Draft
Environmental Impact Statement

Schofield Generating Station Project
United States 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):

United States 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
PO Box 2750
Honolulu, HI 96840

Prepared by:

Tetra Tech, Inc.

April 2015

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DEPARTMENT OF THE ARMY

Draft

ENVIRONMENTAL IMPACT STATEMENT

Schofield Generating Station Project
United States Army Garrison, Hawaii

April 2015

APPROVED BY:

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Richard A. Fromm
Colonel, U.S. Army
Commander
U.S. Army Garrison, Hawaii

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Charles A. Flynn
Major General, U.S. Army
Commanding

____

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

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ENVIRONMENTAL IMPACT STATEMENT

AGENCIES: U.S. Army Pacific Command 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: US Army Corps of Engineers, Mobile District, US Army Environmental Command, and Hawaiian Electric Company (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 multi-fuel 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, USAG-HI Real Property Master Plan, 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 COMMENT DEADLINE: The draft EIS (DEIS) is available for review and comment for 45 days, beginning with publication of the Notice of Availability in the *Federal Register* on April 24, 2015. Public notices will also be published in the State of Hawaii, Department of Health Office of Environmental Quality Control's online publication *The Environmental Notice* and the Honolulu *Star-Advertiser*. Copies of the DEIS 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. The DEIS can also be viewed at the following website: www.garrison.hawaii.army.mil/schofieldplant. Individuals and organizations are invited to submit comments to the Army under the NEPA process by email at sgspcomments@tetratech.com or 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, Hawaii 96857-5013. Comments can also be submitted to the Department of Land and Natural Resources under the HEPA process by mailing them to Department of Land and Natural Resources, 1151 Punchbowl St., Room 131, Honolulu, HI 96813, ATTN: Carty Chang, Acting Chairperson. All comments will be reviewed jointly, so it is not necessary to submit comments through both processes. Comments should be submitted no later than the end of the 45-day review period.

EXECUTIVE SUMMARY

This joint environmental impact statement (EIS) is being 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 Alternatives. 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 Alternatives.

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 two-fold:

- 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, and
- 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* are those that 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 sub-transmission 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 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 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, consultation with the U.S. Fish and Wildlife Service (USFWS) under Section 7 of the Endangered Species Act (ESA), 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.

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.

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	Hawaii Department of Health (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

Table ES-1 (continued)

Permit or Approval	Generating Station, Interconnection, or Both	Agency	Status
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) 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 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; HDOH = Hawaii Department of Health; PUC = Public Utilities Commission; USAG-HI = U.S. Army Garrison, Hawaii; Army = United States Department of the Army; NEPA = National Environmental Policy Act; HEPA = Hawaii Environmental Policy Act

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." 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 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.

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 to 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 its 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 Alternatives. 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 two-fold:

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

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

- 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) 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 by 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.

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

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[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.

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, which 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:

- October 15, 2006: An earthquake caused an island-wide blackout on Oahu causing a 10- to 12-hour power outage at the Army installations.
- December 5, 2007: A wind storm caused power line damage causing the loss of power at Schofield Barracks's Menoher Substation for about 72 hours.
- December 11, 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.

- December 26, 2008: A lightning storm caused an island-wide blackout on Oahu causing 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 are 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 and other disaster responders, particularly if the coastal areas are compromised.

The US 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, 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 that 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 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*	Greenhouse gas emission reduction	Reduce: • Scope 1 and 2 GHGs by 34 percent from 2008 levels by 2020. • Scope 3 GHGs by 13.5 percent from 2008 levels by 2020.

1.4.3 Hawaii Renewable Portfolio Standard Goals

Under Hawaii's RPS, the Hawaiian Electric Companies (Hawaiian Electric; Maui Electric Company, Ltd.; and Hawaii Electric Light Company, Inc.) must meet the following percentages of renewable electrical energy sales:

- 10 percent of net electricity sales by December 31, 2010.
- 15 percent of net electricity sales by December 31, 2015.
- 25 percent of net electricity sales by December 31, 2020.
- 40 percent of net electricity sales by December 31, 2030.

The companies have achieved 18 percent in 2014. The proposed SGSP would contribute to Hawaiian Electric's continued ability to meet or exceed 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 (that is, able to schedule, commit, and load),
- Blackstart,
- Frequency regulation,
- Voltage regulation,
- Turndown to lower minimum loads,

- Daily and seasonal cycling, and
- 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 January 8, 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 January 17, 2014 (Vol. 79, No. 12), initiating a 45-day comment period. The Army and DLNR accepted comments under either process from January 8 through March 2, 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 January 17, 2014 that announced the time and location of two public scoping meetings to solicit public input and comments on the scope of the EIS. Public scoping meetings were held on February 5 and 6, 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 7 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:

- Identify the source of fuel to be used.
- Compare 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.
- Analyze 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.

- Analyze the use of other renewable technologies such as solar or wind.
- Define and describe *first call to power* and *islanding.*
- Analyze a robust range of alternatives, including alternative sites (specifically a site closer to the substation) and plant capacities.
- Provide 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.
- Describe the project's relation to Hawaii's renewable energy goals, policies, and regulations including the Hawaii RPS and the Hawaii Clean Energy Initiative.

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

Similar to the scoping process, there are concurrent 45-day public review periods following publication of the Draft EIS, in accordance with CEQ (NEPA) and HRS Chapter 343 (HEPA) requirements.

The Army and DLNR publishes notices regarding the 45-day public comment period on the Draft EIS in the *Federal Register,* Honolulu *Star-Advertiser,* and the Office of Environmental Quality Control's online publication *The Environmental Notice.* Notices are also mailed to those individuals and organizations on the distribution list (Section 10).

During the Draft EIS review period, individuals and organizations interested in the project are invited to attend a public meeting that will include a presentation of information about the project and an opportunity for participants to provide oral and written comments on the Draft EIS. Individuals and representatives of organizations and agencies can submit written comments to the Army and DLNR, whether or not they attend the public meetings. All comments and responses will be included in the Final EIS.

During the Draft EIS public comment period, individuals and organizations are invited to submit written comments to the Army under the NEPA process at sgspcomments@tetratech.com or by 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

Comments can also be submitted to the Department of Land and Natural Resources under the HEPA process by mail to:

Department of Land and Natural Resources
Attention: Carty Chang, Acting Chairperson
1151 Punchbowl St., Room 131
Honolulu, HI 96813

All comments will be reviewed jointly, so it is not necessary to submit a comment through both processes. All comments on the Draft EIS and responses to those comments will be included in the Final EIS.

Individuals and organizations are invited to access the Draft EIS at the Army's website established for the SGSP EIS at www.garrison.hawaii.army.mil/schofieldplant. Copies of the Draft 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.

Under the NEPA process, the Army may issue the Record of Decision (ROD) after issuing the Final EIS and following a 30-day mandatory waiting period. The Army publishes notices announcing the availability of the EIS for public review in the *Federal Register,* Honolulu *Star-Advertiser*, *The Environmental Notice,* and at www.garrison.hawaii.army.mil/schofieldplant. Under the HEPA process, after issuing the 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.

1.6 ORGANIZATIONAL STRUCTURE OF THE EIS

The EIS is organized by sections. The topics of each section are:

- 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, the existing resources and environmental conditions at the project site and within the region of influence. 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 Policies, Controls, and Land Use Plans*, describes how the proposed project would or would not be consistent with relevant policies, controls, and land use plans.
- 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 Analyses*, 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,* 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.

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 (Section 2.2).

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.

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[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 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 offsite 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 capability 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:

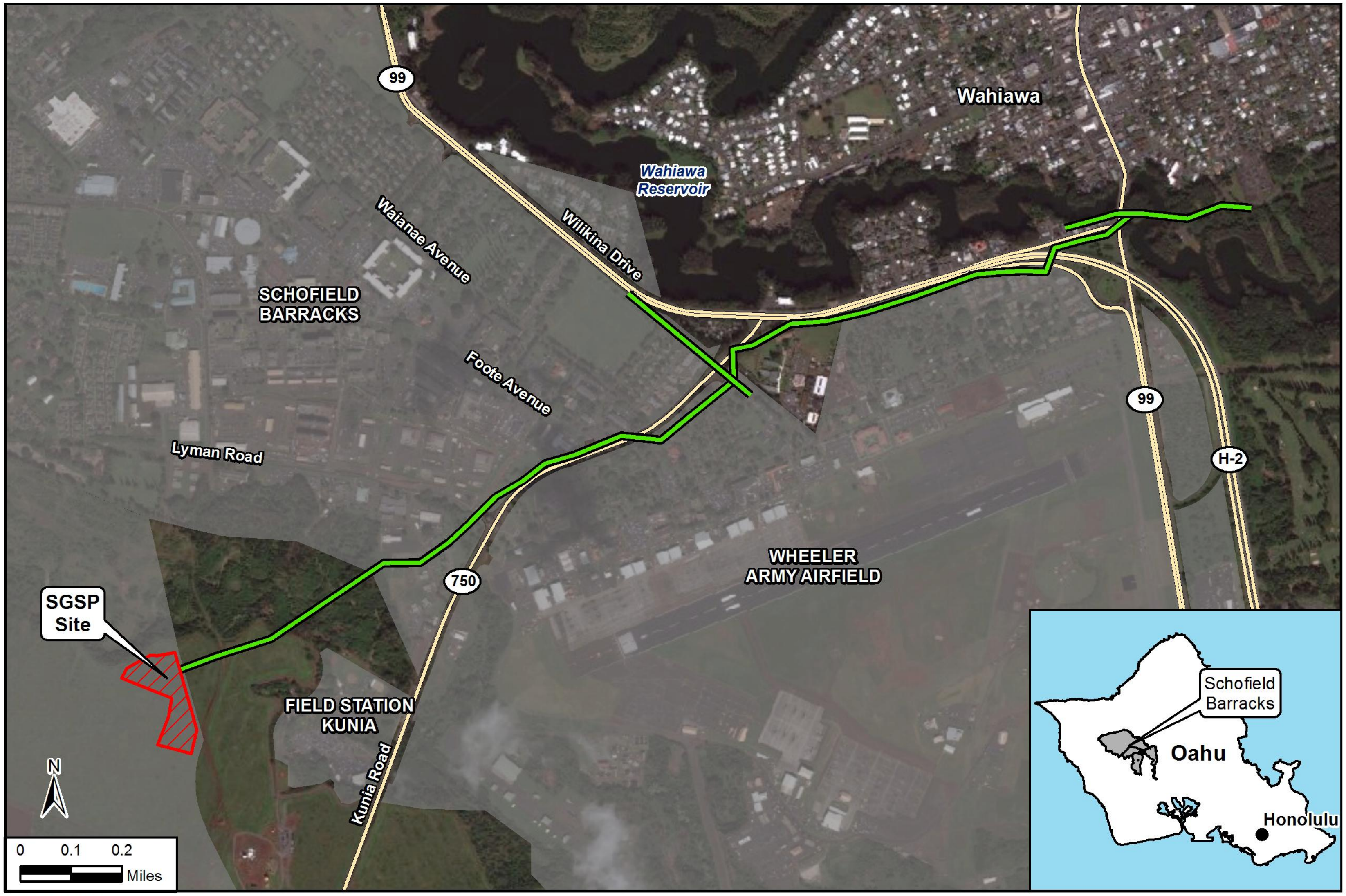
> (1) The U.S. Army's lease of 8.13 acres of land and the related granting of a 2.5-acre interconnection easement (Figures 2.2-1 and 2.2-2), on Schofield Barracks and Wheeler Army Airfield toHawaiian Electric to construct, operate, and maintain a 50- MW capacity renewable energy power plant to include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

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, 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



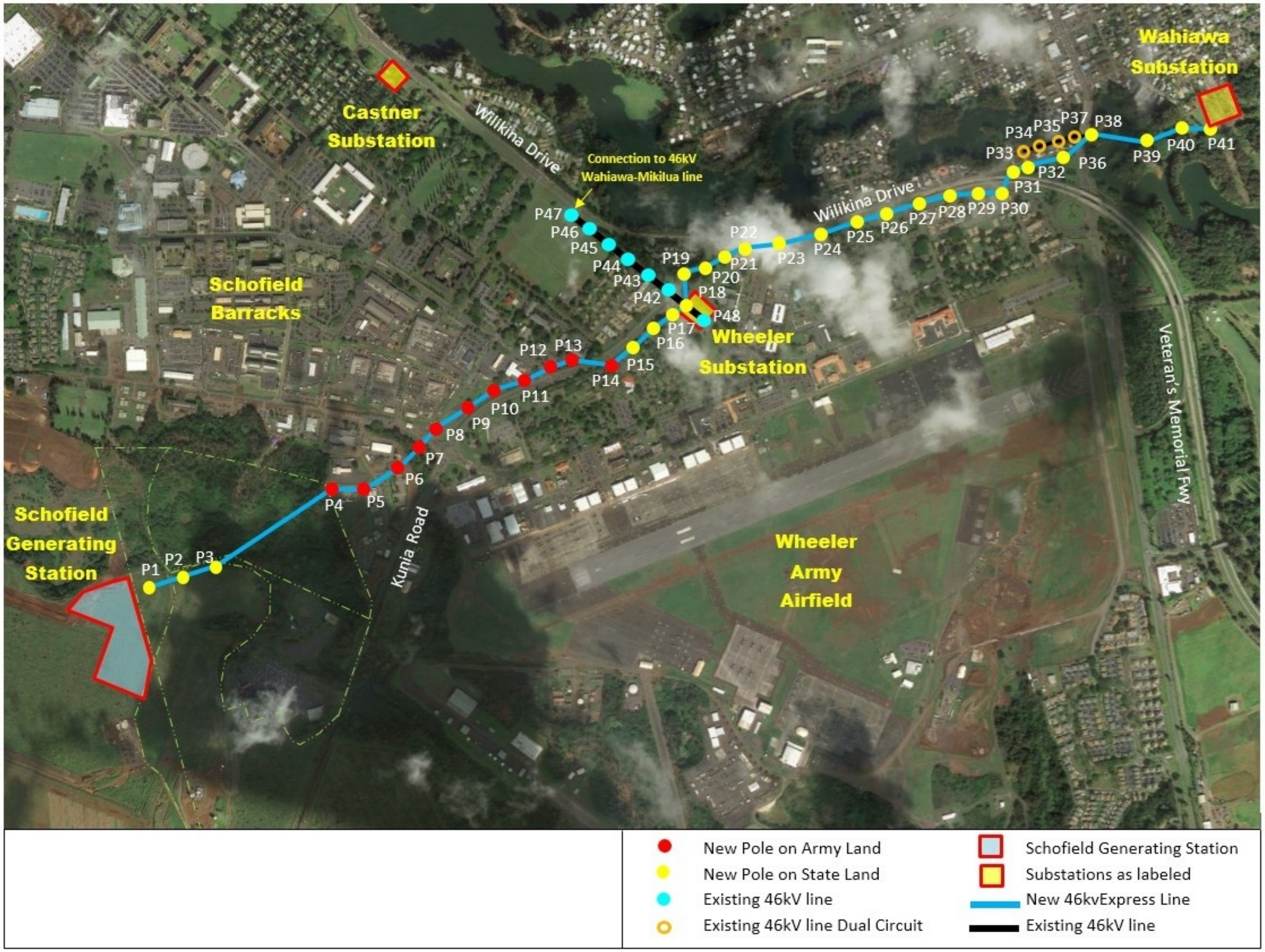
LEGEND

DoD/Federal Land
State Route
SGSP Site
Planned Interconnection Route

Project Location

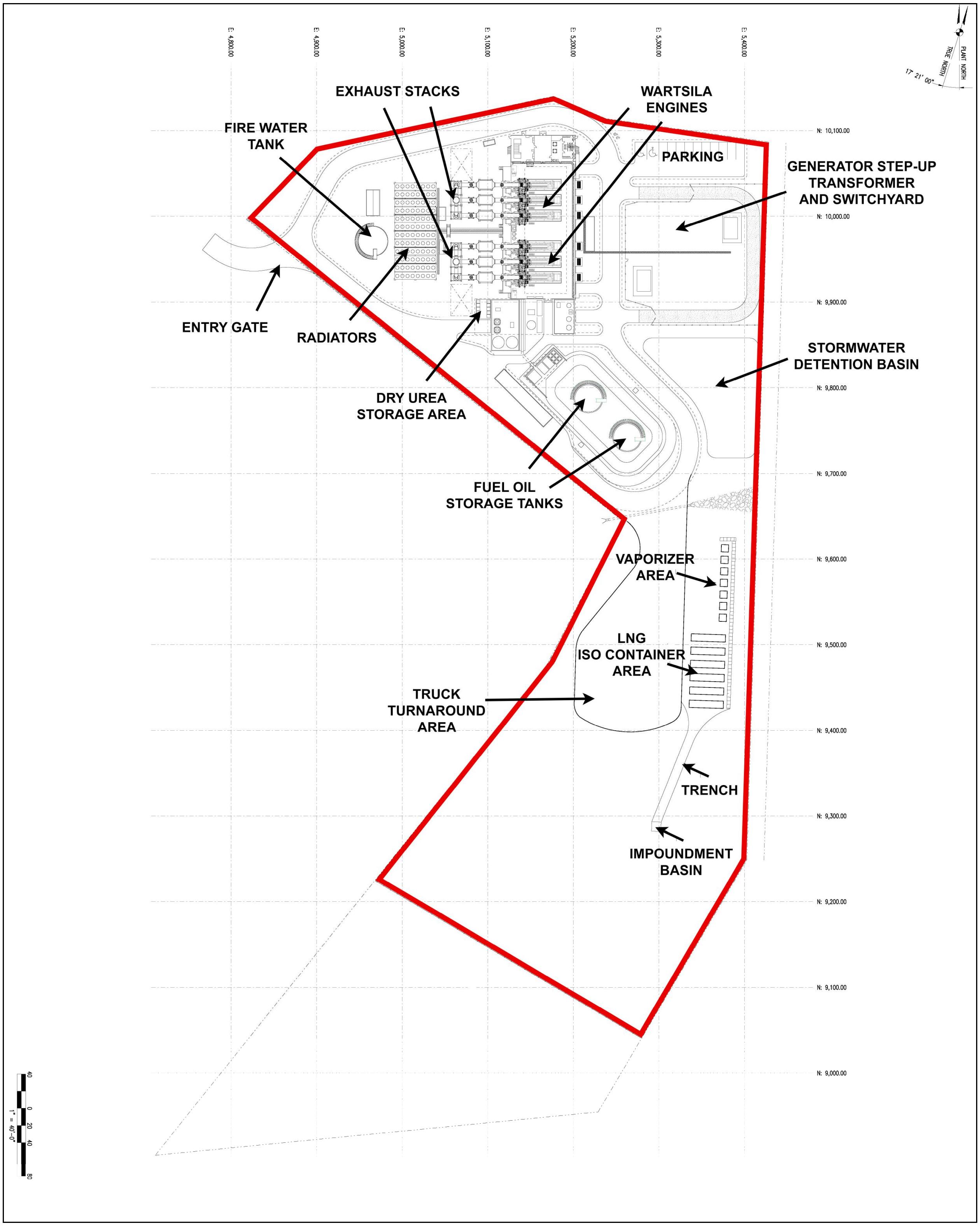
Figure 2.2-1

Source: Schofield Barracks GIS 2014, ESRI 2011.



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 kVs 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.

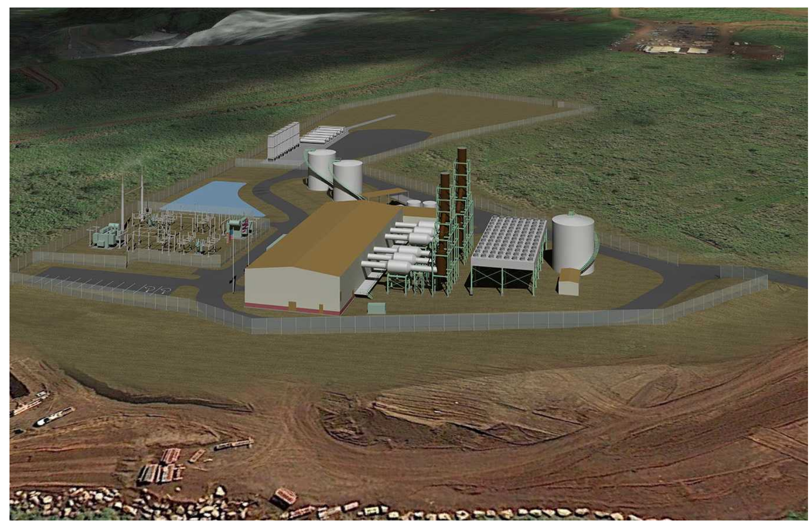
The high-voltage side of the generator step-up transformers would be connected through gas-insulated (SF6) circuit breakers to a single-circuit, three-phase, overhead 46-kV transmission line that would connect to the existing Hawaiian Electric 46-kV grid.

Auxiliary station power would be stepped down from 13.8 kVs 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 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 grid-wide 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 above ground 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 with 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.

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.

- Wash down 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, ratied, 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 42-47 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, 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 tramsmission 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 pre-commissioning 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 September 16 and May 31, the period of time outside the pupping season for the Hawaiian hoary bat. If tree trimming or removal were to become necessary between June 1 and September 15, 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 June 1 and September 15.

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 island-wide 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. to 8:00 a.m.), it is estimated to be used 25 percent of the time during the peak morning demand hours of 6:30 a.m. to 8:00 a.m., for a total energy output of 4,100 MW-hours per year.
- During the day (8:00 a.m. to 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 p.m. to 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

[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.

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 island-wide 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, fulltime 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 September 16 and May 31.

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, consultation with the United States Fish and Wildlife Service under Section 7 of the ESA, and the State Historic Preservation Office under Section 106 of the National Historic Preservation Act.

[7] A *Validated Threat* means 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.

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 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	Hawaii Department of Health (Hawaii DOH)	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) 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

Table 2.2-2. (continued)

Permit or Approval	Generating Station, Interconnection, or Both	Agency	Status
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 $4,400,000 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 (REC) 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 anti-terrorism 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 found.

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 region of influence (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

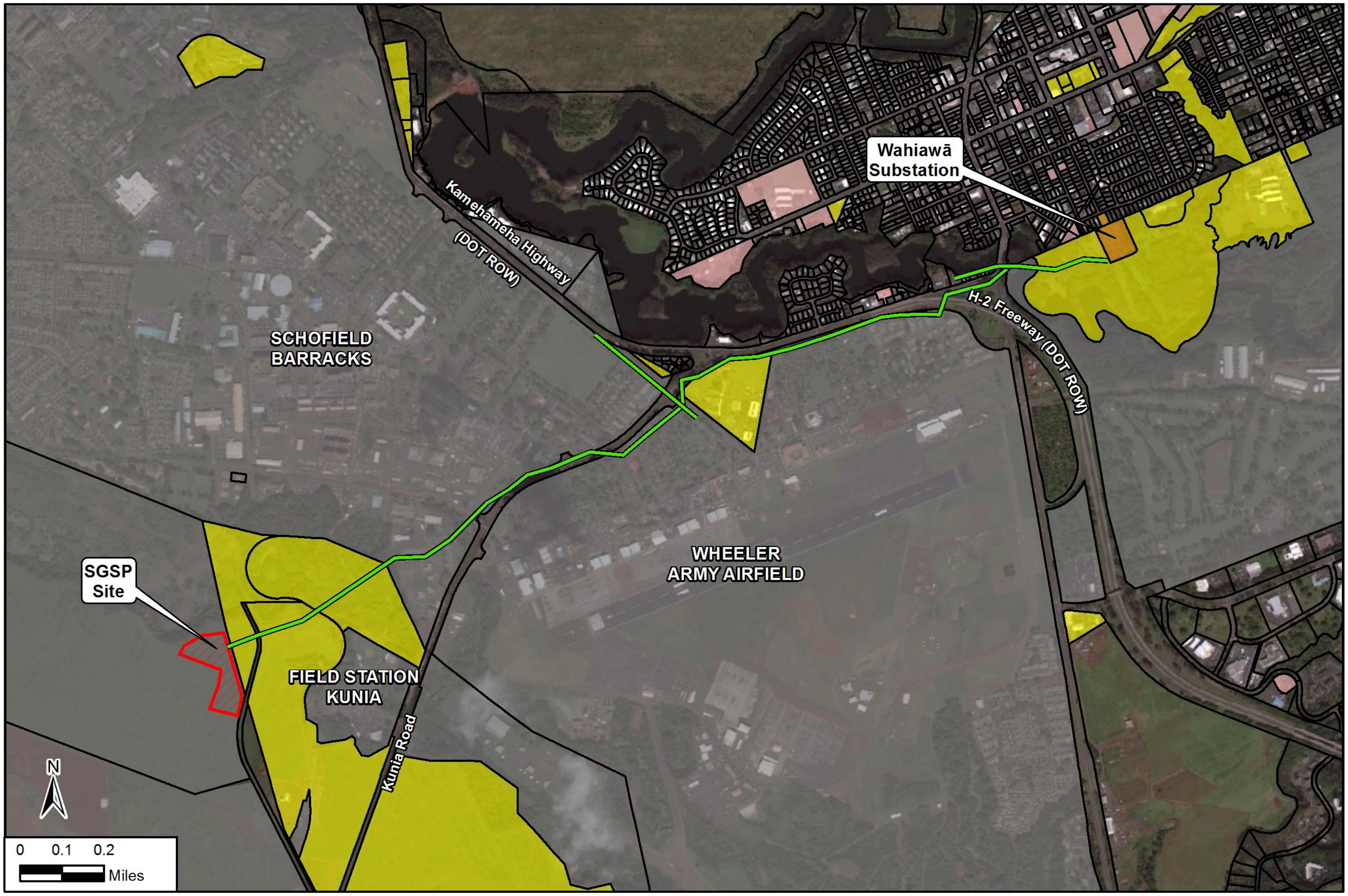
Land ownership on and around the SGSP is shown on Figure 3.1-1 and Table 3.1-1. The site is on Army-owned property on Schofield Barracks' South Range. The interconnection easement is partially on Army-owned property on Schofield Barracks and Wheeler Army Airfield and partially on properties owned or 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 a master plan and Real Property Master Plan Digest (USAG-HI 2009). The master plan identifies the generating station site and surrounding land areas as a light industrial area. These documents describe and analyze existing land uses and 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 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	State of 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	State of 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
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 Policies, Controls, and Land Use Plans* 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. HRS, Chapter 205, 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.

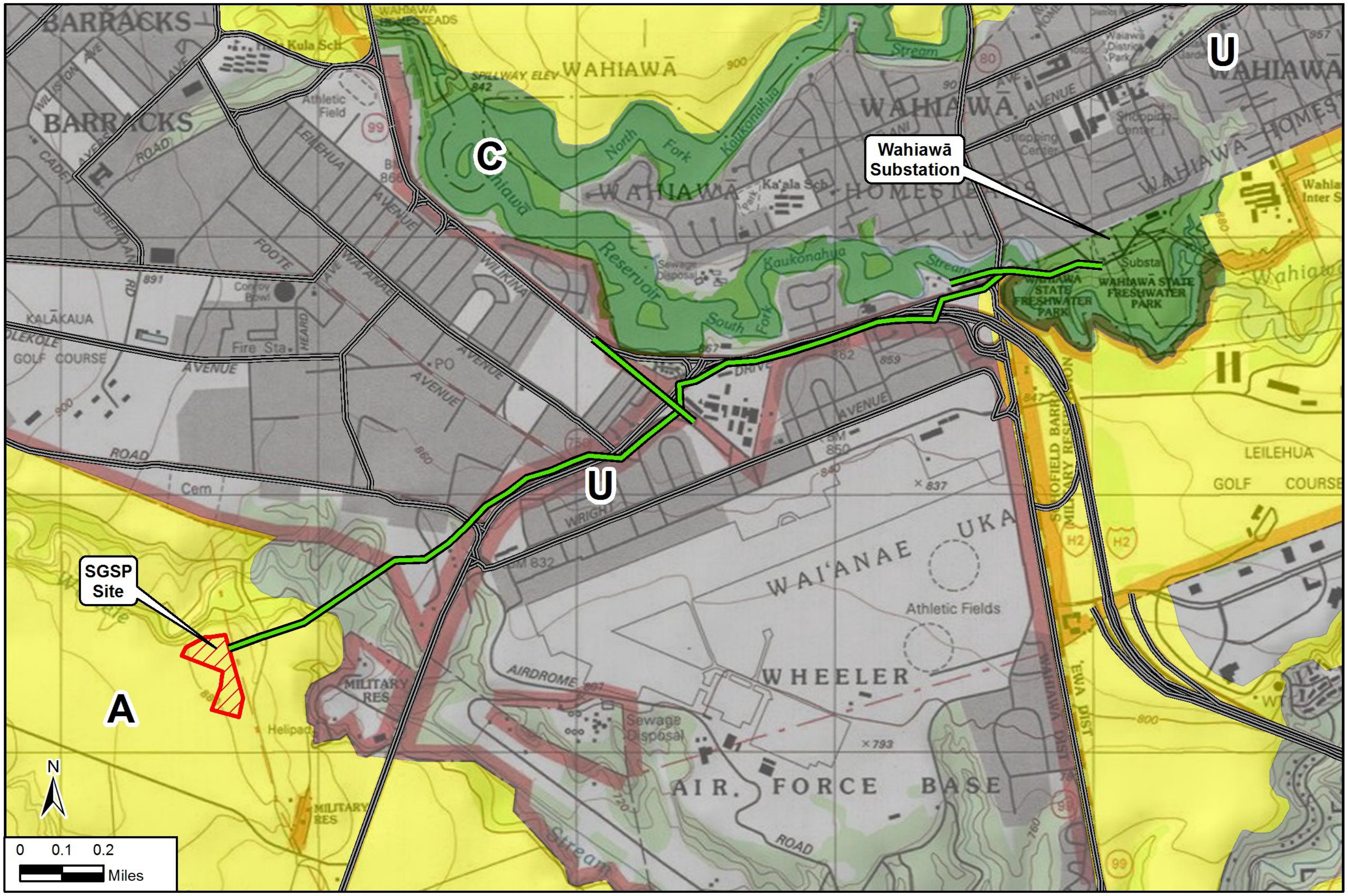
Off-post, the counties make all land use decisions in the urban districts in accordance with their land use plans and regulations. Honolulu adopted a land use ordinance regulating land use to encourage orderly development by establishing zoning districts and specifying the kinds of development and development 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

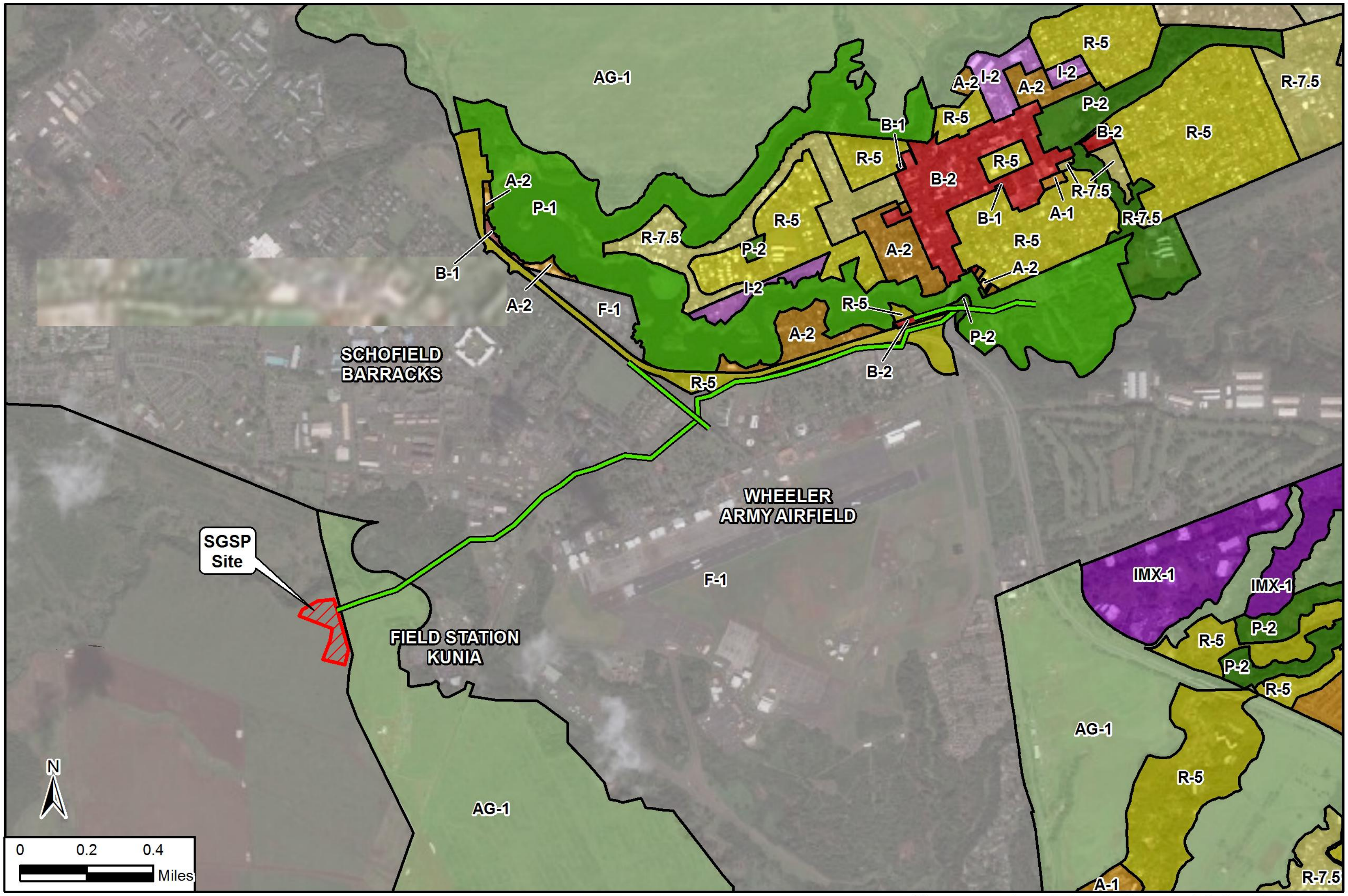
Land Use District

- 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

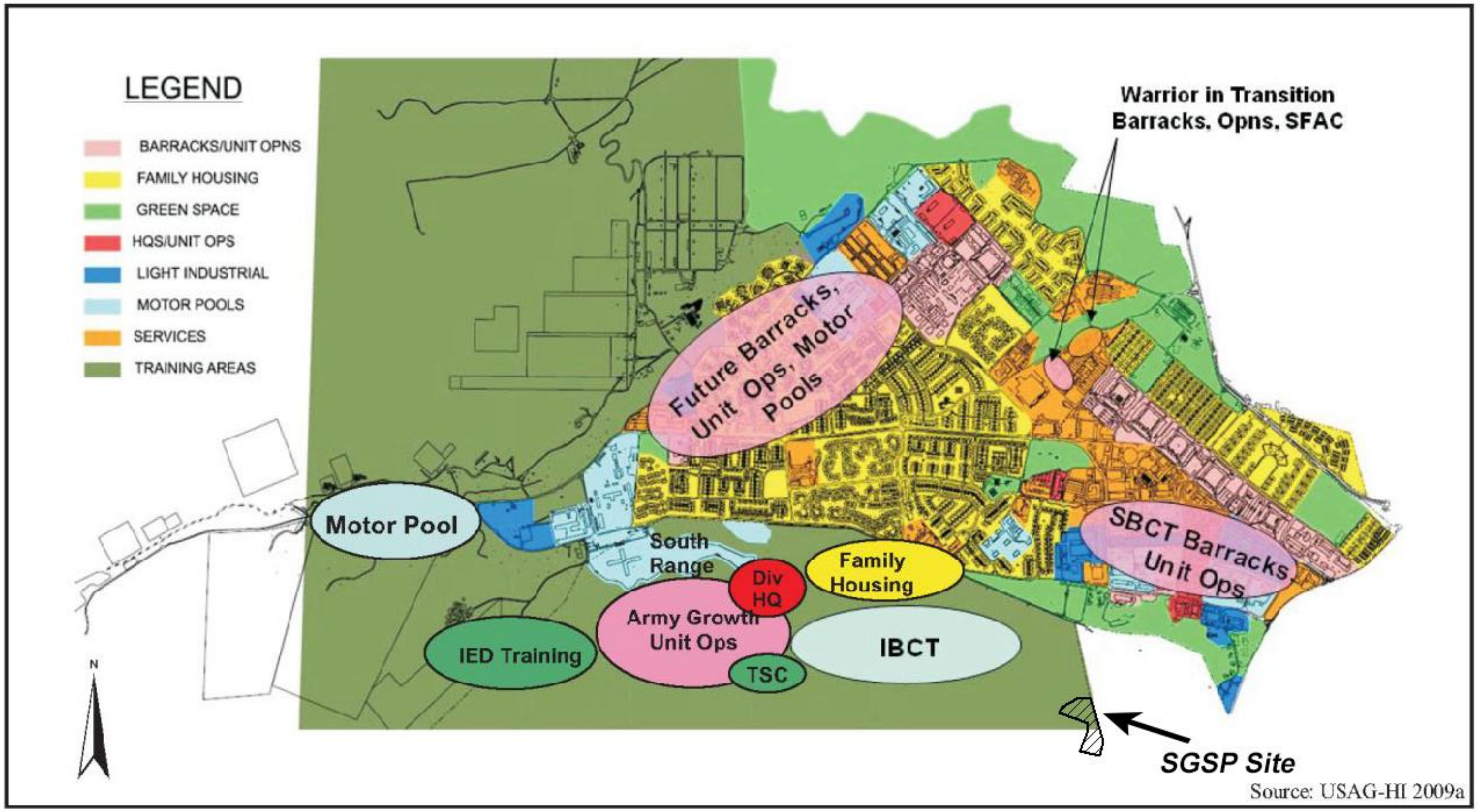
Zoning District

- 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 Best Management Practices

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 the Federal Emergency Management Agency 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 accident potential zones

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.

(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, Notice of Proposed Construction or Alteration. 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) 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) (USAG-HI 2004) provides direction for improving the visual quality on Schofield Barracks. 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; Honolulu Department of Planning and Permitting [HDPP] 2002a) is Central Oahu's guide to development policy for the region. 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 region-wide open space network.

With respect to visual resources, the plan includes region-wide guidelines and guidelines specific to Wahiawa. Region-wide, 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.

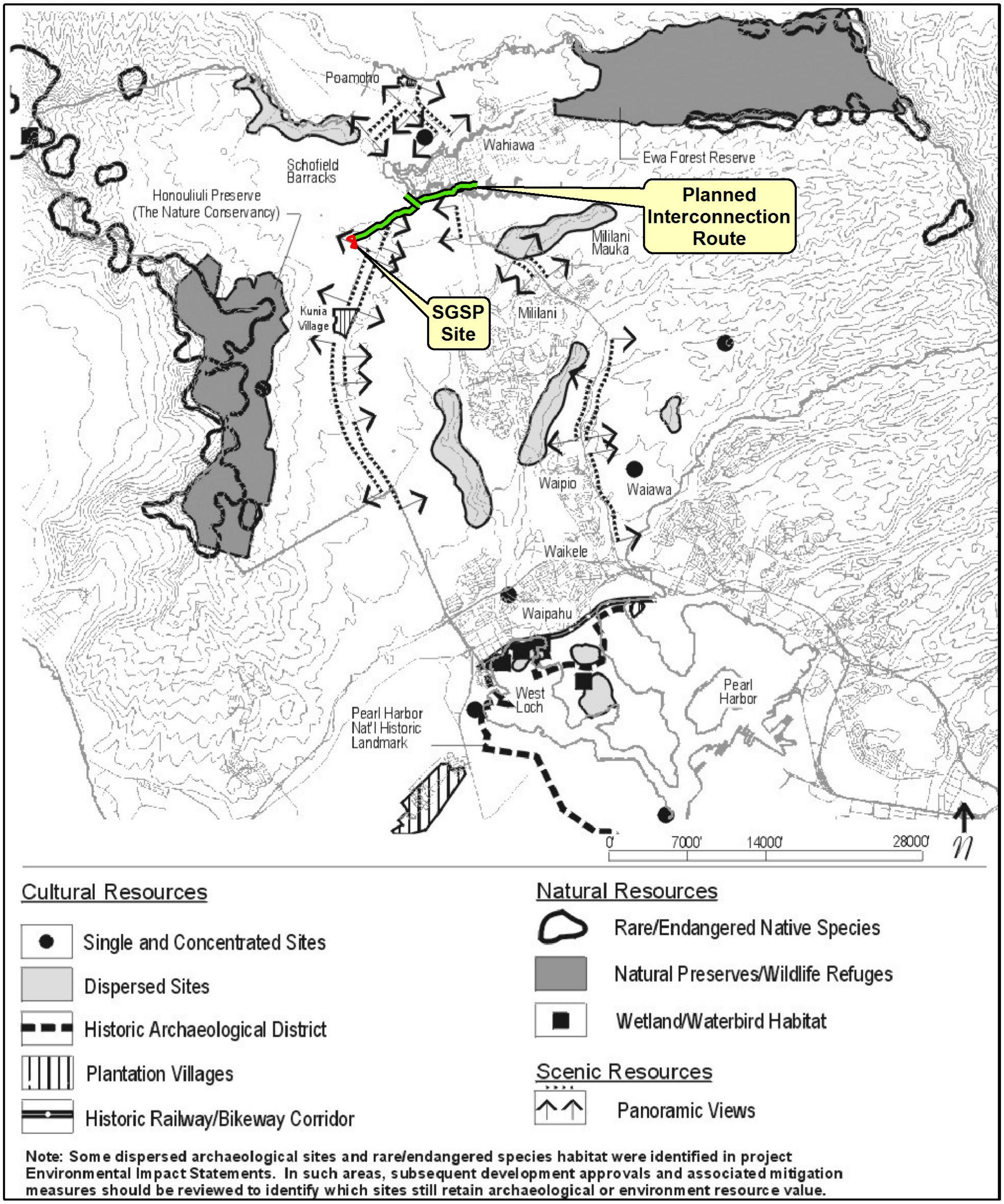
3.3.1.3 Distinct Visual Features and Scenic Views

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



Important Public Views

Figure 3.3-4

Source: 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."

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. 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). 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.

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. 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 Best Management Practices

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. 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) 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 State 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 shows federal and state air quality standards and the monitored concentrations of criteria pollutants at the monitoring location closest to Schofield Barracks (EPA 2013).

3.4.1.2 Installation-Wide 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 installation-wide 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 installation-wide actual emissions and PTE of criteria pollutants and GHGs at Schofield Barracks.

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

Pollutant	Hawaii Air Quality Standards[a]	Federal Air Quality Standards[b]	Monitored Data Near Schofield Barracks
Carbon monoxide (CO)			
1-hour maximum[c] (ppm)	9	35	1.2
8-hour maximum[c] (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)[d]	NE	100	22.0
Ozone (O_3)			
8-hour maximum[e] (ppm)	0.08	0.075	0.05
Sulfur dioxide (SO_2)			
1-hour average[c] (ppb)	0.5	0.5	(no data)
3-hour maximum[c] (ppm)	0.5	0.5	(no data)
24-hour maximum[c] (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[e] (µg/m^3)	NE	35	20
Annual mean[f] (µg/m^3)	NE	12.0	9
Particulate matter less than 10 microns in diameter (PM_{10})			
24-hour maximum[c] (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)

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] Source: Hawaii DOH 2013a; EPA 2013.
[b] Source: 40 CFR §50.1-§50.18.
[c] Not to be exceeded more than once per year.
[d] The 3-year average of the 98th percentile of 1-hour concentrations at each population-oriented monitor must not exceed 35 µg/m^3.
[e] 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.
[f] The 3-year average of the annual mean $PM_{2.5}$ concentrations must not exceed 12.0 µg/m^3.

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 gases; N_2O = nitrous oxide; PM_{10} particulate matter less than 10 microns in diameter; SO2 = 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 installation-wide 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.

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; and
- 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.

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

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; and
- 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 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 13514, *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 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 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 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 January 2, 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 Best Management Practices*.

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 3.4-5, 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 3.4-6 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 3.4-5.
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 3.4-6.
Estimated Emissions 100% Operation of the SGSP

	Total Emissions (tons per year)		
Pollutant	**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
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
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.

Note: 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 selective catalytic reduction (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 3.4-7 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.

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 installation-wide 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 June 12, 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.

Table 3.4-7.
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)	10.1	40	No
Total particulate matter (PM)	72.3	25	**Yes**
Particulate matter less than 10 microns in diameter (PM_{10})	139.8	15	**Yes**
Particulate matter less than 2.5 microns in diameter ($PM_{2.5}$)	139.8	10	**Yes**
Volatile organic compounds (VOCs)	125.4	40	**Yes**
Lead	0.0	0.6	No
Fluorides	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).

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 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 3.4-8, 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 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

13514. Army-wide 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 3.4-8.
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	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 2014.

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 no 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 13514. Operating the SGSP on 100 percent biodiesel would have the largest benefit by potentially reducing nonbiogenic GHG emissions by approximately 355,187 tpy. Operating the SGSP on 50 percent LNG/50 percent biodiesel would potentially reduce nonbiogenic GHG emissions by approximately 243,356 tpy. Operating the SGSP on 50 percent diesel/50 percent biodiesel would potentially reduce nonbiogenic GHG emissions by approximately 202,852 tpy. These effects would be moderately beneficial.

3.4.2.1.3 Mitigation Measures and Best Management Practices

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, 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;and
- Promptly removing spilled or tracked dirt or other materials from paved streets.

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, and
- 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, the EPA provided information suggesting that continuous and long-term noise levels in excess of DNL 65dBA 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

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.

Note: 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

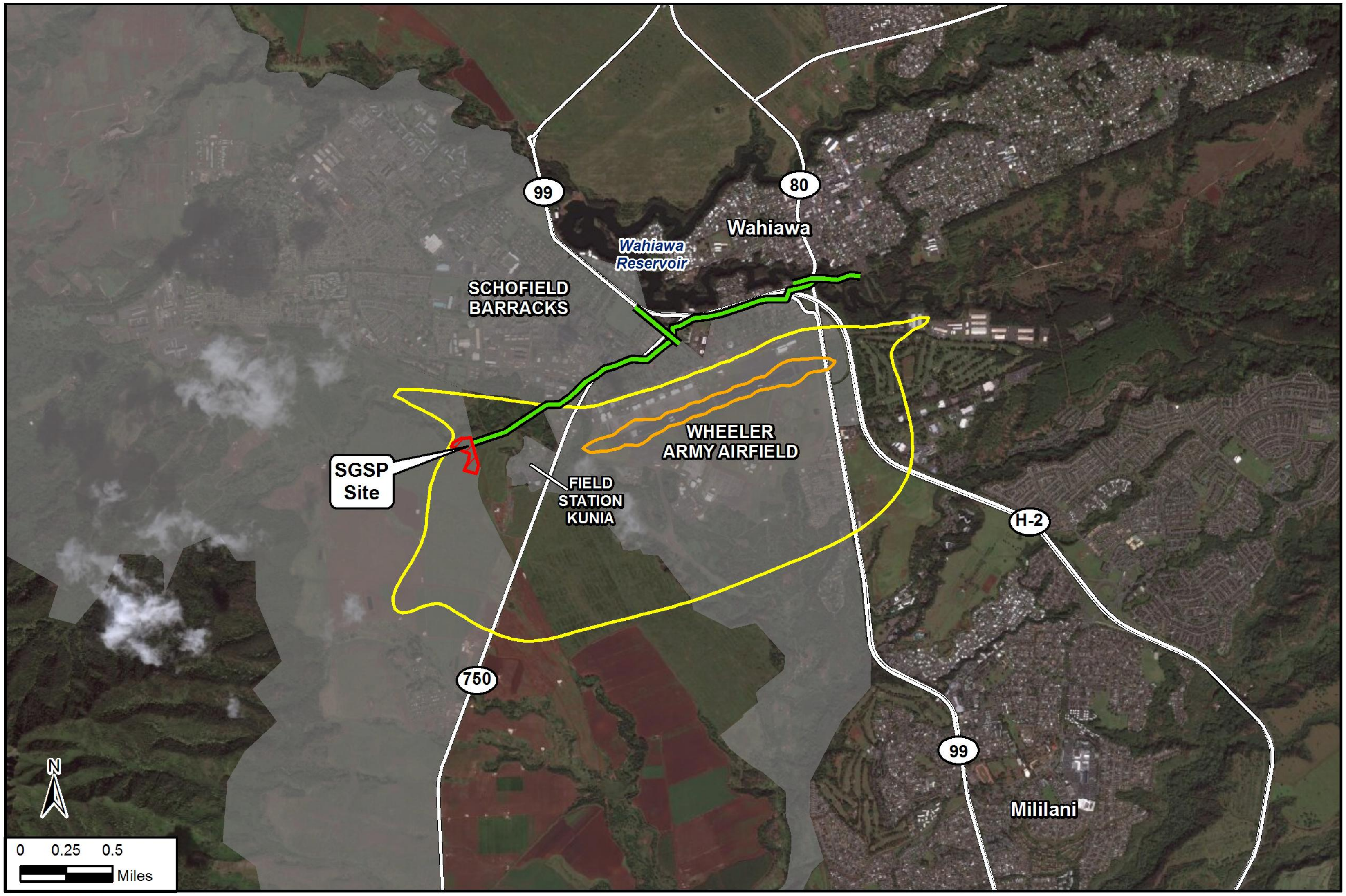
10:00 p.m. and 7:00 a.m. The Noise Control Act of 1972 (42 USC 4901 *et seq*.) directs federal agencies to comply with applicable federal, state, interstate, and local noise control regulations to the fullest extent consistent with agency missions. Military training activities are specifically exempt 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.

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.



LEGEND

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

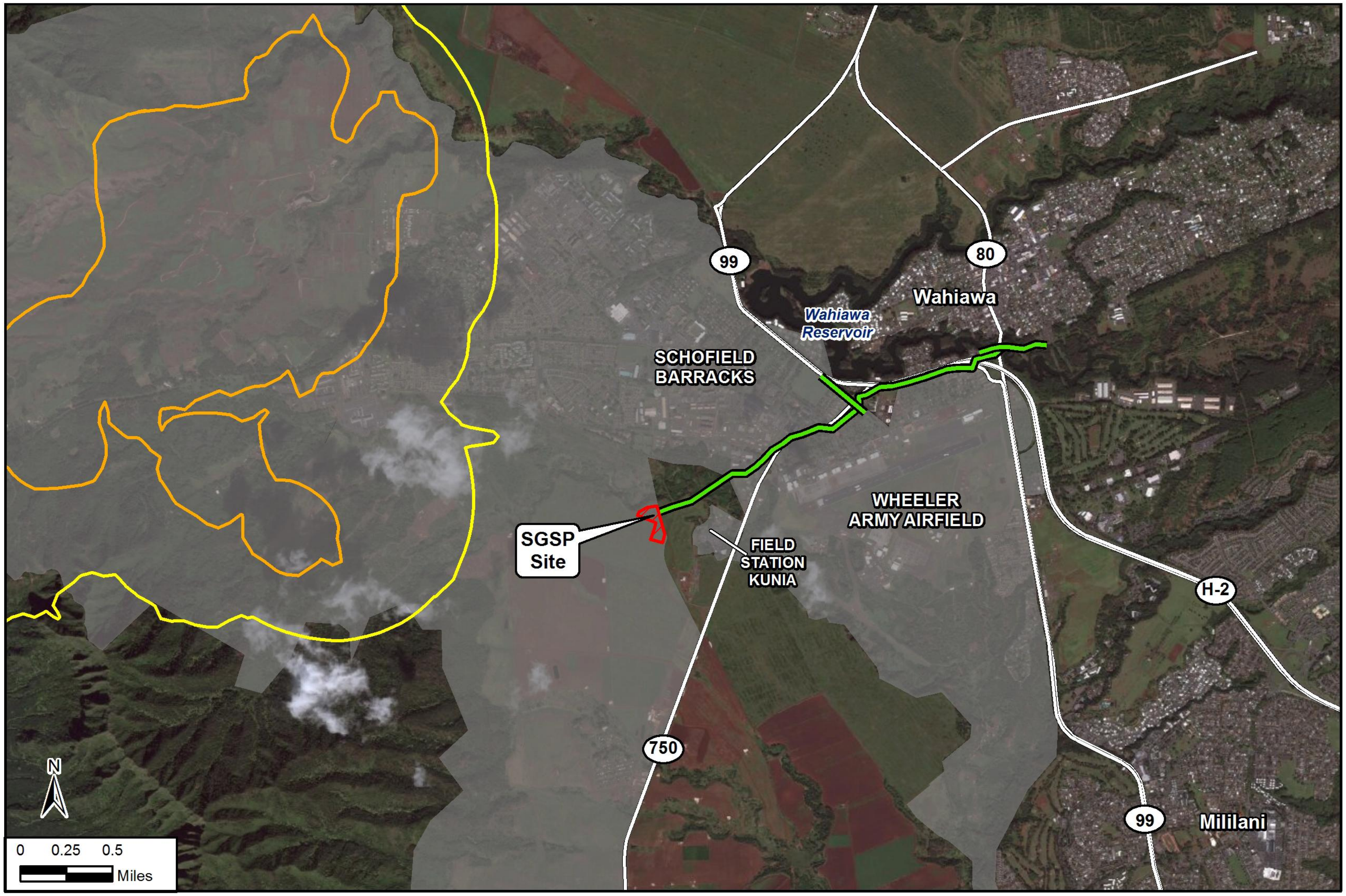
Wheeler Army Airfield Noise Contours

- 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.

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**

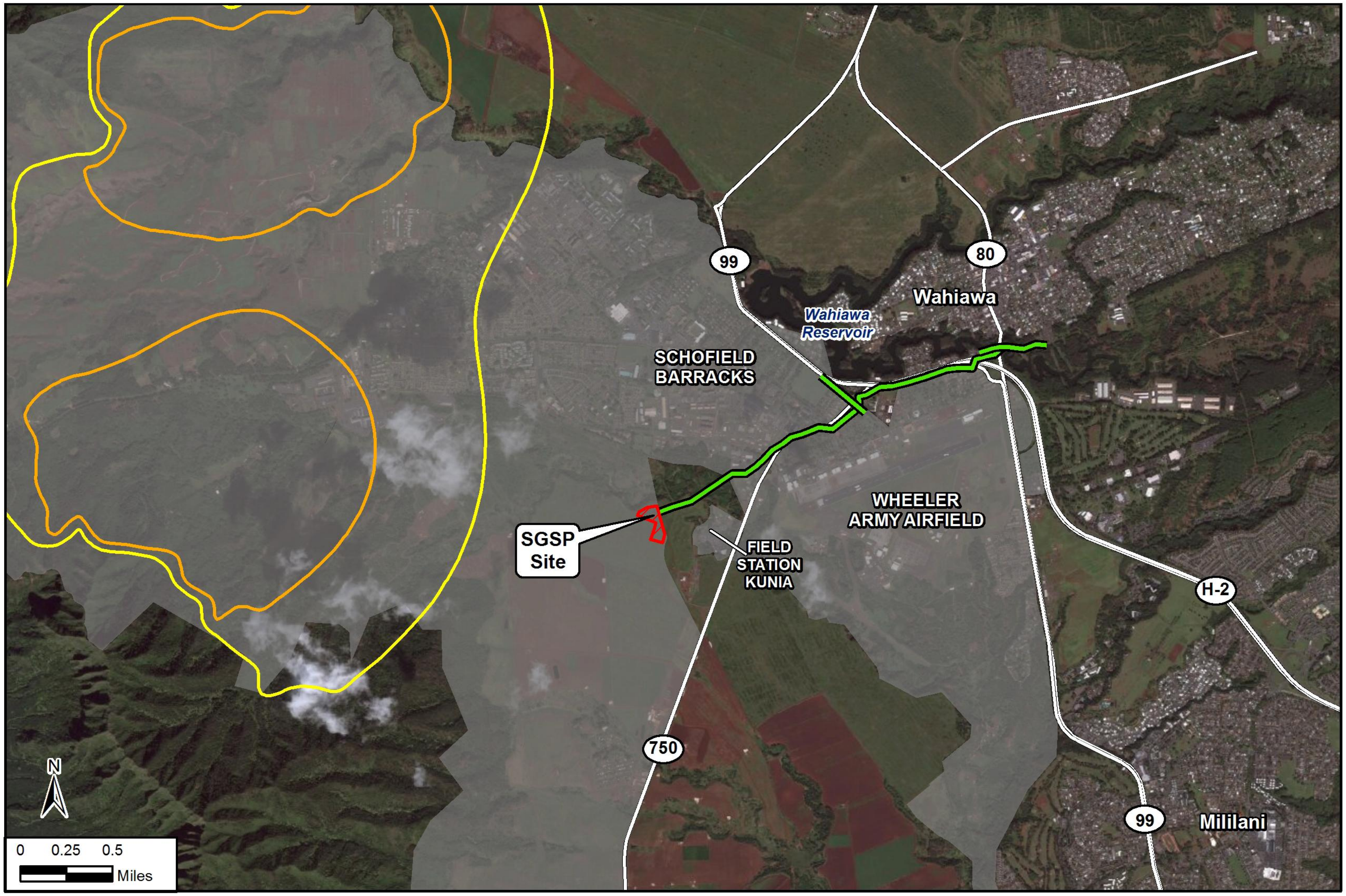
Closest Noise Sensitive Area (NSA)				Estimated Existing Sound Levels (dBA)		
					Average Sound Level	
Distance to Noise Sensitive Area [feet (meters)]	Direction	Type	Land Use Category	DNL	Daytime	Nighttime
1,000 (320)	Northwest	Future residential	Military	65	63	57
2,300 (700)	Northwest	Existing residential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

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.



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.

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 the 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.

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.

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.

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. The ISO 9613 standard: Acoustics—Attenuation of sound during propagation outdoors Part 2: General method of calculation—was used for air absorption and other sound propagation calculations in the assessment (ISO 1996). 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.

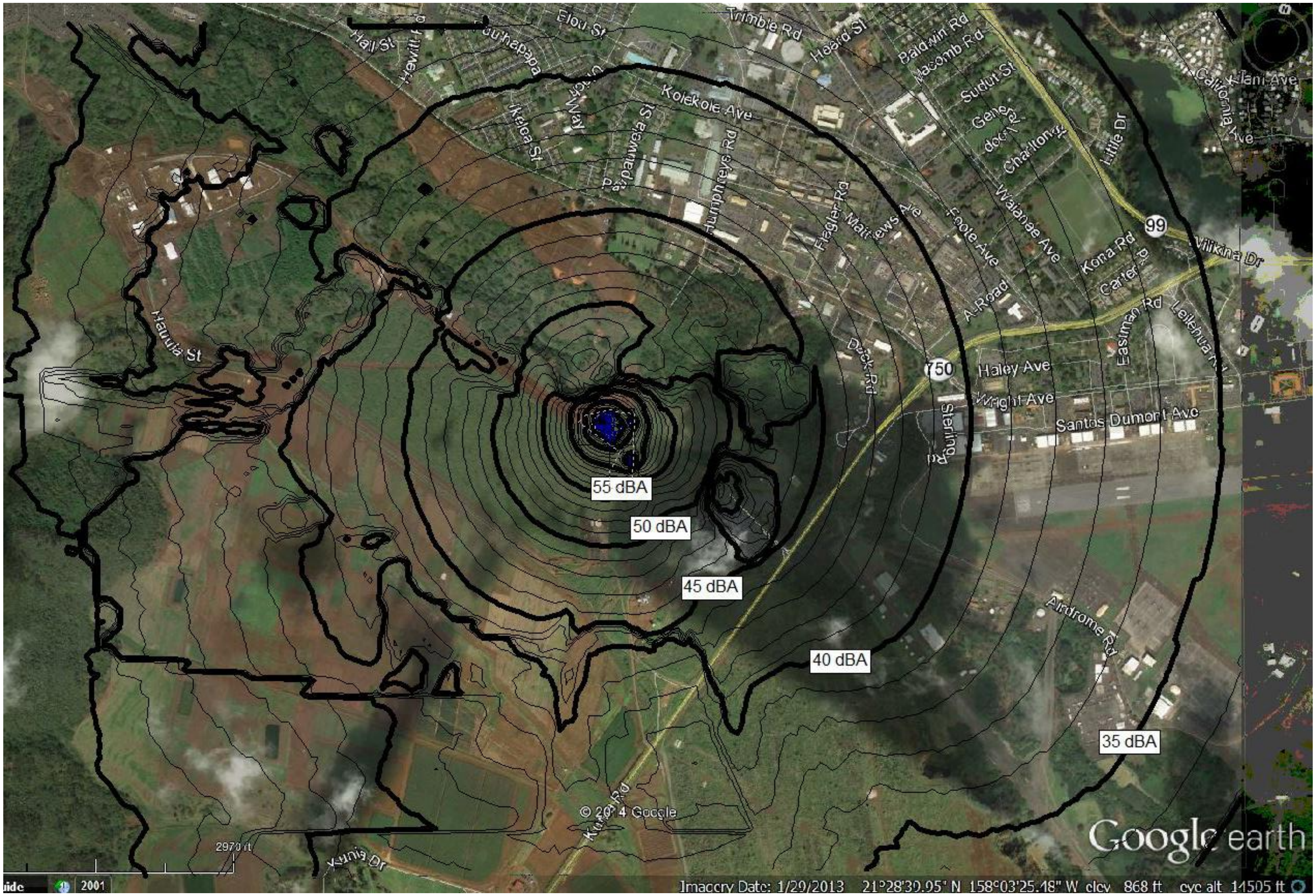
Sound levels could exceed 65 dBA up to 100 feet north and west of the site, 55 dBA up to 500 feet west and east of the site, and 45 dBA approximately half a mile (2,500 feet) in all directions from the site. The proposed facility might be audible beyond this distance during periods of quiet, particularly 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 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 Best Management Practices

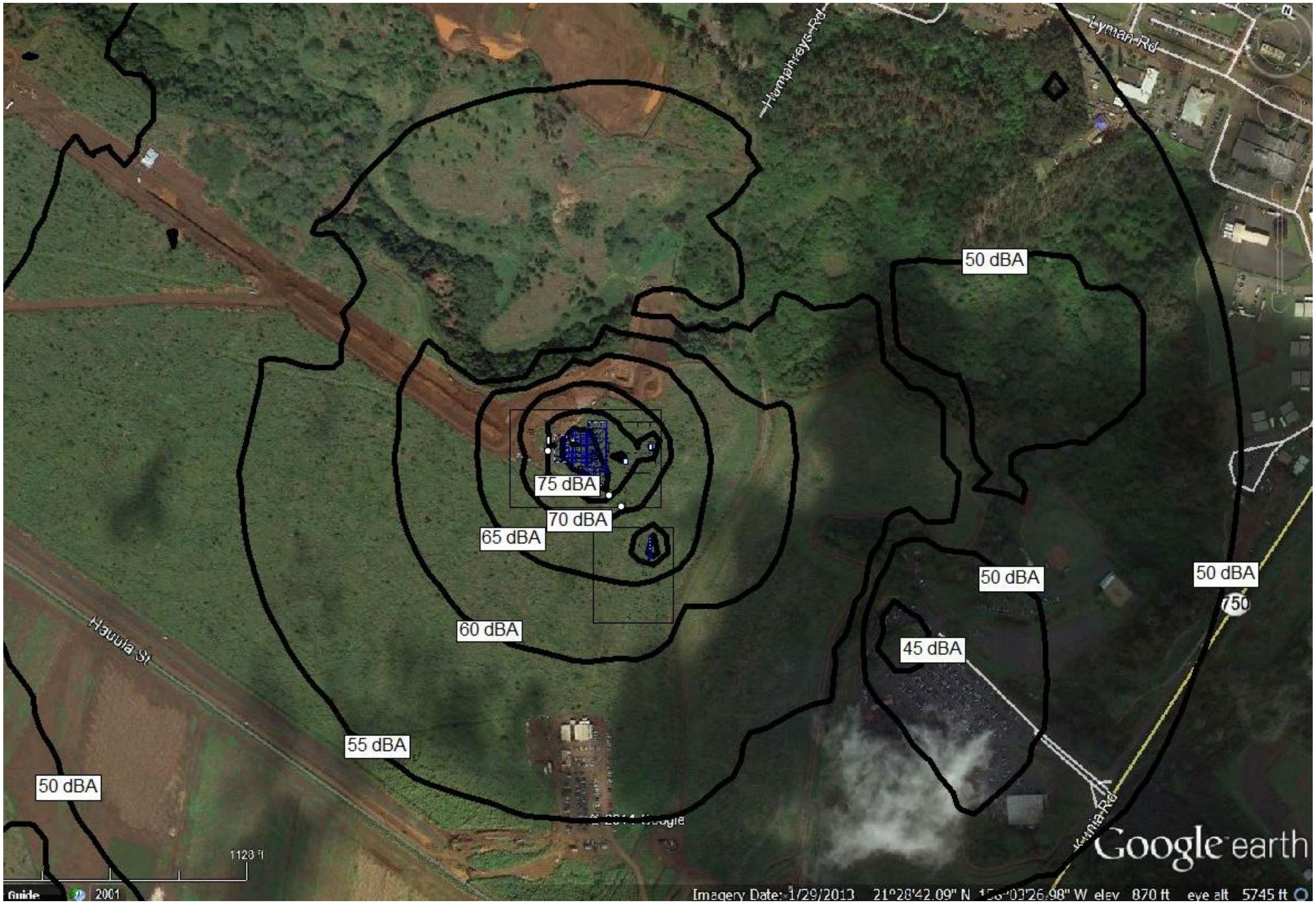
No mitigation measures for noise would be required. The direct, indirect, and cumulative effects associated with noise would be minor to moderate. No activities outside current engineering



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

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 AR 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.

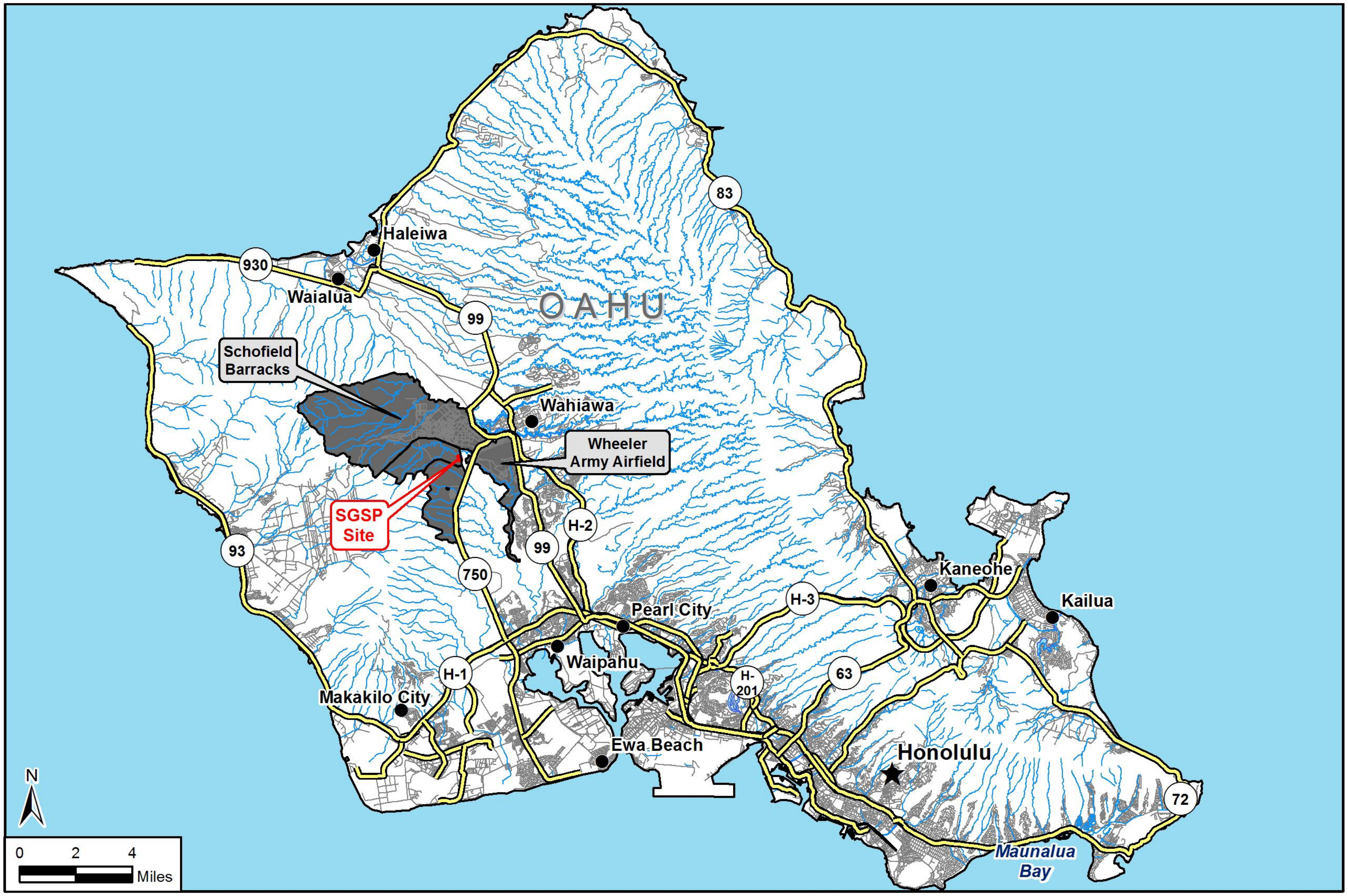
3.6 TRAFFIC AND TRANSPORTATION

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, 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.



LEGEND

- SGSP Site
- State Route
- Road
- Stream

Regional Transportation Network

Figure 3.6-1

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

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.

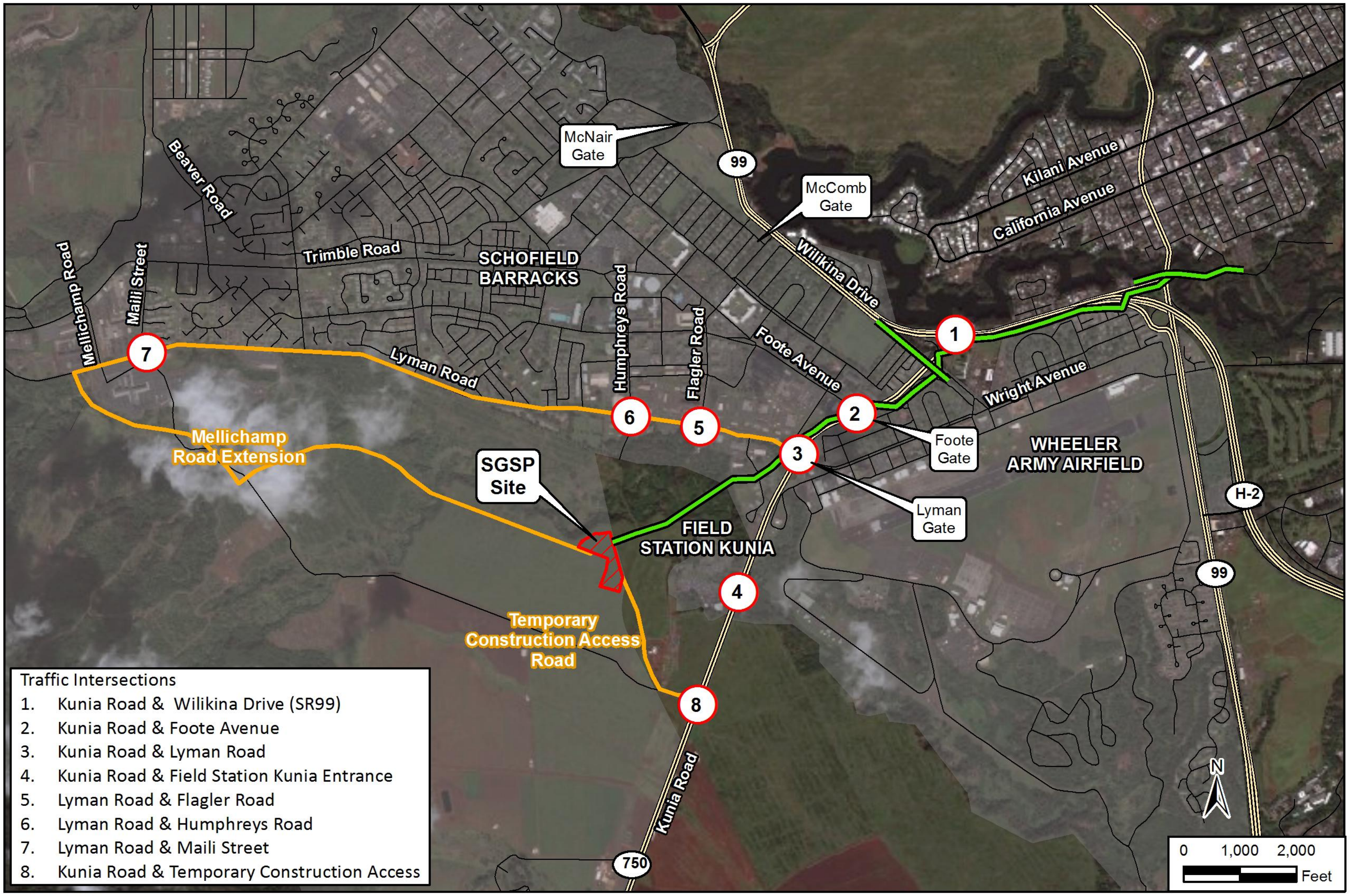
3.6.1.2 Existing Traffic Conditions

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).

3.6.1.3 Access Control Points

Schofield Barracks provides access from the external roadway network through four access control points (ACP), 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.



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.

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	-	-

Source: Tetra Tech 2014a, USAG-HI 2014a.

Note: - = 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 cargohandling 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 to 8 a.m. and 4 to 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
Note: 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 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

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.

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

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

	Baseline (vhp)		Baseline Plus Operation of SGSP (vhp)	
Gate	**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

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.

3.6.2.1.3 Mitigation Measures and Best Management Practices

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 46kV 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 the Federal Emergency Management Agency (Hawaii-NFIP 2013). The eastern portion of the interconnection easement, where poles 31-41 are proposed, lies in a flood Zone AE—areas subject to inundation by the 1 percent annual chance flood event. 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 Total Maximum Daily Load (TMDL) has been prepared for the South Fork of the Kaukonahua Stream to reduce turbidity and nitrogen and a TMDL for Waikele Stream is being prepared. 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 National Pollutant Discharge Elimination System (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 or
    - 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. 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. Installation-wide 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

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. The permit requires that a project-specific Stormwater Pollution Prevention Plan (SWPPP) be prepared. An 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.

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

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 2014c). 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 Selective Catalytic Reduction 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- to 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 2014c).

3.7.2.1.3 Mitigation and Best Management Practices

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, 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.

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

The local elevation ranges from less than 660 feet above mean sea level (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 to 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 (U.S. Army Corps of Engineers [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 (U.S. Geological Survey [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).

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 (U.S. Army Environmental Command [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 to 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 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 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 (International Building Code [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 U.S. Fish and Wildlife Service (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*, January 10, 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*, February 3, 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 Chapter 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 animals protected by the ESA—five birds and one bat—have the potential to occur in the project area. They are the Hawaiian goose or nene, (*Branta sandvicensis*), Hawaiian stilt (*Himantopus mexicanus knudseni*), Hawaiian coot (*Fulica americana alai*), Hawaiian common moorhen (*Gallinula chloropus sandvicensis*), Hawaiian duck (*Anas wyvilliana*), Hawaiian hoary bat (*Lasiurus cinereus semotus*) (USAG-HI 2010; Mansker 2014; Kawelo 2014). Based on recent observations and sightings, it is likely that the nene and the Hawaiian hoary bat occur in the project area. The Hawaiian hoary bat is known from Schofield Barracks and nene 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 Nene

The nene, 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. Nene 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). Nene 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 nene 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 nene has been observed at Wheeler Army Airfield as recently as August 2014. Some geese (four individuals) have been sighted frequently enough that they may need to be considered resident Oahu geese (Kawelo 2014). While nene 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 (Birding Hawaii 2003; 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 non-sensitive 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 Infantry Division and U.S. Army, Hawaii 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 (non-sensitive 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 (non-sensitive 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, nene, 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 non-sensitive 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 non-native 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 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 National Marine Fisheries Service 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 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 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 June 1 and September 15.

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 nene, 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 2014a). 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 (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 (Department of the Army 2014) and the IDG, 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, Landscaping with Native Plants (Department of the Army 2014) and the IDG, 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 June 1 to September 15, 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 the nene, Hawaiian stilt, Hawaiian coot, Hawaiian moorhen, and Hawaiian duck 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 (HRS Chapter 20). 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 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.
- To avoid impacts to 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 bat pupping season. If tree trimming or removal were to become necessary between June 1 and September 15, 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 June 1 and September 15.
- 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* (Sims et al. 2014; Appendix G) and the *Cultural Impact Assessment* (Liston 2014; Appendix H).

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 National Historic Preservation Act (NHPA) of 1966, as amended (54 USC §306108), 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 [Title 42 USC Sections 4321 to 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 State Historic Preservation Division (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*. Section 106 of the NHPA consultation is conducted by the federal agency with the SHPD and other interested parties. HRS Chapter 6E (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 HRS Chapter 343, *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).

HRS, Chapter 343, also requires consideration of a proposed action's effects on the cultural practices of the community and the state. The Cultural Impact Assessment (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

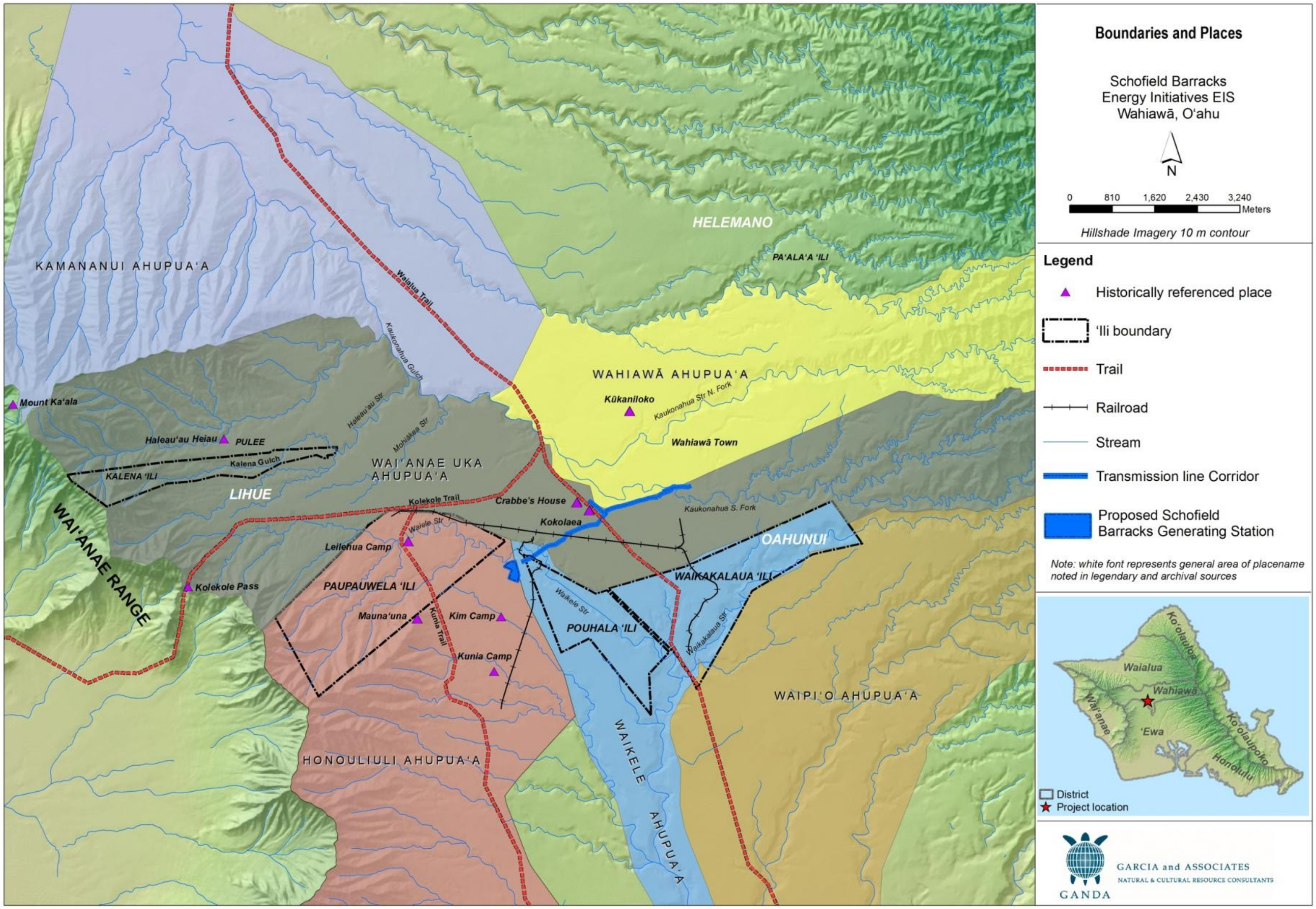


Figure 3.10-1. Traditional and Historic Boundaries and Place Names near the SGSP

on Oahu (Beckwith 1970) and a place where *ulu* (breadfruit; *Artocarpus altilis*) was first introduced to Hawaii (Burgett and Rosendahl 1992; Appendix G).

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 ‘Ī‘ī (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 island-wide 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 Acquisition Area, 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 8 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.

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.

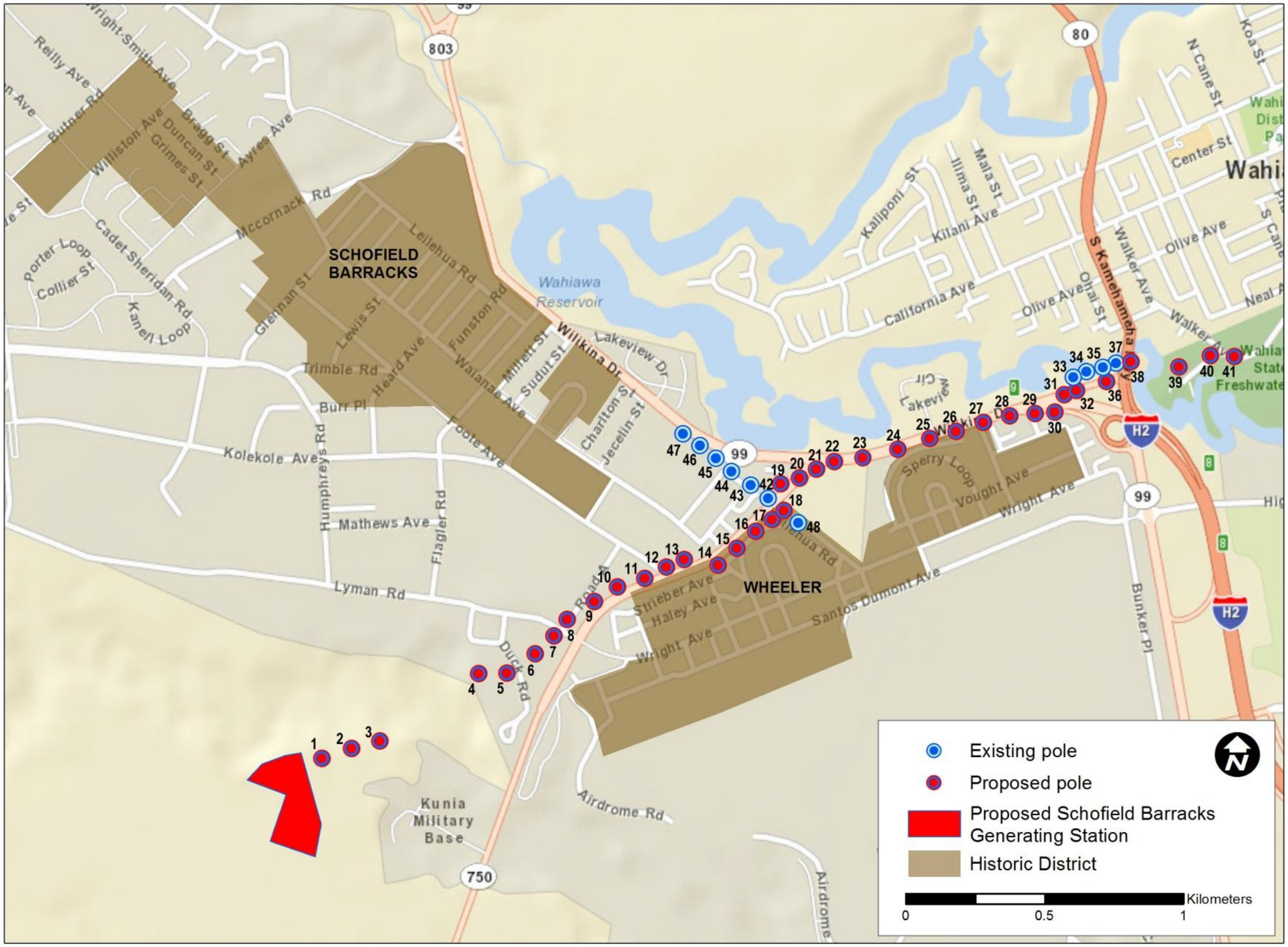


Figure 3.10-2. Historic Districts in Schofield Barracks and Wheeler Army Airfield

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 December 7, 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 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). ‘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 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.

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

**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**

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 October 9, 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) and
- 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. The Army anticipates a positive response from SHPD that the project would have No Adverse Effect under Section 106 of the NHPA.

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 *moʻolelo* 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.

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

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

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.

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) and
- 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 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) the 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, the 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 the 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. The 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. Installation-wide 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 a Hazardous Materials Management Plan (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.

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

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**

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 or 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 Department of Business, Economic Development and Tourism [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) (Bureau of Economic Analysis [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 2014d). 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.

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

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).

3.12.1.3 Schools

The State of Hawaii Department of Education administers the public school system statewide (National Center for Education Statistics [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 February 11, 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

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

Hawaiians for Homestead Lands), neighborhood boards, community associations, civic clubs, libraries, schools, and local governments. See section 1.5 *Public Involvement* for more information.

3.12.1.5 Protection of Children

On April 17, 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 (Wahiawa General Hospital [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.

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

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**

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.

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

3.12.2.1.1.2 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.

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 Sections 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 AR-385-10 (*The Army Safety Program*); NFPA 31 (*Standard for the Installation of Oil-Burning Equipment*); and NFPA 59A (*Standard for the Production, Storage, and Handling of LNG*). 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
National Pollutant Discharge Elimination System (NPDES)	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 island-wide firm power generating capacity of 1,817MW 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 August 26, 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% 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 2014d) 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 2014d). System security requirements, including having highly flexible thermal units with high ramp rate capabilities, are described in detail in the PSIP (Hawaiian Electric 2014d).

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 million gallons per day (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 three 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).

3.13.1.4 Sanitary Wastewater

Discharge and treatment of wastewater is regulated by the 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 grid-wide 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 grid-wide 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.

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.

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**

3.13.2.1.1 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 island-wide 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, etc.). 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 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 grid-wide 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 grid-wide 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 Best Management Practices

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 island-wide grid would remain vulnerable to coastal effects and other outages, and the island-wide 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, Hawaiian goose [nene], Hawaiian stilt, Hawaiian coot, Hawaiian moorhen, and Hawaiian duck) to enter the project area during construction or operation, Hawaiian Electric has incorporated several design elements and best management practices 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**

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SECTION 4
CONSISTENCY WITH EXISTING LAND USE PLANS, POLICIES, AND CONTROLS

4.1 OVERVIEW

In accordance with the requirements of Hawaii Administrative Rules (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 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

The master plan for USAG-HI that addresses Schofield Barracks and Wheeler Army Airfield is 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 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. 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:

- The 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.
- The 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.
- The 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 [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*. 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. 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*. 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 (non-attainment). The CAA general conformity rule requires that projects in non-attainment and maintenance areas be consistent with the applicable State Implementation Plan.

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 December 5, 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 non-stormwater 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 which 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 National Marine Fisheries Service 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 National Register of Historic Places. 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 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; and
- 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) that 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 island-wide 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 island-wide 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 island-wide electrical grid.

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.

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).

[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 Hawaii 2050 Sustainability Task Force submitted to the Legislature in January 2008.

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 HRS Chapter 205A (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

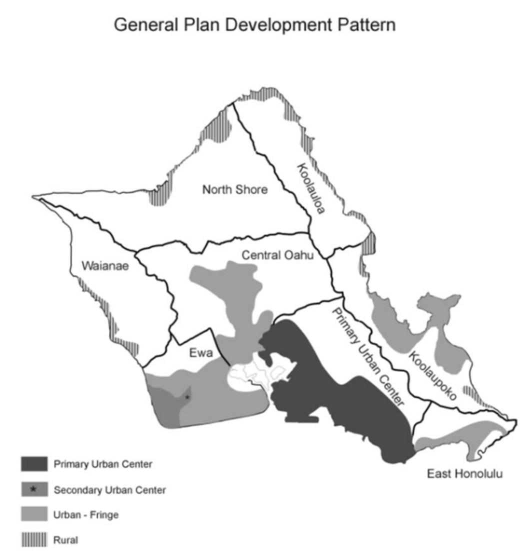
The *General Plan for the City and County of Honolulu* was first adopted in 1977 and was most recently amended in 2002. The *Oahu General Plan* is a comprehensive statement of the long-range social, economic, environmental, and design objectives for the general welfare and prosperity for the people of 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 (Table 4.4-1):*

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 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.

Economic Goals. 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.*

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.

Natural Environment Goals. 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 50MW 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.

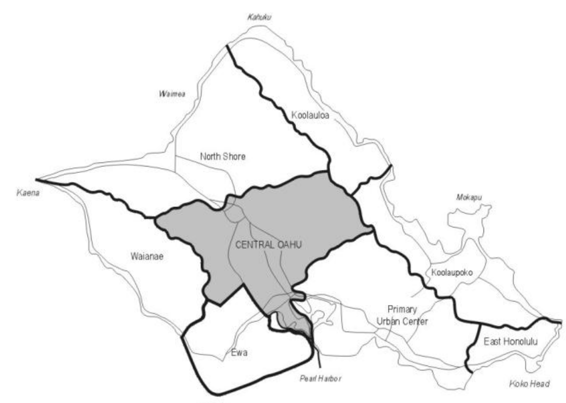
The purpose of the SGSP is to maintain an efficient and reliable power supply for Oahu. The intent of this EIS document is to carefully fulfill the planning requirements of NEPA and HEPA to evaluate potential impacts to the natural and human environment, so the SGSP would be consistent with these objectives.

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 were 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 non-Federal) 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* (USAEC 2008) and in the *Environmental Assessment for Construction of Four Projects to Support the Army Growth Stationing Action at Schofield Barracks Military Reservation Oahu, Hawaii* (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 plan 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 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

[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 non-Federal."

Table 5.1-1.
Past, Present, and Reasonably Foreeseeable 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 battalion complex, Military Police 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	Installation-wide facilities construction and associated infrastructure improvements.	2009-ongoing	USAG-HI including Schofield Barracks and Wheeler Army Airfield	Variable
Army 2020 Force Structure Realignment	Army wide force and realignment, including reductions up to 8,000 Soldiers and Army civilians at Schofield Barracks.	2013-ongoing	Army-wide 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 (Installation-wide)	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 Hawai'i 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 replacement	Replace 12 existing transmission poles from Wahiawa Substation to approximately 1 mile east	2014-2015	East of Wahiawa Substation	Transmission pole footprints

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 USAG-HI master plan, 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 State Implementation Plan (SIP) (USEPA 2014). 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 region of influence (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 installation-wide 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 Stormwater Pollution Prevention Plan 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 installation-wide 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. In considering, 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 pre-project 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, grid-wide 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 8
LIST OF PREPARERS AND CONTRIBUTORS

Emmy Andrews
MS Environmental Management, University of San Francisco, 2005
BA Art and Art History, Duke University, 1998
Tetra Tech, Inc.
Years of Experience: 10

John Bock
BS Environmental Toxicology, University of California–Davis, 1993
Tetra Tech, Inc.
Years of Experience: 20

Michelle Cannella
BS Mineral Economics, Penn State University, 1990
Tetra Tech, Inc.
Years of Experience: 19

Michael Desilets
MA Anthropology, Western Washington University, 1995
Garcia and Associates
Years of Experience: 19

Kevin T. Doyle
BA Sociology, University of California, Santa Barbara, 1976
Tetra Tech, Inc.
Years of Experience: 29

Jennifer Duckworth
MS Environmental Science and Policy, Johns Hopkins University, 2004
BS Civil Engineering, Univ. of Massachusetts, 1995
Tetra Tech, Inc. Years of Experience: 20

Chad Helmle
MS Civil Engineering, Cornell University, 2005
BS Engineering and Environmental Science, University of Notre Dame, 1997
Tetra Tech, Inc.
Years of Experience: 16

Greg Hippert
BS Earth Science, University of North Carolina–Charlotte, 1992
Tetra Tech, Inc.
Years of Experience: 18

Yvana Hrovat, PE
MS Environmental Science and Management, University of California, Santa Barbara, 2006
BS Civil and Environmental Engineering, University of Michigan, Ann Arbor, 2002
Years of Experience: 10

Jennifer Jarvis
BS Environmental Resource Management, Virginia Tech, 1998
Tetra Tech, Inc.
Years of Experience: 16

Kevin Kelly
MS Biological Oceanography, University of Hawaii at Manoa, 2005
BS Biology, Pennsylvania State University, 1992
Tetra Tech, Inc.
Years of Experience: 16

Chris King
MBA Project Management, Aspen University, 2006
BS Chemical Engineering, Illinois Institute of Technology, 1999
Tetra Tech, Inc.
Years of Experience: 15

Timothy Lavallee, PE
MS Civil and Environmental Engineering, Tufts University, 1997
BS Mechanical Engineering, Northeastern University, 1992
LPES, Inc.
Years of Experience: 25

Jolie Liston
PhD Archaeology, Australian National University, 2013
Garcia and Associates
Years of Experience: 25

Jerry Liu
MS Civil Engineer, Florida State University, 2001
BS Highway and Urban Roads, TongJi University, 1992
Tetra Tech, Inc.
Years of Experience: 21

Julia Mates
MA History/Public History, California State University, Sacramento, 2003
BA History, University of California, Los Angeles, 1993
Tetra Tech, Inc.
Years of Experience: 13

Charles Morgan
PhD Limnology and Oceanography, University of Wisconsin, Madison, 1975
BA Chemistry, University of California, San Diego, 1971
Planning Solutions, Inc.
Years of Experience: 30

Sam Pett
MS Environmental Science, University of Massachusetts-Boston, 1992
BS Wildlife Biology, Michigan State University, 1978
Tetra Tech, Inc.
Years of Experience: 22

Scott Prosuch
MS Mechanical Engineering, Penn State University, 1975
BS Mechanical Engineering, Florida Tech, 1971
Tetra Tech, Inc.
Years of Experience: 40

Chuck Purnell
BS Civil Engineering, Washington State University, 1988
Tetra Tech, Inc.
Years of Experience: 26

Kristin Shields
BA Environmental Science, Sweet Briar College, 1991
Tetra Tech, Inc.
Years of Experience: 22

Makena White
MS Psychology, Chaminade University of Honolulu, 2011
BA Religion, University of Hawaii at Manoa, 2004
Planning Solutions, Inc.
Years of Experience: 15

Perry White
Master of Regional Planning, University of Pennsylvania, 1972
BA History/Economics, Stanford University, 1965
Planning Solutions, Inc.
Years of Experience: 40

Ann Zoidis
MS Physiology and Behavioral Biology, San Francisco State University, 1989
BA Geology, Smith College, 1983
Years of Experience: 28

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SECTION 9
CONSULTATION AND COORDINATION

The Army and Hawaiian Electric consulted or coordinated with the following agencies and organizations during preparation of this EIS:

- City and County of Honolulu—Board of Water Supply
- City and County of Honolulu—Department of Transportation Services
- 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
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Mr. Paul Henson, Acting Field Supervisor	U.S. Department of the Interior, Fish and Wildlife Service	Honolulu
Mr. Michael Tosatto, Regional Administrator	U.S. Department of Commerce, National Marine Fisheries Service, Pacific Islands Regional Office, NOAA Inouye Regional Office	Honolulu
Rear Admiral Cari Thomas, District Commander	U.S. Coast Guard District 14	Honolulu
N/A	U.S. Department of the Interior, Geological Survey, Pacific Islands Water Science Center	Honolulu
N/A	U.S. Department of the Interior, National Parks Service, Pacific Islands Regional Office	Honolulu
N/A	U.S. Department of Transportation, Federal Aviation Administration	Honolulu
N/A	U.S. Department of Transportation, Federal Highways Administration, Hawaii Division	Honolulu
N/A	U.S. Department of Transportation, Federal Transit Administration, Region 10	Seattle
N/A	U.S. Environmental Protection Agency, Region 9, Pacific Islands Contact Office	Honolulu
N/A	U.S. Department of Agriculture, National Resources Conservation Service, Pacific Islands Area	Honolulu

Government of the State of Hawaii		
Name/Role	**Agency/Organization**	**City**
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Sen. Donovan Dela Cruz,	Hawaii State Senate District 22	Honolulu
Sen. Mike Gabbard, Chair, Energy/Environment Committee	Hawaii State Senate District 20	Honolulu
Sen. Donna Mercado Kim, Senate President	Hawaii State Senate District 14	Honolulu
Sen. Gil Riviere	Hawaii State Senate District 23	Honolulu
Rep. Beth Fukumoto Chang	Hawaii House of Representatives District 36	Honolulu
Rep. Lauren Matsumoto, House Minority Whip	Hawaii House of Representatives District 45	Honolulu
Rep. Chris Lee, Chair, Energy and Environmental Protection Committee	Hawaii House of Representatives District 51	Honolulu
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Rep. Marcus Oshiro Chair, Committee on Finance	Hawaii House of Representatives District 46	Honolulu
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Mr. Mark Glick, Energy Administrator	State of Hawaii Department of Business, Economic Development and Tourism, Strategic Industries Division	Honolulu
	State of Hawaii Department of Business, Economic Development and Tourism, Office of Planning	Honolulu
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Librarian	State of Hawaii Department of Education, Hawaii State Library, Hawaii Documents Center	Honolulu
Librarian	State of Hawaii Department of Education, Hawaii State Library, Kaimuki Regional Library	Honolulu
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Librarian	State of Hawaii Department of Education, Hawaii State Library, Hawaii Kai Regional Library	Honolulu
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Librarian	State of Hawaii Department of Education, Hawaii State Library, Pearl City Regional Library	Pearl City
Ms. Jobie Masagatani, Director	State of Hawaii Department of Hawaiian Home Lands	Honolulu
Mr. Alec Wong, Chief	State of Hawaii Department of Health, Clean Water Branch	Honolulu
Mr. Keith Kawaoka, Deputy Director	State of Hawaii Department of Health, Environmental Health Administration	Honolulu
Ms. Laura Leialoha Phillips McIntyre, Program Manager	State of Hawaii Department of Health, Environmental Planning Office	Honolulu
Mr. Jordan Nakagawa, Project Manager	State of Hawaii Department of Health, Hazard Evaluation and Emergency Response	Honolulu
Dwight Takamine, Director	State of Hawaii Department of Labor and Industrial Relations	Honolulu
Mr. Carty Chang, Acting Chairperson	State of Hawaii Department of Land and Natural Resources	Honolulu
Dr. Alan Downer, Administrator	State of Hawaii Department of Land and Natural Resources, State Historic Preservation Division	Kapolei
Mr. Alex Roy, Staff Planner	State of Hawaii Department of Land and natural Resources, Office of Conservation and Coastal Lands	Honolulu
Mr. Nolan Espinda, Director	State of Hawaii Department of Public Safety	Honolulu
Mr. Ford Fuchigami, Director	State of Hawaii Department of Transportation	Honolulu
Darren Lerner, Interim Director	University of Hawaii Water Resources Research Center	Honolulu
Chittaranjan Ray, Director	University of Hawaii Environmental Center	Honolulu

Maynard Young, Manager of Facilities Planning and Design	University of Hawaii Office of Capital Improvement	Honolulu
Librarian	University of Hawaii Thomas H. Hamiton Library	Honolulu
Librarian	University of Hawaii Edwin H. Mookini Library	Hilo
Librarian	University of Hawaii Maui College Library	Kahului
Librarian	University of Hawaii Kauai Community College Library	Lihue
Dr. Kamana'opono Crabbe, Chief Executive Officer	Office of Hawaiian Affairs	Honolulu
Mr. Randall Iwase, Chair	Public Utilities Commission	Honolulu
Librarian	Legislative Reference Bureau Library	Honolulu
Government of the City and County of Honolulu		
Name	**Agency/Organization Name**	**City**
Mayor Kirk Caldwell	Honolulu Mayor's Office	Honolulu
Mr. Ernest Lau, Manager and Chief Engineer	City and County of Honolulu Board of Water Supply	Honolulu
N/A	City and County of Honolulu Department of Customer Services Municipal Library	Honolulu
Mr. Robert J. Kroning, PE, Director	City and County of Honolulu Department of Design and Construction	Honolulu
Ms. Lori Kahikina, Director	City and County of Honolulu Department of Environmental Services,	Kapolei
Mr. Ross Sasamuraj, Director	City and County of Honolulu Department of Facility Maintenance	Kapolei
Mr. Manuel Neves, Chief	City and County of Honolulu Fire Department	Honolulu
Mr. Gary Nakata, Acting Director	City and County of Honolulu Department of Community Services	Honolulu
Mr. George Atta, Director	City and County of Honolulu Department of Planning and Permitting,	Honolulu
Ms. Michele K. Nekota, Director *Requested not to be Consulted Party*	City and County of Honolulu Department of Parks and Recreation	Kapolei
Mr. Louis Kealoha, Chief	City and County of Honolulu Police Department	Honolulu
Mr. Mike Formby, Director	City and County of Honolulu Department of Transportation Services	Honolulu

Mr. Ernest Martin, Council Chair	City and County of Honolulu District 2	Honolulu
Mr. Ikaika Anderson, Chair, Committee on Zoning & Planning	City and County of Honolulu District 3	Honolulu
Ms. Carol Fukunaga, Councilmember	City and County of Honolulu District 6	Honolulu
Brandon Elefante, Councilmember	City and County of Honolulu District 8	Honolulu
Mr. Ron Menor	City and County of Honolulu District 9	Mililani
Mr. Richard Poirer, Chair	Mililani-Waipio-Melemanu Neighborhood Board No. 25	Mililani
Ms. Jeanne Ishikawa, Chair	Wahiawa-Whitmore Village Neighborhood Board No. 26	Honolulu
Ms. Kathleen Pahinui, Chair	North Shore Neighborhood Board No. 27,	Honolulu
Dean Hazama, Chair	Mililani Mauka-Launani Valley Neighborhood Board No. 35	Mililani
Local Utility Providers		
Name	**Agency/Organization Name**	**City**
Mr. Sheldon Hunt, President and General Manager	Aqua Engineers	Kalaheo
Mr. Nathan C. Nelson	Hawaii Gas	Honolulu
N/A	Hawaiian Telcom	Honolulu
Business and Industry		
Name	**Agency/Organization Name**	**City**
Robert Hennkens	Carbontech Cooperative, Inc.	Tucson, AZ
N/A	Dole Foods	Honolulu
Mr. Valentine Peroff	Hawaii Renewable Resources, LLC	Aiea
N/A	James Campbell Company	Kapolei
N/A	Lend Lease's Island Palm Communities, Administrative Offices	Schofield Barracks
N/A	Monsanto	Kunia
N/A	Robinson Kunia Land	Honolulu
N/A	Wahiawa General Hospital	Wahiawa
Organizations		
Name	**Agency/Organization Name**	**City**
Mr. Walter Benavitz, Director	Wahiawa Community and Business Association	Wahiawa

Mr. Jack Kampfer, President	Wahiawa Community Based Development Organization	Wahiawa
Mr. Edward Ayau, Po'o	Hui Mālama I Na Kupuna O Hawaii Nei	Hoʻolehua
Ms. Jamie Barton	Hawaii Agricultural Research Center	Kunia
Mr. Henry Curtis, Executive Director	Life of the Land	Honolulu
Ms. Leimana DaMate, Executive Director	Aha Moku Advisory Committee, State of Hawaii, Department of Land and Natural Resources	Honolulu
Ms. Kiersten Faulkner, Executive Director	Historic Hawaii Foundation, The Dole Cannery	Honolulu
Ms. Blosom Feiteira, President	Association of Hawaiians for Homestead Lands	Honolulu
Mr. Henry Gomes, President	Hawaii Maoli	Honolulu
Ms. Piilani Hanohano, Government Relations Coordinator	Kamehameha Schools, Community Relations and Communications Group	Honolulu
Mr. Robert Harris, Esq., Director	Sierra Club Hawaii Chapter	Honolulu
Mr. Jim Hatfield, President	Wahiawa Lions Club	Wahiawa
Ms. Michelle Kauhane, President	Council for Native Hawaiian Advancement	Honolulu
Ms. Terrilee Kekoʻolani	AFSC Hawaii	Honolulu
Mr. Tom Lenchanko	Hawaii Civic Club of Wahiawa	Mililani
N/A	The Nature Conservancy of Hawaii	Honolulu
Ms. Annelle Amaral, President	Association of Hawaiian Civic Clubs	Honolulu
Ms. Sherry Menor-McNamara, President & CEO	Hawaii Chamber of Commerce	Honolulu
Mr. Kimo Lee, Chair	Oahu Island Burial Council, Kakuhihewa Building, State Historic Preservation Division	Kapolei
Mr. Napali Woode, CFO and Vice President	Native Hawaiian Economic Alliance	Kapolei
N/A	Association of Hawaii Civic Leaders	Honolulu
N/A	EnviroWatch	Mililani
N/A	Hawaii Association of Conservation Districts	Wailuku
N/A	Hawaii Audubon Society	Honolulu

N/A	Honolulu Neighborhood Commission Office	Honolulu
N/A	KAHEA	Honolulu
N/A	Malama Hawaii	Honolulu
N/A	Native Hawaiian Organizations Association	Honolulu
N/A	Surfrider, Oahu Chapter	Honolulu
N/A	The Outdoor Circle	Honolulu
Local Libraries		
Name	**Agency/Organization Name**	**City**
Librarian	Sergeant Rodney J. Yano Main Library	Schofield Barracks
Librarian	Fort Shafter Library	Fort Shafter
Librarian	Mililani Public Library	Mililani
Librarian	Wahiawa Public Library	Wahiawa
Librarian	Waialua Public Library	Waialua
Private Citizens		
Name	**Agency/Organization Name**	**City**
R. Doug Aton	Private Citizen	Wahiawa
Luella Costales	Private Citizen	Mililani
Mike Dau	Private Citizen	Waipahu
Ben Fairbanks	Private Citizen	Unknown
Ronald Gunderson	Private Citizen	Unknown
Julie Hong	Private Citizen	Kaneohe
Mr. Shad Kane	Private Citizen	Kapolei
Gregory Kwan	Private Citizen	Honolulu
Michael Magaoay	Private Citizen	Mililani
Jean Maier	Private Citizen	Mililani
Steve Nimz	Private Citizen	Honolulu
Kelly O'Brien	Private Citizen	Honolulu
Matthew Patterson	Private Citizen	Aiea
Jean Public	Private Citizen	Unknown
Mrs. Leimaile Quitevis	Private Citizen	Waianae
Dan Reinke	Private Citizen	Edwards AFB
Bob Robinson	Private Citizen	Aiea
Jon Shindo	Private Citizen	Waipahu
Ms. Kēhaulani Souza	Private Citizen	Mililani
Mr. Harry Wasson	Private Citizen	Laie
Steve Wendel	Private Citizen	Aiea
John Yonemori-Antal	Private Citizen	Honolulu

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
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
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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