine to medium subangular blocky; lots of small roots; few pebbles and coral pieces; diffuse lower boundary.	Topsoil and introduced material for landscaping
	II	14–74	2.5YR 3/4 (dark reddish-brown) silty clay; compact; moist; cohesive; medium plasticity; fine to medium subangular blocky; few small roots.	Intact native soil

Table 3. (cont.)

Test Pit	Layer	Depth (cmbs)	Description	Interpretation
9	I	0–17	5YR 2.5/2 (dark reddish-brown) silty clay; moist; cohesive; low plasticity; fine to medium subangular blocky; lots of small roots and small rocks; few large rocks; distinct lower boundary.	Topsoil
	II	13–37	2.5YR 3/3 (dark reddish-brown) silty clay mixed with Layer III; cohesive; compact; medium plasticity; fine to medium subangular blocky; few medium rocks and small roots, diffuse lower boundary.	Fill material to level ground surface
	III	37–81	10YR 2/2 (very dark brown) silty clay; non-cohesive; low plasticity; fine to medium subangular blocky; loose; crumbly; few medium rocks and small roots; 3-inch gray PVC pipe at 61 cmbs in center of pit running parallel to Kunia Road (electrical conduit).	Fill material around PVC pipe
10	I	0–8	5YR 3/3 (dark reddish-brown) silty clay; moist; cohesive; low plasticity; fine to medium subangular blocky; lots of grass roots; few medium roots; distinct lower boundary.	Topsoil
	II	8–42	2.5YR 3/2 (dusky red) (80%), 5YR 3/2 (dark reddish-brown) (20%) silty clay; dry; crumbly; hard; non-cohesive; low plasticity; medium subangular blocky; 30% small-medium rocks; few medium roots; few glass pieces, coral, and degraded lava; diffuse lower boundary.	Fill material to stabilize ground surface
	III	42–80	5YR 3/2 (dark reddish-brown) modeled with 10YR 5/8 (yellowish-brown) clay (10%); dry; crumbly; very hard; non-cohesive; low plasticity; medium subangular blocky; 40% medium-large rocks; few small roots; cement block at 60 cmbs; large tree root at base of west wall.	Fill material to level ground surface
11	I	0–8	5YR 3/3 (dark reddish-brown) silty clay; moist; cohesive; low plasticity; fine to medium subangular blocky; lots of small roots; diffuse lower boundary.	Topsoil
	II	8–24	10R 3/4 (dusky red) silty clay; moist; cohesive; medium plasticity; fine to medium subangular blocky; few small roots; lots of small rocks; distinct lower boundary.	Fill material to stabilize ground surface
	III	24–54	2.5YR 3/4 (dark reddish-brown) silty clay; crumbly; non-cohesive; low plasticity; fine to medium subangular blocky; few small roots; lots of small-medium rocks; 1-inch-thick black cable 40 cmbs in north wall; diffuse lower boundary.	Fill material to level ground surface
	IV	54–74	2.5YR 4/6 (red) (50%), 5YR 3/3 (dark reddish-brown) (50%) silty clay; dry; crumbly; cohesive; low plasticity; fine to medium subangular blocky; very few roots; lots of small rocks.	Intact native soil
12	I	0–14	5YR 3/3 (dark reddish-brown) silty clay; moist; cohesive; low plasticity; fine to medium subangular blocky; lots of small roots; few small rocks; distinct lower boundary.	Topsoil
	II	14–19	7.5YR 3/3 (dark brown) silty clay; crumbly; non-cohesive; low plasticity; fine to medium subangular blocky; lots of small roots; chalky feel; distinct lower boundary.	Fill material to stabilize ground surface

Table 3. (cont.)

Test Pit	Layer	Depth (cmbs)	Description	Interpretation
12	III	19–21	10R 3/3 (dusky red) silty clay; cohesive; medium plasticity; fine to medium subangular blocky; few small roots; distinct lower boundary.	Fill material
	IV	21–25	2.5YR 4/4 (reddish-brown) silty clay; crumbly; cohesive; low plasticity; fine subangular blocky; few small roots; distinct lower boundary.	Fill material to stabilize ground surface
	V	25–67	10R 3/3 (dusky red) silty clay; cohesive; medium plasticity; fine to medium subangular blocky; very few roots; 3-inch gray PVC pipe at base of excavation (electrical conduit).	Fill material around PVC pipe
13	I	0–9	5YR 3/3 (dark reddish-brown) silty clay; moist; cohesive; low plasticity; fine to medium subangular blocky; lots of small roots; diffuse lower boundary.	Topsoil
	II	9–96	7.5YR 4/3 (brown) (60%), 5YR 4/6 (yellowish-red) (20%), 10R 3/4 (dusky red) (10%), 10YR 3/2 (very dark grayish brown) (10%) silty clay; loose; crumbly; semi-moist; cohesive; low plasticity; fine to medium subangular blocky; few small roots; some small rocks; crushed Schiltz can 14 cmbs; 3-inch gray PVC pipe 60 cmbs in south wall (electrical conduit).	Fill material for road

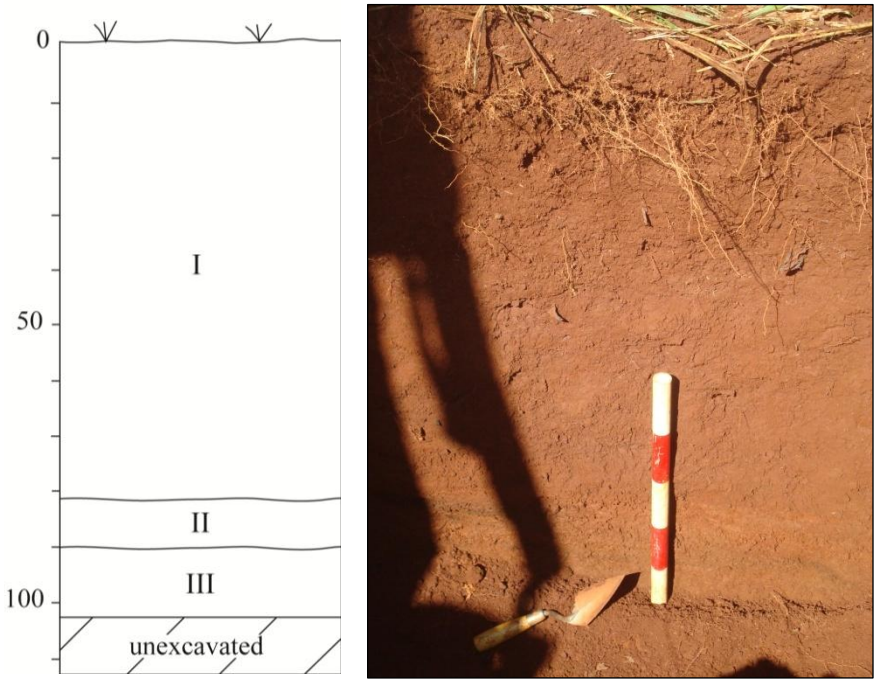

Figure 25. Test Pit 1 profile, facing northwest.

Test Pit 2

Test Pit 2 was on Hawai‘i Department of Agriculture land, 3.0 meters south of Waikele Stream gulch and 1.5 meters north of the dirt cane road running the perimeter of the field. It measured 110 centimeters long and 100 centimeters wide, with a depth of 75 cmbs and azimuth of 36 degrees. The profile was on the north wall and contained three stratigraphic layers (Layers I–III) (Figure 26).

Layer I, from 0 to 27 cmbs, is composed of dry, cohesive, dark reddish-brown silty clay. It has low plasticity, fine to medium subangular blocky peds, abundant small roots and one large root, and a distinct lower boundary. Layer II is a compact layer from 14 to 59 cmbs and is composed of moist, cohesive, dark reddish-brown silty clay mixed with Layer III (10 percent). It has medium plasticity, fine to medium subangular blocky peds, few small roots, few cobbles, and a diffuse lower boundary. Layer III is a compact layer from 53 to 75 cmbs and is composed of moist, cohesive, dark reddish-brown silty clay with hard red chunks. It has medium plasticity, medium subangular blocky peds, and no roots.

Test Pit 2 produced no evidence of traditional Hawaiian or early historic cultural deposition.

Test Pit 3

Test Pit 3 was off Duck Road on the SBMR, 7.2 meters southwest of the southwest corner of the fueling station perimeter fence. It measured 110 centimeters long and 90 centimeters wide, with a depth of 67 cmbs and azimuth of 96 degrees. The profile was in the north wall and contained two stratigraphic layers (Layers I and II) (Figure 27).

Layer I, from 0 to 10 cmbs, is composed of dry, cohesive, dark reddish-brown silty clay. It has low plasticity, fine to medium subangular blocky peds, abundant small roots, and a distinct lower boundary. Layer II is a compact layer from 10 to 67 cmbs and is composed of moist, cohesive, dark reddish-brown silty clay. It has medium plasticity, fine to medium subangular blocky peds, few rootles, and no cobbles.

Test Pit 3 produced no evidence of traditional Hawaiian or early historic cultural deposition.

Test Pit 4

Test Pit 4 was off Duck Road on the SBMR, 7.0 meters west of Duck Road and near the southeast corner of the fueling station perimeter fence. It measured 110 centimeters long and 85 centimeters wide, with a depth of 62 cmbs and azimuth of 210 degrees. The profile was in the northwest wall and contained two stratigraphic layers (Layers I and II) (Figure 28).

Layer I, from 0 to 12 cmbs, is composed of dry, cohesive, dark reddish-brown silty clay. It has low plasticity, fine to medium subangular blocky peds, abundant small roots, and a distinct lower boundary. Layer II is a compact layer from 12 to 62 cmbs and is composed of moist, cohesive, dark reddish-brown silty clay. It has medium plasticity, fine to medium subangular blocky peds, few rootlets, and no cobbles.

Test Pit 4 produced no evidence of traditional Hawaiian or early historic cultural deposition.

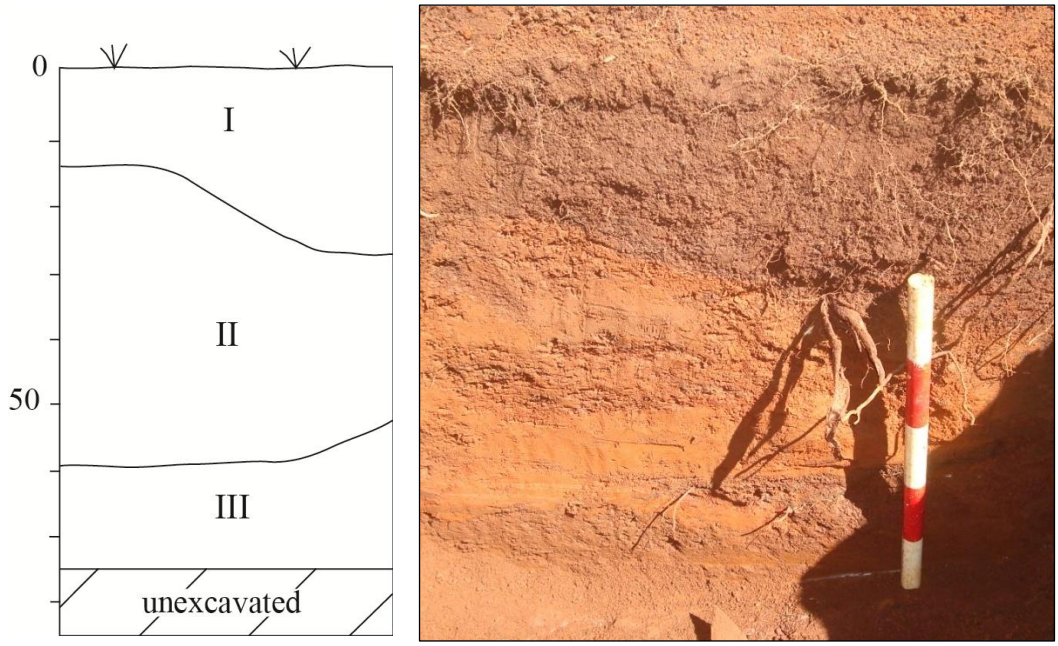

Figure 26. Test Pit 2 profile, facing north.

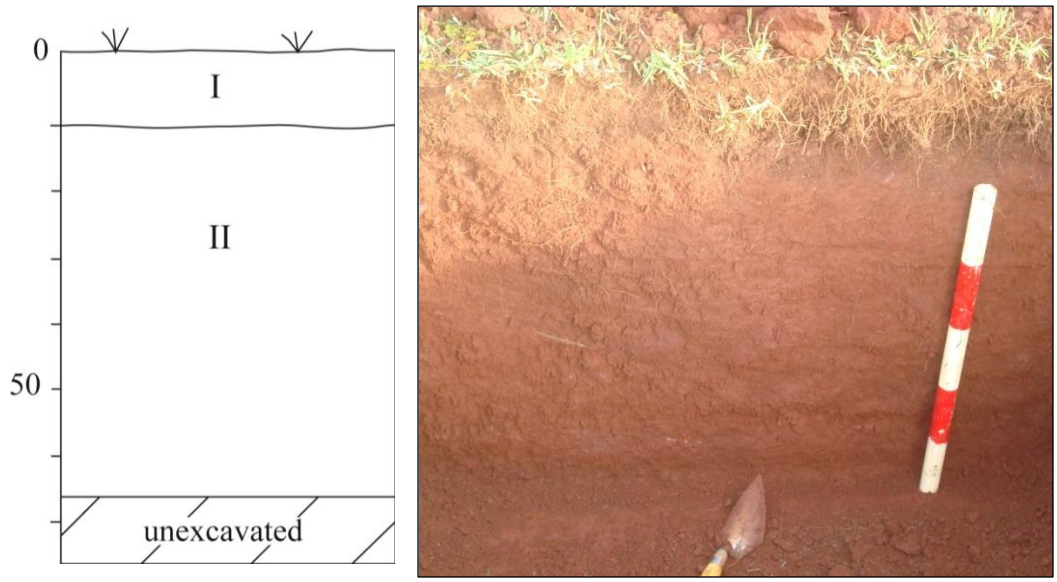

Figure 27. Test Pit 3 profile, facing north.

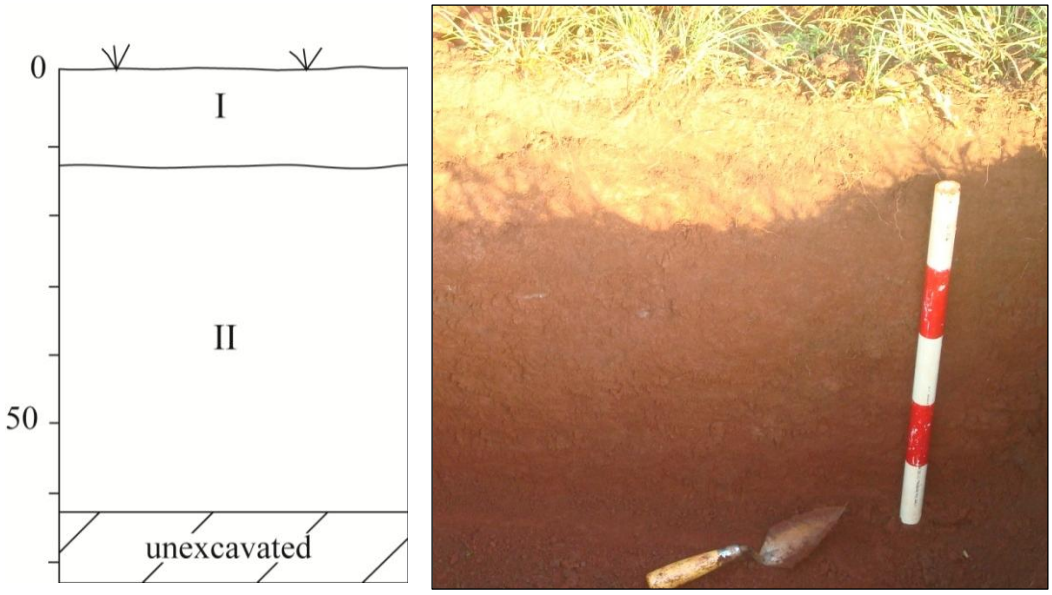

Figure 28. Test Pit 4 profile, facing northwest.

Test Pit 5

Test Pit 5 was off A Road on the SBMR, approximately 50 meters north of Lyman Road and the A Road intersection, and 7.0 meters northeast of the fenceline corner. It measured 106 centimeters long and 90 centimeters wide, with a depth of 84 cmbs and azimuth of 40 degrees. The profile was in the northwest wall and contained three stratigraphic layers (Layers I–III) (Figure 29).

Layer I, from 0 to 24 cmbs, is composed of moist, cohesive, dark reddish-brown silty clay mixed with Layer II in the lower 12 centimeters. It has medium plasticity, fine to medium subangular blocky peds, some coral fill, abundant small roots, and a diffuse lower boundary. Layer II is a compact layer from 24 to 64 cmbs and is composed of non-cohesive, very dark brown silty clay with crushed coral and coarse sand (30 percent). It has low plasticity, fine to medium subangular blocky peds, few small black rocks and glass, very few roots, a coral fill band between 41 to 46 centimeters, and a distinct lower boundary. Layer III is a compact layer from 64 to 84 cmbs and is composed of moist, cohesive, dark reddish-brown silty clay. It has medium plasticity, fine to medium subangular blocky peds, few rootlets, and no cobbles.

Test Pit 5 produced no evidence of traditional Hawaiian or early historic cultural deposition.

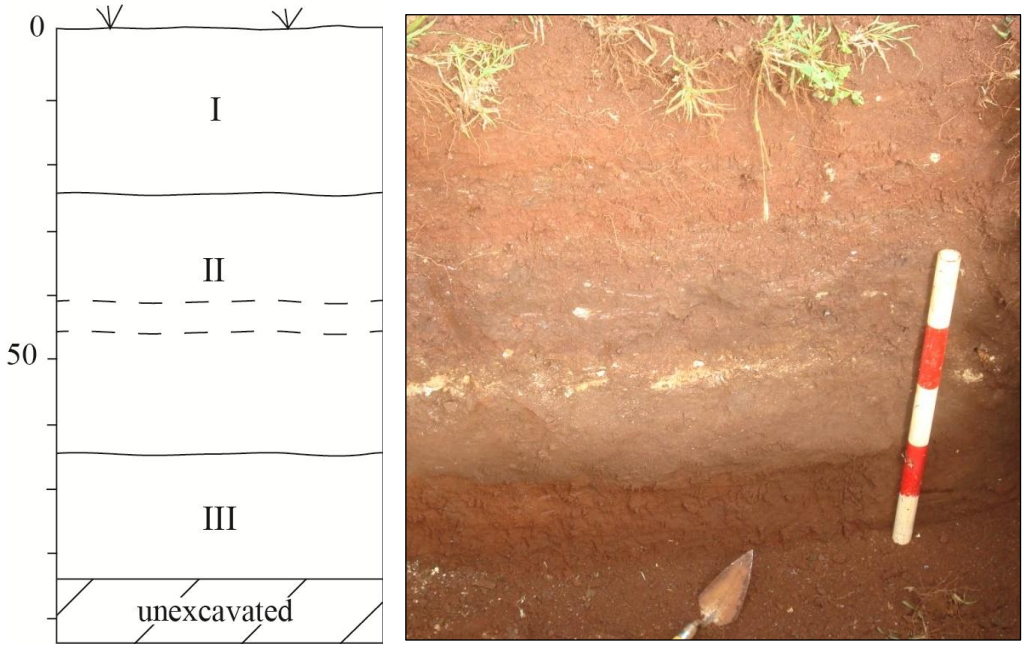

Figure 29. Test Pit 5 profile, facing northwest.

Test Pit 6

Test Pit 6 was near Car Care Center on the SBMR, 11.5 meters southwest of the southwest corner of the gas station fence. It measured 100 centimeters long and 96 centimeters wide, with a depth of 90 cmbs and azimuth of 224 degrees. The profile was in the northwest wall and contained seven stratigraphic layers (Layers I–VII) (Figure 30).

Layer I, from 0 to 22 cmbs, is composed of moist, cohesive, dark reddish-brown silty clay. It has medium plasticity, fine to medium subangular blocky peds, abundant small and medium roots, few pebbles, and a distinct lower boundary. Layer II is a crumbly layer from 22 to 27 cmbs and is composed of non-cohesive, very dark gray silt with some coarse sand (20 percent). It has low plasticity, fine subangular blocky peds, many gray pebbles, few small roots, an ash-like feel, and a distinct lower boundary. Layer III is a crumbly layer from 27 to 35 cmbs and is composed of dry, non-cohesive, very pale brown coral fill with coarse sand. It has low plasticity, fine to medium subangular blocky peds, few gray pebbles and small roots, and a wavy lower boundary. Layer IV is from 30 to 55 cmbs and is composed of a cohesive, dark reddish-brown silty clay with some yellowish-red silty clay (10 percent), It has a mottled appearance, medium plasticity, fine to medium subangular blocky peds, few small roots, and a distinct lower boundary. Layer V is from 55 to 63 cmbs and is composed of dry, chunky, non-cohesive, black degraded asphalt. It has low plasticity, medium subangular blocky peds, no roots, and a distinct lower boundary. Layer VI is a crumbly layer from 58 to 71 cmbs and is composed of non-cohesive, very dark gray silt. It has low plasticity, fine subangular blocky peds, many gray pebbles, no roots, an ash-like feel, and a diffuse

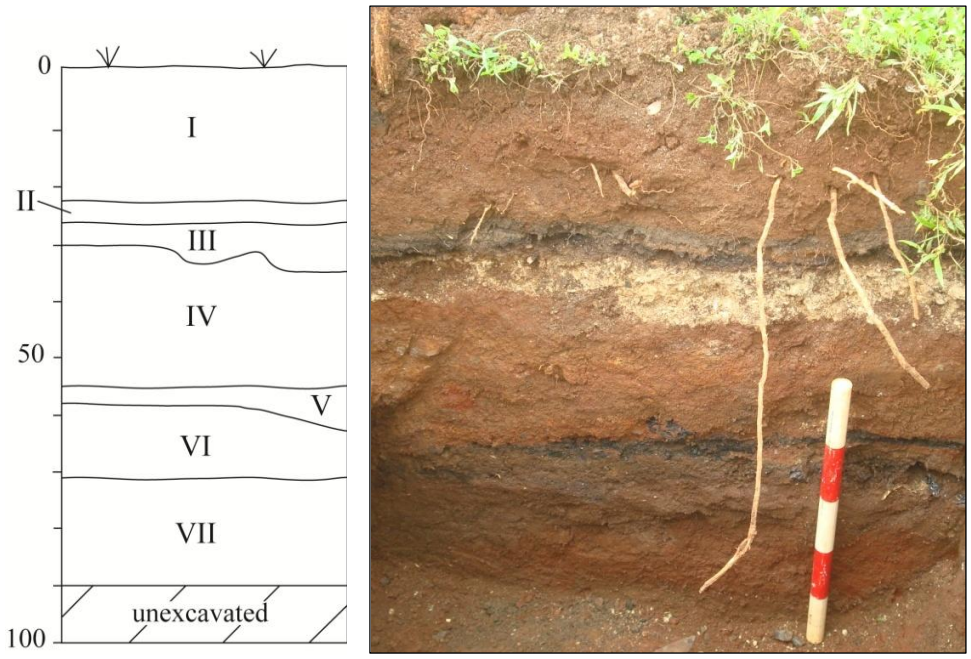

Figure 30. Test Pit 6 profile, facing northwest.

lower boundary. Layer VII is a compact layer from 71 to 90 cmbs and is composed of moist, cohesive, dark reddish-brown silty clay. It has medium plasticity, fine to medium subangular blocky peds, and no roots or cobbles.

Test Pit 6 produced no evidence of traditional Hawaiian or early historic cultural deposition.

Test Pit 7

Test Pit 7 was 9.2 meters southeast of the southeast corner of the 500th Military Intelligence Brigade Building 130 on the SBMR. It measured 94 centimeters long and 84 centimeters wide, with a depth of 75 cmbs and azimuth of 56 degrees. The profile was in the north wall and contained four stratigraphic layers (Layers I–IV) (Figure 31).

Layer I, from 0 to 11 cmbs, is composed of moist, cohesive, dark reddish-brown silty clay with 30 percent gravel. It has medium plasticity, fine to medium subangular blocky peds, abundant small roots, few coral pieces, and a diffuse lower boundary. Layer II is a crumbly layer from 11 to 14 cmbs and is composed of dry, non-cohesive, dark gray gravel mixed with Layer I (20 percent). It has low plasticity, fine to medium subangular blocky peds, lots of small roots, and a diffuse lower boundary. Layer III is from 14 to 32 cmbs and is composed of moist, cohesive, dark reddish-brown silty clay with 5 percent gravel. It has medium plasticity, fine to medium subangular blocky peds, few small roots and coral pieces, and a distinct lower boundary. Layer IV is from 23 to 75 cmbs and is composed of moist, cohesive, dark reddish-brown silty clay. It has medium plasticity, fine to medium subangular blocky peds, and few small roots.Layer IV is

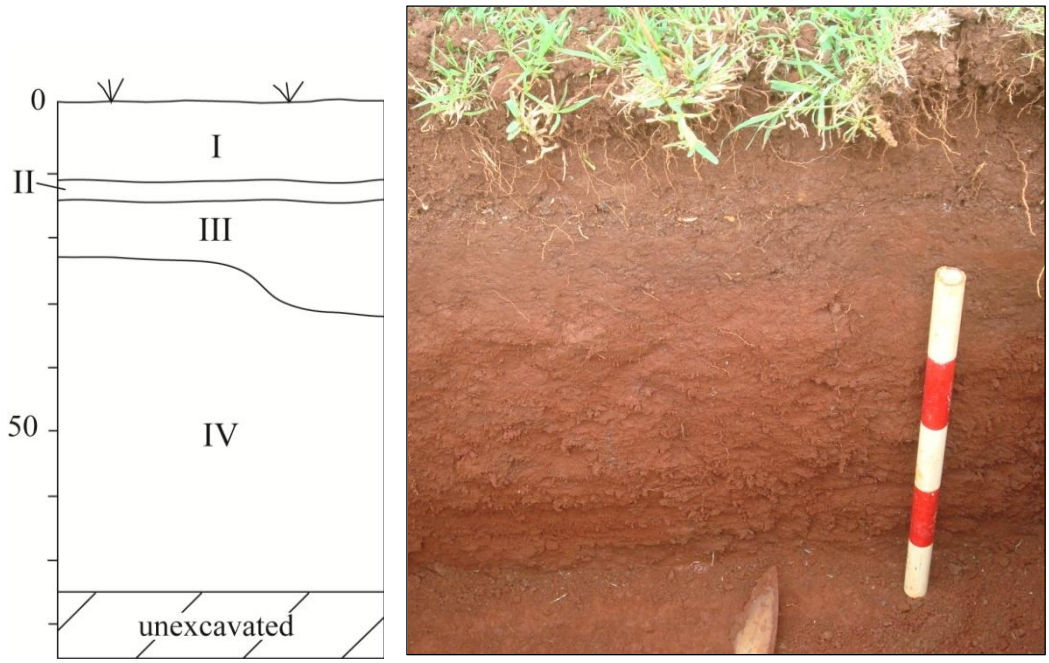

Figure 31. Test Pit 7 profile, facing north.

composed of a moist, cohesive, dark reddish-brown silty clay. It has a medium plasticity, fine to medium subangular blocky peds and few small roots.

Test Pit 7 produced no evidence of traditional Hawaiian or early historic cultural deposition.

Test Pit 8

Test Pit 8 was off the northwest curve of Eastman Road on WAAF, 7.6 meters west of a hedge demarking a parking area near Waiʻanae Avenue. It measured 93 centimeters long and 87 centimeters wide, with a depth of 74 cmbs and azimuth of 144 degrees. The profile was on the northeast wall and contained two stratigraphic layers (Layers I and II) (Figure 32).

Layer I, from 0 to 14 cmbs, is composed of moist, cohesive, dark reddish-brown silty clay. It has medium plasticity, fine to medium subangular blocky peds, abundant small roots, few pebbles and coral pieces, and a diffuse lower boundary. Layer II is a compact layer from 14 to 74 cmbs and is composed of moist, cohesive, dark reddish-brown silty clay. It has medium plasticity, fine to medium subangular blocky peds, and few small roots.

Test Pit 8 produced no evidence of traditional Hawaiian or early historic cultural deposition.

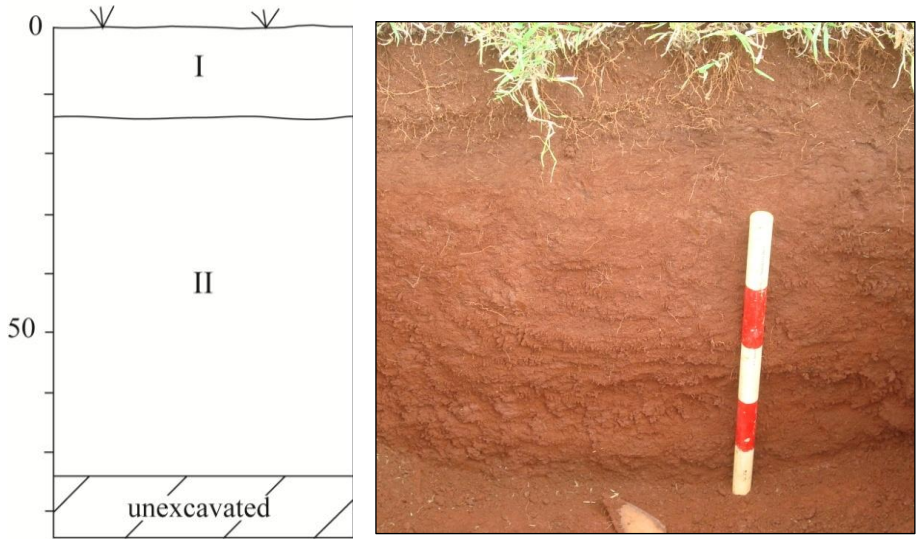

Figure 32. Test Pit 8 profile, facing northeast.

Test Pit 9

Test Pit 9 was in the right-of-way on the west side of Kunia Road, approximately 100 meters southwest of the Wilikina Drive intersection and 9.0 meters southwest of the Kokoloea Place intersection. It measured 105 centimeters long and 85 centimeters wide, with a depth of 81 cmbs. The profile was in the northwest wall and contained three stratigraphic layers (Layers I–III) (Figure 33).

Layer I, from 0 to 17 cmbs, is composed of moist, cohesive, dark reddish-brown silty clay. It has low plasticity, fine to medium subangular blocky peds, abundant small roots and pebbles, few cobbles, and a distinct lower boundary. Layer II is a compact layer from 13 to 37 cmbs and is composed of cohesive, dark reddish-brown silty clay mixed with Layer III. It has medium plasticity, fine to medium subangular blocky peds, few cobbles and small roots, and a diffuse lower boundary. Layer III is a loose, crumbly layer from 37 to 81 cmbs and is composed of non-cohesive, very dark brown silty clay. It has low plasticity, fine to medium subangular blocky peds, few cobbles, and small roots. A 3-inch gray PVC pipe was encountered at 61 cmbs and parallel to Kunia Road.

Test Pit 9 produced no evidence of traditional Hawaiian or early historic cultural deposition.

Test Pit 10

Test Pit 10 was in the right-of-way on the south side of Wilikina Drive, 4.0 meters southwest of the second light pole east of the Kunia Road intersection. It measured 100 centimeters long and 88 centimeters wide, with a depth of 80 cmbs and azimuth of 84 degrees. The profile was in the north wall and contained three stratigraphic layers (Layers I–III) (Figure 34).

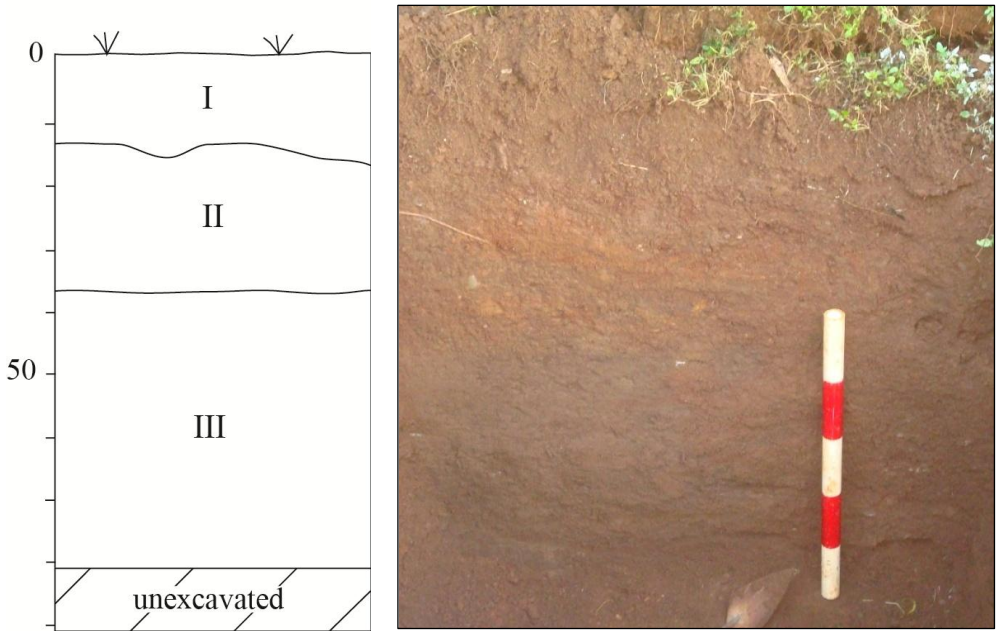

Figure 33. Test Pit 9 profile, facing northwest.

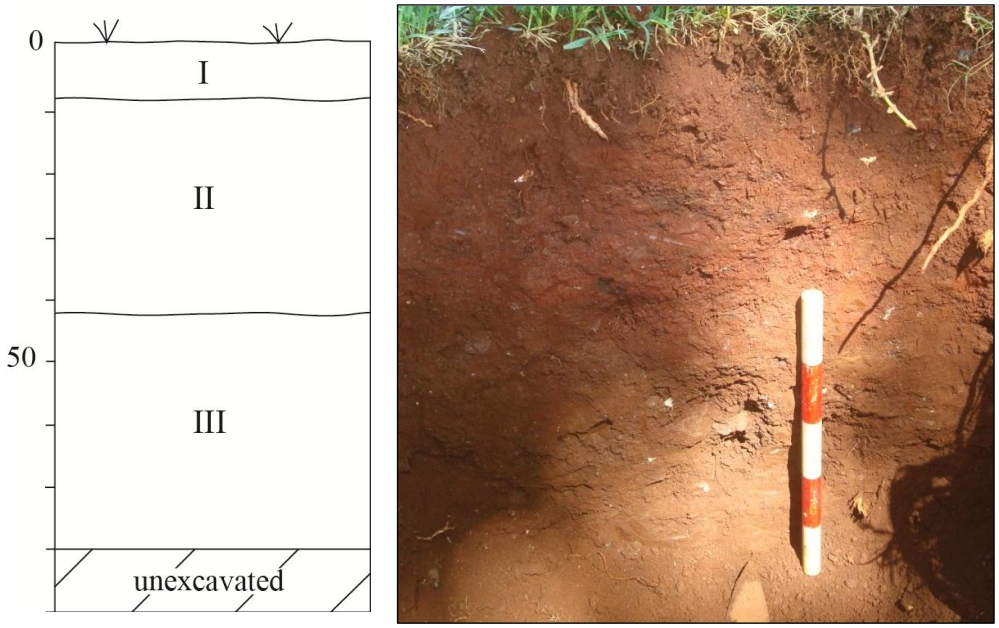

Figure 34. Test Pit 10 profile, facing north.

Layer I, from 0 to 8 cmbs, is composed of moist, cohesive, dark reddish-brown silty clay. It has low plasticity, fine to medium subangular blocky peds, abundant small roots, few medium roots, and a distinct lower boundary. Layer II is a crumbly, compact layer from 8 to 42 cmbs and is composed of dry, non-cohesive, dusky red silty clay mixed with dark reddish-brown silty clay (20 percent). It has low plasticity, medium subangular blocky peds, 30 percent small-medium rocks, few medium roots, few glass pieces, degraded basalt, few coral pieces, and a diffuse lower boundary. Layer III is a crumbly, compact layer from 42 to 80 cmbs and is composed of dry, non-cohesive, dark reddish-brown silty clay modeled with yellowish-brown clay (10 percent). It has low plasticity, medium subangular blocky peds, 40 percent medium-large cobbles, few small roots, cement block at 60 cmbs, and a large tree root at the base of the west wall.

Test Pit 10 produced no evidence of traditional Hawaiian or early historic cultural deposition.

Test Pit 11

Test Pit 11 was in the right-of-way on the south side of Wilikina Drive, 3.1 meters northeast of the third light pole east of the Kunia Road intersection. It measured 108 centimeters long and 90 centimeters wide, with a depth of 74 cmbs and azimuth of 80 degrees. The profile was in the south wall and contained four stratigraphic layers (Layers I–IV) (Figure 35).

Layer I, from 0 to 8 cmbs, is composed of moist, cohesive, dark reddish-brown silty clay. It has low plasticity, fine to medium subangular blocky peds, abundant small roots, and a diffuse lower boundary. Layer II, from 8 to 24 cmbs, is composed of moist, cohesive, dusky red silty clay. It has medium plasticity, fine to medium subangular blocky peds, abundant pebbles, few small roots, and a distinct lower boundary. Layer III is a crumbly layer from 24 to 54 cmbs and is composed of non-cohesive, dark reddish-brown silty clay. It has low plasticity, fine to medium subangular blocky peds, abundant medium-large cobbles, few small roots, and diffuse boundary. A 1-inch black cable was encountered at 40 cmbs in the north wall. Layer IV is a crumbly layer from 54 to 74 cmbs and is composed of dry, cohesive, dark reddish-brown and red silty clay. It has low plasticity, fine to medium subangular blocky peds, abundant pebbles, and very few roots.

Test Pit 11 produced no evidence of traditional Hawaiian or early historic cultural deposition.

Test Pit 12

Test Pit 12 was in the right-of-way on the south side of Wilikina Drive, 9.3 meters southwest of the sixth light pole east of the Kunia Road intersection. It measured 108 centimeters long and 78 centimeters wide, with a depth of 67 cmbs and azimuth of 62 degrees. The profile was in the south wall and contained five stratigraphic layers (Layers I–V) (Figure 36).

Layer I, from 0 to 14 cmbs, is composed of moist, cohesive, dark reddish-brown silty clay. It has low plasticity, fine to medium subangular blocky peds, abundant small roots, few pebbles, and a distinct lower boundary. Layer II is a crumbly layer from 14 to 19 cmbs and is composed of non-cohesive, dark brown silty clay. It has low plasticity, fine to medium subangular blocky peds, abundant small roots, a chalk-like feel, and a distinct lower boundary. Layer III, from 19 to 21 cmbs, is composed of cohesive, dusky red silty clay. It has medium plasticity, fine to medium subangular blocky peds, few small roots, and a distinct lower boundary.

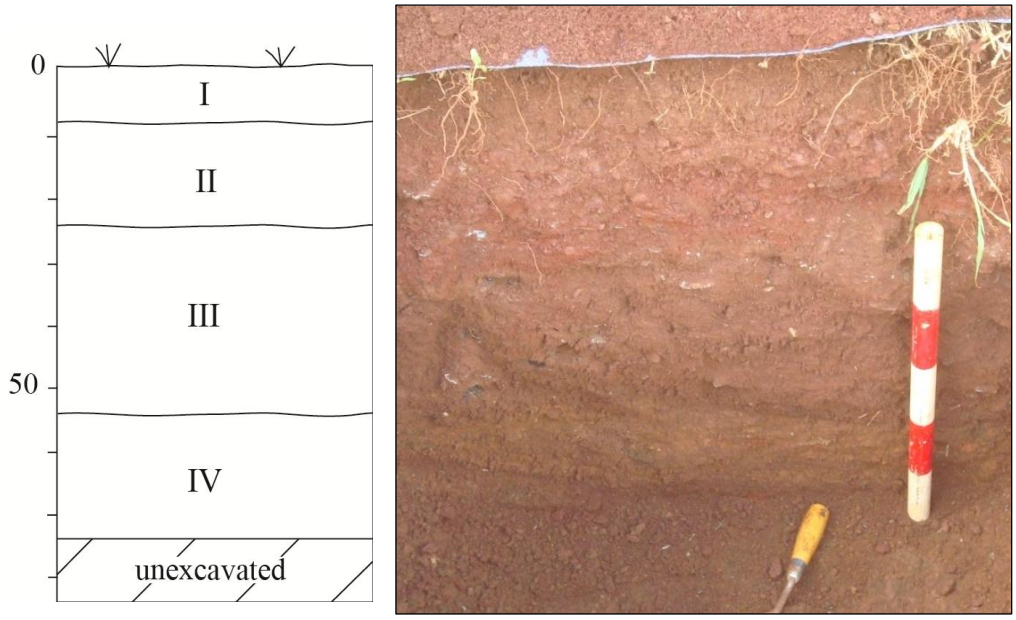

Figure 35. Test Pit 11 profile, facing south.

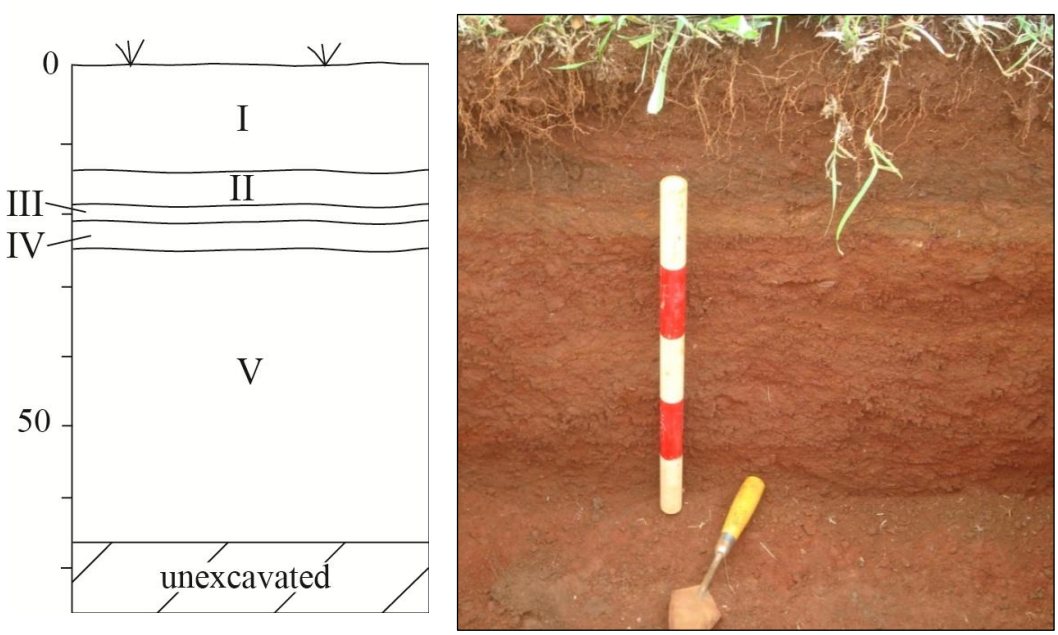

Figure 36. Test Pit 12 profile, facing south.

Layer IV is a crumbly layer from 21 to 25 cmbs and is composed of cohesive, reddish-brown silty clay. It has low plasticity, fine subangular blocky peds, few small roots, and a distinct lower boundary. Layer V, from 25 to 67 cmbs, is composed of cohesive, dusky red silty clay. It has medium plasticity, fine to medium subangular blocky peds, and very few roots. A 3-inch gray PVC pipe running parallel to Wilikina Drive was encountered at the base of excavation.

Test Pit 12 produced no evidence of traditional Hawaiian or early historic cultural deposition.

Test Pit 13

Test Pit 13 was in the right-of-way on the south side of Wilikina Drive, 11.0 meters west of the first light pole west of the Lakeview Circle intersection. It measured 110 centimeters long and 78 centimeters wide, with a depth of 96 cmbs and azimuth of 78 degrees. The profile was in the north wall and contained two stratigraphic layers (Layers I and II) (Figure 37).

Layer I, from 0 to 9 cmbs, is composed of moist, cohesive, dark reddish-brown silty clay. It has low plasticity, fine to medium subangular blocky peds, abundant small roots, and a diffuse lower boundary. Layer II is a loose, crumbly layer from 9 to 96 cmbs and is composed of semi-moist, cohesive, brown silty clay modeled with yellowish-red, dusky red, and very dark grayish-brown silty clay. It has low plasticity, fine to medium subangular blocky peds, few pebbles, and few small roots. A crushed Schlitz beer was encountered at 14 cmbs and a 3-inch gray PVC pipe, oriented parallel with Wilikina Drive, was observed at 60 cmbs in the south wall of the test pit.

Test Pit 13 produced no evidence of traditional Hawaiian or early historic cultural deposition.

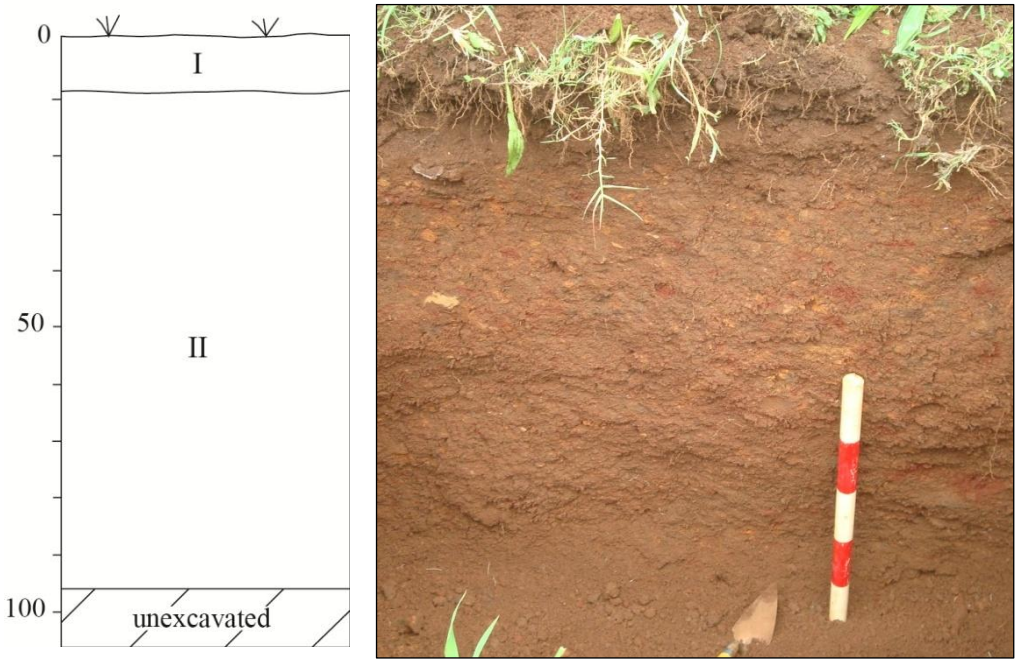

Figure 37. Test Pit 13 profile, facing north.

5.0 SUMMARY AND CONCLUSIONS

The primary objective of the AIS was to identify, document, and evaluate all pre-Contact and post-Contact properties within the Schofield Generating Station Project APE using a sampling strategy proportionate to the archaeological sensitivity of the area. Previous archaeological findings in the project vicinity indicate that the APE has a very low probability for archaeological resources. The 8.1-acre generator site, in particular, is on former pineapple fields where nearly a century of cultivation has likely destroyed most, if not all, cultural deposits. Furthermore, the upper plateaus used for pineapple were generally not preferred by pre-Contact Hawaiians of the Līhuʻe area for habitation or subsistence. Most of the known traditional Hawaiian sites in the region are found in gulch bottoms or on high-elevation ridges. The transmission line corridor likewise has a very low probability for archaeological deposits. The corridor, while less studied archaeologically, is largely within a heavily utilized right-of-way that has been subject to a great deal of modern disturbance.

Archaeological testing results support the findings of the background research. Excavation of eight test trenches and 13 test pits produced no evidence of traditional Hawaiian or early historic cultural deposition. Stratigraphic data from the generating station test trenches clearly indicate the presence of an extensive pineapple cultivation, or "plowzone," layer consisting of a weathered reddish-brown silty clay with charcoal flecking (presumably from field burns) and decomposing black plastic fragments.[4] The cultivation layer lies directly on intact native soil that shows no signs of anthropogenic disturbance. Similarly, test pit excavation at the new pole locations produced only construction fill overlying undisturbed volcanic soil. In some cases the intact soil was quite shallow, between 10 and 14 cmbs. It is reasonable to surmise that some degree of cutting, filling, and grading has occurred in this semi-urban corridor, and that we might therefore be observing truncated native soils.

Importantly, Test Pits 1, 2, and 3, intentionally selected because of their location on the edge of Waiʻeli Gulch, also contained no cultural deposits. Project activities along edges of Waiʻeli Gulch were raised as a special concern by U.S. Army Garrison-Hawaii archaeologists during early coordination meetings. Since pre-Contact and early historic habitation and subsistence in the region tended to be focused on the rich gulch bottomlands, it was felt that these locales had a higher probability for archaeological resources relative to the rest of the APE. All new pole locations along the edges of Waiʻeli Gulch were tested and produced negative results.

In conclusion, AIS data indicate that the Schofield Generating Station Project is very unlikely to affect archaeological sites. Test excavation results confirm that the APE has a very low probability for containing archaeological deposits. Extensive land modifications associated with a century of commercial cultivation, ranching, U.S. military activity, and urbanization has likely destroyed most of the tangible evidence of the traditional Hawaiian and early historic past in this area.

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[4] Black plastic sheeting is used in commercial pineapple cultivation to hinder weed growth and retain soil moisture.

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Appendix H
Cultural Impact Assessment

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Cultural Impact Assessment for Schofield Generating Station Project, Wai‘anae Uka, Honouliuli, and Waikele Ahupua‘a in Wahiawā and ‘Ewa Districts, O‘ahu Island, Hawai‘i

TMKs (1) 7-7-001:001, 9-2-005:026, and 9-4-012:003

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GANDA Report No. 2269-1

GANDA

June 2014

MANAGEMENT SUMMARY

At the request of Tetra Tech, Inc., Garcia and Associates conducted a Cultural Impact Assessment (CIA) in support of a joint Federal/State Environmental Impact Statement (EIS) for the Schofield Generating Station Project (SGSP) in the western portion of O‘ahu’s central plateau. Tetra Tech, Inc. is supporting the Army and Hawaiian Electric Company in preparation of the joint EIS. The CIA is being conducted in accordance with the requirements of the Hawai‘i Environmental Policy Act (HEPA) as codified in Hawai‘i Revised Statutes (HRS) Chapter 343, Environmental Impact Statements. The study’s objective is to assess the level of impact that would be caused by implementing the proposed project on traditional and current cultural practices and beliefs. This assessment was accomplished by gathering information through archival research and consulting with appropriate and knowledgeable community members to identify cultural practices and traditional land use in the project area.

The collected data indicate that that there will be no adverse impact to cultural resources, cultural practices, and traditional beliefs by the proposed SGSP. Although O‘ahu’s central plateau played a significant role in traditional Hawaiian sociopolitical development, warfare, and ceremonial activities, more than a century of commercial agriculture, military development, and urban growth have eliminated most, if not all, of the tangible evidence of pre-Contact cultural activity in the project area and have disassociated the Hawaiian community from traditional land use practices. There is no tangible or intangible evidence of any former or ongoing cultural activities occurring in the project area.

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1.0 INTRODUCTION

At the request of Tetra Tech, Inc., Garcia and Associates conducted a Cultural Impact Assessment (CIA) in support of a joint Federal/State Environmental Impact Statement (EIS) for the Schofield Generating Station Project (SGSP). Tetra Tech, Inc. is supporting the Army and Hawaiian Electric Company in preparation of the joint EIS. The SGSP is in the western portion of Oʻahu's central plateau and includes portions of Waiʻanae Uka Ahupuaʻa in Waiʻanae District and Waikele and Honouliuli Ahupuaʻa in ʻEwa District (TMKs (1) 7-7-001:001, 9-2-005:026, and 9-4-012:003) (Figure 1).

The objective of the CIA is to assess the level of impact that would be caused by implementing the proposed SGSP on traditional and current cultural practices and beliefs. The assessment was accomplished by collecting and analyzing data on cultural practices and traditional land use in the project area through a combination of archival research and consultation with appropriate community members.

1.1 Proposed Action

The SGSP, a project of the U.S. Army's Energy Initiatives Task Force, is being undertaken to increase production and integration of renewable energy and to provide energy security to Army installations. U.S. Army Garrison-Hawaii proposes to lease Hawaiian Electric Company an 8.13-acre parcel on Schofield Barracks Military Reservation's (SBMR) Kunia Training Area (KUNTA) to construct a 50-megawatt biofuel-capable power generation plant (Figure 2).

To connect the generating station to the existing Hawaiian Electric Company grid at Wheeler Army Airfield (WAAF) and Wahiawā substations, U.S. Army Garrison-Hawaii and the State of Hawaiʻi will provide Hawaiian Electric Company with a 3.7-kilometer interconnection easement for a 46-kilovolt aboveground transmission line. The transmission line will extend from the east side of the new power plant, across Waiʻeli Gulch, and onto the southwest corner of SBMR's cantonment. The line will then continue along the southwestern extremity of the cantonment and cross Duck Road, Lyman Road, and Lyman Gate following the SBMR-Kunia Road fence line. It will then cross Kunia Road and enter WAAF between Waiʻanae Avenue and Eastman Road. At the U.S. Army's Wheeler Substation, the line will split with one line running northwest onto the SBMR cantonment (terminating at Ralston Field) and the other running east along Wilikina Drive. The Wilikina line will extend over the south fork of Wahiawā Reservoir (Lake Wilson) and terminate at Hawaiian Electric Company's Wahiawā Substation.

A series of 47 electrical poles will support the transmission line. The poles will be 60 to 80 feet high and 24 inches in diameter. Of the 47 poles, 36 will be newly installed, 7 will be replacements for existing poles, and 4 will be existing poles (Figure 2).

1.2 Regulatory Authority

Evaluation of impacts to cultural and historic resources for the SGSP is required by the U.S. Army's implementing regulations (Title 32 of the *Code of Federal Regulations* [CFR] Part 651, *Environmental Analysis of Army Actions*) of the National Environmental Policy Act (NEPA) [Title 42 of the *United States Code* (U.S.C.) Sections 4321 to 4370 (f)], NEPA regulations (40 CFR Parts 1500–1508), and the Hawaiʻi Environmental Policy Act (HEPA) as codified in Hawaiʻi Revised Statutes (HRS) Chapter 343, *Environmental Impact Statements*.

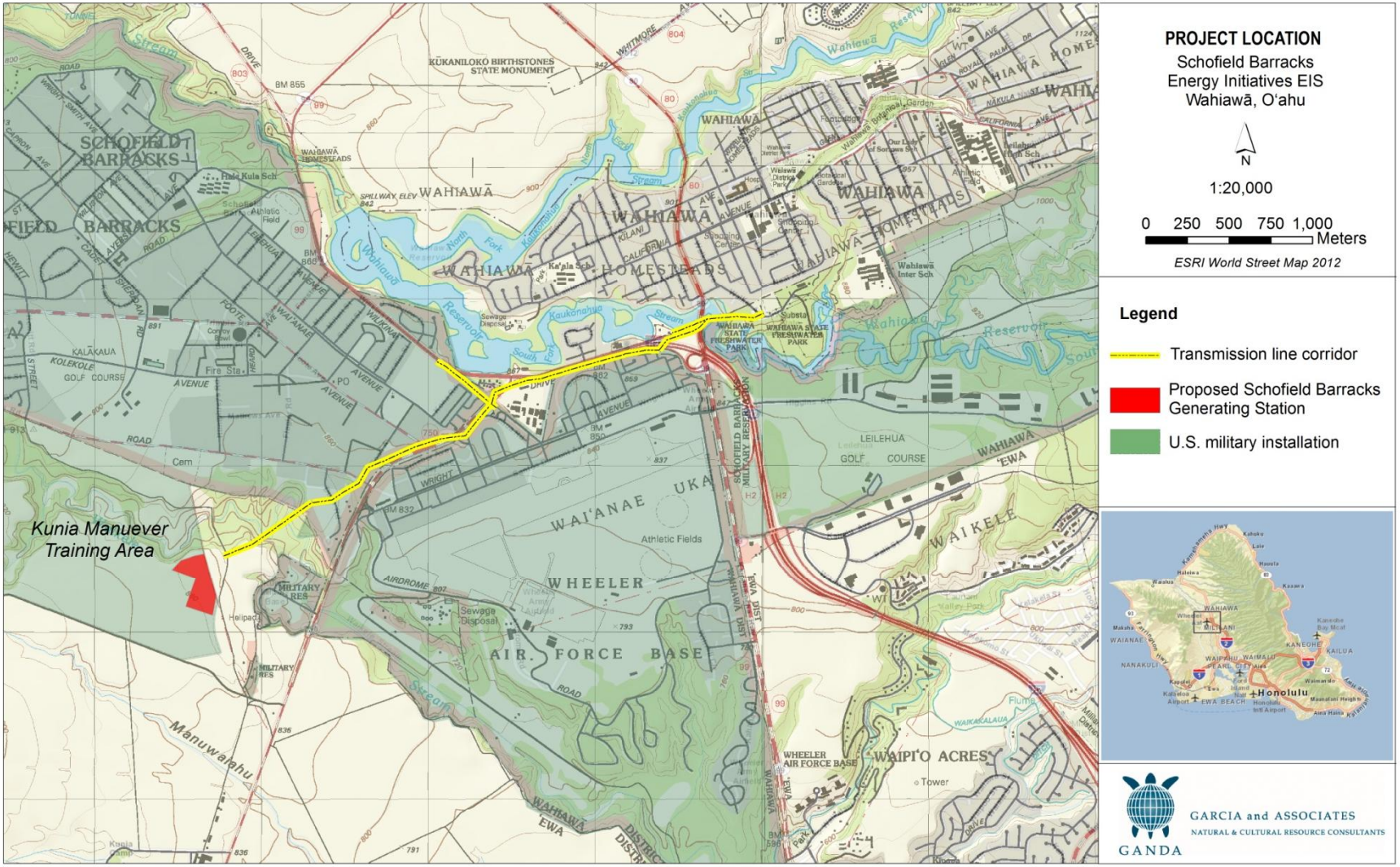

Figure 1. Location of the Schofield Generating Station Project.

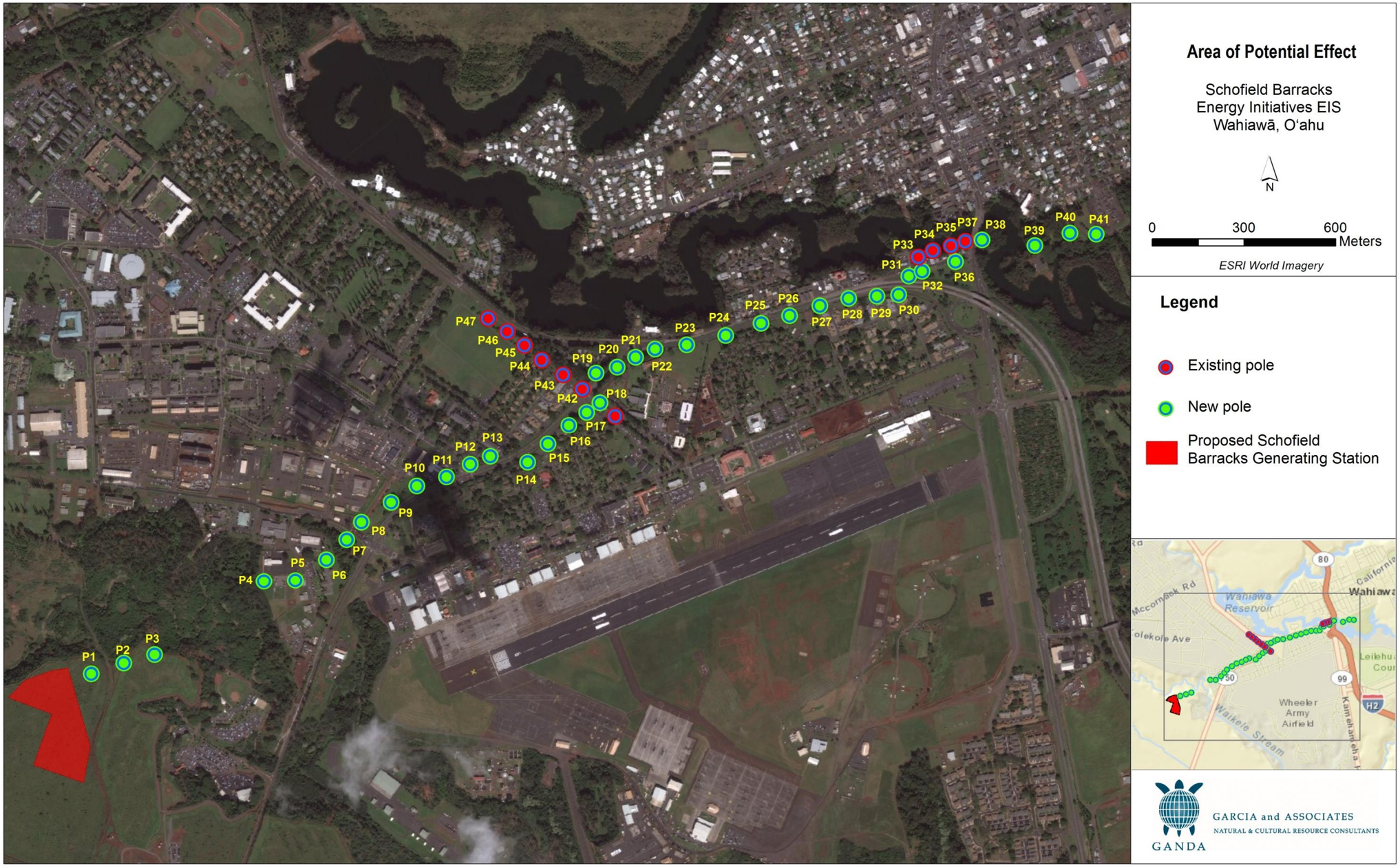

Figure 2. Area of Potential Effect (APE) for Schofield Generating Station, including transmission corridor improvements.

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Under NEPA and HEPA regulations, an EIS must consider the effects of the proposed action on the *human environment*, which 40 CFR 1508.14 defines as "the natural and physical environment and the relationship of people with that environment." The human environment includes important scientific, archaeological, and tangible and intangible cultural resources. Chapter 343, HRS, also requires consideration of a proposed action's effects on the cultural practices of the community and the State. The CIA was conducted in accordance with the State of Hawai'i Office of Environmental Quality Control's Guidelines for Assessing Cultural Impacts (1997).

1.3 Area of Potential Effect

The Area of Potential Effect (APE) is the surface and subsurface landscape that might be impacted by implementation of the proposed project. The APE for the SGSP falls largely within SBMR property, but also extends onto properties owned or leased by the State of Hawai'i's Departments of Agriculture, Transportation, and Land and Natural Resources. As stated above, the generating station will be sited on an 8.13-acre parcel on the western edge of KUNTA in Honouliuli Ahupua'a, and a 3.7-kilometer overhead transmission line will connect the power plant to Hawaiian Electric Company's WAAF and Wahiawā substations (Figure 1).

The project's APE includes the generating station's footprint and all locations at which new power poles will be installed. New pole installation will involve excavating boreholes sufficiently wide to support 24-inch-diameter power pole bases. The boreholes will extend 2.75 meters (9 feet) beneath the surface. As mentioned previously, 36 new poles will be installed at the locations shown in Figure 2. These 36 pole locations, and the 9 feet below ground, in addition to the generating station footprint, constitute the APE for direct effects of the project. Installation of replacement poles will use the holes remaining from the removal of old poles and will not involve new ground disturbance.

To keep construction impacts to a minimum, there will be no vegetation grubbing during new pole installation or during periodic line maintenance. No roads will be constructed through the gully to access pole installation locales. Indirect effects are therefore not anticipated for new pole installation or maintenance.

1.4 Personnel and Schedule

The CIA was carried out from January to April 2014. Jolie Liston, PhD, served as the project's Principal Investigator. She was assisted by Michael Desilets, MA, and Amanda Sims, BA. Dr. Liston has conducted oral history research extensively in Micronesia and has been conducting cultural resource management studies in Hawai'i for more than a decade.

2.0 ETHNOGRAPHIC SURVEY METHODS

The CIA focuses on identifying historic and extant traditional Hawaiian practices associated with subsistence, medicinal, religious, and cultural activities and beliefs in the project area. This information is used to assess the impact of the proposed action on the relationship of Hawaiian community members to the identified cultural resources, beliefs, and traditional land uses. Archival research and an ethnographic survey were the two methods used to collect information for the CIA.

2.1 Ethnographic Consultation Methods

Ethnographic consultation consisted of locating expert cultural practitioners and appropriate community members to interview, consulting with the knowledgeable individuals, and analyzing the ethnographic data provided.

2.1.1 Consultant Selection

The first step in the ethnographic consultation process is locating individuals who are knowledgeable about, and willing to share, cultural practices, *moʻolelo*, and traditional land use in the APE and the surrounding area. The selection of consultants was based on the following criteria:

- Had or has ties to the project location
- Known Hawaiian cultural expert
- Known Hawaiian traditional practitioner
- Referred by a cultural expert, traditional practitioner, or cultural resource professional

Appropriate organizations and individuals who met the criteria were contacted (Table 1). Efforts to locate individuals with traditional knowledge about the specific APE met with limited success because of the inherent limitations in conducting an ethnographic survey of the lands encompassed by the SGSP. Few people retain generational or first-hand information about the project area's traditional cultural practices and land use. This is due to the Hawaiian population not occupying or using these lands since the U.S. military acquired them at the turn of the 20th century or since they became large-scale commercial agricultural plantations soon after.

Project Consultants

Very few of the contacts were willing to participate in the ethnographic survey, citing a lack of information about the project area. Two cultural consultants, Mr. Thomas T. Shirai, Jr. and Mr. Shad S. Kane, however, agreed to be interviewed.

Mr. Shirai has limited knowledge of the area, although his *manaʻo* was taken into consideration. Mr. Kane provided a comprehensive overview of the traditional *moʻolelo* of the central plateau that he said relied heavily on archival literature and archaeological information.

Thomas T. Shirai, Jr., born in 1961 in Honolulu, is in the Kawaihapai *ʻohana* from Mokuleia and lives in Waialua. Mr. Shirai is a graduate of Waialua High School. He is the great-great grandnephew of Anton Kaʻoʻo (a noted hula master from Waialua). Currently a member of the North Shore Neighborhood Board and the Mokuleia Community Association, Mr. Shirai served on the Oʻahu Island Burial Council and the Office of Hawaiian Affairs Hawaiian Historic Preservation Council. Mr. Shirai was a consultant to U.S. Army Garrison-Hawaii for cultural resource matters associated with the Stryker Brigade Combat Team transformation project and various undertakings at Dillingham Airfield, Oʻahu.

Table 1. List of Organizations and Individuals Contacted for Ethnographic Survey

Name of Contact	Contact Method	Results of Contact	Referred To
Hawaiian Civic Club of Wahiʻawa	announcement at meeting(s), posting on club Internet site (by Jo-Lin Lenchanko)	one-sentence email response from Thomas Lenchanko	-
Maria Kaimipono Orr	email	referrals to others	Thomas T. Shirai, Jr.; Shad S. Kane
Jo-Lin Lenchanko Kalimapau	email, telephone	contacted Hawaiian Civic Club of Wahiʻawa	-
Keona Mark	email, telephone	suggested taking interested parties on tour of APE to elicit comments	-
Thomas T. Shirai, Jr.	visit for consultation	no traditional knowledge of SGSP area	-
Shad S. Kane	visit for consultation	provided the significant recorded oral histories of project area	-
Ginger Burch	telephone, visit for consultation	not able to connect	-

Shad S. Kane served 34 years as a Honolulu Police Department Metropolitan Lieutenant. He was born on February 23, 1945, in Honolulu and graduated from Kamehameha Schools in 1964. He then acquired his BA from the University of Hawaiʻi in 1976 and an MA in Public Administration from Central Michigan University in 1980. Mr. Kane lives in Kapolei where he is a charter member of the Kapolei Hawaiian Civic Club and chairman of the Committee on the Preservation of Historic Sites and Cultural Properties of the Oʻahu Council of Hawaiian Civic Clubs. He is also with the Royal Order of Kamehameha ʻEkahi, the Native American Advisory Group as a Native Hawaiian member, the Oʻahu Island Burial Council, the Makakilo/Kapolei Lions Club, and a member of the Historic Preservation Partner of the Navy Region Hawaiʻi.

2.1.2 Interview Process

Each interview was conducted at the convenience of the cultural consultant. Consultations were recorded on a digital audio recorder. A *makana*, or gift, was given to each consultant in keeping with traditional reciprocal protocol.

The consultation began with a brief overview of the nature and location of the SGSP. Topographic and satellite view maps of the project area were used to identify the exact location of the proposed generating station and electric poles. The cultural consultant was then given a consent or "agreement to participate" form to review and sign (see Appendix A).

Topics discussed included the cultural consultant's background, general knowledge of the project area, and information on past and current traditional land use, place names, legends, and stories. Research categories were addressed in the form of open questions that allowed the cultural

consultant to answer in the manner in which he was most comfortable. Follow-up questions were asked based on the consultant's responses or to clarify what was said. The interviews were largely based on a "talk-story" form of sharing information, although questions were asked more directly when necessary.

2.1.3 Analysis of Ethnographic Data

Because of the lack of consultant data directly relating to the APE, much of the traditional information presented in this report is garnered from extensive regionally based ethnographic reports (see Section 2.2). Section 6.0 provides the analysis and evaluation of consultation data.

2.2 Archival and Literature Research

Research was conducted to collect all available information on traditional and post-Contact history, land use, place names, cultural practices, and *moʻolelo* pertinent to the project APE and its surroundings. This information was used to develop a historical context of the project area and to identify any previously reported Hawaiian cultural properties or practices in the project area. Research included a review of Hawaiian historical accounts, legends, and traditions; Māhele documents; and previous oral history and archaeological studies. The study also examined maps, historical photographs, and documents on file at the Hawaiʻi State Archives, the Bernice P. Bishop Museum, the State Historic Preservation Division, the State Survey Office, the University of Hawaiʻi at Mānoa's Hamilton Library, and the Bureau of Conveyances.

3.0 ENVIRONMENTAL CONTEXT

The APE is on the fairly level central plateau of Oʻahu Island within the broad saddle between the Koʻolau and Waiʻanae mountain ranges. The project area ranges in elevation from approximately 160 to 268 meters (525 to 880 feet) above mean sea level.

Annual rainfall averages 96 centimeters (Giambelluca et al. 2013), with temperatures ranging from 59 to 87 degrees Fahrenheit (Armstrong 1983:56). Significant annual rainfall along the upper elevations of the Waiʻanae Range exceeding 250 centimeters contributes to the tributaries descending the steep, amphitheater-headed slopes of the mountains to form meandering and incised valleys within the lower plateau lands. Although represented on the U.S. Geological Survey (USGS) quadrangle maps as permanent watercourses, these streams flow intermittently in response to heavy rains.

The gulch formed by Waiʻeli Stream separates KUNTA, to the south, from the SBMR cantonment to the north. This seasonal stream flows southeast to join Waikakalaua Stream at WAAF's southern border and become Waikele Stream. WAAF construction altered the stream course east and downstream of the project area (Tomonari-Tuggle and Bouthillier 1994:9). Waikele continues on to Oʻahu's south coast to empty into Pearl Harbor's western embayment (the West Loch).

Kaukonahua Stream roughly bounds the SBMR cantonment's northeast edge before flowing northward to drain into the ocean at Waialua. In about 1905 a dam was constructed across the convergence of the north and south forks of the Kaukonahua Stream to supply irrigation water to the surrounding cultivated fields. This resulted in the formation of Lake Wilson (Wahiawā

Reservoir), O‘ahu’s largest freshwater impoundment. At the east end of the APE, along the south fork of Lake Wilson and Kaukonahua Stream, is the Department of Land and Natural Resources-managed Wahiawā State Freshwater Park.

This dam, along with other historic and modern land alterations, contributed to the current landscape by increasing slope erosion, accelerating siltation, and downcutting stream channels to form deep gulches.

Ethnohistoric documents relate O‘ahu’s plateau lands were once covered in forest. Serano Bishop, a resident of ‘Ewa in the 1830s, reported that:

> Beyond Kipapa gulch the upland was dotted with occasional groves of Koa tress. On the high plains ti plant abounded often so high as to intercept the view. No cattle then existed to destroy its succulent foliage. According to the statements of the natives a forest formerly covered the whole of the then nearly naked plains. [Bishop 1916:45, cited in Belt Collins Hawaii 2000:9-1]

Kamakau writes the following about the sandalwood (*Santalum* spp.) that covered the central plateau, especially the area around Wahiawā and likely the APE:

> At the completion of the fort [in 1816 at Honolulu] Ka-lani-moku and all the chiefs went to work cutting sandalwood at Wahiawa, Halemano, Pu‘ukapu, Kanewai, and the two Ko‘olaus. The largest trees were at Wahiawa, and it was hard work dragging them to the beach. [Kamakau 1992:207]

Koa (*Acacia koa*) and *lo‘ulu* (*Pritchardia* ssp.) probably also covered the plateau lands. Historically, KUNTA was under pineapple cultivation with its termination only after the recent military acquisition of the land. Regrowth consists of mostly non-native shrubs, grasses, and secondary saplings. The lands on or near the military installations are manicured and landscaped grounds consisting of non-native grasses, trees, and shrubs with a few stands of ti (*Cordyline terminalis*) near residential houses. The right-of-way along the major thoroughfares is manicured lawn, while the Wahiawā State Freshwater Park is wooded in both native and introduced species.

4.0 TRADITIONAL HISTORY AND MO‘OLELO

Traditional history, along with archaeological evidence, indicates that O‘ahu’s central plateau is politically and spiritually important. The ancient lands of Līhu‘e—south of SBMR on the eastern slopes of the Wai‘anae Range—and portions of Wahiawā overlap in the lower reaches of the central plateau to possibly encompass the entire APE.

The Chant for Kapawa exemplifies the connectedness of the various central plateau regions and sites[1]:

[1] Chant and translation provided by the historian of the Wahiawā Hawaiian Civic Club, August 2009 (Desilets et al. 2011:40).

ʻO Kapawa, ʻo ke aliʻi o Waiʻalua	Kapawa, the chief of Waiʻalua,
I hanau i Kūkaniloko	Was born at Kūkaniloko;
ʻO Wahiawā ke kahua	Wahiawā the foundation;
ʻO Līhuʻe ke ewe	At Līhuʻe the placenta, (taken away)
ʻO Kaʻala ka piko	At Kaʻala the navel cord, (buried)
ʻO Kapukapuakea ka aʻa	At Kapukapuakea (Heiau) the caul,
ʻO Kaiaka i Maeaea	(Heiau) of Kaiaka at Maeaea;
Haʻulei i Nukea i Wainakia	He died at Nukea at Wainakia
IʻAʻaka i Haleu	Through (the surf of) ʻAʻaka at Haleu,
I ka laʻi malino o Hauola	Through the calm stillness of Hauola,
Ke liʻi ʻo Kapawa hoʻi no	The chief Kapawa was taken,
Hoʻi no i uka ka waihona	Returning the organs to the uplands of Iʻao
Hoʻi no i ka pali kapu o na liʻi	Taken to the sacred pali of the chiefs,
He kiaʻi Kalahiki no Kakaʻe	Kalahiki is the "Watchman" of Kakaʻe,
ʻO Heleipawa ke keiki a Kapawa	Heleipawa was the son of Kapawa,
He keiki aliʻi no Waiʻalua i Oʻahu	A chiefly child of Waiʻalua, Oʻahu

This connectedness of the various central plateau regions was also recognized in an assessment of the SBMR and the Helemano Military Reservation for their potential to contain National Register of Historic Places (NRHP)-eligible traditional cultural places (TCPs), ethnographic landscapes, or archaeological districts (Desilets et al. 2011). The study found that the western portion of the SBMR, above ca. 1,000 feet elevation, can be defined as a Līhuʻe Uplands TCP or as a discontiguous archaeological district within the historic context of Hawaiian Occupation and *Lō Aliʻi* Social Organization AD 1100–1778. This same upland area, and potentially a larger region including Kūkaniloko to the east, might also qualify as an NRHP-eligible ethnographic landscape. Desilets et al. (2011) encountered no evidence to support the presence of NRHP-eligible TCPs, ethnographic landscapes, or archaeological districts within the lower elevations of Līhuʻe—where the current project is located—or within the Helemano Military Reservation.

4.1 Traditional Cultural Properties Identified in Archaeological Investigations

As Mr. Kane stated, much of the information on traditional land use is not contained in *moʻolelo* and personal histories, but is garnered from archaeological research. A summary of the results of archaeological investigations in the SBMR is provided to give a context for the remainder of the CIA because it highlights the degree of archaeological information that is no longer available in the project area. Robins et al. (2007) and Desilets et al. (2011) provide a comprehensive overview of the localized archaeological studies.

Commercial pineapple cultivation and residential, commercial, and military development have made it unlikely that archaeological and cultural sites are present in the SBMR cantonment, WAAF, the lower elevations of the South and East Ranges, and KUNTA. Archaeological investigations have encountered no remaining surface or subsurface pre-Contact or 19th century cultural properties in these lowland areas (Bouthillier et al. 1995; McIntosh et al. 1995; Tulchin and Hammatt 2013; Watanabe 1987). Cultural monitors working on the Stryker

Brigade Combat Team cultural resource management project observed no traditional Hawaiian resources or deposits in the sampling locations on the lower elevation tablelands (Desilets et al. 2011).

Regardless, an oral history study of the SBMR stated that, "According to Mr. Tom Lenchanko, there are numerous traditional properties in the SBMR area; however, for fear of exposing knowledge about their location, he would not disuses what these were or where they were located" (Social Research Pacific, Inc. 2004:23). Consultants interviewed during this project did not mention any tangible cultural properties remaining in or immediately adjacent to the APE.

Despite portions of the uplands being subjected to artillery bombardment, the remote location and restricted development of much of the higher elevations west of the APE has resulted in the preservation of many traditional cultural properties, particularly in the deep, upper elevation gulches and valleys. Mr. Kane noted some of these traditional sites while horseback riding along the gulches above the low tablelands. Documented upland cultural sites comprise mostly Hawaiian structures associated with habitation, animal husbandry, wetland and dryland agriculture, ceremonial activities, and possible burials. Historic roads and military structures associated with SBMR development and training were also identified.

Desilets et al. (2011) conclude that:

> The best site preservation is found in the deep, upper elevation gulches within both the South and West Ranges. Phase I and II surveys of the newly acquired South Range area (Roberts et al. 2004; Robins et al. 2007) indicate that the lower reaches, which were almost entirely in pineapple until very recently, have no remaining surface features. This is also true of some of the broad, upper elevation ridges. Pineapple was planted on any commercially feasible acreage within the South Range, extending right up to the current forest reserve boundary. Within the more inaccessible parts of the South Range, however, such as deep drainages, Hawaiian sites are quite plentiful and, in some cases, form extended complexes. Higher elevation valleys in the South Range also contain relatively large and well-preserved ceremonial sites (e.g., Site 50-80-08-6479). [Desilets et al. 2011:69] [refer to Figure 3 for locations]

For the purposes of this CIA, it is important to understand that these previous studies have unanimously concluded that more than a century of intensive impacts by military land use, urban development, and commercial agriculture have substantially altered the cultural landscape of the central plateau's tablelands. With the long-term destruction of traditional surface structures and little evidence of remaining subsurface deposits, the area's significance relates to "its context within a larger geographic area" (Tomonari-Tuggle and Bouthillier 1994:75).

4.2 Places and Place Names

The project APE is with the traditional lands of Līhuʻe, a broad regional term thought to include much of the central plateau, ranging from Helemano in the east to Kalena in the west. In its literal translation, *Līhuʻe* means "cold chill" (Pukui et al. 1974:132), a quality often referred to

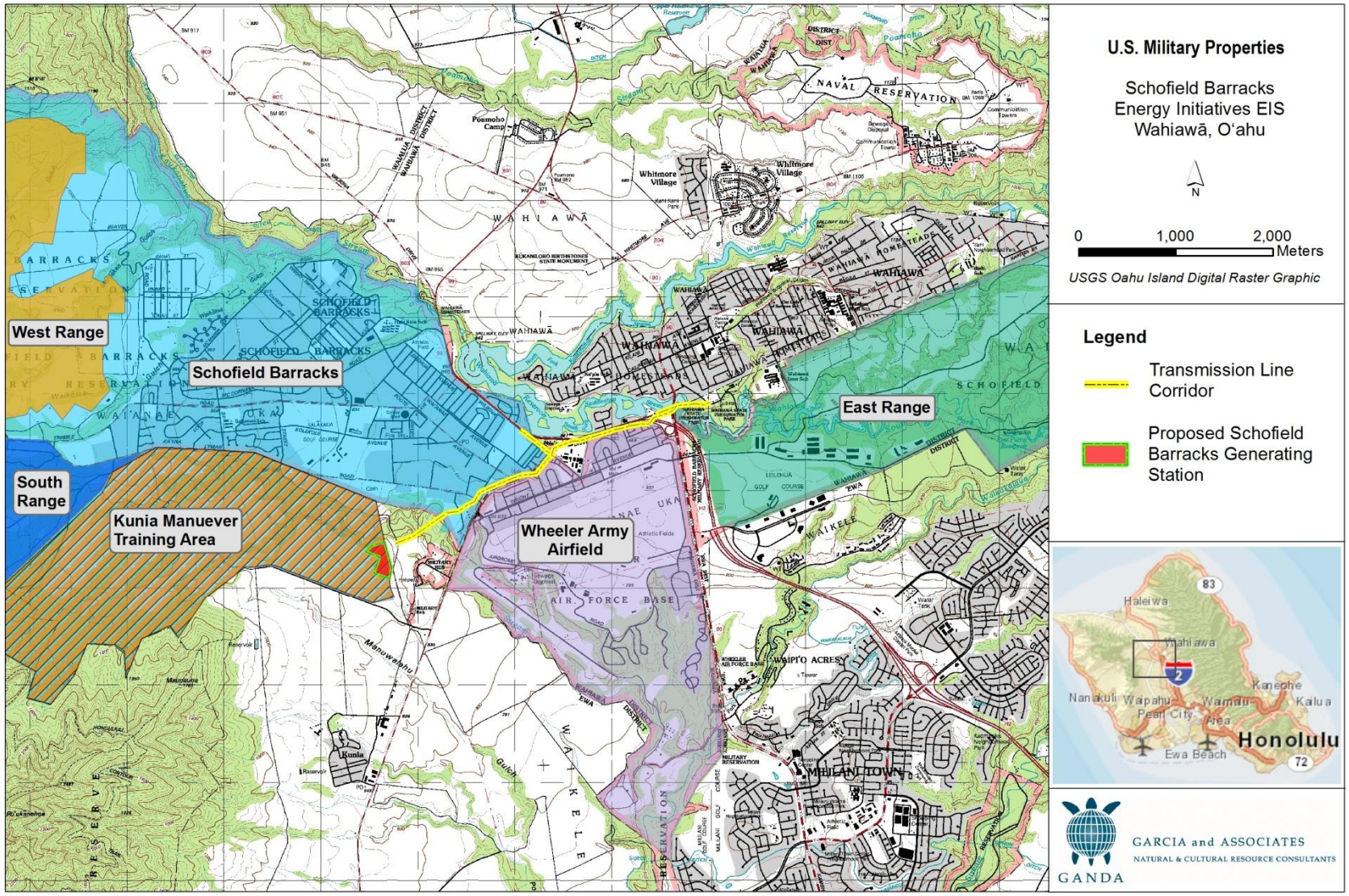

Figure 3. U.S. military properties around Schofield Generating Station with training ranges delineated.

in the traditional literature of Līhuʻe, Kalena, and Haleʻauʻau. Although not evidence of a strictly upland and mountainous boundary, it does point to the literature's tendency to focus on the higher elevation, upland portion of the Līhuʻe lands.

Honouliuli Ahupuaʻa, whose northern tip will support the proposed Schofield Generating Station, is Oʻahu's largest *ahupuaʻa*, encompassing most of the western half of the ʻEwa District. *Honouliuli* means "dark bay" (Pukui et al. 1974:51) and is apparently named after the West Loch bordering what is now Pearl Harbor. Honouliuli is known as the first place where human beings landed on Oʻahu (Beckwith 1970:343), and a place where *ʻulu* (breadfruit; *Artocarpus altilis*) was first introduced to Hawaiʻi (Burgett and Rosendahl 1992: Appendix E).

The proposed generating station and the west end of the transmission line are in two historically referenced *ʻili*, Paupauwela in Honouliuli Ahupuaʻa and Pouhala in Waikele Ahupuaʻa (Figure 4). Paupauwela is also written as *Popouwela* or *Poupowela* (ʻĪʻī 1959:97; Sterling and Summers 1978). *Pouhala ʻIli*, translated as "pandanus post" (Pukui et al. 1974:190), is also a named place in southern Waikele next to "an important fishpond" and *loʻi* or *kalo* patches called Kapalaha (Sterling and Summers 1978:29). The upland *ʻili* is referenced as "Pouhala Uka" in late 19th century land documents (Tomonari-Tuggle and Bouthillier 1994:20).

Waikele, translated as "muddy water," also refers to a stream formed by the convergence of Waiʻeli Stream north of the generating station and Waikakalaua Stream to the southeast. Waiʻeli Stream is sometimes written as *Waikele Stream* on more recent USGS maps and as *Waieli*, meaning "dug water" (Pukui et al. 1974:221), on a late 19th century Oʻahu Island map (Hawaiian Government Survey 1881). *Wahiawā* means "place of noise" (Pukui et al. 1974:71), referring possibly to the drums kept at Hoʻolonopahu Heiau that resonated across the plains to announce the birth of a high chief.

The majority of the transmission line is in the lower elevations of Waiʻanae Uka Ahupuaʻa. The names and borders of any smaller traditional divisions once in this area are unknown. One of Oʻahu's largest *ahupuaʻa*, Waiʻanae Uka Ahupuaʻa, is landlocked and extends from the tablelands across the crests of the Waiʻanae and Koʻolau mountain ranges. Hawaiian deities guarded the boundary between Waiʻanae Uka and the *ahupuaʻa* to the west (Lualualei and Waiʻanae Uka). Mount Kaʻala is the home of the kind goddess Kaiona who harmed no one. The mountain goddess Kolekole protected the mountain pass (Sterling and Summers 1978:133–135). A likely ancient pass through the saddle is afforded at Kolekole (ʻĪʻī 1959:99) by Mount Kaʻala, the highest point on the island.

Handy et al. (1972:465) refer to a famous traditional place named Kukui-o-Lono, where the high chief Kūkaniloko is said to have made the first *loʻi*. Kukui-o-Lono might correspond to one of the cultivated watersheds in western Waiʻanae Uka (such as Kalena, Mohiākea, or Haleʻauʻau streams) because the location is described as "above and west" of the present town of Wahiawā north and northeast of the project area.

Another traditional place name near the APE is Kokoloea, the location of a benchmark in the late 1800s Crown Lands surveys and a USGS benchmark (271 meters, or 888 feet, above sea level) (Figure 4). Located on the south side of what is now Lake Wilson, near Wilikina Drive, the 1876 Boundary Commission testimonies describe an ancient *ʻulu maika* field or *kahua maika*

named Kapalauauai (ʻĪʻī 1959:99) as being at Kokoloea. Kokoloea was the name of a chief of the *Lo* class and the site of the "old Dowsett ranch house" (Tomonari-Tuggle 1997:13).

The SBMR oral history study (Social Research Pacific, Inc. 2004) reports that Mr. Lenchanko told of:

> a navigational chart was created on land that helped train people to use the ocean. But after 900 A.D. there was no need to sail since the land provided for the people, and sailing became an art form. The *Kaʻa Naniao*, located within the SBMR vicinities, is part of the traditional navigational chart. It is a grid that links sites together that are located on military properties throughout Oahu. The location of the *Kaʻa Naniao* was not revealed. [Social Research Pacific, Inc. 2004:23]

4.3 Early Settlement

Traditionally, Honouliuli Ahupuaʻa contained a large permanent settlement around what is now the West Loch, scattered fishing encampments elsewhere on the coast, and small permanent settlements and associated agricultural plots (Tuggle 1995:100). Initial settlement on the eastern slopes of the Waiʻanae Mountains and the central plains was likely mainly temporary and might have been related to bird hunting and the collection of other forest and inland resources.

Permanent Hawaiian settlement of Waiʻanae Uka might have started as early as AD 1250, as populations expanded into central Oʻahu (Roberts et al. 2004:6). Habitation sites are identified as primarily temporary, suggesting recurring occupation perhaps associated with cultivation seasons. The limited number of permanent occupation sites led Carson and Yeomans (2000:68) to propose intensive habitation began shortly before the area was abandoned because a long period of habitation would result in a more intensive archaeological landscape. However, the extensive historic and modern landscape alterations have effectively erased the archaeological remains of the traditional inhabitants so that the extent and type of traditional habitation in the plateau lands might never be known.

Two charcoal samples derived from pondfield contexts in an irrigated agricultural complex (State Inventory of Historic Places [SIHP] No. 5394) in upland Līhuʻe produced calibrated date ranges of AD 1120–1430 and AD 1280–1420 (Carson and Yeomans 2000:18). A similar calibrated date range of AD 1290–1470 was returned from agricultural deposits at nearby SIHP No. 5392 (Robins and Spear 2002: Appendix C-2).

These dates suggest that by about the 13th century, irrigated pondfields were developed along Waiʻeli Stream (and in other similar stream valleys) (Robins and Spear 1997a:7). Although a variety of ceremonial, habitation, burial, and agricultural sites have been identified in the uplands west of the APE, the distribution of sites suggest that intensive agriculture in the stream valleys was a focus of Hawaiian activity. Despite the lack of direct archaeological evidence resulting from extensive historic land disturbances, traditional Hawaiian land use in the neighboring tablelands of Honouliuli, Waiʻanae Uka, and Waikele are presumed to have followed the same pattern of cultivation and associated permanent habitation.

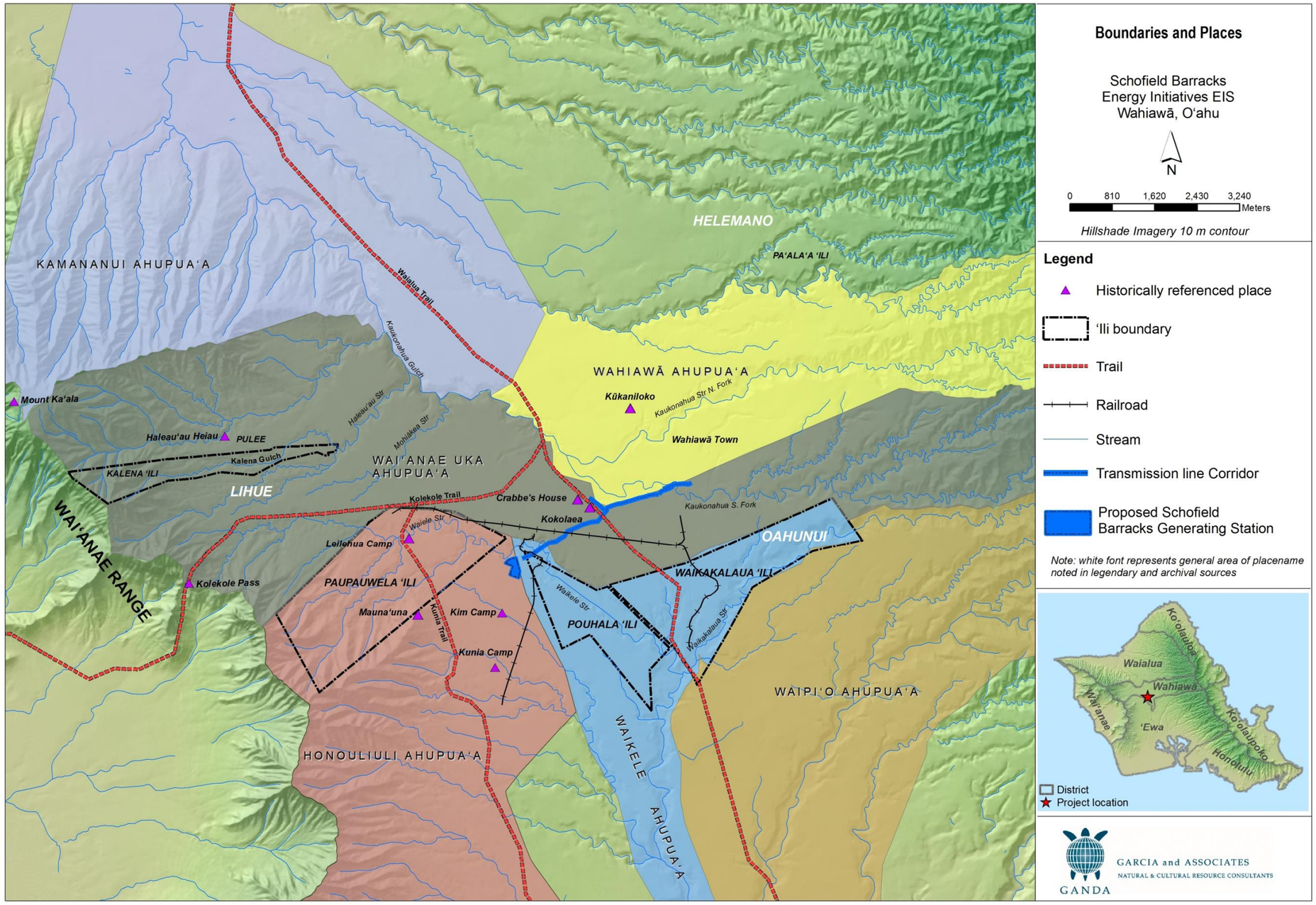

Figure 4. Traditional and historic boundaries and place names near the Schofield Generating Station Project.

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The large number of agricultural sites documented in the uplands above the SBMR suggests the areas' significance in traditional cultivation regimes. Mr. Kane agrees with this interpretation since the traditional inhabitants were living off the land and sea. Although little archaeological evidence remains, the lack of abundant water sources in the plateau lands suggests there was a reliance on dryland cultivation with wetland fields near the few streams and intermittently flowing gulches. It is possible that Waiʻeli Gulch held wetland cultivation plots and that the dryer reaches contained sweet potato or other dryland crops. However, the traditional stories and myths do not impart a sense of ancient types and methods of the APE's subsistence regimes.

Mr. Shirai suggests that because of the occasional presence of water in the gulch formed by Waiʻeli Stream, this would be an area that community members might be concerned with as potentially containing traditional cultural resources.

4.4 Trails

A network of trails provided access to settlement and ceremonial areas in central Oʻahu and connected these places with other parts of the island. The three main travel routes recorded by mid-18th century Hawaiian scholar John Papa ʻĪʻī (1959) provided transportation across the island (Figure 4). Mr. Kane stressed the importance of the tablelands in supplying transportation routes.

One trail extended in a northerly direction from the rich estuaries of Waikele along the south coast of the island to the north shore at Waialua (Waialua Trail). On its way to Kūkaniloko, the Waialua Trail passes under the transmission line just west of the intersection of Kunia Road and Wilikina Drive. Another route, the Kolekole Trail, passed through Waiʻanae Kai, crossed the Waiʻanae Mountains at Kolekole Pass and descended into western Waiʻanae Uka to meet with the Waialua Trail. The third trail, Kunia Trail, came from the south across Honouliuli Ahupuaʻa to meet the Kolekole Trail.

The following extended excerpt explains the trail system and references a number of important cultural sites and place names. Some of the place names are found in the 1881 Hawaiian Government (Figure 5) and 1902 Hawaiʻi Territory Survey (Figure 6) maps.

> They went down to the water and up, going above the group of taro patches of Waiau, to the stream of Kukehi, up to the two maika fields, Puehulunui and Haupuu. Puehulu lies at the crossroads, where one [trail] leads to Waialua and the other branches off to Honouliuli, and to Waianae. . . . There were three roads there at Puuokapolei, Pohakea, and **Kolekole**, from Kunia, the plain of Keahumoa, up to **Maunauna** and by Paupauwela where they join with the road from **Wahiawā** and the one from Waialua**,** on the west side of Mahu to Malamanui, to which spot one can look down from **Kolekole**, to Pokiʻi and Waianae-uka. There was a long cliff road, Eloui, from **Kalena** and **Haleʻauʻau**, on the east side of **Kaʻala**, coming down here to Waianae. There was also a trail going up and then down Makaha-uka, called Kumaipo. Below that trail was a fortress in the olden days, named Kawiwi. At the time of battle a boy was set as a guard every night [with no food--which led to turning over to rebels] . . . From the stream of Anahulu and from Kamani, above the homes, and taro patches a trail lies in front of Kuokoa's houselot and the church, which goes on to meet the creeks of Opaeula and **Halemano**, the sources of the stream of **Paalaa**, on down to the

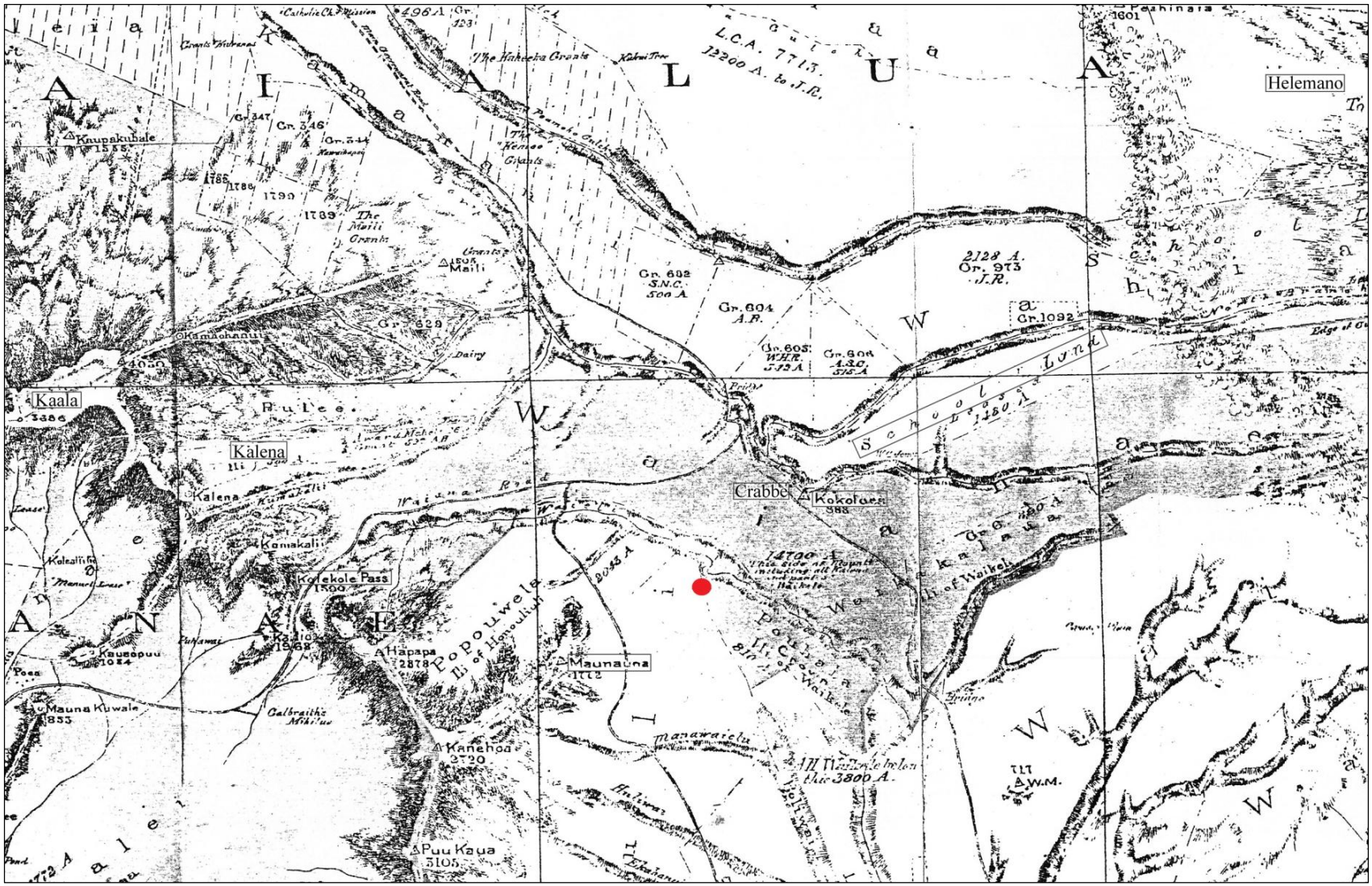
Helemano
Kaala
Kalena
Crabbe
Kokokaen
Kaukonahua
Kaukonahua Road
Kaala Road
Kaala Road
Kaala

Figure 6. Enlarged detail of 1902 O‘ahu Island map with proposed Schofield Generating Station marked in red and boxes around place names mentioned in text (Hawai‘i Territory Survey, Walter E. Wall – Surveyor).

> stream of Pooamoho, and go to the crossroad which branches from Mokuleia to Kamananui and Kewaaihe, The kukui grove of Kahewahewa lies below the trail to **Kūkaniloko** where visitors gathered. It goes to the stream of Paka, and the maika playing field of Kapalauauai which lies above the pond belonging to the village. There the trail meets with the one from **Kolekole** and goes on to the stream of Waikakalaua, Piliamoo, the plain of Punaluu to a rise, then down to Kïpapa to Kehaulele, A trail runs off from this long trail to Kalakoa, **Oahunui** and other places much visited, like **Kūkaniloko**, and from there to the digging place of Kahalo. [ʻĪʻī 1959:99; emphasis added]

4.5 The Lō Aliʻi and Kūkaniloko

Oʻahu's central plateau has long been an important Hawaiian religious center with the establishment of an *aliʻi* birthplace at Kūkaniloko, *heiau*, such as Hoʻolonopahu, and Haleʻauʻau and Kalena in western Waiʻanae Uka, and the Maunauna site in Waikele Ahupuaʻa east of the project parcel (Figure 4).

The *lō aliʻi*, in conjunction with Kūkaniloko, are central to the traditional Hawaiian lore of the Līhuʻe-Wahiawā region of the central plateau and its mountainous periphery. The *lō aliʻi* were a specific class of *aliʻi* tied by birth and practice of strict *kapu* to the Līhuʻe-Wahiawā-Helemano region of Oʻahu's central plateau. Kamakau (1964) provides the following description of the *lō aliʻi* class:

> The chiefs of Līhuʻe, Wahiawā, and Halemano on Oʻahu were called *lō aliʻi*. Because the chiefs at these places lived there continually and guarded their *kapu*, they were called *lō aliʻi* [from whom a "guaranteed" chief might be obtained, *loaʻa*]. They were like gods, unseen, resembling men. [Kamakau 1964:40]

> The chiefs of Lihue, Wahiawa, and Halemano on Oahu were called *Lo* chiefs, *Poʻe Lo Aliʻi* {"people from whom to obtain a chief"}, because they preserved their chiefly kapus. The men had kapus, and the women had kapus, and when they joined their kapus and children were born, the children preserved their kapus. They lived in the mountains (*i kuahiwi*); and if the kingdom was without a chief, there in the mountains could be found a high chief (*aliʻi nui*) for the kingdom. Or if a chief was without a wife, there one could be found—one from chiefly ancestors. Kauakahiʻailani, Maʻilikukahi, Kalona, Piliwale, Kukaniloko, Paʻakakanilea {Paʻakanilea}, Kaʻakauualani, Kaʻau, Lale, Paoakalani, Pakapakakuaua, Nononui, Kokoloea, and a great many others were *Lo* chiefs. [Kamakau 1964:5][2]

The emergence of the *lō aliʻi* in central Oʻahu probably has its origin in the sacred birthing site of Kūkaniloko (SIHP No. 50-80-04-218), on the Waialua side of Kaukonahua Gulch. Tomonari-Tuggle and Bouthillier (1994:75) suggest that Kūkaniloko might have extended as far south as Waikalalaua and would therefore encompass some of the project area. Listed on the NRHP (Register No. 73000674), the Kūkaniloko birthstones was one of two sacred places in the

[2] An almost identical passage is found in the Appendix of *Kepelino's Traditions of Hawaii* (Beckwith 2007:196).

Hawaiian Islands where *kapu* chiefesses went to give birth (Handy et al. 1972:465; McAllister 1933:134–135; see also Cordy 1996:596; Fornander 1996:20; Kamakau 1991:136).

Around the 13th and 14th centuries, Kūkaniloko was established by Nanakāoko and his wife Kahihiokalani for the birth of their son, Kapawa. In a chant commemorating Kapawa, Līhuʻe and nearby lands, that are now within the project area, are referenced as metaphors for his birth at Kūkaniloko (Kamakau 1991:136):

> Kapawa, the chief of Waiʻalua
> Was born at Kukaniloko
> Wahiawa the site;
> At Lihue the placenta
> At Kaʻala the naval cord,
> At Kapukapuakea [heiau] the caul

Kūkaniloko can be translated as "an inland area from which great events are heralded" and "to anchor the cry within." According to Kamakau (1991:53), "Chiefs born at Kūkaniloko were the *akua* [gods, spirits] of the land and were *aliʻi kapu* as well."

Associated with Kūkaniloko is the nearby *heiau* of Hoʻolonopahu (SIHP No. 50-80-04-219). By 1933 pineapple cultivation had obliterated the *heiau* (McAllister 1933:137). Remnants of the *heiau* are said to be in the gulch to the south of the birth site (Au 1993, personal communication), although McAllister (1933:57) places the *heiau* to the north of Kūkaniloko, and hence, north of the project area.

The sacred drums of Opuku and Hawea were stored in Hoʻolonopahu, which translates to "sounding the *pahu* drum." The drums were sounded to announce the birth of an *aliʻi* and the cutting of the naval cord (Sterling and Summers 1976:140). Hawaiian traditions tell of:

> thunderous waves at Wai-a-lua being carried as far inland as Wahi-a-wa. Such passages sometimes refer not merely to the ocean's roar, but may also connote the sound of ceremonial drums signaling the birth of a royal chief. [Pukui and Korn 1973:33]

During the long period of island-wide rule by Līhuʻe chiefs, and continuing into the succeeding years, birth at Kūkaniloko remained a powerful status symbol. In 1797 Kamehameha arranged to have his son Liholiho born at Kūkaniloko, but the plan was foiled by the sickness of Queen Keopuolani. It is notable that by this date, the site had already "fallen into decay" (Sterling and Summers 1978:140).

Kūkaniloko also served as a *puʻuhonua*, or place of refuge. According to ʻĪʻī (1959:138), ". . . Kūkaniloko in Wahiawa, Oahu; and Holoholoku in Wailua, Kauai, were places to which one who had killed could run swiftly and be saved." The story of Lāʻieikawai provides additional evidence. Early in this story we learn that, "Now, Kapukaihaoa took Laielohelohe to the uplands of Wahiawa, to the place called Kukaniloko" (Haleole 2006). Kapukaihaoa, a priest, took Laielohelohe to Kūkaniloko because the baby girl would have been killed by her father (or his executioner) if he discovered she had been born.

Another story of the central plateau's traditional importance is set at O‘ahunui (east of the project area), said to have been a residence of high chiefs. However, it was abandoned during the reign of chief O‘ahunui, who was turned to stone when he became a cannibal and ate the two sons of his brother-in-law, Lehuanui (Nakuina 1897:90).

> Lo-Aikanaka is the name given to a family of South Sea chiefs who are driven from the plains of Mokuleia into the hills to a place called Hele-mano, where they are received by the chief Oahu-nui east of that locality and the two chiefs exchange courtesies. Oahu-nui develops a passion for human flesh and finally the two chubby sons of his sister Kilikiliula, wife of Lehua-nui, are sacrificed to his appetite during the absence of their father. Warned by a vision, the father returns, puts to death the chief and his sister, and abandons the place with his men. A curse hangs over the place...None has ever dared to live there since (T.Thrum quoted in Beckwith 1970:342).

Desilets et al. (2011:13) describe the sociopolitical and cultural importance of O‘ahu's central plateau:

> Around AD 1300, district (*moku*) level organization appears to have arisen on O‘ahu. By about AD 1320 to 1340, the *moku* of ‘Ewa, Kona, and Ko‘olaupoko were ruled by the sons of Maweke (Cordy 2002:22). ‘Ewa, including not only ‘Ewa proper, but Wai‘anae and Wai‘alua as well, was ruled by the Maweke-Kumuhonua line. It is possible that Maweke's grandson, Kumuhonua, ruled the entirety of O‘ahu between AD 1340 and 1360 from his seat of power in Līhu‘e on the central plateau. Kumuhonua's ‘Ewa lands would have included the sacred birthing place Kūkaniloko and it is likely that Līhu‘e was the primary ruling center for all of O‘ahu. Although most chiefly classes were not regionally based, Līhu‘e was exceptional and was home to chiefs with the specific designation of *lō ali‘i* during this time. This class of chiefs populated the Central Plateau between the Ko‘olau and Wai‘anae ranges, including all of what is today referred to as Wai‘anae Uka Ahupua‘a. The high status of the *lō ali‘i* chiefs was likely derived from birthing at Kūkaniloko, interbreeding, and strict *kapu* observance.

4.6 Warfare

The chiefly residents of Līhu‘e were recognized for their skills in spear throwing and were known as excellent teachers of the skill (Kamakau 1991:50). Mr. Kane states that the central plateau is noted for its association with practices used to prepare for traditional warfare and wars. Mr. Lenchanko states that "longhouses were situated throughout the area and that this was the ‘training grounds for the warriors'" (Social Research Pacific, Inc. 2004:23).

Lua, a battle method of dislocating joints of opponents, was practiced on unsuspecting travelers crossing over the western boundary of Wai‘anae Uka at Kolekole Pass (Sterling and Summers 1978:134–135).

Paupauwela, Kalena, Pulee, and Malamanui were noted battlefields between the island chief Kuali‘i and rival island chiefs from the ‘Ewa and Waialua districts (Fornander 1996:280–281). Fornander (1996:393) provides a translation of *Ka inoa o Kuali‘i*, or Chant of Kuali‘i, recounting the famous battle at Kalena:

Where, where was the field
[on which] the warriors fought?
Lo! The field is at Kalena;
Scattered about, overflowing
Poured out is the godly fluid

In the cultural monitor report for the cultural resource management associated with the Stryker Brigade Combat Team, Mr. Eric Burch discusses the battle of Kalena:

The Mele of Kalena
Ihea, ihea la ke kahua
Where, where is the field?
Paia ao O ke koa-a
On which the warriors fought
I kahua I Kalena
There the field is Kalena
I manini, I hanini
Scattered about, overflowing bodies
I ninia I ka wai Akua
Poured out is the godly fluid, blood
I kou hana I Malamanui
By your work (battle) at Malamanui

The Mele of Kalena talks about one chief whose name is Ku‘ali‘i and how he was trying to end the division between many Ahupua‘a. This story talks about the people of old who fought for what they believed in. Just like the Kupuna today, how they try to fight for what they believe in. As you read about the story of “The Battle of Kalena,” imagine and think about “What would you do?” to conquer twelve thousand men on one side and the other side had just four men.

Ku‘ali‘i was born at Waihole; he trained at Kualoa Valley that was a place where the Ali‘i trained. As he trained, he mastered the art of sling and spear throwing. He was a very disciplined person. He sounds like a person who was very dedicated in mastering some skills. It must have taken some time to put everything into perfection.

As he became a man, he noticed how all the districts on the island of Oahu became independent. He realized that each district was growing their food and the island was not unified under one rule. After analyzing what was going on in the island he decided that he wanted to become the Mo‘i of the island. Mo‘i means being the one to conquer, or a person who becomes successful. He started to come up with a plan to conquer the island of Oahu.

He decided to travel to the island of Kauai in search for the finest woods to make spears for his men. Ku‘ali‘i wanted to make sure he had the right type of weapon to become successful. He searched for the finest of weapon makers so they could make all the spears and other weapons he needed to fight in a war. After getting all his weapons together he returned back to Oahu. Upon returning back to Oahu, he saw people gathered at Kamaile. Ku‘ali‘i said, “If they want to fight, we will meet them at Kalena.” As he got closer he noticed they were the chiefs of Ewa and Waialua.

> So Ku‘ali‘i started to get ready for battle by gathering up as many men to fight with him.
>
> Ku‘ali‘i, Maheleana, and Malanihaehae were the only ones to fight on Ku‘ali‘i’s side.
>
> They took a nights rest before battle. The next morning the fighting began at Kalena on the plains of Haleauau (near Lihue). On one side there were twelve thousand men, while Ku‘ali‘i had only three men on his side. Ku‘ali‘i defeated all twelve thousand men with just having three men all together.
>
> The battle of Kalena happened at Schofield Barracks and seeing the sites, artifacts, and writing on rocks really explained what happened in the past. The story really made me feel the mana that the training area has until today. Working out at the BAX really makes me feel that history was once: they’re walking around and planting plants and making food to survive. This story really made me think about how the Hawaiians were very smart when it came to war. [Toney and Desilets 2013:87–89]

At Mauna‘una, the Wai‘anae chief Kuiaia avoided a battle with Kuali‘i, as well as impending slaughter, by heeding a warning from his advisor and performing a chant to the god Kū:

> Mauna-una…Kuiaia, the chief of Wai-anae, came with his forces to meet Kualii on the battleground here mentioned. His kahu, forewarned, told him when coming to battle should he find a knotted ti leaf on the road he would know he was in danger and surrounded by an ambush which would cut off his whole force. On finding this knotted ti leaf, he began and chanted this mele from the beginning to end, to the honor of Ku. All on both sides laid down in reverence. Ku gave the signal of reconciliation, and the slaughter was averted. [Fornander 1969, cited in Sterling and Summers 1978:38]

According to the Legend of Kuali‘i (Beckwith 1970:395), it was after the battles in Malamanui, Pulee, and Paupauwela that Kuali‘i “subdues the whole island” and reestablishes paramount rule between around AD 1720 and 1740 (Cordy 2002:32). Beckwith (1970:396–398) suggests the Kuali‘i tradition might represent a political movement led in the name of Kū, rather than signifying the efforts of a single chief.

5.0 POST-CONTACT HISTORY

This section presents the post-contact history of the project area. Desilets et al. (2011), Tomonari-Tuggle (1997), and Tomonari-Tuggle and Bouthillier (1994) all provide a more detailed description of the historic context of O‘ahu’s central plateau.

5.1 Initial Post-Contact Impacts

By western contact, when history started being recorded, the central O‘ahu plateau was dotted with villages. The location of schools provides insight into the size of central plateau settlements soon after contact.

> Kamakau (1992:424) writes that during the reign of Kamehameha III (1825-1854), “schools were built in the mountains and in the crowded settlements...At Kahalepo‘ai, Hauone, Kalakoa, Wahiawa, Halemano, and

> Kanewai, there were large villages with teachers and schoolhouses; so at Lihuʻe, Kalena, Maunauna, Kake, and Puʻukuʻu." This probably occurred sometime after 1840 when a law establishing government schools was passed. This law required "that a school should be maintained in every community where there were fifteen or more children of suitable age" (Kuykendall 1968:347). Given that rural areas throughout the islands were being abandoned in the early 1800s as a result of factors such as population collapse or out-migration to Honolulu, the fact that these settlements could support government schools at mid-century suggests that they had been of substantial size and/or stability at contact. [Tomonari-Tuggle 1997:15]

School land, leased to W.C. Jones, is shown in the 1881 Oʻahu map drafted as part of the Hawaiian Government Survey by W.D. Alexander, General Surveyor, in the area of what would become the town of Wahiawā (Figure 5). The map also displays much of the plateau as undeveloped and devoid of forest land.

Like elsewhere in the Hawaiian Islands, the native population of central Oʻahu experienced a major decline due to the spread of foreign diseases and movement away from remote localities to the shipping ports and business centers, such as Honolulu. Reverend Artemis Bishop recounts the quick and devastating effects of a measles epidemic he observed from 1848 to 1849 in the Waiʻanae and ʻEwa residents:

> The past has been a year of trials and sorrows among my people in passing through scenes of sickness and death, beyond what I had ever witnessed…how strikingly their former athletic frames and warlike habits contrast with their enfeebled and effeminate corpses.
>
> Middle of October the measles broke out like wildfire…burning the dead was the great work, all other occupations were suspended and people staggered about like walking corpses. [Bishop 1849 and 1851: Mission letters]

Not long after western contact (ca. 1815–1826), *ʻiliahi* or sandalwood was extensively harvested from the Hawaiian Islands, resulting in the decimation of much of the native forests, particularly in the lower, more accessible elevations. Central Oʻahu was undoubtedly affected by the over-harvesting of sandalwood because Wahiawā was famous for its large sandalwood trees (Kamakau 1992:251–252). In pursuit of the riches gained in the sandalwood trade, chiefs ordered the *makaʻāinana* (commoners) to devote all their time to cutting sandalwood. As a consequence, subsistence practices were abandoned, such as farming and fishing, and famine was experienced throughout the islands (McGrath et al. 1973:18). Foreign contact also led to the over-harvesting of other forest trees used as fuel on whaling ships to render whale blubber into oil (Cuddihy and Stone 1990:38).

The establishment of Christian mission stations in Waialua, Waiʻanae, and ʻEwa resulted in transportation route improvements for easier travel between settlements in the vicinity of the project area. In 1837 Reverend Emerson reported improvements to the Kolekole Trail:

> During the year past, a number of patches of road have been made, which considerably facilitate our access to some remote parts of the station and to Waianae. The pali between Waialua and Waianae, which formerly rendered the latter place inaccessible from Waialua except on foot, has been so

> improved that a horse can be rode up and down without difficulty (Emerson 1837: Mission letters).

Historical documents and archival data for the central Oʻahu region indicate that Native Hawaiians continued to live and cultivate crops during the mid- to late-1800s, particularly along Mohiākea and Kalena ʻIli, and along Waiʻeli Stream which runs through the study area (Robins and Spear 2002:23, 24, 31, and 32). An 1886 photograph with Kolekole pass in the background shows the location of a homestead and active pondfields (likely *loʻi kalo*) along a portion of Waiʻeli Stream to the west of the project area (Figure 7). It is presumed that the rectangular features represent fenced boundaries of traditional features, such as dwellings and active or recently active croplands.

5.2 Historic Land Tenure

In the mid-1800s Māhele, all of Waiʻanae Uka Ahupuaʻa, with the exclusion of Kalena ʻIli, was designated as Crown Land. Honouliuli Ahupuaʻa was awarded to Kekauʻohoni, grandchild of Kamehameha I. Upon her death in 1851, her husband Levi Haʻalelea inherited the majority of the land, and later (1864) passed it on to his wife at the time, Amoe Haʻalelea. Haʻalelea sold it to her brother-in-law John Harvey Coney. The land has since been acquired by private owners and the state and federal government for ranching, cultivation practices, and U.S. military activities as detailed in the following sections.

5.3 Ranching

Honoluliuli

In 1877 James Campbell purchased the portion of Honouliuli retained by John Harvey Coney (about 43,640 acres) and established a cattle ranch under the namesake of Honouliuli Ranch. Before the purchase, John Meek and James Dowsett leased portions of Honouliuli for cattle grazing and stock running. Meek and Dowsett "introduced grazing in areas too high or dry for agriculture" (Burgett and Rosendahl 1992:E-7). Meek was known to have leased more than 3,000 acres in the ʻEwa District, including Waikakalaua Gulch, and had 4,000–5,000 head of cattle (Tomonari-Tuggle and Bouthillier 1994:19). By 1881 Honouliuli Ranch was a successful ranch with 10,000 acres devoted to agriculture. Some of the cultivated land may have encompassed the project area.

Waiʻanae Uka

Meek was the first individual to ranch cattle at Waiʻanae Uka. In 1851 Kalena ʻIli was conveyed to Meek by Reverend Bishop (Bureau of Conveyances, Book 17:148), who described the parcel as having "taro patches for 4 or 5 families" (Department of the Interior, n.d.). By 1875 his heirs leased the entire *ahupuaʻa* of Waiʻanae Uka.

Meek's affluence in Oʻahu society is remembered by Taylor (1922:223):

> The days are recalled, also, when Captain Meek controlled Lihue and Wahiawa on Oahu under lease from the government. He raised thoroughbred horses, and his daughters rode the finest in the islands…

Figure 7. 1886 photograph showing homestead and active crops in Wai‘eli Stream (Bishop Museum Archives, Neg. CP117, 503), from Robins and Spear (2002:31).

A ranch house once likely occupied by Meek’s daughter Elizabeth Meek Crabbe and husband Horation Crabbe is shown on a late 19th century map as “Crabbe” (Hawaiian Government Survey 1881) (Figure 4, Figure 5). Between 1875 and 1889, Wai‘anae Uka was leased to various westerners for cattle ranching, including a shared lease between Meek (and his heirs) and Dowsett.

In 1882 King Kalākaua and C.H. Judd purchased two-thirds of Wai‘anae Uka, under whom the lands were named Leilehua Ranch (Tomonari-Tuggle and Bouthillier 1994:22; Figure 4, Figure 6). Kalākaua and Judd built a hunting lodge, Malamanui, to use as a retreat and place to entertain influential people (Nedbalek 1984:13). In 1889 Dowsett purchased the lease and Leilehua Ranch assets, which consisted of more than 20,000 acres and 3,000 head of cattle and other stock (Tomonari-Tuggle and Bouthillier 1994:24). Wai‘anae Uka remained under Dowsett Ranch until the U.S. military took over in the early 1900s.

Tomonari-Tuggle (1997:24) describes the significant effect of more than 20 years of cattle ranching on the central plateau as follows:

> the probable final demise of native plants as the dominant vegetation of the area. Cattle are known to have opened up native forests through foraging, trampling of the forest understory, and spreading of alien grasses. In addition, associated human activities exacerbated the actions of the cattle. Logging often preceded ranch operations or was used to expand existing pastures. Timber was cut for fencing or ranch buildings. Some native plants

> were considered "noxious" and removed to encourage pasture growth and facilitate the movement of cattle (Cuddihy and Stone 1990:62).

5.4 Commercial Agriculture

In 1897 the Oahu Sugar Company was established on the ʻEwa Plains by the predecessor of Amfac, H. Hackfield & Co. (Wilcox 1996:98). In 1898 a group of homesteaders began settling the Wahiawā Colony Tract, which the Land Act of 1895 designated as a homestead land (Nedbalek 1984:18). Clearly shown in the 1902 survey map, W.C. Jones' leased land has been split into 17 homesteads roughly bounded by the north and south forks of Kaukonahua Stream (Figure 6).

James B. Dole began growing pineapple in the Wahiawā Tract in 1900 for his canning operation, the Hawaiian Pineapple Company. The east part of the military reservation, and the school land leased to W.C. Jones, is shown as pineapple land in the 1902 map (Figure 6).

The Wahiawā Colony organized the Wahiawa Water Company, which by 1902 built a network of flumes, ditches, and tunnels to provide water to the homesteads and cultivated fields (Nedbalek 1984:28). The water company completed a dam across Kaukonahua Gulch in 1906 to form the reservoir now known as Lake Wilson (Haile 1976). By the 1920s more than 71 artesian wells had been dug in Honouliuli, which produced more than 100 million gallons of water per day (Burgett and Rosendahl 1992: Appendix E). Within a decade, thousands of acres of pineapple fields were being cultivated in central Oʻahu.

In 1906 the Oahu Rail and Land Company (OR&L) extended their railway from Waipahu to Wahiawā, through what would become WAAF, so that pineapples could be transported from the fields to the new Dole cannery constructed at Iwilei in Honolulu. These rail lines expanded over the decades to keep up with the commercial growth of the central plateau (Figure 4).

Between 1910 and 1920 a number of smaller plantations were established in central Oʻahu, mostly by Japanese immigrants. Masanari Saito was one of the independent growers who, in 1913, first planted pineapple on leased fields near Kunia using pineapple tops discarded by another grower (Nedbalek 1984:56). Saito decided to move his plantation from Kunia to "Leilehua…in the valley west of Schofield," which proved to be a difficult undertaking:

> He and his friend Tamotsu Ono traveled by horse and began clearing a path as they moved along. At Leilehua first he built something that looked like a chicken coop and slept there. Then he built a kitchen and slept there and finally he made the main rooms. After the land had been cleared, plowed and planted he bought passage on a ship and returned to Japan for the woman who would be his bride. [Nedbalek 1984:56]

North of the project area, a plantation camp labeled as "Leilehua" might correspond to Saito's early plantation that Nedbalek (1984) also refers to as Leilehua (Figure 6).

Large corporations, including Dole and Hawaiian Islands Packing Company, established labor camps near the fields, including the Kunia and Robinson I camps southeast of the present study area. Small stores and itinerant peddlers served these outlying communities and isolated plantations.

By the 1920s mechanized pineapple farming and military occupation of the central plateau at SBMR and WAAF contributed to economic expansion centered in Wahiawā that gradually promoted infilling development and an even greater expansion of pineapple farming throughout the central plateau. USGS maps from the 1920s to 1953 indicate that all of the upper plateau lands and broad ridge tops were cultivated in pineapple, and a network of roads were also established for access between the fields (Figure 8, Figure 9).

An aerial photo of SBMR cantonment dated to 1926 shows the Schofield Generating Station area, in the left foreground below Wai‘eli Stream, planted in pineapple (Figure 10). A photo of anti-aircraft training amidst pineapple fields in O‘ahu’s central plateau during World War II also shows the extent of commercial cultivation (Figure 11). Pineapple cultivation continued in and around KUNTA under various companies (Roberts et al. 2004:6) until Del Monte Pineapple Company abruptly shut down operations in November 2006.

5.5 U.S. Military

Following annexation of the Hawaiian Islands by the United States in 1898, former Crown Lands, including Wai‘anae Uka, became the property of the federal government. In 1899 Wai‘anae Uka (excluding Kalena ‘Ili) was set aside as a military reservation. In the 1902 Hawai‘i Territory Survey map by Walter E. Wall, Surveyor, much of the central plateau, with the exception of Kalena, is shown as U.S. Military Reservation (Figure 6). The military reservation was not occupied until 1909 when it was mandated to be the base for O‘ahu’s mobile defense troops because of its strategic central location.

The landscape of the project area is described in a report on the adequacy of the central plateau for a military post:

> The main road across the island runs across the tract, cutting it into two pieces of 8,000 and 6,000 acres respectively. The west section is cultivated with pineapples and is the smaller of the two and in my opinion the other tract is amply large for all purposes and not having been broken up, is covered with sod which is a very great advantage as the red dirt here is beastly dusty in dry weather and equally vile in wet. The site is an ideal one for a post being a level or practically level place, but there is not a tree on the tract. [Foster 1908, cited in Tomonari-Tuggle 1997:25]

Initially called either Leilehua Barracks or Castner Village, the latter named for the construction supervisor Captain Castner, SBMR was first occupied by 473 soldiers from the 5th Cavalry Regiment (Alvarez 1982:16). In April 1909 the military base was formally named Schofield Barracks in honor of Lt. General John M. Schofield, a former Civil War hero and Commander of the Army’s Pacific Division. Although World War I halted construction, most major construction for SBMR (General Officers housing, new barracks for artillery troops, new infantry barracks, and additional Officers Quarters for the infantry and cavalry sections) was finished in the early 1920s (Robins and Spear 1997b:39–42). A 1909–1919 military survey map suggests initial development of SBMR was centered immediately north of the study area at a place called Leilehua along the north boundary. An OR&L railroad track terminating at several structures in Leilehua might be the original track that was extended into the military reservation in 1906 (U.S. Army Military Survey 1909).

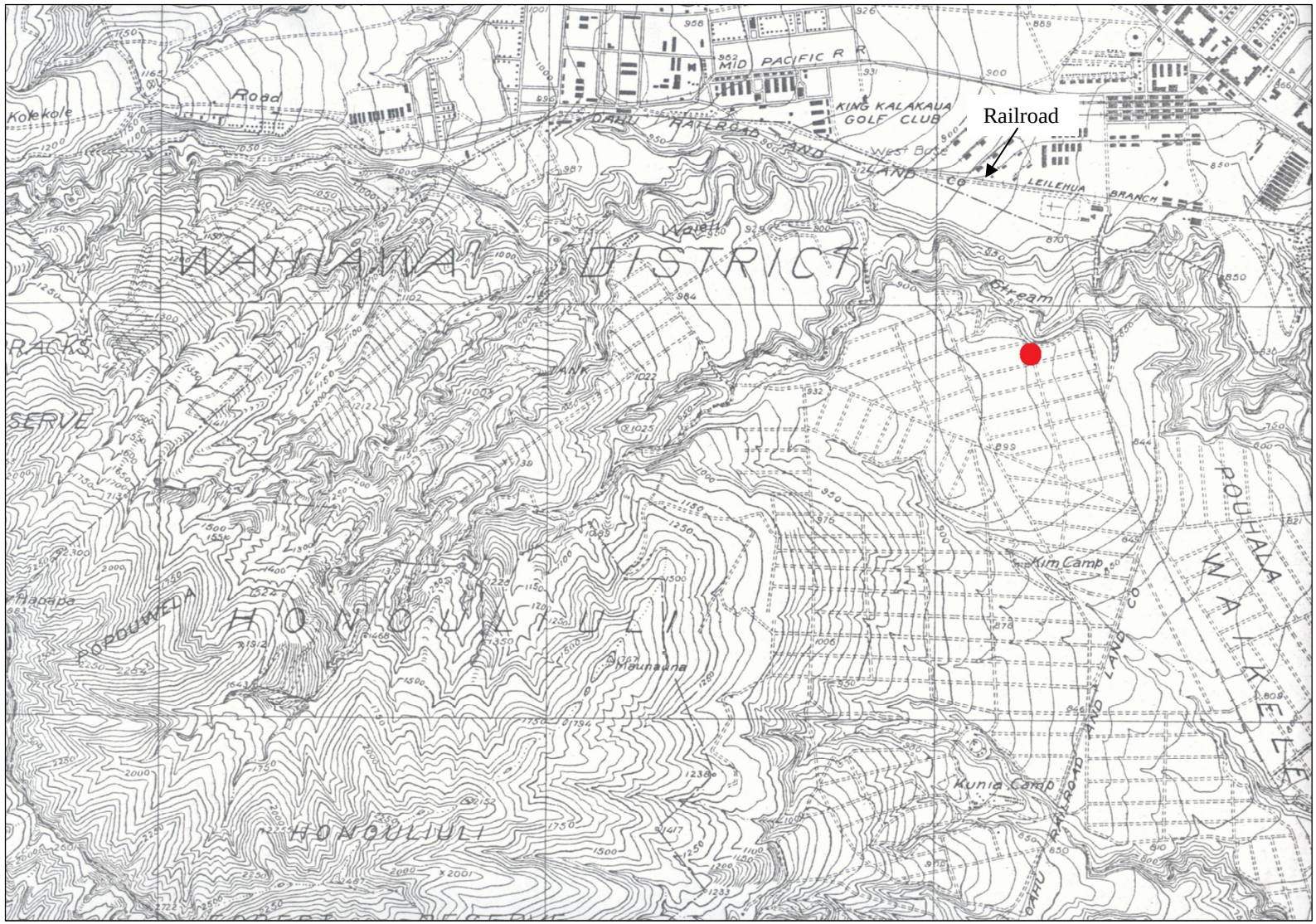

Figure 8. Enlarged detail of the 1927–1930 USGS Schofield Quadrangle with proposed Schofield Generating Station marked. Dashed lines around marked area indicate one-lane roads through cultivated fields.

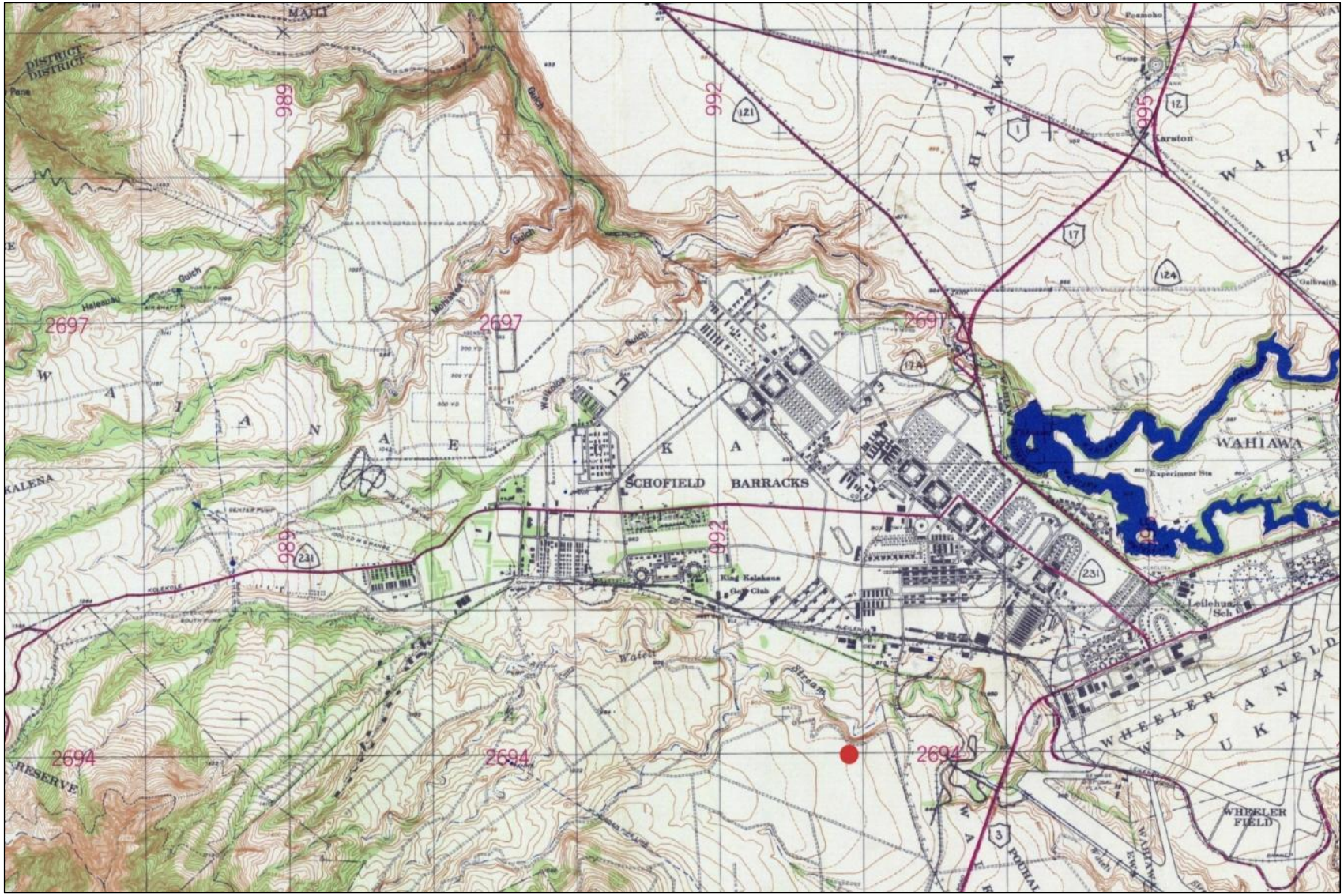

Figure 9. Enlarged detail of the 1943 USGS Schofield Quadrangle with proposed Schofield Generating Station marked.

Provided by Tropic Lighting Museum Aerial of Schofield 23 Jan. 1936 P.306

Figure 10. 1936 aerial photograph of Schofield Barracks showing surrounding pineapple fields (Tropic Lighting Museum).

Figure 11. Anti-aircraft training amidst pineapple fields in central O‘ahu during World War II (From Paradise of the Pacific 1944:49).

During early development of SBMR, water was scarce and was apparently derived from one primary source at a "spring on the slopes of the Waianae Mountains Range" (Nedbalek 1984:59). Photographs taken in 1909 show water tanks and a water supply camp in western Wai‘anae Uka that might correlate with the location of a probable pump house identified as SIHP Site No. 6557 in Hale‘au‘au Stream (Robins et al. 2005:16). A water shortage continued at SBMR until 1925 when Ku Tree Reservoir was constructed in eastern Wai‘anae Uka (Nedbalek 1984:60) and a deep well was excavated in 1938 (Addleman 1940, cited in Spencer Mason Architects 1997).

A northwestern extension of the OR&L line connected the lower post with the artillery area in the 1920s and 1930s. The USGS Schofield Barracks Quadrangle map of 1927–1930 displays two rail companies extending through the plateau; the OR&L and the Mid Pacific Railroad (Figure 8). Both companies have rails leading to the cantonment area. The same shows the Leilehua Ranch house is now identified as the King Kalākaua Golf Club.

WAAF was established as a military installation in 1922 on land included in the 1909 Executive Order establishing SBMR. Initially used for mounted cavalry training, WAAF was constructed in the 1920s by a detachment from the Army Air Service based at Luke Field on Ford Island. During the 1930s the field was upgraded and new buildings were constructed, including houses, hangars, and a fire station. At the same time, the OR&L relocated their railroad tracks to avoid the aviation field that was under construction.

During the 7 December 1941 Japanese attack on Pearl Harbor, SBMR was subject to Japanese air fire. Troops returned fire from the quadrangle roofs, shooting down two Japanese planes and one U.S. plane (Alvarez 1982:64). No significant damage was incurred at SBMR during the attack; however, nearby WAAF was hit hard. SBMR was used as a major training camp during the Pacific campaign of World War II. The Ranger Combat Training School at SBMR was established in 1942 and intended to train the troops for jungle warfare (Alvarez 1982:68). In 1947 WAAF was moved to U.S. Air Force control and then put in caretaker status from 1948 until 1951, when the Korean War began.

While the number of troops and level of activity at SBMR has varied considerably since the close of World War II, the reservation has continued in its importance as a training center and post for the U.S. Army's 25th Infantry Division. WAAF remained in U.S. Air Force control until 1993, when it was returned to the U.S. Army. The 1943 USGS map displays few changes from the 1930 USGS map (Figure 9). There are a few more permanent structures. Mid Pacific Railroad is no longer displayed; and WAAF is established.

In 2005 the U.S. Army purchased 1,402 acres south of the SBMR cantonment and east of the South Range from the Campbell Estate. The northernmost of the three parcels, composing the South Range Acquisition Area, would become KUNTA. At the time of purchase, the lands, including broad ridges and stream floors, were still under pineapple cultivation as they had been for almost a century.

6.0 CULTURAL IMPACT ASSESSMENT RESULTS

Native Hawaiian use of the lands encompassed by the APE ended more than a century ago as U.S. military, ranching, and commercial agricultural endeavors encroached upon the traditional

landscape. These developments transformed the landscape into extensive farmlands, military installations, and an urban development. Lack of public access to the portions of the APE within SBMR likely had a deleterious effect on traditional use of those areas. As previous oral history and ethnographic studies of SBMR and WAAF (e.g., Desilets et al. 2011; Social Research Pacific, Inc. 2004) have found, there are very few, if any, Hawaiian oral historians, *kapuna*, and community members with knowledge of traditional cultural practices and land use associated with this region.

According to the cultural consultants in this CIA, most knowledge about cultural practices and cultural sites on Oʻahu's central plains is only available from archival documents and archaeological research rather than first-hand experience. The cultural consultants knew of no traditional Hawaiian resources, sites, or practices within the APE and saw no adverse effects from the project.

6.1 Cultural Resources, Practices, and Beliefs Identified—Location and Significance

All archival ethnohistoric research and ethnographic consultations conducted during this study indicate that the lower elevations of Oʻahu's central plateau contained important traditional transportation routes, centers for training in warfare, and battlefields. Most significantly the Līhuʻe-Wahiawā-Helemano region is associated with a specific class of high chiefs, the *lō aliʻi*, tied by birth and practice of strict *kapu* to the uplands. The only remnants of this cultural complex are the Kūkaniloko birthing stones, located well outside of the project area, and a large number of archaeological sites in the upland reaches of SBMR, also quite distant from the project area. More than a century of commercial agriculture, military development, and urban growth appear to have eliminated most, if not all, evidence of traditional cultural activity within the APE.

Data analyzed during this assessment indicate that the long period of historic development, particularly that related to the vast expanses of pineapple fields and military installations, has resulted in the termination of any traditional cultural practices that might have once occurred in or adjacent to the project area. There is no tangible or intangible evidence of any former or ongoing cultural practices (including resource procurement through hunting or gathering, transportation routes, burials, or other ceremonial activities) occurring in the APE.

6.2 Effects of the Proposed Project

Based on the above findings, this study concludes that there will be no adverse impact to cultural resources, cultural practices, and traditional beliefs by the SGSP. Traditional Hawaiian land use in the APE terminated more than a century ago with any potential tangible remains long lost to commercial agricultural endeavors, military activities, and urban development. Along with this loss of cultural properties in the project area, the *moʻolelo* once held by traditional community members were forgotten.

6.3 Confidential Information Withheld

During the course of conducting the ethnographic survey for the SGSP, no sensitive or confidential information was discovered in the background literature or communicated by consultants. All results of this effort are therefore presented in an unrestricted manner and no data was withheld.

6.4 Conflicting Information

No conflicting information was identified in the consultation process or in the archival research. A number of themes were consistently repeated in interviews and background literature (i.e., transportation routes, warfare) demonstrating independent confirmation and verification of findings.

6.5 Proposed/Potential Physical Alterations and Isolation/Alteration of Resources

With no known tangible or intangible cultural resources or practices in the project area, the SGSP presents very little potential to physically alter or isolate any cultural resources.

6.6 Recommendations

It is recommended that the proposed design for constructing the generating station and installing the electric poles and overhead lines be followed as planned. The proposed design will not impact any known cultural sites or practices and avoids impact to Wai‘eli Stream gulch, which which a cultural consultant noted might raise concerns of community members. Should the planned development substantially change, it is recommended that this CIA be revisited.

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APPENDIX A: AGREEMENT TO PARTICIPATE

Agreement to Participate in the Cultural Impact Assessment for the Schofield Generating Station EIS
Jolie Liston, Garcia and Associates

You are invited to participate in the Cultural Impact Assessment of the Schofield Generating Station Environmental Impact Assessment (EIS) on O'ahu (herein referred to as "Project"). The Project is being conducted by Garcia & Associates, a cultural resource management firm, on behalf of TetraTech, who is conducting the EIS on behalf of the Hawaiian Electric Company. The ethnographer will explain the purpose of the Project, the procedures that will be followed, and the potential benefits and risks of participating. A brief description of the Project is written below. Feel free to ask the ethnographer questions if the Project or procedures need further clarification. If you decide to participate in the Project, please sign the attached Consent Form. A copy of this form will be provided for you to keep.

Description of the Project

This ethno-historic study is being conducted to collect information about the long-term land use in and around the project area through interviews with individuals who are knowledgeable about this area, and/or about information including cultural practices, legends, songs, or chants. The goal of this Project is to identify and understand the importance of any traditional Hawaiian and/or historic cultural resources, places, or traditional cultural practices in these properties.

Procedures

After agreeing to participate in the Project and signing the Consent Form, the ethnographer will record your interview on audio tape and have it transcribed. The transcript will be sent to you for editing and final approval. Data from the interview will be used as part of the Cultural Impact Assessment for this EIS and transcripts may be included in part or in full as an appendix to the report. The ethnographer may take notes and photographs and ask you to spell out names or unfamiliar words.

Discomforts and Risks

Possible risks and/or discomforts resulting from participation in this Project may include, but are not limited to the following: being interviewed and recorded; having to speak loudly for the recorder; providing information for reports which may be used in the future as a public reference; your uncompensated dedication of time; possible misunderstanding in the transcribing of information; loss of privacy; and worry that your comments may not be understood in the same way you understand them. It is not possible to identify all potential risks, although reasonable safeguards have been taken to minimize them.

Benefits

This Project will give you the opportunity to express your thoughts and opinions and share your knowledge, which will be considered, shared, and documented for future generations. Your sharing of knowledge may be instrumental in the preservation of cultural resources, practices, and information.

Confidentiality

Your rights of privacy, confidentiality and/or anonymity will be protected upon request. You may request, for example, that your name and/or sex not be mentioned in Project material, such as in written notes, on tape, and in reports; or you may request that some of the information you provide remain off-the-record and not be recorded in any way. To ensure protection of your privacy, confidentiality and/or anonymity,

you should immediately inform the ethnographer of your requests. The ethnographer will ask you to specify the method of protection, and note it on the attached Consent Form.

Refusal/Withdrawal

At any time during the interview process, you may choose to not participate any further and ask the ethnographer for the tape and/or notes. Please note that you will be given an opportunity to review your transcript, and to revise or delete any part of the interview.

Consent Form

I, _____, am a participant in the Cultural Impact Assessment for the Schofield Generating Station Project Environmental Impact Assessment (herein referred to as "Project"). I understand that the purpose of the Project is to conduct oral history interviews with individuals knowledgeable about the lands the project will impact. I understand that Garcia and Associates and/or TetraTech will retain the product of my participation (audio tapes, transcripts of interviews, etc.) as part of their permanent collection and that the materials may be used for scholarly, educational, land management, and other purposes.

_____ I hereby grant to Garcia and Associates and TetraTech ownership of the physical property delivered to the institution and the right to use the property that is the product of my participation (e.g., my interview, photographs, and written materials) as stated above. By giving permission, I understand that I do not give up any copyright or performance rights that I may hold.

_____ I also grant to Garcia and Associates and TetraTech my consent for any photographs provided by me or taken of me in the course of my participation in the Project to be used, published, and copied by Garcia and Associates and TetraTech and its assignees in any medium for purposes of the Project.

_____ I agree that Garcia and Associates and TetraTech may use my name, photographic image, biographical information, statements, and voice reproduction for this Project without further approval on my part.

_____ I understand that I will have the opportunity to review my transcripts to ensure that they accurately depict what I meant to convey. I also understand that if I do not return the revised transcripts after one week from the date of receipt, my signature below will indicate my release of information for the draft report, although I will still have the opportunity to make revisions during the draft review process.

By signing this permission form, I am acknowledging that I have been informed about the purpose of this Project, the procedure, how the data will be gathered, and how the data will be analyzed. I understand that my participation is strictly voluntary, and that I may withdraw from participation at any time without consequence.

_____

Consultant Signature **Date**

_____

Print Name **Phone**

_____

Address

Thank you for participating in this valuable study.