

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU

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SEP 8 2016

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2016/ED-7(WA)

August 16, 2016

Mr. Scott Glenn, Director
State of Hawaii
Department of Health
Office of Environmental Quality Control
235 South Beretania Street, Room 702
Honolulu, Hawaii 96813

Dear Mr. Glen:

SUBJECT: Special Management Area Ordinance
Chapter 25, Revised Ordinances of Honolulu
Draft Environmental Assessment

Project: Waiau Generating Station Non-Character Altering Projects:
2016-2015

Applicant: Hawaiian Electric Company, Inc.
Agent: Planning Solutions, Inc. (Makena B. White)
Location: 475 Kamehameha Highway - Waiau
Tax Map Key: 9-8-003: 001 and 010; 9-7-018: 012; and 9-8-004: 002 and 003
Proposal: Special Management Area-Major (SMA) Permit for a variety of minor
Projects to be phased over the next ten years at its Waiau Generating
Station. The Major SMP will cover Projects to replace, upgrade,
remove, and add facilities within the station that do not change its
character or use. The Major SMP is necessary because Minor SMPs
are restricted to \$500,000 of development at a single facility annually.

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OFC. OF ENVIRONMENTAL
QUALITY CONTROL

We respectfully request publication of the Project summary of the Draft Environmental Assessment (DEA) in the next edition of "The Environmental Notice" on **September 8, 2016**. Enclosed are one hard copy and one electronic copy of the DEA and the Publication Form. The Publication Form, including Project summary, was also sent via electronic mail to your office.

Should you have any questions, please contact William Ammons at 768-8025 or via email at wammons@honolulu.gov.

Very truly yours,
George I. Atta
FOR George I. Atta, FAICP
Director

Enclosure: DEA, one hard copy and one disk
One copy of OEQC Publication Form

Doc 1377450

17-082

**NON-CHAPTER 343 DOCUMENT
PUBLICATION FORM
OFFICE OF ENVIRONMENTAL QUALITY CONTROL**



Project Name: Waiau Generating Station Non-Chapter Altering Projects: 2016-2025

Applicable Law: Chapter 25, Revised Ordinances of Honolulu

Type of Document: Draft Environmental Assessment

Island: Oahu

District: Pearl City

TMK: 9-8-003: 001 and 010, 9-7-018: 012, and 9-8-004: 002 and 003

Permits Required: Special Management Area Permit (Major), Shoreline Setback Variance, Minor Modification to Conditional Use Permit (CUP), Grading, Grubbing, Stockpiling, and Building Permits, National Pollutant Discharge Elimination System (NPDES)

Approving Agency: City and County of Honolulu
Department of Planning and Permitting
650 South King Street, 7th Floor
Honolulu, Hawaii 96813
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wammons@honolulu.gov

Applicant: Hawaiian Electric Company, Inc.
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Consultant: Planning Solutions, Inc.
210 Ward Avenue, Suite 330
Honolulu, Hawaii 96814
Contact: Makena B. White
(808) 550-4538
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Status: DEA

Project Summary: Hawaiian Electric proposes to apply for a Major Special Management Area Permit (SMP) for a variety of minor projects to be phased over the next ten years at its Waiau Generating Station. The Major SMP will cover projects to replace, upgrade, remove, and add facilities within the station that do not change its character or use. The Major SMP is necessary because Minor SMPs are restricted to \$500,000 of development at a single facility annually.

Hawaiian Electric frequently requires minor projects as a result of unanticipated equipment failures and changing regulatory requirements. This creates a regulatory bottleneck, where the need for minor projects requiring SMPs exceeds the annual limits on SMA minors. Also, due to the size of the facility,

the complexity of activities, and the high-tech nature of the use, the proposed projects have a value that exceeds \$500,000 but which will not change the character or use of the facility.

The proposed action is not anticipated to result in significant impacts to environmental resources. The implementation of standard Best Management Practices will ensure no significant impacts.

Draft Environmental Assessment

**Waiau Generating Station
Non-Character Altering Projects:
2016-2025**

Pearl City, O'ahu, Hawai'i

Prepared for:
Hawaiian Electric Company, Inc.

Prepared by:



P L A N N I N G
S O L U T I O N S

July 2016

SUMMARY OF PROPOSED ACTION

Project:	WGS Non-Character Altering Projects: 2016-2025
Applicant:	Hawaiian Electric Company, Inc. P.O. Box 2750 Honolulu, Hawai'i 96840-0001 Contact: Rouen Q.W. Liu (543-7245)
Approving Agency:	Department of Planning and Permitting City and County of Honolulu 650 South King Street Honolulu, HI 96813
Location:	WGS, 475 Kamehameha Highway, Pearl City, HI 96782
Proposed Action:	Granting of Special Management Area (SMA) Use Permit (SMP) Major for a variety of projects requiring development within the SMA at Hawaiian Electric's WGS
Associated Actions Requiring Environmental Assessment:	Construction within the SMA as required by Revised Ordinances of Honolulu (ROH) Chapter 25-3.3(e)
Tax Map Keys:	(1) 9-8-003:001 and 010, 9-7-018:012, and 9-8-004:002 and 003
Development Plan Designation:	Public Facility
State Land Use District:	Urban
County Zoning:	I-2 Intensive Industrial
Required Permits & Approvals:	For overall program: <ul style="list-style-type: none"> • SMP Major For select individual projects: <ul style="list-style-type: none"> • Shoreline Setback Variance • Minor Modification to Conditional Use Permit (CUP) • Grading, Grubbing, Stockpiling, and Building Permits • National Pollutant Discharge Elimination System (NPDES) Construction permit
Anticipated Determination:	Finding of No Significant Impact
Parties Consulted:	See Section 8.0
Consultant:	Planning Solutions, Inc. 210 Ward Avenue, Suite 330 Honolulu, HI 96814 Contact: Makena White (808-550-4538)

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1.0 PURPOSE AND NEED

1.1 Overview

Hawaiian Electric Company (herein referred to as “Hawaiian Electric” or “the Company”) is the franchised public utility responsible for the production, purchase, transmission, distribution, and sale of electricity on the Island of O’ahu. In carrying out these responsibilities, it develops, operates, and maintains power generation facilities at several locations on the island. One of Hawaiian Electric’s most important facilities is the WGS (“WGS”; see Figure 1.1 and Figure 1.2 below).

The individual generating units at Waiau are listed in Table 1.1. The names and locations of other facilities at Waiau that support the generating units and deliver the electrical power they produce to the islandwide electrical grid are shown in Figure 1.3 and include extensive support facilities within the generating station. The support facilities include welding and repair bays, fuel and water storage tanks, water treatment facilities, cooling water intakes and discharge facilities, electrical substation equipment, offices, and warehouses.

Table 1.1 Existing Generating Units at the WGS

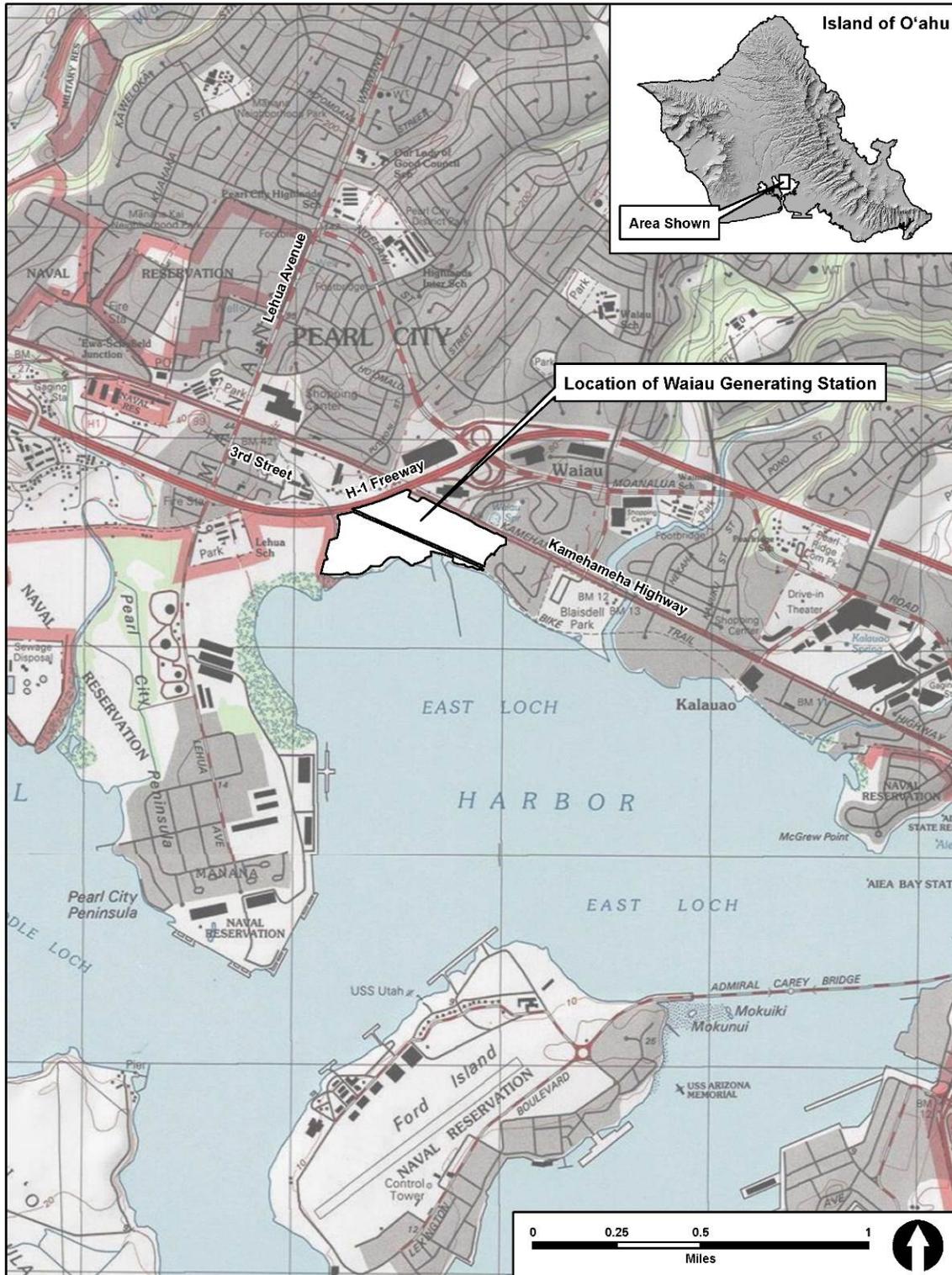
<i>Unit Name¹</i>	<i>Fuel Type²</i>	<i>Top Load Rating (In MW)³</i>		<i>Year Installed</i>	<i>Delivery Type⁴</i>
		<i>Gross</i>	<i>Net</i>		
Waiau 3	LSFO	49.0	46.2	1947	Baseload
Waiau 4	LSFO	49.0	46.4	1950	Baseload
Waiau 5	LSFO	57.0	54.6	1955	Cycling
Waiau 6	LSFO	56.0	55.6	1961	Cycling
Waiau 7	LSFO	87.1	83.3	1966	Cycling
Waiau 8	LSFO	90.1	86.2	1968	Cycling
Waiau 9	LSFO	53.0	52.9	1973	Quick-start
Waiau 10	LSFO	50.0	49.9	1973	Quick-start
Total	—	491.0	474.1	—	—

Note:

1. Waiau Units 1 and 2 have been removed from the station.
2. LSFO = low sulfur fuel oil. The PSIP indicates Waiau 5-10 will be converted to liquefied natural gas (LNG) beginning in 2017.
3. Gross refers to the total power output by source; net refers to the amount of power which it is able to provide to the grid.
4. Baseload = Typically run at all times throughout the year, except in the case of repairs or scheduled maintenance. Cycling = Typically cycled daily such that a unit is run only during periods of high demand. Quick Start = reserve units that can start quickly when there is a shortage of power or a high peak.

Source: Table 3-2. O’ahu Utility-Owned Generation Units, in *2014 Power Supply Improvement Plan (PSIP)* dated August 26, 2014.

Figure 1.1 Location Map



Source: Planning Solutions, Inc. (2015)

Figure 1.3 WGS Site Plan



Source: Planning Solutions, Inc. (2015)

As shown in Table 1.2, the WGS property consists of five separate parcels, all of which are in the City and County of Honolulu’s I-2 Intensive Industrial District. Because all of the parcels that comprise the WGS site are within the City and County of Honolulu’s SMA, SMPs are required for all activities at the facility that meet the Revised Ordinances of Honolulu’s (ROH), Chapter 25 definition of “development.”¹ Given the nature of the complex, this means that only the relatively few actions that are clearly limited to ongoing operations and maintenance do not require specific SMP coverage.

Table 1.2 Summary of Parcel Data and Zoning and Land Use

<i>TMK No.</i>	<i>Parcel Area (acres)</i>	<i>Zoning District</i>	<i>Within SMA</i>	<i>Mauka or Makai of Pearl Harbor Historic Trail</i>	<i>Uses</i>
9-7-018:012	18.169	I-2 Intensive Industrial	Yes	Makai	Fuel tanks, sand blasting; primarily farming and wetlands
9-8-003:001	4.703	I-2 Intensive Industrial	Yes	Makai	Fuel tank and Waiiau 9 and 10
9-8-003:010	15.2904	I-2 Intensive Industrial	Yes	Mauka	Working station (Waiiau 3, 4, 5, and 6; tanks; and support facilities) and small farm area
9-8-004:002	1.282	I-2 Intensive Industrial	Yes	Makai	Cooling water outlet; landscape
9-8-004:003	10.7472	I-2 Intensive Industrial	Yes	Mauka	Working station (Waiiau 7 and 8, and support facilities)

1.2 Regulatory Context

1.2.1 DPP’s Policy and Hawaiian Electric’s Permitting Needs

At the present time the Director of DPP is authorized to issue a SMP Minor when the development being permitted has a valuation which is not in excess of \$500,000 and would have no significant adverse effects, taking into account potential cumulative effects. Developments with a valuation in excess of \$500,000 or which may have substantial adverse or cumulative effects must obtain a SMP Major. Issuance of a SMP Major requires completion of an Environmental Assessment (EA) or Environmental Impact Statement (EIS), processing of a SMP application, and adoption of a Resolution by the Honolulu City Council.

In the past, DPP dealt with relatively small projects at the WGS that qualified for SMP Minors on an individual basis, allowing numerous such applications to be processed concurrently. DPP revised its policy in 2013, and it now considers the valuation of all projects located at the same facility together when determining whether or not they qualify for SMP Minors. Under this new interpretation, the cumulative valuation of all projects for which SMP Minors are accepted and processed may not exceed \$500,000 during any 12-month period. The change in policy has led

¹ Sec. 25-1.3 states that “Development” means any of the uses, activities or operations on land; in or under water, within the special management area that are included below, but not those uses, activities, or operations excluded in paragraph (2). “Development” includes but is not limited to the following: (A) The placement or erection of any solid material or any gaseous, liquid, solid or thermal waste; (B) Grading, removing, dredging, mining or extraction of any materials; (C) Change in the density or intensity of use of land, including but not limited to the division or subdivision of land; (D) Change in the intensity of use of water, ecology related thereto, or of access thereto; and (E) Construction, reconstruction, demolition or alteration of the size of any structure.

DPP to reject SMP Minor applications for a variety of small projects which Hawaiian Electric needs to implement in order to continue efficient operation of its generating facilities.

As noted above, WGS is located entirely within the SMA; thus, even very minor forms of development require an SMP. At the same time, Hawaiian Electric’s planning and implementation of minor projects at Waiau, in support of the objectives outlined in Table 1.3, is ongoing. These minor projects are often required due to unanticipated equipment failures and changing regulatory requirements. This creates a regulatory bottleneck, where the need for minor projects in need of SMP approval surpasses the limits on SMP Minors established by DPP.

Table 1.3 Project Objectives

<i>Number</i>	<i>Objective</i>
1	Maintain existing generating units and support facilities in good working order.
2	Refurbish, modify, reconstruct, and add facilities to increase operating output, improve efficiency, and/or enhance worker safety.
3	Install, modify, and remove facilities as needed to provide for adequate security.
4	Maintain or modify existing, and install new equipment and facilities to continue compliance with applicable regulations (e.g., air emissions standards, storm water controls, etc.)

Source: Compiled by Planning Solutions, Inc. (2015)

In addition, due to the size of the generating station, the complexity of activity, and the high-tech nature of the use, certain projects associated with the objectives in Table 1.3 have a value that exceeds \$500,000 but (i) do not change the character of the use or activities at the site, and (ii) do not have substantial adverse or cumulative effects. These projects require a SMP Major solely based on their value because they would not result in substantial adverse or cumulative effects.

This EA, which seeks categorical approval for a variety of known projects, and as yet un-defined types of projects, is intended to support the Company’s SMP permitting needs while conforming to DPP policy. The EA considers projects that fit within certain categorical definitions (Section 1.3.2) valued at less than and more than \$500,000 that would not change the character of the site or have significant adverse effects. For the purposes of this EA these projects are all considered “minor” projects.

1.2.2 Proposed 2016-2025 Categorical SMP Major

This EA, developed in consultation between DPP and Hawaiian Electric, is intended to allow the Company to gain SMP Major approval for a variety of minor projects to be implemented at WGS over the next ten years. The categorical nature of the proposed SMP Major means that the SMP Major will cover both a series of defined projects within the SMA, but also categories of anticipated activities/projects (see Section 1.3.2) which Hawaiian Electric believes it is likely to conduct over the next decade. Where information is currently available, specific projects have been identified that provide insight into the types of projects that fit within each category. Both projects and project categories are described in detail in Chapter 3.0. The projects and categories are similar to projects that have been undertaken at Waiau in the past and which DPP and Hawaiian Electric mutually agree are not controversial. Examples of projects which have obtained SMP coverage are provided in Appendix A. The decade-long nature of the proposed SMP Major means that it will cover the specific projects identified in this report, as well as those

projects that qualify for one of the covered categories, over a ten year period (i.e., between 2016 and 2025).

A categorical SMP Major for minor projects at WGS over the coming ten years would allow Hawaiian Electric to fully comply with DPP's current interpretation of SMA law while meeting its permitting needs in a timely and efficient way. This EA supports the issuance of an SMP Major by providing the documentation and analysis required to justify this approval, and to offer DPP the level of detail necessary for it to fulfill its regulatory oversight role. The categorical nature of the SMP, based on a combination of specific project data—where available—and on generalized activity descriptions encompassing the broad range of activities Hawaiian Electric is likely to undertake at Waiiau, allows the potential environmental effects to be described and analyzed pursuant to the requirements of Hawai'i Revised Statutes (HRS) Chapter 343 and/or ROH Chapter 25, which govern environmental impact review documents and procedures.

In pursuing this categorical approach, Hawaiian Electric and DPP are establishing a clear agreement on the additional level of project-specific detail which the Company will need to provide in order to move from a SMP to a Conditional Use Permit (CUP) approval. In doing so, Hawaiian Electric's project managers will gain clear guidelines regarding the types of activities which it can plan and implement under the categorical SMP coverage, without facing the current permitting delays. At the same time, it will allow both DPP and Hawaiian Electric to clearly determine whether a needed project fits into one of the pre-approved categories of development, so that they can adjust their plans or seek individual permit coverage where necessary.

1.2.3 Permits other than SMP

Once a proposed Hawaiian Electric project at WGS receives SMP coverage via the proposed categorical SMP or another route, the regulatory context requires that the facility's CUP (89/CUP1-47) be updated prior to implementing the project. As part of the CUP process, DPP will have the opportunity to review project details, make comments on, and place conditions on each individual project.

Other permits, including those listed in Table 3.4, will also be required prior to project implementation. The specific permits required will depend on the characteristics of the project.

1.3 Covered Projects and Activities

This EA supports issuance of a SMP Major for two types of projects: (i) specific projects (see Section 1.3.1), and (ii) projects for which specific information is not yet available, but which qualify for one of the categories of development defined in Section 1.3.2. For both types of projects (i.e., specific and categorical) this EA provides all of the environmental impact information required to comply with ROH Chapter 25, which governs development within the SMA, and HRS Chapter 343. While most of the development described and analyzed in this document would not "trigger" a Chapter 343 environmental review, it is possible that a project element may be within the Shoreline Setback Area and would require this level of review in order to obtain a Shoreline Setback Variance (SSV).

All of the projects and activities discussed in this EA meet the ROH Chapter 25 definition of development within the SMA. While each project to replace, upgrade, remove, and add facilities

within the generating station targets specific needs, all of the covered projects and activities discussed in this EA are intended to support the objectives listed in Table 1.3.

1.3.1 Specific Projects for Which SMP Coverage is Being Sought

Based on a comprehensive review of its current needs and plans at WGS, Hawaiian Electric has developed a list of projects which it would like to implement over the next ten years, and for which SMP coverage is being sought. None of these projects—whether considered individually or cumulatively—would considerably alter the use (i.e., power generation) or heavy industrial character of WGS. These projects are summarized in Table 1.4 below and more specific information for each of these defined projects is provided in Chapter 3.0.

Table 1.4 Summary of Defined Projects at WGS

<i>Project Name</i>	<i>Discussion in EA</i>
Category 1 – Replacements	
C&M Trailer Replacement Project	§3.2.1
Category 2 – Unoccupied Improvements without Earthwork	
Perimeter Fence Lighting	§3.3.1
Vehicle Fuel System Reconfiguration Project	§3.3.2
Variable Frequency Drive Project	§3.3.3
Category 3 – Unoccupied Improvements with Earthwork	
12 kV Substation Demolition	§3.4.1
138 kV Substation Retrofit Project	§3.4.2
46 kV Substation Upgrade and Relocation Project	§3.4.3
Waiau Former Wastewater Pond Modification Project	§3.4.4
Category 4 – Occupied Structures	
Hawaiian Electric does not have any Category 4 projects planned at WGS at this time.	
Source: Planning Solutions, Inc. (2016)	

1.3.2 Potential Actions for Which Categorical SMP Coverage is Being Sought

In addition to the defined projects summarized in Section 1.3.1, Hawaiian Electric is also seeking SMP coverage for a variety of potential actions at WGS for which complete project information is not yet available, but which can be described by the types of development activities taking place within the SMA. Based on: (i) discussions with Hawaiian Electric engineers and project managers concerning their ongoing needs and the level of information which is generally available to them in the early phases of defining and budgeting projects; and (ii) long experience with SMP application processing both at Waiau and other power supply sites, the Company has grouped these potential actions into four (4) categories, listed in Table 1.5 below. To assist with understanding the types of projects that qualify for these four categories, the defined projects in

Table 1.4 are grouped into the categories Hawaiian Electric believes they qualify. In addition, Appendix A provides an overview of projects completed at the facility in the last 10 years that would have qualified for one of the four categories.

In addition to the nature of the projects themselves (i.e., the category into which it falls), their specific location within the facility can be an important factor in analyzing its potential for environmental impacts. In this EA, Hawaiian Electric defines and describes specific geographic areas at WGS, henceforth referred to as *envelopes*, wherein each of these four categories of development might occur, and for which the Company is seeking categorical SMP coverage. Each category has an envelope, and each envelope is scaled according to the type of development anticipated; thus the envelope for Category 1 replacements of existing facilities (the least impactful category) encompasses the entire developed area of WGS, whereas the envelope for a larger development such as Category 4 occupied equipment or structures (with greater potential for impacts) is limited to select areas within the facility where space, access, infrastructure and other considerations make it a desirable candidate area. Future projects that qualify for one of the categories based on its description but whose location falls outside of the envelope, would not be covered by this EA or the resultant SMP.

Table 1.5 Development Categories at WGS

<i>Category</i>	<i>Definition</i>	<i>Envelope</i>
Category 1 – Replacements	Projects that consist of a nearly “one for one” replacement of an existing structure or piece of equipment; however, due to project characteristics, does not meet the definition of a replacement in ROH Chapter 25 that would be exempt (i.e., an exact replacement). Projects in this category require the demolition or removal of the existing structure or equipment, and, therefore, may require minor earthwork (i.e., <50 cubic yards).	See Figure 1.4; the entire facility.
<i>New Facilities</i>	<i>Projects that will add new facilities or structures, but which will not considerably alter the use or character of the generating station.</i>	
Category 2 – Unoccupied Improvements without Earthwork	Projects that involve new equipment or facilities that are not designed for human occupation or internal work and do not require significant grading, grubbing, stockpiling, or other earthwork (i.e., <50 cubic yards). This category generally includes linear types of projects (e.g., new fencing or lighting) or small three dimensional projects (e.g., new cabinets, equipment, and transformers).	See Figure 1.5; the “working” portion of the facility.
Category 3 – Unoccupied Improvements with Earthwork	Projects that involve new equipment or facilities that are not designed for human occupation or internal work but require significant grading, grubbing, stockpiling, or other earthwork (i.e., >50 cubic yards). Examples of this type of project could include new parking areas, drainage berms, or clearing and grading old water treatment ponds.	See Figure 1.6; the working portion of the facility with 40-foot shoreline setback and 15-foot internal water setback.
Category 4 – Occupied Structures	Projects which include one or more new pieces of equipment or structures of sufficient size to allow interior human occupation or work. These projects may or may not require significant grading, grubbing, stockpiling, or other earthwork. Examples of projects which could be placed in this category include addition of new modular office buildings, demineralized water tanks, and larger equipment and material enclosures.	See Figure 1.7; less restricted working areas with the setbacks outlined above.

Figure 1.4 Category 1 Envelope at WGS



Source: Planning Solutions, Inc. (2015)

Figure 1.5 Category 2 Envelope at WGS



Source: Planning Solutions, Inc. (2015)

Figure 1.6 Category 3 Envelope at WGS



Source: Planning Solutions, Inc. (2015)

Figure 1.7 Category 4 Envelope at WGS



Source: Planning Solutions, Inc. (2015)

1.4 Potential Actions for Which Categorical SMP Coverage Is Not Being Sought

This EA supports issuance of a SMP Major for a variety of specific projects and potential activities at WGS which (i) are not controversial; (ii) do not have significant adverse effects; and (iii) will not alter the overall size, shape, character and/or use (i.e., electrical power generation) of the facility. Not all Company activities at the facility will comply with these requirements; the three types of potential development at WGS outlined below are not covered by this EA and Hawaiian Electric is not seeking categorical SMP coverage for them through this effort:

1. Large, character-altering projects. The development categories in Table 1.5 do not include larger, non-standard actions (e.g., projects related to possible changes in fuel supply) that have the potential to alter the generating station's use or character. If and when any of those larger, non-standard actions move forward, individual SMP Major(s) will be sought; they would not be covered by this categorical SMP Major.
2. Small projects that do not qualify for a category. Hawaiian Electric anticipates that it may still need to seek SMP Minor(s) for some small projects which do not qualify for one of the categories outlined in Table 1.5.
3. Categorical projects beyond the envelope. Projects that fit within one of the categories identified in Table 1.5 but are located outside of the respective geographic envelope will not be eligible for SMP coverage via the proposed categorical SMP. Such projects will need to apply individually for SMP Minors or SMP Majors, as appropriate.

Thus any project which would alter the overall character of the generating station, or which do not meet the categorical definitions and locations specified in this EA will be addressed by a separate SMP application and environmental review document (i.e., EA or EIS) as required by law.

1.5 Organization of the Report

The remainder of this EA is organized as follows:

- Chapter 2 describes the alternatives which Hawaiian Electric evaluated in the preliminary planning stage of this project, including those alternatives which were initially examined but ultimately eliminated from further consideration as impracticable.
- Chapter 3 describes, by category, both those defined projects which the Company is seeking an SMP Major for, as well as the types of activities which—while not yet fully defined projects—Hawaiian Electric anticipates it may need to undertake between 2016 and 2025.
- Chapter 4 describes the existing environment and analyzes potential for impacts on the environment resulting from the types of activities for which Hawaiian Electric is seeking SMP coverage. It also outlines strategies for minimizing and mitigating unavoidable adverse effects.
- Chapter 5 discusses the consistency of the proposed action with relevant plans, policies, and controls at the county and state levels.

- Chapter 6 provides justification for the anticipated Finding of No Significant Impact (FONSI) by considering each individual significance criterion with respect to the proposed action of the Honolulu City Council granting a categorical SMP Major to Hawaiian Electric for its WGS.
- Chapter 7 and 8, respectively, list the references cited and parties consulted during preparation of this EA.

2.0 ALTERNATIVES CONSIDERED

ROH, Chapter 25-3.3(c)(1) states that any proposed development within the SMA requiring a SMP shall be subject to an assessment by the agency in accordance with the procedures set forth in HRS, Chapter 343, and its implementing regulations in Hawai‘i Administrative Rules (HAR), Title 11, Chapter 200. Among other things, it requires the approving agency—in this case DPP—to analyze alternatives to the proposed action in the EA. In accordance with that requirement, and as part of its continuing review of its operations and facilities at WGS, Hawaiian Electric considered various alternatives before selecting the proposed action as the appropriate course to take. This process consisted of identifying the overarching project objectives (see Table 1.3) within their regulatory context, identifying possible alternatives including those mandated by HRS Chapter 343, and evaluating potential alternatives against these criteria. This chapter describes the alternatives which the Company has considered, including those which it has considered but ultimately rejected because they were unable to meet the project objectives.

2.1 Introduction to the Alternatives Analyzed in this EA

As noted in Section 1.3, this EA is atypical in that it is intended to cover a suite of potential projects over a ten-year period (i.e., 2016-2025) at WGS. These projects are of two kinds: (i) projects identified in Table 1.4 for which Hawaiian Electric has conceptual plans; and (ii) other potential actions which have not yet been identified, but which can be defined by their general characteristics, the work needed to implement them, and their respective location envelopes within WGS.

In order to address this situation, this EA considers three alternatives:

- *Alternative 1*; (see Section 2.2) is Hawaiian Electric’s preferred alternative. It consists of the Honolulu City Council (HCC) granting SMP coverage to, and the Company implementing all (or some subset of all) the activities covered in this EA—both specific and categorical (see Section 1.3)—which are needed to keep WGS operating appropriately.
- *Alternative 2*; (see Section 2.3) is a reduced scale alternative, wherein the HCC would approve SMP coverage for, and Hawaiian Electric would implement between 2016 and 2025, only the projects listed in Table 1.4, for which conceptual plans have been prepared.
- *Alternative 3*; (see Section 2.4) is the “No Action” alternative required by HRS Chapter 343. Under this alternative, the HCC would not grant SMP coverage to the group of specific projects and potential actions described in Section 1.3. Hawaiian Electric would still have the option of attempting to permit and implement individual projects within the limits currently imposed by DPP.

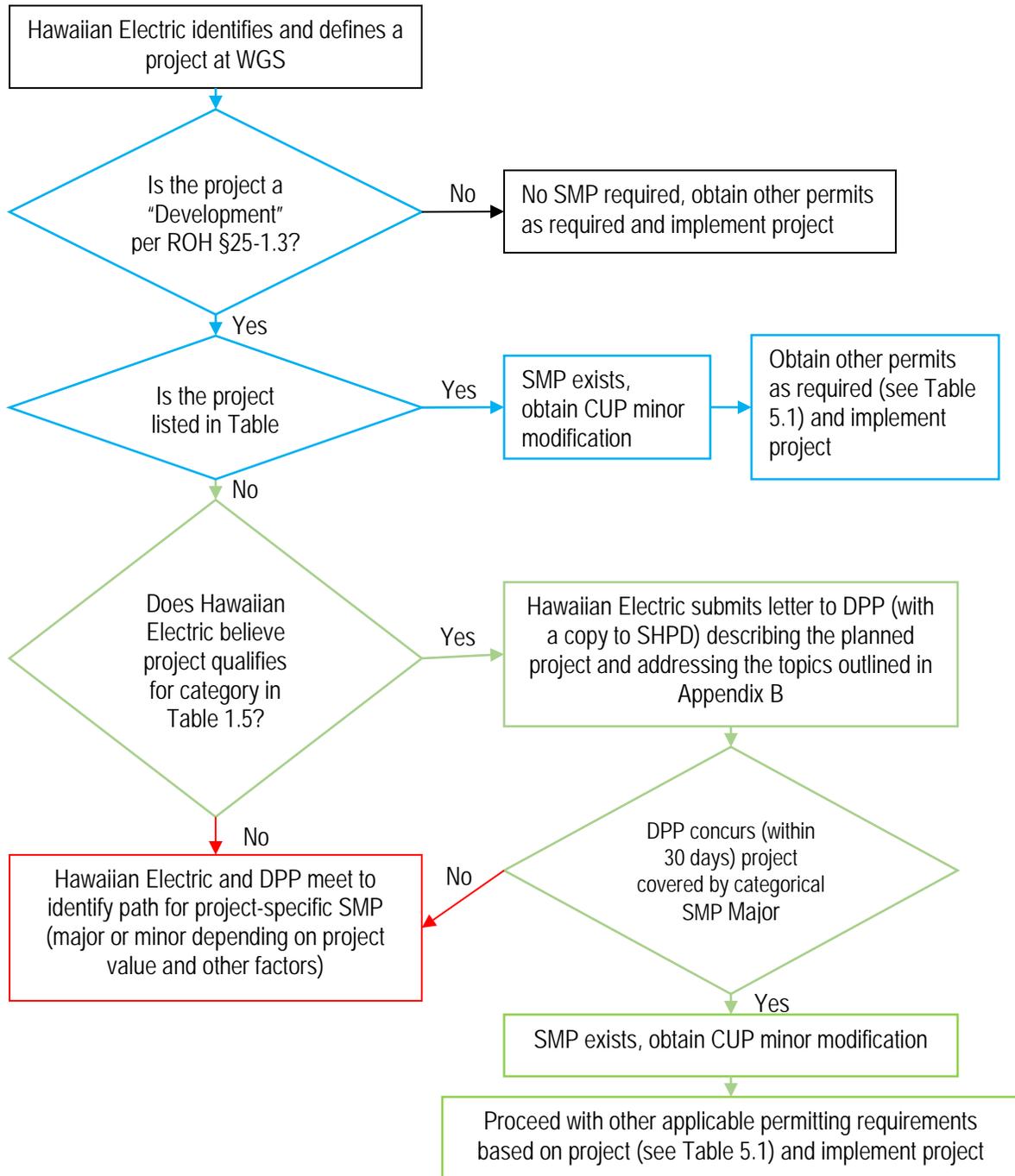
2.2 Alternative 1: Preferred Alternative

The Preferred Alternative consists of the HCC approving an SMP Major for all (or some subset) of the projects listed in Table 1.4 and additional projects that qualify for the categories described

in Table 1.5. All defined projects are assumed to be initiated in the 2016 to 2020 time period, while the as-yet undefined projects that qualify for a category are assumed to be implemented principally between 2018 and 2025. These dates would be adjusted based on the date of actual SMP award; for instance, if the SMP is not awarded until 2017 for some reason, then projects would not be initiated until 2017 but categorical projects could continue to be initiated until ten years after SMP award, in 2027.

As the categorical activities described in Table 1.5 are more clearly identified and defined by Hawaiian Electric, the following decision-making process shown in Figure 2.1 will be applied to each project to ensure that each project's SMA review is addressed appropriately. As this figure illustrates, both the defined projects (Table 1.4) and the as-yet undefined projects that qualify for a category (Table 1.5), will require a Conditional Use Permit (CUP) minor modification prior to proceeding. DPP will have the opportunity to review project details, make comments on, and place conditions on each individual project during the CUP minor modification process.

Figure 2.1 Alternative 1 SMP Coverage Process Flow Diagram



Source: Planning Solutions, Inc. (2015)

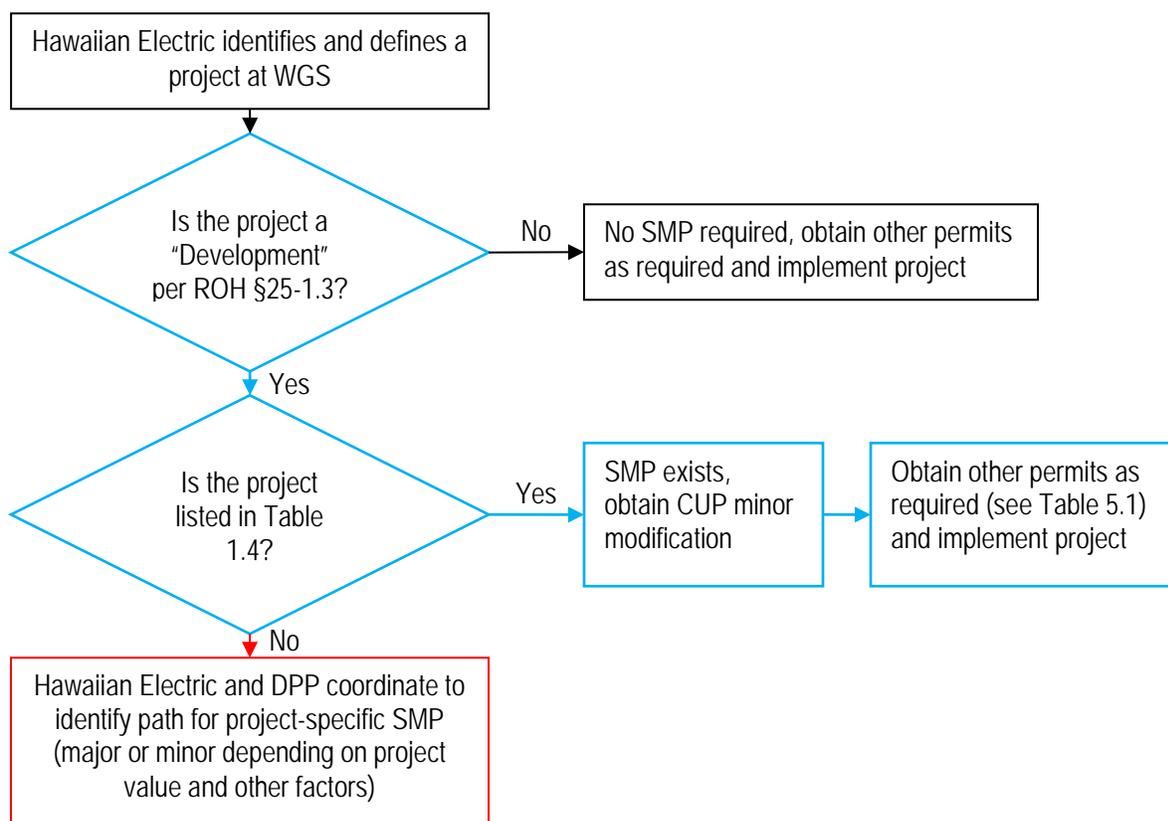
Hawaiian Electric has concluded that this Preferred Alternative (i.e., Alternative 1) would achieve all of the objectives outlined in Table 1.3.

2.3 Alternative 2: Defined Projects Only

Alternative 2 consists of HCC granting SMP approval for all, or some subset of, the defined projects summarized in Table 1.4 and that Hawaiian Electric would subsequently implement these projects between 2016 and 2025. Similar to Alternative 1, the dates will be adjusted based on the date of actual SMP award. It assumes that as-yet undefined projects will be addressed in separate environmental review documents at some later date, once their characteristics can be better defined and their implementation schedule(s) become more certain.

Under this reduced-scale alternative, the process of obtaining SMP coverage for projects as they are identified and defined by Hawaiian Electric during the ten year period which the SMP Major is valid would follow a decision-making process depicted in the flow diagram in Figure 2.2 below. As the figure illustrates, the defined projects (Table 1.4) will require a CUP minor modification prior to proceeding. DPP will have the opportunity to review project details, make comments on, and place conditions on each individual project during the CUP minor modification process.

Figure 2.2 Alternative 2 SMP Coverage Process Flow Diagram



Source: Planning Solutions, Inc. (2015)

Hawaiian Electric has concluded that this reduced scale alternative (i.e., Alternative 2) would achieve some of the objectives outlined in Table 1.3. At minimum it would allow Hawaiian Electric to maintain, refurbish, modify, and reconstruct some of the existing facilities at WGS in a timely and efficient manner while complying with DPP's interpretation of the rules governing

SMPs. However, it would not allow the Company to establish a flexible and efficient approval system for categorical approval system for WGS, or take full advantage of the categorical analysis presented in this EA for the Preferred Alternative (i.e., Alternative 1).

2.4 Alternative 3: No Action

Under this No Action Alternative (i.e., Alternative 3) the City and County of Honolulu would not grant its approval for the SMP Major which Hawaiian Electric is seeking for either the defined projects or the categorical activities at WGS. The Company would be subject to the existing limits on the acceptance and processing of SMP Minor applications, as discussed in Section 1.2.1; no more than \$500,000 worth of cumulative development would be permitted at WGS in any 12-month period. This, in turn, would severely limit the Company's ability to plan and implement projects it needs to continue to: (i) provide continuous, reliable power to its customers; (ii) to maintain a safe and comfortable working environment for its employees; and (iii) to plan and implement needed projects within the SMA at WGS in a timely and efficient way.

Hawaiian Electric has concluded that the No Action Alternative would not achieve the objectives for the project outlined in Table 1.3. Consequently, it is not considered a viable alternative, and is included in this EA to fulfill the legal requirements of HRS Chapter 343 and HAR §11-200.

2.5 Alternatives Eliminated from Detailed Consideration

2.5.1 Delayed Action

In 2014, Hawaiian Electric submitted a series of SMP Minor applications to DPP for minor projects at WGS which were ultimately rejected on the grounds that they exceeded the City and County's cumulative limit per facility of \$500,000 total per 12-month period. The Preferred Alternative (i.e., Alternative 1), which would provide categorical approval for categories of activities which it plans to conduct at WGS over the next ten years, is intended to overcome this regulatory limit. Thus, the Preferred Alternative itself is a form of delayed action, in which the Company has had to limit proposed development within the SMA while it developed the categorical approval process supported by this EA. Any further delay would not allow Hawaiian Electric to meet the objectives outlined in Table 1-3, or even the objectives of the original round of projects seeking individual SMP Minors. For these reasons, Hawaiian Electric has concluded that further delaying action is not viable, and has eliminated this alternative from further consideration.

2.5.2 Alternative Location

The support facilities that Hawaiian Electric proposes to construct and operate at its Waiau Generating Facility are intended to meet the operational needs of that facility. They could not perform the same function if located elsewhere. Hence, alternative locations are not feasible.

3.0 PROJECT DESCRIPTIONS

3.1 Description of the Preferred Alternative

The Preferred Alternative consists of granting a multi-project SMP Major for a variety of relatively small developments at WGS, including those summarized in Table 1.4, and described in further detail below, as well as similar project which have not been fully articulated but which qualify for one of the categories of development summarized in Table 1.5. All of these projects would be undertaken between 2016 and 2025. The projects named in Table 3.1 will all be located in the areas identified in Figure 3.1, Figure 3.4, and Figure 3.10. The projects which are as yet not fully defined will all be limited to the respective geographic envelopes with WGS shown in Figure 1.4, Figure 1.5, Figure 1.6, and Figure 1.7. The remainder of this section describes each of the defined projects in greater detail, providing information about their respective construction, operation, maintenance, schedule, and cost.

To help readers understand the categories of potential actions which Hawaiian Electric is seeking approval for, Table 3.1 applies these categories to all of the currently-planned minor projects at WGS. This is intended to provide examples of the types of projects which Hawaiian Electric is seeking categorical SMP Major coverage for.

Table 3.1 Defined Projects for Which SMP Major Is Being Sought

<i>Project Name</i>	<i>Summary of Project Objectives</i>
Category 1 – Replacements	
C&M Trailer Replacement Project	A dilapidated temporary 24' x 60' trailer utilized by construction and maintenance (C&M) crews will be replaced with a new and permanent 24' x 60' trailer.
Category 2 – Unoccupied Structures without Earthwork	
Perimeter Fence Lighting Project	This project involves the installation of LED lighting every ~20' along the existing perimeter fence to improve facility security.
Vehicle Fuel System Reconfiguration Project	An aging underground storage tank will be removed and replaced with an above-ground storage tank (AST). Other upgrades to the fuel system will also be made to ensure compliance with existing regulations.
Variable Frequency Drive Project	Two (2) new variable frequency drives (VFD) units will be installed to control the two boiler feed pumps that supply boiler water to generating units W7 and W8.
Category 3 – Unoccupied Improvements with Earthwork	
12 kV Substation Demolition	An obsolete 12 kV substation at WGS will be demolished and removed and its location landscaped.
138 kV Substation Retrofit Project	An existing 138 kV substation will be retrofitted. This will involve adding one (1) new bay to the existing six (6) bays, then sequentially

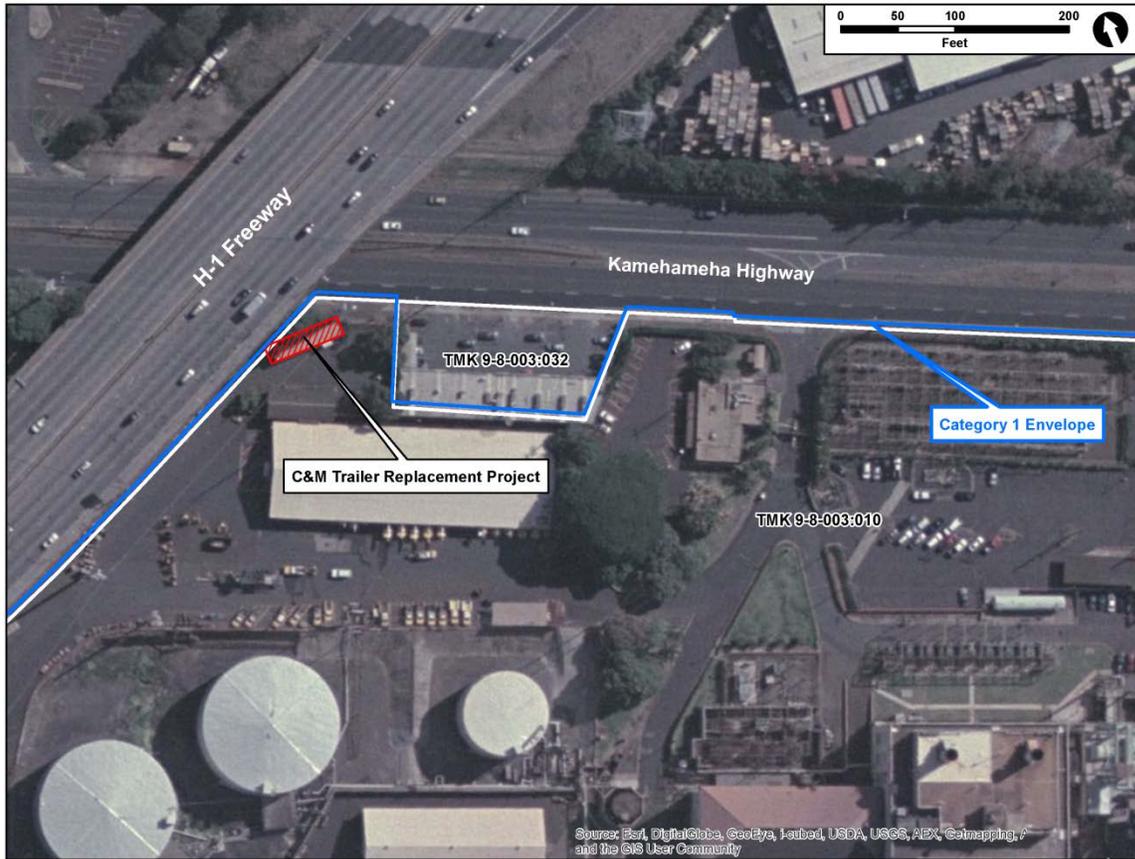
	taking each of the bays out of service, retrofitting it, returning it to service, and then moving onto the next bay until all but one bay has been retrofitted. The last bay will be removed; only six (6) bays are needed.
46 kV Substation Upgrade and Relocation Project	A new and upgraded 46 kV Gas Insulated Substation (GIS) will be built in a parking area <i>makai</i> of the existing substation. Once the new substation is in service the old substation will be removed and the area converted to parking.
Waiiau Former Wastewater Pond Modification	The abandoned wastewater ponds at WGS will be modified by grading, surface dressings, and landscaping. The modifications will provide a more level area that the Company may use for equipment staging, parking, or other uses.
Category 4 – Occupied Structures	
Hawaiian Electric does not have any Category 4 projects planned at WGS at this time.	
Source: Hawaiian Electric (2016)	

3.2 Category 1 – Replacements

The first and least impactful category of minor development at WGS consists of “one for one” replacements of existing structures or pieces of equipment which are already within the SMA. Because ROH §25-1.3(2)(F) establishes that development does not include “Repair, maintenance or interior alterations to existing structures” this category is limited to projects which qualify as development, as in cases where demolition or removal of prior structures or equipment is required, or where the replacement requires an alteration in the size of the existing structure or equipment.² The location of the one defined Category 1 project outlined in this section is depicted in Figure 3.1 below.

² ROH §25-1.3(1)(E) stipulates that construction, reconstruction, demolition or alteration of the size of any structure constitutes development within the SMA.

Figure 3.1 Location of Defined Category 1 Projects at WGS



Source: Planning Solutions, Inc. (2015)

3.2.1 C&M Trailer Replacement Project

The objective of this project is to replace an aging mobile office trailer which has been present at WGS on a temporary basis with a new, permanent modular office trailer. The new facility would be a “double-wide” 24’x60’ trailer fundamentally identical in size and exterior appearance to the facility which it would replace (see Figure 3.2). As with the existing trailer, the new trailer will be hooked up to necessary infrastructure, including electrical, communications, and security interconnections via an existing underground conduit. This office trailer will not require water or sewer service. Also, similar to the existing trailer being replaced, the new trailer will have at least two points of ingress and egress; one of these access points will be accessible via an ADA-compliant ramp. A plan depiction of a conceptual interior layout is provided in Figure 3.3.

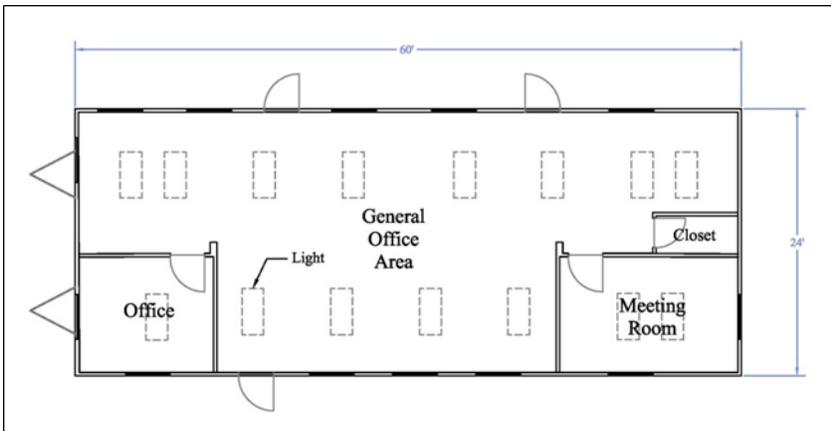
The new trailer will provide improved office space for the C&M crews present at WGS. The new trailer will be in the same general area of the facility (see Figure 3.1), but it may be oriented differently. If the new trailer is oriented differently, parking in the area may be modified, but the number of parking places available in the area will remain the same.

Figure 3.2 Existing C&M Office Trailer



Source: Planning Solutions, Inc. photo dated September 25, 2015

Figure 3.3 Conceptual 24' by 60' Office Trailer Interior Configuration

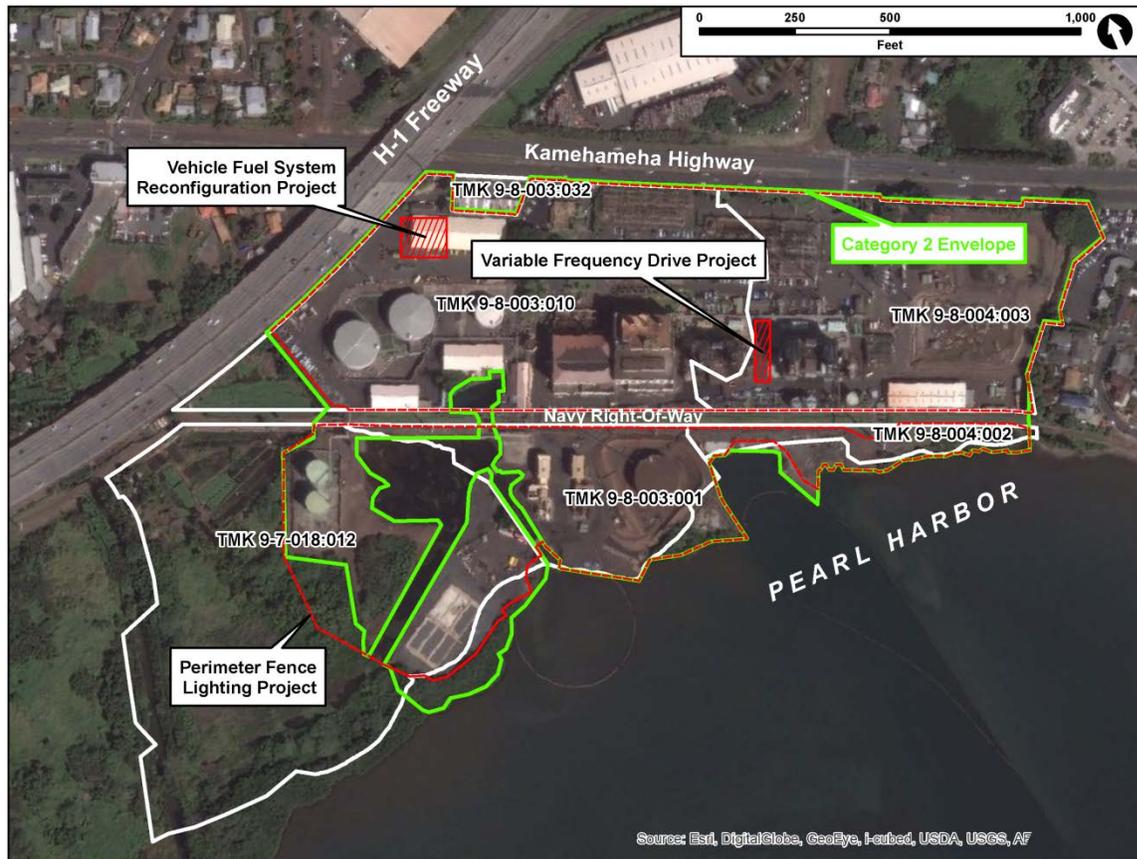


Source: Blazer Industries, Inc. (2014)

3.3 Category 2 – Unoccupied Improvements without Earthwork

All of the defined projects at WGS which have been assigned to Category 2 consist of unoccupied improvements to the facility which meet the ROH Chapter 25 definition of “development within the SMA” but which would not require any significant grubbing, grading, or stockpiling, or other earthwork (i.e., less than 50 cubic yards of earthmoving). The locations of the Category 2 projects outlined in this section are depicted in Figure 3.4 below.

Figure 3.4 Location of Defined Category 2 Projects at WGS



Source: Planning Solutions, Inc. (2015)

3.3.1 Perimeter Fence Lighting

Hawaiian Electric, in support of its overall objective to, “install, modify, and remove facilities as needed to provide for adequate security,” (see Table 1.3), plans to install fence-mounted lighting around the perimeter of WGS. There has been some lighting along portions of the facility fence line previously, however they were not fully shielded and were removed as part of the Company’s commitment to seabird-friendly lighting. Security personnel present at WGS have noted that, with the removal of this lighting, certain areas have become very dark and difficult to monitor.

The new, fully-shielded lighting would be installed along the portions of the perimeter fence where lighting is currently not present. Within the SMA the total linear distance for new lighting will be approximately 5,500 feet (~1 mi.) (see Figure 3.4).

The lighting system which Hawaiian Electric intends to install is manufactured by CAST Lighting, Inc. (see Figure 3.5). The product is marketed in kits of between 12 and 36 lighting units; several kits will be required for this project. All lights will be Light Emitting Diode (LED), full-cutoff fixtures and will be placed at approximately 20-foot intervals along the perimeter fence. Each LED unit produces approximately 160 Lumens.

Figure 3.5 Photograph of Perimeter Fence Lighting



Source: Planning Solutions, Inc. photo dated September 25, 2015.

Hawaiian Electric estimates that it will install approximately 264 fixtures in total. Power for the lights will be provided via interconnection with the existing, on-site electrical system at multiple locations. Some minor trenching between buildings and the perimeter fence may be necessary to connect each section of lighting with an available power source; however the earthwork would amount to less than 50 c.y. in total. The low-voltage power cables between the individual units would be housed in small conduit mounted atop the perimeter fence (Figure 3.5).

The perimeter fence lighting system will be equipped with a “light eye” sensor so that the lights switch on and off automatically at dusk and dawn, respectively. The lights also conform to the Underwriters Laboratory (UL) standards 1838 and 8750, and are suitable for use in wet locations. Similar lighting systems have been installed around portions of the perimeter fence at various Hawaiian Electric facilities in the past.

3.3.2 Vehicle Fuel System Reconfiguration Project

The objective of this project is to maintain the Company’s vehicle-support facilities in good working order, which relates to overall project objective 1 in Table 1.3. Another objective is to

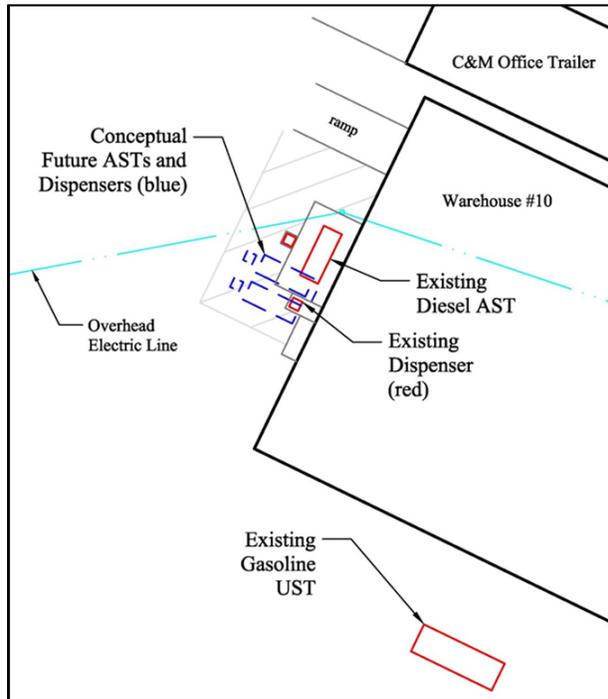
maintain the Company's compliance with applicable regulations, in this case underground storage tank (UST) regulations, which relates to overall project objective 4. The existing vehicle fuel system at WGS is located near Warehouse No. 10 in the northwest corner of the facility (see Figure 3.4 above) and consists of a 5,000-gallon unleaded gasoline UST, a 1,000-gallon diesel above-ground storage tank (AST), one dispenser for each fuel type, and associated underground and above-ground fuel piping (Figure 3.6 and Figure 3.7).

Figure 3.6 Photograph of Existing Fueling Area



Source: Planning Solutions, Inc. photo dated September 25, 2015.

Figure 3.7 Existing and Conceptual Future Vehicle Fueling Area



Source: Planning Solutions, Inc. (2016)

The existing UST is aging and will need of replacement within the next 10 years. The project will close the 5,000 gallon UST, through removal per applicable regulations, and reconfigure the fuel system to consist of two 1,000-gallon ASTs, one diesel and one gasoline, with two dispensers and associated piping. The reconfiguration will require new concrete pads for the tanks and dispensers plus new bollards to protect the equipment; this effort is not anticipated to require more than 50 cubic yards of soil disturbance or changes in grade of more than one foot. The closure of the UST will require the backfilling of the excavation to remove the UST; this will require roughly 25 cubic yards of self-compacting imported backfill material (e.g., 3b fine gravel). The precise design of the reconfigured vehicle fuel system has not yet been established and a number of factors will influence the final design, including Honolulu Fire Department, State of Hawai'i Department of Health (DOH), and DPP review and the fact that fuel tanks cannot be placed directly beneath electric lines.

A conceptual design of the reconfigured vehicle fuel system is illustrated in Figure 3.7. While no construction drawings have been prepared at the present time, photographs of a new fueling area at Hawaiian Electric's Ko'olau Substation (see Figure 3.8 below) depict the type of facility which the Company intends to install at WGS. By continuing to have an on-site vehicle fuel system, Hawaiian Electric will be able to continue to fuel its service vehicles in a timely, efficient, and cost-effective way. An advantage to replacing the gasoline UST with an AST will be that it is easier to install and service.

Figure 3.8 New Fueling Area at Ko‘olau Baseyard



Source: Hawaiian Electric (2016)

3.3.3 Variable Frequency Drive Project

The objective of the Variable Frequency Drive (VFD) project is to improve the efficiency of the power generation process at WGS, which relates to project objective 2 in Table 1.3. This project will install two (2) VFD units which will control the two boiler feed pumps which serve generator units W7 and W8. The VFDs function to control the boiler feed pumps, varying the flow of water into the boiler, and thus varying the (otherwise fixed) power output from those generators. The addition of VFDs will allow Hawaiian Electric plant managers flexibility in the operation of these two generators, continuously matching their output to fluctuating system demand, increasing facility efficiency.

The VFDs which Hawaiian Electric plans to install at WGS are similar to the trailer-mounted unit which has been in use at Kahe Generating Station on an experimental basis (shown in Figure 3.9 below). However, because these VFDs would be installed on a permanent basis, they would be pad-mounted, rather than on a mobile trailer as shown in the photographs. While the exact location of the VFD units has not yet been determined, the general location (as shown in Figure 3.4) would be in an open area between units W6 and W7. Installation of the concrete pads and ancillary water, electrical, and control interconnections may require some minor trenching or earthwork, but would be less than 50 c.y. total.

Figure 3.9 Photographs of Typical VFD Units



Source: Hawaiian Electric (2015)

3.4 Category 3 – Unoccupied Improvements with Earthwork

Category 3 projects include minor facility improvements which will not require significant modifications to the existing character or use of WGS, but which will require earthwork in excess of 50 cubic yards. The locations of the Category 3 projects outlined in this section are depicted in Figure 3.10 below, followed by a discussion of each of the projects.

Figure 3.10 Location of Defined Category 3 Projects at WGS



Source: Planning Solutions, Inc. (2015)

3.4.1 12 kV Substation Demolition

This project consists of demolishing and removing an obsolete 12 kV substation located near the main entrance to WGS (see Figure 3.10). The objective of this project is to remove the obsolete equipment and interconnections, which—consistent with the objectives outlined in Table 1.3—will enhance worker safety and free up needed space within the facility. The 12 kV substation currently occupies approximately 10,000 sq. ft. of area on the *mauka* side of the administration building. Photographs of the existing facility are shown in Figure 3.11 below. All electrical equipment and foundations will be removed, with the exception of two junction boxes; wherever practical equipment will be reused or recycled.

Once the existing substation is removed, the area will be graded and stabilized with landscaping. Grading will be kept to a minimum, but it is assumed that more than 50 c.y. of soil will be handled during the project. Select fill will be imported so that the grade of the area can be restored after the removal of the substation improvements. Project implementation is anticipated to require approximately 3 months.

Figure 3.11 12 kV Substation at WGS to be Demolished



Source: Planning Solutions, Inc. photos dated September 25, 2015.

3.4.2 138 kV Substation Retrofit Project

This project will retrofit the existing 138 kV substation at WGS, which occupies a roughly 1 acre area *mauka* of generating units W5 through W8 (Figure 3.10). It consists of adding one (1) new bay to the six (6) existing bays, then sequentially taking one of the old bays out of service, retrofitting it, returning it to service, and then moving onto the next bay until all but the last bay has been retrofitted; the last bay will be removed. The objective of this project is to retrofit aging equipment within the substation in order to improve its efficiency and enhance worker safety, which relates to overall project objective number 2 in Table 1.3. By conducting this major refurbishment of the existing 138 kV substation, Hawaiian Electric will implement a long-term and cost-effective solution to corrosion on the existing substation support structures, reduce operations and maintenance costs, and improve system reliability.

Each of the existing six (6) bays is approximately 45' wide and 60' long, with risers 88' high. The new bay would have approximately the same dimensions. Thus, the new bay would appear to be similar in general configuration to the existing bays but with its axis running in a *mauka-makai* orientation, as opposed to the east-west orientation of the existing bays. A view of the existing 138 kV substation is shown in Figure 3.12 below. The general configuration of the proposed 138 kV Substation Retrofit Project is shown in Figure 3.13. During construction of the new substation temporary parking will be provided elsewhere on the WGS property.

Figure 3.12 Photograph of Existing 138kV Substation



Source: Planning Solutions, Inc. photo dated September 25, 2015.

Figure 3.13 Conceptual Layout of 138 kV Substation Retrofit Project



Source: Hawaiian Electric (2016)

3.4.3 46 kV Substation Upgrade and Relocation Project

This project will replace the existing air insulated 46 kV substation, which occupies approximately half an acre on the *mauka* side of WGS, which is currently aging and suffering from corrosion of the some of its support structures, with a new 46 kV Gas-Insulated Substation (GIS). The objective of this project is to replace the aging equipment with modern, more efficient equipment that will improve station efficiency and enhance worker safety, relating to overall project objective 2 in Figure 1.3. A view of the existing substation is shown in Figure 3.14 below. The new 46 kV GIS substation will be located in an existing parking area immediately *makai* of the existing substation and will occupy an area less than half an acre in size, as shown in Figure 3.16. The lines shown connecting to/from the GIS substation will be underground; beyond the limits shown on the figure the transmission lines will be above ground as they are currently.

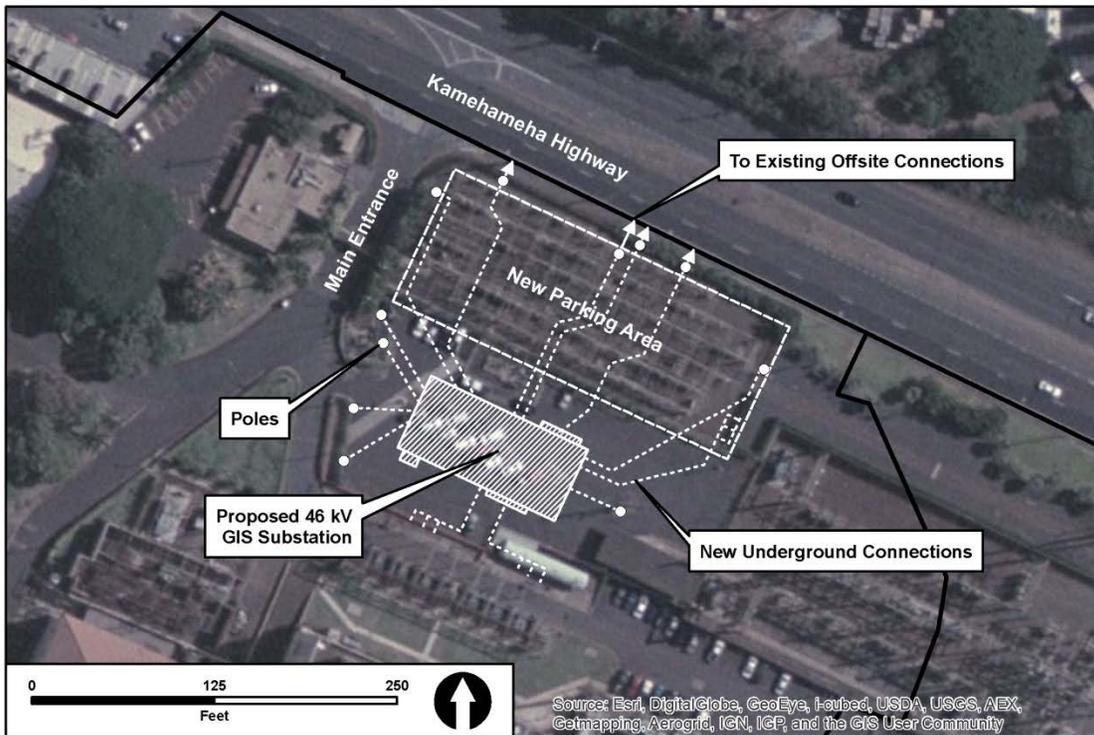
Figure 3.14 Photograph of Existing 46 kV Substation



Source: Planning Solutions, Inc. (2016)

In order to implement the 46 kV Substation Upgrade and Relocation Project, Hawaiian Electric would begin by conducting all required civil engineering work for the new GIS facility, including: (i) installing high-volume duct banks and cable trenches; (ii) constructing the new foundations and GIS building; and (iii) installing all rise poles and their foundations to connect the new GIS with Hawaiian Electric's existing electrical grid. Once the building and connections are in place, the Company will install and energize the new GIS equipment, including circuit breakers, switches, transformers, arresters, and all necessary interconnections.

Figure 3.15 Conceptual Layout of 46 kV Substation Upgrade and Relocation Project



Source: Planning Solutions, Inc. (2016)

Once the new GIS was complete, Hawaiian Electric will execute the circuit cutovers to the new facility from the existing 46 kV substation. Finally, the Company will remove all the equipment and foundations from the old substation and create a new paved parking area *mauka* of the GIS. All of the equipment, housings, and support structures will be reused, recycled, or disposed of at an approved offsite location. A conceptual layout of the new facility is shown in Figure 3.15.

3.4.4 Wai'au Former Wastewater Pond Modification

The objective of this project is to maintain support facilities in good working order, which relates to overall project objective number 1 in Table 1.3. The support facility in this case is the open area on the eastern side of the facility where two wastewater management ponds were previously located; this area is now used as a parking, staging, and storage area to support general operations at the station. The former wastewater ponds ceased operation over ten years ago and were officially closed by DOH at that time. The DOH closure indicates there is no longer a health or safety concern regarding the area's past use for wastewater management.

Some improvements to the area have been made since the ponds were closed. The ponds have been partially graded and coarse gravel has been placed to stabilize the surface and provide an appropriate surface for vehicle and equipment parking and staging (Figure 3.16). In addition, the Diamond Head berm of the *makai* pond has been landscaped, including the installation of a keystone retaining wall in place of the soil berm, to improve the functionality of the area between the pond and facility fence line as well as its appearance (Figure 3.17).

Figure 3.16 View from West Side of Mauka Former Wastewater Pond



Source: Planning Solutions photo dated September 25, 2015.

Figure 3.17 Improved Portion of Makai Former Wastewater Pond Berm



View towards the southwest along the eastern side of the former pond.

Source: Planning Solutions, Inc. photo dated September 25, 2015.

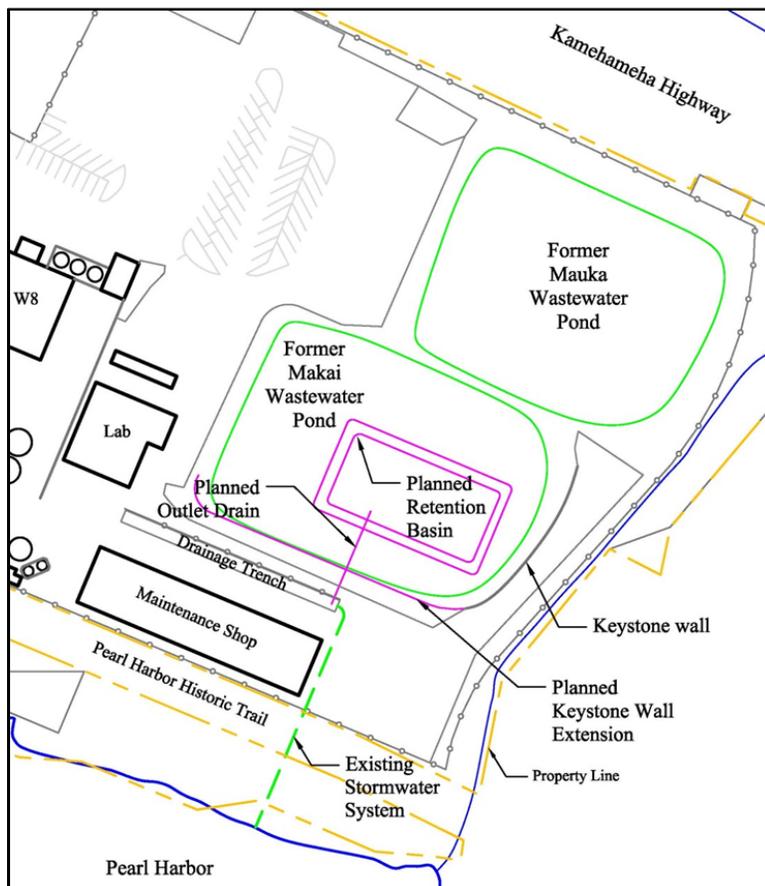
The proposed modifications to the former pond area include:

- Both the *mauka* and *makai* ponds will be graded and the height of their surrounding berms reduced. The elevation of the interior of the *mauka* pond will be increased, and the elevation of the interior of the *makai* pond will be reduced. This regrading will improve access to the interior areas of these former ponds, particularly for the *mauka* pond where the berm will be largely eliminated.
- A storm water retention basin will be installed in the former *makai* pond. The retention basin will be approximately 152' by 82' and 4' deep. This would provide a capacity of 230,000 gallons, sufficient to accommodate a 2-year storm event, per the design standards of the City and County of Honolulu. It will have an extended detention outlet structure (see Figure 3.18) connected to WGS' existing storm water elimination system. The retention basin is not a condition or requirement of an existing permit, but is being installed to buffer the flow into the existing downstream drainage infrastructure.
- The keystone wall (illustrated in Figure 3.19 and similar in appearance and function to the existing keystone wall shown in Figure 3.17) will be extended along the *makai* side of the former *makai* pond.
- The driveway between the former pond and the drainage trench will be widened, resulting in approximately 5,000 sq. ft. of new paved area.
- The graded areas within the former *makai* pond and outside of the proposed retention basin will be dressed with course gravel to inhibit erosion.
- Landscaping to improve the area's appearance to viewer groups on or near WGS.

As part of this project, the existing storm water system will be cleaned, removing any accumulated silt and other matter prior to linking the retention basin to it. To the extent practicable, the project design attempts to balance earthwork cut and fill; however, it is likely that approximately 1,000 c.y. of excess material will require offsite disposal. In addition, some materials, such as the gravel used for surface dressing, will be imported. The total area disturbed will be approximately 3 acres. Due to the area and volume of grading both an NPDES Notice of Intent – Construction (NOI-C) permit and a grading permit will be required prior to project implementation.

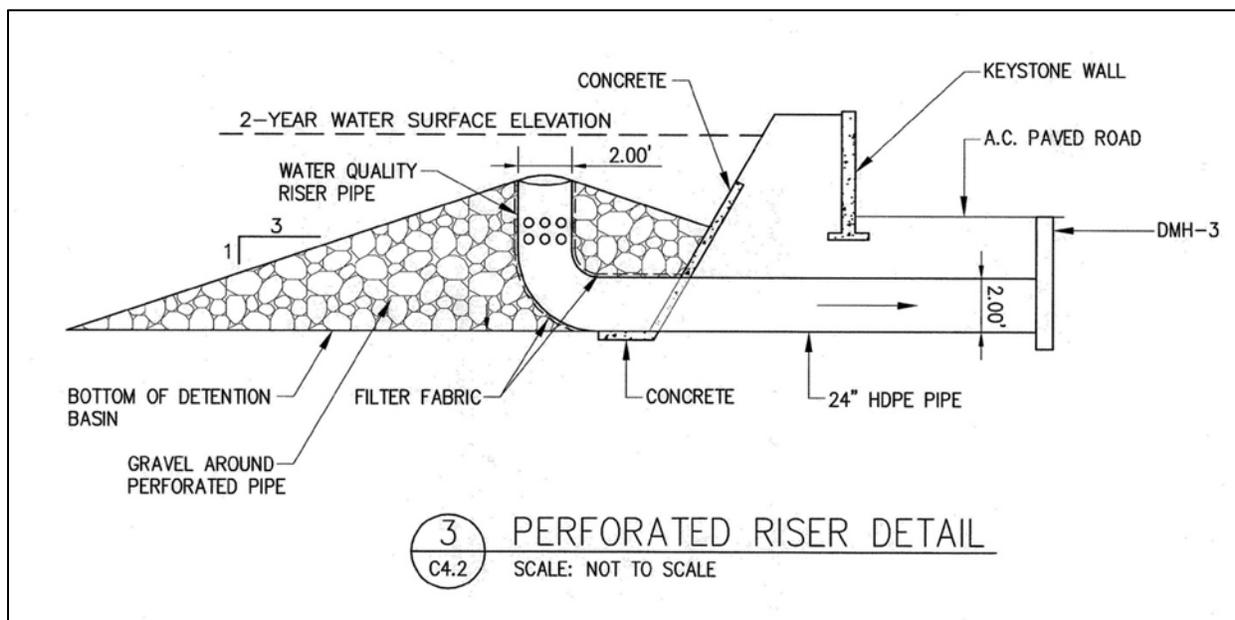
During construction best management practices (BMPs) will be employed to reduce the potential for adverse effects to storm water. BMPs will include protocols for: (i) proper materials and waste management, (ii) proper vehicle fueling, (iii) protection for storm drain inlets, (iv) perimeter controls and sediment barriers, (v) stabilized construction site ingress and egress, and (vi) for stopping work in the event of storms, among others.

Figure 3.18 Overview of Waiau Former Wastewater Pond Modification Project Area



Source: Planning Solutions, Inc. (2015)

Figure 3.19 Cross Section of Extended Detention Outlet Structure



Source: Hawaiian Electric (2015)

3.5 Category 4 – Occupied Structures

Category 4 project consist of those project which include one or more entirely new structures, whether buildings or other enclosures, which will be occupied by Hawaiian Electric personnel on a part- or full-time basis. Because these types of structures tend to be larger and require a higher level of access, interconnection, and safety they are assigned their own category in this EA. Hawaiian Electric does not have any Category 4 projects planned at WGS at this time; refer to Appendix A for an example of a project previously permitted at WGS via a SMP Minor (Modular Office for Power Supply Engineering Department [2011/SMA-16]) which would qualify for Category 4.

3.6 Implementation Schedule

The estimated construction start date and duration of each defined project listed in the sections above and Table 3.1 are presented in Table 3.2, below.

Table 3.2 Approximate Implementation Dates for Projects

<i>Project Name</i>	<i>Estimated Start Date</i>
C&M Trailer Project	2018
Perimeter Fence Lighting Project	2017
Vehicle Fuel System Reconfiguration Project	2018-2022
Variable Frequency Drives Project	2018
12 kV Substation Demolition Project	2018
138 kV Substation Retrofit Project	2022
46 kV Substation Upgrade & Relocation Project	2020
Former Wastewater Pond Modification Project	2018

Source: Hawaiian Electric (2016)

3.7 Project Costs Estimates

Hawaiian Electric has prepared preliminary construction cost estimates for the defined projects based on the conceptual information presented above. These estimates are summarized in Table 3.3.

Table 3.3 Estimated Cost of Projects

<i>Project Name</i>	<i>Estimated Total Cost</i>
Category 1 – Replacements	
C&M Trailer Replacement Project	\$230,000
Category 2 – Unoccupied Improvements without Earthwork	
Perimeter Fence Lighting	\$620,000
Vehicle Fuel System Reconfiguration Project	\$1,000,000-\$2,000,000
Variable Frequency Drive Project	\$750,000
Category 3 – Unoccupied Improvements with Earthwork	
12 kV Substation Demolition	\$300,000
138 kV Substation Retrofit	To Be Determined
46 kV Substation Upgrade and Relocation Project	To Be Determined
Waiiau Former Wastewater Pond Modification	\$2,000,000
Category 4 – Occupied Structures	
Hawaiian Electric does not have any Category 4 projects planned at WGS at this time. See Appendix A for an example of a recent project at WGS that would qualify for this category.	
Source: Hawaiian Electric (2015)	

3.8 Required Approvals by Project

The permits and approvals which may be required for each of the constituent projects covered by this EA are summarized in Table 3.4 below.

Table 3.4 Summary of Required Approvals

<i>Project Name</i>	<i>NPDES</i>	<i>Shoreline Setback Variance (SSV)</i>	<i>Conditional Use Permit (CUP) Minor Mod.</i>	<i>Flammable Liquids Storage Tank Permit</i>	<i>Grading, Grubbing, Stockpiling Permit</i>	<i>Building Permit</i>
Category 1 – Replacements						
C&M Trailer Replacement	N	N	Y	N	N	Y
Category 2 – Unoccupied Improvements without Earthwork						
Perimeter Fence Lighting	N	N	Y	N	N	Y
Vehicle Fuel System Reconfiguration	N	N	Y	Y	N	Y
Variable Frequency Drives	N	N	Y	N	N	Y
Category 3 – Unoccupied Improvements with Earthwork						
12 kV Substation Demolition Project	N	N	Y	N	N	Y
138 kV Substation Retrofit	Y	N	Y	N	Y	Y
46 kV Substation Upgrade & Relocation	Y	N	Y	N	Y	Y
Waiiau Former Wastewater Pond Modification	Y	N	Y	N	Y	Y
Category 4 – Occupied Structures						
Hawaiian Electric does not have any Category 4 projects planned at WGS at this time.						
Note: Y = Yes, N = No, P = Possible						
Source: Hawaiian Electric (2016)						

4.0 OVERVIEW OF THE EXISTING ENVIRONMENT, POTENTIAL IMPACTS, & MITIGATION MEASURES

This chapter describes the potential environmental effects of the proposed actions. It is organized by impact topic (e.g., air quality, noise, geology and soils, water quality, etc.). The discussion under each topic begins with an overview of existing conditions related to that topic. Where appropriate, this includes the larger environmental context (e.g., Pearl Harbor, Central O‘ahu); in other cases the focus limited to the boundaries of WGS. The discussion also distinguishes between short-term construction impacts and those that may result from facilities’ continuing presence or operation. As circumstances require, the discussion includes the measures which Hawaiian Electric proposes to undertake to minimize or mitigate potential adverse effects on the natural and human environment.

4.1 Topography, Geology, and Soils

4.1.1 Existing Conditions

The WGS is located at the foot of the Ko‘olau Range, one of the two shield volcanoes that originally formed the Island of O‘ahu. Pearl Harbor is essentially a series of drowned river valleys and has a complex historic reflecting a balance among the processes of sea-level change, uplift and subsidence of the island itself, and inputs of material from erosion of the island. Its *makai* portions were also influenced by the development of coral reefs (see MacDonald, Abbott and Peterson 1983). The result is a complicated series of discontinuous layers of sedimentary deposits lapping into hard-rock outcrops of volcanic basalt.

The bulk of the facility is on the gentle sloping portion of the mostly drowned river valley and has ground elevations ranging from approximately 40 feet above mean sea level (MSL) along Kamehameha Highway to just a few feet above MSL along the *makai* side of the facility. Slopes range from a maximum of less than 5 percent on the upper portion of the site to less than 0.5 percent on the *makai* side of the station, with a consistent slope toward Pearl Harbor (i.e., *makai* side of the facility).

The shoreline on the eastern side of WGS has been modified by dredging and filling over the years to create the present engineered shoreline (see Figure 1.2). The western portion of the facility includes a portion of the Waiau Stream delta as it empties into Pearl Harbor. In times past, native Hawaiian fish ponds were present in this area but fell into disrepair or were destroyed. It has been reported that sedimentation increased, forming the current delta when areas upland of WGS were used for commercial-scale sugarcane cultivation.

According to the U.S. Department of Agriculture’s Soil Conservation Service, three soil types make up the bulk of the developed area of WGS. In the *makai* area the soil is composed of Kea‘au Clay (KmbA). These soils are saline, have 0 to 2 percent slopes, and are poorly drained. This type of soil occurs in depressions adjacent to the ocean or in pockets within the limestone where seepage water evaporates. In the central and western portion of the facility the soil is Honouliuli Clay (HxA); these soils have 0 to 2 percent slopes and are well drained. In the *mauka* portion of the facility, the soil is Moloka‘i Silty Clay Loam (MuC). This soil has 7 to 15 percent slopes with a moderate risk of erosion, and is well drained. This soil type occurs on knolls and

sharp slope breaks. Two other soil-types are present in limited areas: (i) Pearl Harbor Clay (Ph) is present in a small area in the southwest corner of the facility, this soil has 0 to 2 percent slopes and is poorly drained; and (ii) Tropaquepts (TR) in the northeast corner of the facility. This soil has 0 to 2 percent slopes and is poorly drained; Tropaquepts are typically found in areas of very shallow groundwater, and are subject to flooding. This soil can be used to grow crops that thrive in water by periodically flooding them. The general locations of these soils are shown in Figure 4-1 below, based on the Natural Resource Conservation Service's Soil Survey Geographic Database (SSURGO) data.

Development at WGS has largely capped or removed the soils listed above with structures, roadways and parking areas. During this development the natural soils that were not considered supportive of the planned structures and uses were covered or removed and replaced with engineered fill material. Where open areas do remain, primarily in the western portion of the facility, soil maps indicate the Pearl Harbor Clay, Keaau Clay and Honouliuli Clay noted above. Although some farming takes place in adjacent areas, the soil classifications indicate only Honouliuli Clay represents prime farmland, if irrigated.

Figure 4.1 Soil Classifications



Source: Natural Resource Conservation Service, Soil Survey Geographic Database (SSURGO) (2015)

4.1.2 Probable Impacts

Action Alternatives

Given the I-2 Intensive Industrial zoning and existing use of WGS, geology and soils are not resources critical to either the welfare of the community or to the continued operation of the facility. The capacity of the geology and soils to support the developments which are sited there is the primary concern throughout the working area of the facility. The sole exception to this is in the undeveloped western portion of the facility, where geologic and soil resources, which support wetland farming, could be adversely impacted by additional development.

All projects evaluated in this EA would be designed and constructed to comply with engineering standards and codes related to geotechnical parameters, such as slope stability and the ability for the substrate to support the improvements. In addition, Best Management Practices (BMPs) would be employed during construction and post-construction measures will be incorporated into project designs to reduce the potential for erosion and windborne fugitive dust. These BMPs will help Hawaiian Electric to avoid, or where unavoidable, minimize the potential for project-related impacts to topography, geology, and soils.

Under both of the action alternatives (i.e., Alternatives 1 and 2), the probably impacts would be similar in type but vary in scope and potentially the longevity of construction-phase impacts. Alternative 1, which would see implementation of both the defined projects summarized in Table 1.4 as well as additional projects belonging to the categories summarized in Table 1.5 over a period of approximately ten years, would have impacts greater in scope due to the longevity of its construction activities. Under Alternative 2, only those projects listed in Table 1-4 would be implemented, limiting the scope and duration of construction period impacts. In both cases, the impacts would be well below the level of significance.

Table 4.1 below summarizes the impacts associated with the different categories of projects.

Table 4.1 Summary of Impacts to Topography, Geology, and Soils by Category of Development

<i>Project Category</i>	<i>Anticipated Impacts</i>
1 – Replacements	These projects do not have the potential to significantly impact topography, geology, and soils because replacement project will only occur where existing facilities are present and will not require significant earthwork. None of these projects will occur in the undeveloped western portion of the facility. The existing facilities being replaced may have affected topography, geology, and soils to some extent when originally installed; replacing them now will not result in significant adverse effects. Some limited subsurface work may be required for foundations, utility interconnections, etc.
2 – Improvements without Earthwork	These projects do not have the potential to cause meaningful impacts to topography, geology, and soils because they do not involve earthwork in excess of 50 c.y. These improvements may require limited subsurface disturbances during demolition or work to make foundation adjustments, however the limited scale of earthwork ensures that any resulting impacts will be negligible.
3 – Improvements with Earthwork	<p>Projects in this category do have the potential to affect topography, geology, and soils present at WGS. They may require modification to the station’s topography, or disturb underlying geology and soils. Examples of activities with this potential include: (i) pouring new concrete-slab foundations; (ii) installing micropile foundations; (iii) trenching for water, electrical, and communications connections; and (iv) grading. As these examples indicate, while individual projects may locally alter topography, geology, and soils they will not modify the overall ground surface or slope (i.e., the overall slope will continue to be southerly, or <i>makai</i>), or the ground elevation in any area more than 10 feet.</p> <p>In addition, these disturbances will be limited to the previously developed portion of the facility (see Figure 1.6) and away from the shoreline. These modifications will not inhibit any current or future land uses, and neither the defined projects in Table 1.4, nor the categorical activities summarized in Table 1.5 will considerably alter the use or character of WGS. The generating station would continue to have the same general physiographic and topographic characteristics.</p> <p>For example, the former waste water pond modifications will change the ground elevation throughout the area, increasing it within much of the former pond area, but also decreasing it in the future detention basin. Overall the area will continue to slope in a <i>makai</i> direction and the surface will continue to consist of engineered material, either gravel or asphalt.</p> <p>Therefore, the impact is considered negligible and less than significant.</p>
4 – Occupied Structures	Same as Category 3; all development will be limited to the envelope shown in Figure 1.7.

Source: Planning Solutions, Inc. (2015)

No Action Alternative

Under the No Action Alternative Hawaiian Electric would not immediately undertake any of the defined or categorical projects evaluated in this EA, thus there would be no resulting impacts to topography, geology, or soils within WGS. However, as each of the projects and activities evaluated here is motivated by ongoing and increasingly acute need, Hawaiian Electric would pursue other avenues for permitting and implement the various projects individually.

4.2 Climate/Micro-Climate

4.2.1 Existing Conditions

The Hawaiian Island chain is situated south of the large Eastern Pacific semi-permanent high-pressure cell, the dominant feature affecting air circulation in the region. Over the Hawaiian Islands, this high-pressure cell produces very persistent winds called the Northeast Trade Winds. During the winter months, cold fronts sweep across the north central Pacific Ocean, bringing rain to the Hawaiian Islands and intermittently modifying the trade wind regime. Thunderstorms, which are rare but most frequent in the mountains, also contribute to annual precipitation.

Temperature

Due to the tempering influence of the Pacific Ocean and their low-latitude location, the Hawaiian Islands experience extremely small diurnal and seasonal variations in ambient temperature. On average, at Honolulu International Airport the coolest month is February and the warmest month is August (see Table 4.2). The temperature variations, less than 10 degrees, are quite modest when compared to those that occur at inland continental locations.

Table 4.2 Average Temperature, Rainfall, and Humidity, by Month

<i>Month</i>	<i>Ambient Temperature, °Fahrenheit</i>		<i>Average Monthly Rainfall (inches)</i>	<i>Relative Humidity (%)</i>	
	<i>Maximum</i>	<i>Minimum</i>		<i>8:00 a.m.</i>	<i>2:00 p.m.</i>
January	80.1	66.3	2.31	81	61
February	80.2	66.1	1.99	79	59
March	81.2	67.7	2.02	73	57
April	82.7	69.4	0.63	70	55
May	84.6	70.9	0.62	67	54
June	87.0	73.4	0.26	66	52
July	87.9	74.5	0.51	68	52
August	88.7	75.1	0.56	68	52
September	88.6	74.4	0.70	70	53
October	86.7	73.4	1.84	71	56
November	83.9	71.4	2.42	75	59
December	81.2	68.3	3.24	79	60
Annual	84.4	70.7	17.10	72	56

Note: Data collected by National Weather Service, Honolulu International Airport Station.

Source: Department of Business, Economic Development and Tourism, *State of Hawai'i Data Book 2014*

Rainfall and Humidity

The terrain on O'ahu strongly influences regional rainfall. Near the top of the Ko'olau Range on the windward side of O'ahu, rainfall averages nearly 250 inches per year. On the leeward side of the Ko'olau Range, where WGS is located, the annual average is much lower (see Table 4.2). Annual average rainfall at the Waiu Power Plant is less than 30 inches per year. Rainfall tends to be greatest in the month of January, when the median monthly rainfall is 5 inches. The month of June tends to be the driest month, with a median monthly rainfall of approximately 1-inch.

Although the project area is on the leeward side of the Ko‘olau Range, the humidity is still moderately high, ranging from the mid-60s to the mid-70s.

Wind Patterns

The northeast trade winds predominate in the vicinity of WGS. Data from the Honolulu International Airport show that they are strongest and most persistent in the summer. During July, for example, winds from the northeast through east are present over 85 percent of the time and winds average 12.8 miles per hour. The trade winds become weaker and less persistent in the winter. During January, for example, they are much less persistent. In winter, winds from the northeast through east are present only 35 percent of the time and the average wind speed drops to 10.5 miles per hour. The island is also influenced by occasional *kona* storms, which are intense low-pressure centers that pass near the island, bringing moderate to strong southerly winds and rain. When the trade winds or storms do not dominate the wind flows, the winds are typified by land/sea breezes and *kona* winds.

4.2.2 Probable Impacts

Action Alternatives

Under both of the action alternatives (i.e., Alternatives 1 and 2), the series of relatively minor projects which Hawaiian Electric would undertake would be similar in type. In both cases the impacts to the existing regional climate or area micro-climate would be negligible. The scope of these projects, from fencing to minor structures, is such that they do not have the potential to affect the temperature, rainfall, humidity, wind speed, or wind direction in the immediate vicinity of the generating station or the surrounding community. The sole exception may be some minor effect on the ground-level airflow within the overall facility, or higher level airflow that is responsible for the dispersion of flue gas from the generator stacks. However, this very minor alteration of airflow would be limited to the immediate vicinity of WGS and would not have a measurable impact on surrounding areas.

During construction of all the minor projects included in Alternatives 1 and 2 Best Management Practices (BMPs) will be employed to reduce the potential for fugitive dust or other construction related emissions. This effort will avoid and minimize the potential for the constituent projects to individually or collectively impact the regional climate or area micro-climate. Because not all of the projects which are covered in this EA have been fully defined at this time, Table 4.3 below summarizes the anticipated impacts associated with the different projects by category of development.

Table 4.3 Summary of Impacts to Climate by Category of Development

<i>Project Category</i>	<i>Anticipated Impacts to Climate</i>
1 – Replacements	Projects in this category are replacements which are, while not exactly the same, similar to the original facility they are replacing in size, shape, location and function. Thus, while they may affect air flow at the ground level to some minor extent, they will not substantially alter the existing patterns of air movement within WGS.
2 – Improvements without Earthwork	These minor projects are limited size, both because they are not intended for human occupation, and because they are limited to installations which do not require substantial (i.e., <50 c.y.) earthwork. They are not anticipated to have a measurable effect on airflow, beyond a small zone immediately surrounding the new structure, if at all.
3 – Improvements with Earthwork	These unoccupied improvements are generally limited in size and scope because they are not intended for human occupation. However, some of the projects do include changes to the existing grade and topography that could exert some local influence on airflow at ground level. The relatively minor projects that qualify for this category will not result in topographic changes of more than 10', which is far lower than the existing structures in the immediate vicinity such as the warehouses (~30') and generator buildings (>80') currently present at WGS. Thus, while some very local changes in airflow may result from implementation of the projects in this category, they will not be significant.
4 – Occupied Structures	The projects in this category are intended to be occupied, and as such may be of a size sufficient to affect airflow in an open environment. However, all Category 4 projects will be confined to the working areas of WGS and surrounded by many other large structures. Because these structures will be limited to the central and <i>mauka</i> areas shown in Figure 1.7, they would not have the potential to affect airflow on Kamehameha Highway or the adjacent Pearl Harbor Historic Trail.
Source: Planning Solutions, Inc. (2015)	

As noted in the preceding discussion, the projects considered in this EA are all relatively minor and would have only minimal effects on airflow within WGS. None of them have the potential to adversely affect airflow in or over surrounding areas, including publicly accessible adjacent areas such as the Pearl Harbor Historic Trail. The facility will continue to have a similar general layout, resulting in preservation of the existing pattern of airflow. Therefore, the impact is considered to be negligible and less than significant.

No Action Alternative

Under the No Action Alternative there would be no immediate impacts to microclimates. However, Hawaiian Electric would pursue, to the extent possible under the existing limits on development within the SMA, other avenues to achieve permitting and implementation of the various projects.

4.3 Air Quality

4.3.1 Existing Conditions

WGS burns petroleum fuels, Low Sulfur Fuel Oil (LSFO) to produce electrical power. The combustion of LSFO requires the release of resulting gases. Each generator at WGS has a flue gas stack for discharging its flue gases. The flue gas is the exhaust from the generators as they burn fuel mixed with air; it consists of nitrogen (N₂), carbon dioxide (CO₂), steam (water vapor than can resemble smoke), oxygen (O₂) not consumed during combustion, and relatively small quantities of particulate matter (i.e., soot), carbon monoxide (CO), nitrogen oxides (NO_x), and sulfur oxides (SO_x). Nitrogen is the primary component because nitrogen makes up 78 percent of ambient air.

According to EPA's Toxics Release Inventory (TRI) Program, in 2013 (the most recent year for which complete data was available) WGS released 226,094 pounds of pollutants into the air. Only certain compounds are reported through the TRI program; carbon dioxide (CO₂), carbon monoxide (CO), and nitrogen oxides (NO_x) are not reported. Most of the reported release consisted of sulfuric acid and hydrochloric acid, which amounted to 200,000 and 26,000 pounds, respectively. Other components included 90 pounds of lead compounds, and four pounds of polycyclic aromatic compounds. Generally, the reported weight of the facility's release has declined over the years, including a significant decrease in nitrate, nickel, and mercury compounds.

Generally, air quality in the area near WGS is excellent. The State of Hawai'i Department of Health monitors ambient air quality on O'ahu using a system of 9 monitoring sites. The primary purpose of the monitoring network is to measure ambient air concentration of the six criteria pollutants that the U.S. Environmental Protection Agency (EPA) has promulgated as National Ambient Air Quality Standards (NAAQS). These include ozone (O₃), nitrogen dioxide (NO₂), carbon monoxide (CO), sulfur dioxide (SO₂), 10 and 2.5-micron particulate matter (PM₁₀ & PM_{2.5}), and airborne lead. The State of Hawai'i has also adopted ambient air quality standards for some pollutants; in some cases these are more stringent than the federal standards. At present, the State has set standards for ozone, carbon monoxide, nitrogen dioxide, PM₁₀, lead, and hydrogen sulfide (H₂S).

Both state and national air quality standards consist of two parts: (i) an allowable concentration of a pollutant; and (ii) an averaging time over which the concentration is to be measured. The allowable concentrations are based on the results of studies of the effects of those pollutants on human health, crops, and vegetation, and in some cases, damage to paint and other materials. The averaging times are based on whether the damage caused by the pollutant is more likely to occur during exposure to a high concentration for a short period of time (e.g., one hour), or to a lower average concentration over a longer period of time (e.g., 8 hours, 24 hours, or one month). For some pollutants there is more than one air quality standard, reflecting both its short-term and long-term effects. Table 4.4 presents the state and national ambient air quality standards for selected pollutants.

Air quality data collected at the Pearl City monitoring station (the station nearest to WGS) and in downtown Honolulu during 2013 are presented in Table 4.5. As shown by these data, air quality in the area never exceeded the short-term or long-term state or national standards for particulate

matter (PM₁₀) or carbon monoxide, the two pollutants likely to be released during construction of the minor projects covered by this EA.

Table 4.4. State and National Ambient Air Quality Standards

Pollutant	Standards		
	Hawai'i State	Federal Primary ^a	Federal Secondary ^b
Carbon Monoxide (CO)			
1-hour ^c	9 ppm	35 ppm	----
8-hour ^c	4.4 ppm	9 ppm	----
Nitrogen Dioxide (NO₂)			
1-hour ^d	----	0.100 ppm	----
Annual mean	----	0.053 ppm	0.053 ppm
Annual average	0.04 ppm	----	----
Particulate matter 10 microns or less in diameter (PM₁₀)			
24-hour ^e	150 µg/m ³	150 µg/m ³	150 µg/m ³
Annual average	50 µg/m ³	----	----
Particulate matter 2.5 microns or less in diameter (PM_{2.5})			
24-hour ^f	----	35 µg/m ³	35 µg/m ³
Annual ^g	----	12 µg/m ³	15 µg/m ³
Ozone (O₃)			
8-hour ^h	0.08 ppm	0.075 ppm	0.075 ppm
Sulfur Dioxide (SO₂)			
1-hour ⁱ	----	0.075 ppm	----
3-hour ^c	0.5 ppm	----	0.5 ppm
24-hour block average	0.14 ppm	----	----
Annual average	0.03 ppm	----	----
Lead (Pb)			
3-month average	1.5 µg/m ³ (calendar quarter avg.)	0.15 µg/m ³ (running average)	0.15 µg/m ³ (running average)
Hydrogen Sulfide (H₂S)			
1-hour average	0.025 ppm	----	----

Source: State of Hawai'i, Department of Health, Clean Air Branch – Hawai'i Administrative Rules, Chapter 59. Code of Federal Regulations, Title 40, Part 50, January 2013 and EPA. <http://epa.gov/air/criteria.html>

Notes: ^a Designated to prevent against adverse effects on public health
^b Designated to prevent against adverse effects on public welfare, including effects on comfort, visibility, vegetation, animals, aesthetic values, and soiling and deterioration of materials.
^c Not to be exceeded more than once per year.
^d 98th percentile of 1-hour daily maximum concentrations, averaged over 3 years.
^e Due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution, the agency revoked the annual PM₁₀ standard in 2006 (effective December 17, 2006).
^f Not to be exceeded more than once per year on average over 3 years.
^g 98th percentile, averaged over 3 years.
^h Annual mean, averaged over 3 years.
ⁱ Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years.
^j 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years.
ppm = parts per million; µg/m³ = micrograms per cubic meter; --- = no standard

Table 4.5 2013 Air Quality at Selected Locations

<i>Pollutant</i>	<i>Pearl City</i>	<i>Honolulu</i>	<i>Sand Island</i>	<i>Kapolei</i>
<i>Carbon Monoxide (CO)</i>				
1-hour 1 st highest	----	1.6	----	1.3
1-hour 2 nd highest	----	1.5	----	1.3
Annual 1-hour mean	----	0.4	----	0.7
8-hour 1 st highest	----	1.2	----	1.0
8-hour 2 nd highest	----	1.2	----	1.0
Annual 8-hour mean	----	0.4	----	0.7
<i>Nitrogen Dioxide (NO₂)</i>				
1-hour 1 st highest	----	----	----	0.031
1-hour 2 nd highest	----	----	----	0.030
Annual mean	----	----	----	0.003
<i>Particulate matter 10 microns or less in diameter (PM₁₀)</i>				
24-hour 1 st highest	38	35	----	39
24-hour 2 nd highest	36	28	----	39
Annual average	18.9	11.4	----	14.5
<i>Particulate matter 2.5 microns or less in diameter (PM_{2.5})</i>				
24-hour 1 st highest	16.2	17.5	19.6	16.2
24-hour 98 th percentile	15.7	15.6	17.5	15.8
Annual mean	5.5	5.3 ¹	6.2	2.8
3-year average	12	11	15	13
<i>Ozone (O₃)</i>				
8-hour 1 st highest	----	----	0.051	0.057
8-hour 2 nd highest	----	----	0.050	0.052
8-hour 4 th highest	----	----	0.047	0.051 ¹
Annual mean	----	----	0.026	0.033
3-year average	----	----	0.046	----
<i>Sulfur Dioxide (SO₂)</i>				
1-hour 1 st highest	----	0.022	----	0.016
1-hour 2 nd highest	----	0.015	----	0.012
Annual 1-hour mean	----	0.001	----	0.002
3-hour 1 st highest	----	0.017	----	0.011
3-hour 2 nd highest	----	0.011	----	0.011
Annual 3-hour mean	----	0.001	----	0.002
24-hour 1 st highest	----	0.005	----	0.005
24-hour 2 nd highest	----	0.003	----	0.005
Annual 24-hour mean	----	0.001	----	0.002
Notes: ¹ = Does not meet summary criteria, <75% data recovery in 3 rd quarter.				
Source: State of Hawai'i, Department of Health, Clean Air Branch – 2013 Air Quality Data Book (2014)				

4.3.2 Probable Impacts

Construction Impacts

Because they consist of only replacements and/or additions without the need for significant earthwork, only minor amounts of work with the potential to affect air quality will be needed to prepare sites for Category 1 and 2 projects. This includes replacing or adding small amounts of paving, removal of existing equipment and structures, and installation of electrical, communications, and other utility interconnections from their nearest existing nodes. Emissions will originate from the internal combustion engines used to power construction equipment and the work vehicles that transport material and construction workers to and from the site. None of these impacts are substantial.

Construction of Category 3 and 4 projects, such as the 46 kV Substation Replacement Project and the Waiiau Machine Shop Project, will entail more substantial site work. The heavy construction equipment that will be used for the work (e.g., bulldozers, dump trucks, excavators) will be powered by internal combustion engines that emit a variety of air pollutants, all in small quantities.³ None of these will add substantially to existing pollution sources in the area.

Air quality impacts attributed to construction across all categories will be temporary and limited to exhaust emissions of construction vehicles, construction equipment, and the dust generated by short-term, construction activities. Access roads within WGS are paved, and thus fugitive dust caused by construction vehicle traffic will not be an issue. Construction activities will generate some airborne particulate matter. In general, this relatively small volume of dust that could be generated, in combination with WGS's distance from sensitive sites such as schools or hospitals, means that these can be easily managed by normal construction dust control measures as necessary.

Construction related exhaust emissions will be minimized by ensuring that contractors for all constituent projects covered by this EA are required to employ standard BMPs including maintaining their construction vehicles and equipment in proper working order, immediately repairing or replacing faulty equipment, and using water to control dust during earth handling operations. Under these circumstances, the volume of pollutants that could be released is too small to have a significant effect on air quality.

All construction work will conform to the air pollution control standards contained in HAR §11-59 *Ambient Air Quality Standards* and HAR §11-60 *Air Pollution Control*.

Operational Impacts

Neither the defined projects listed in Table 1.4 nor the categorical development activities outlined in Table 1.5 will considerably alter the use or character of WGS. In addition, none of the projects will change the fuel being utilized to power the generators; any such change would be dealt with in a separate environmental review document (i.e., an EA or EIS).

³ Construction equipment emissions result from the following sources and activities: (i) construction equipment engine exhaust; (ii) motor vehicle exhaust, brake and tire wear; (iii) entrained dust from material delivery trucks; (iv) entrained dust from trucks traveling on roads; (v) entrained dust from construction worker vehicles; (vi) fugitive dust from earthwork and the handling of excavated material; and (vii) fugitive dust from wind erosion or disturbed areas.

As noted in Table 1.3, one of the general objectives for the developments covered by this EA is to improve efficiency and another is to continue to comply with changing environmental regulations. Improving generator efficiency, as the VFD project (Section 3.3.3) would, can reduce the generating station’s air emissions. One set of environmental regulations that can change are those related to air quality and emissions from generators. Future projects at WGS which may be eligible for one of the development categories (see Table 1.5), and for which Hawaiian Electric is seeking SMP coverage, may include the replacement or addition of equipment to improve the quality of, or decrease the quantity of, generator emissions to comply with applicable regulations. For these reasons, it is assumed that efforts to replace existing air quality control equipment, or to install new air quality control equipment in compliance with changing regulations will: (i) maintain the existing pollutant discharge load; or (ii) reduce the existing discharge load from WGS; and (iii) contribute to continued regional compliance with the national and state ambient air quality standards. Therefore, none of the projects that qualify for the development categories will adversely affect air quality once construction is complete, but may have a beneficial impact as summarized by category in Table 4.6 below.

Table 4.6 Summary of Impacts to Air Quality by Category of Development

<i>Project Category</i>	<i>Anticipated Impacts to Air Quality</i>
1 – Replacements	Projects in this category could include projects related to replacing equipment related to air quality control.
2 – Improvements without Earthwork	Qualifying project could include the installation of new equipment to control air quality emissions or improve generator efficiency, such as the VFD project would.
3 – Improvements with Earthwork	Qualifying projects are unlikely to involved air quality related projects because air quality equipment typically is not ground-mounted. Nevertheless, there remains a possibility that an air quality project could qualify for this category and other projects, including substation replacements, could incrementally improve facility efficiency.
4 – Occupied Structures	Occupied structures are typically not involved in air quality of generator efficiency related projects; however, the potential exists that some projects in this category may influence local air quality.

Source: Planning Solutions, Inc. (2015)

4.4 Hydrology

4.4.1 Existing Conditions

Surface Water

The WGS lies along the shore of the East Loch of Pearl Harbor. The principal surface water features in the project area are: (i) Pearl Harbor Estuary; (ii) Waiau Pond; (iii) Waiau Stream; (iv) Kalua‘o‘opu Spring; and (v) Pearl City Stream. These features are depicted in Figure 4.2

below. Neither Waiiau Stream nor Pearl City Stream are perennial streams listed in *The Atlas of Hawaiian Watersheds & Their Aquatic Resources* (Parham et al., 2008).⁴

According to the provisions of HAR §11-54-3, the DOH classifies waters based on the uses within them that are to be protected. With the exception of Pearl Harbor, all of the water bodies in and around WGS are designated as “Class 2 Inland Water” by DOH. According to HAR §11-54-3(2):

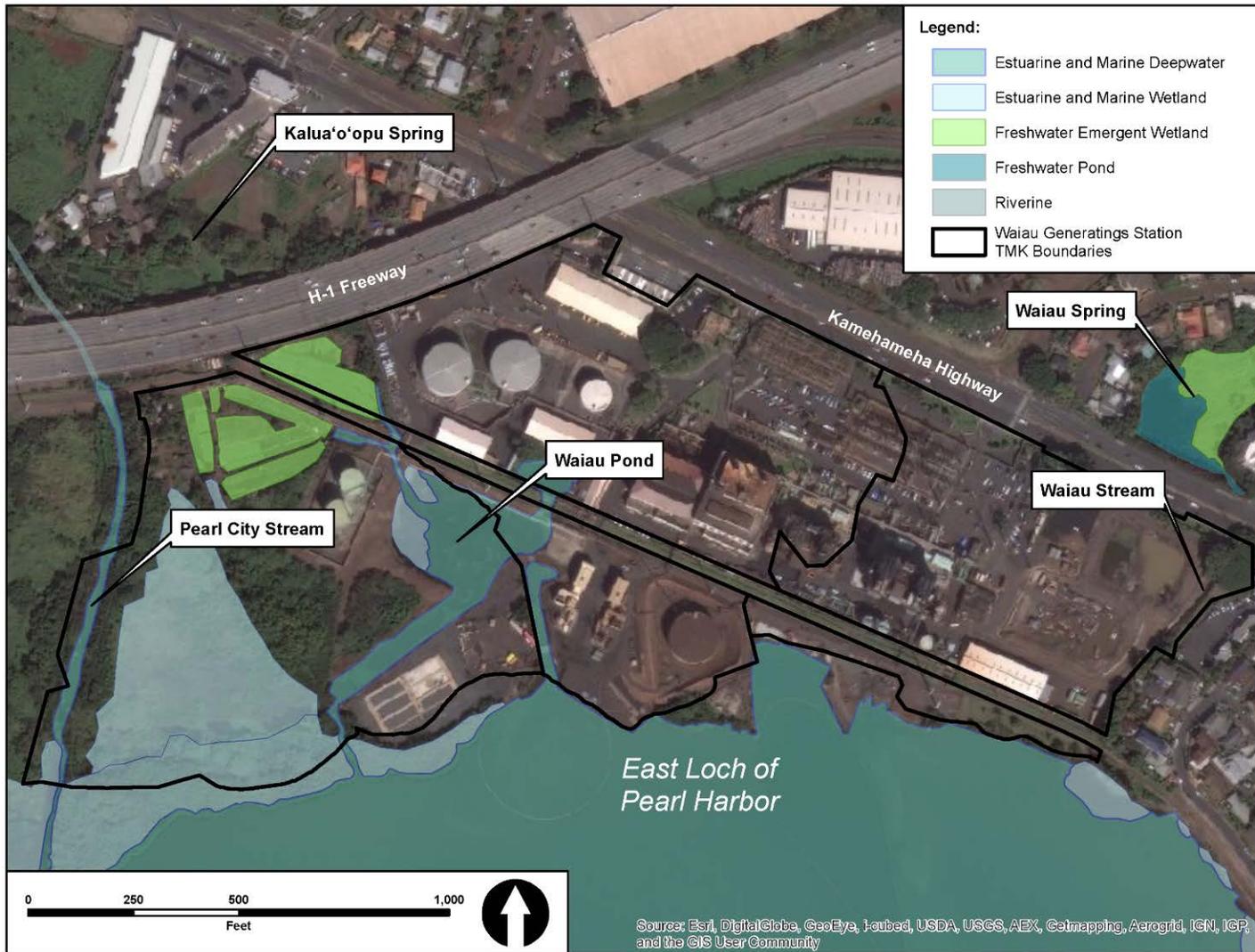
The objective of class 2 waters is to protect their use for recreational purposes, the support and propagation of aquatic life, agricultural and industrial water supplies, shipping, and navigation. The uses to be protected in this class of waters are all uses compatible with the protection of fish, shellfish, and wildlife, and with recreation in and on these waters.

Hawaiian Electric holds NPDES Permit No. HI0000604 for discharges from WGS to Pearl Harbor.

The U.S. Fish and Wildlife Service (USFWS) classifies wetlands, which includes surface waters, based on their characteristics instead of their uses and has established a hierarchical classification structure. The USFWS-identified wetlands are illustrated and identified in in Figure 4.3. The following subsections describe the various surface waters in the vicinity of the facility.

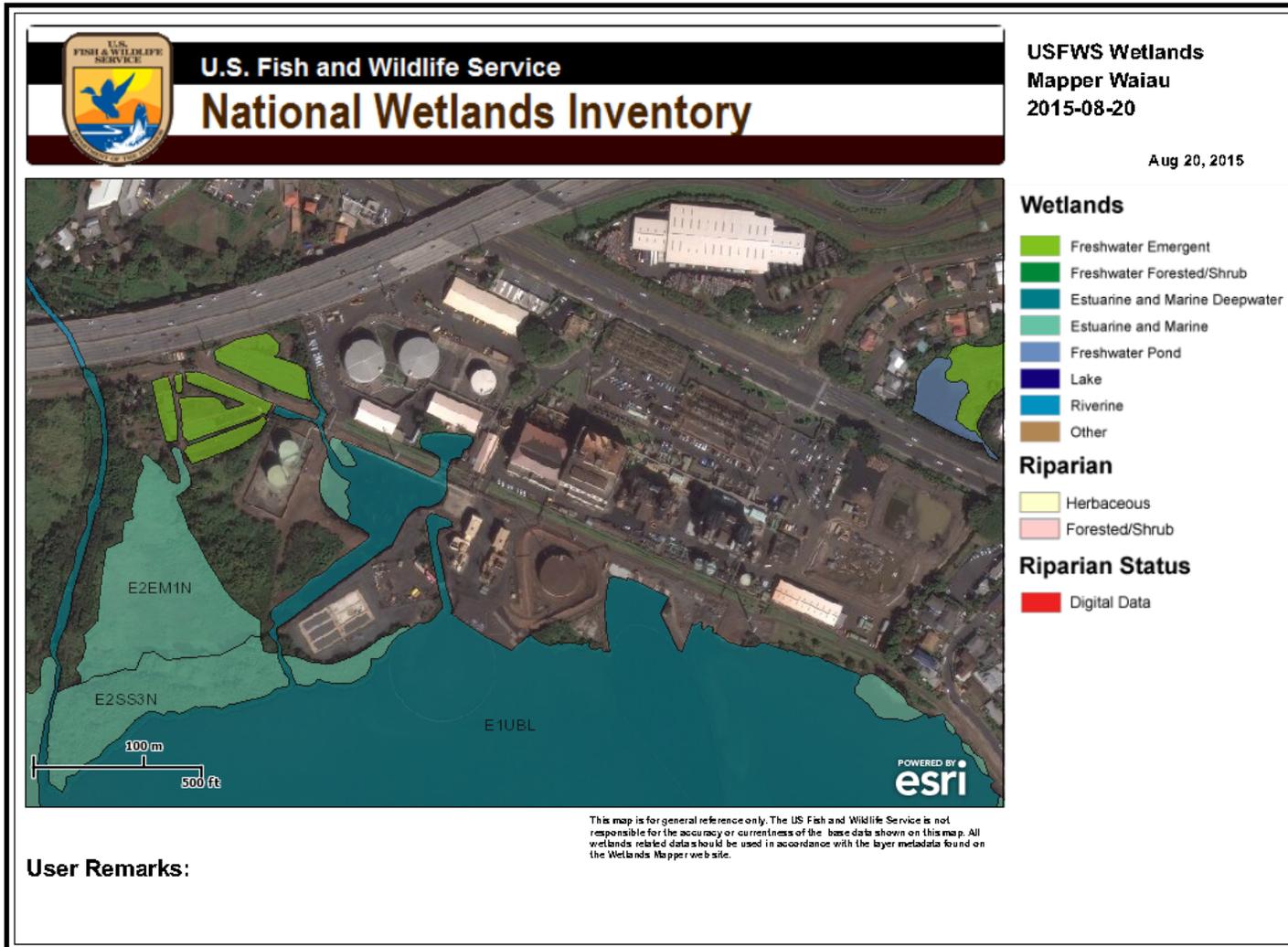
⁴ Retrieved from the web at: <http://www.hawaiiwatershedatlas.com/index.html>

Figure 4.2 Surface Water Bodies in the Project Vicinity



Source: National Wetlands Inventory (2015)

Figure 4.3 USFWS-Identified Wetlands in the Project Vicinity



Source: USFWS Wetlands Mapper (2015)

Pearl Harbor

Pearl Harbor borders WGS to the south. Pearl Harbor, known in Hawaiian as Honouliuli (lit. “dark bay”) is the largest landlocked estuarine body of water in Hawai‘i. It has a surface area of approximately 8 square miles, a mean depth of 30 feet, and about 36 miles of shoreline. Six perennial streams, two intermittent streams, and several small dry gulches draining an estimated 109 square mile area of Central O‘ahu, discharge into Pearl Harbor. Currently, DOH classifies Pearl Harbor as a Class 1 protected estuarine inland water, and most industrial discharges are prohibited from entering the harbor.

The harbor contains four lochs, or arms: (i) West Loch, (ii) Middle Loch, (iii) East Loch, and (iv) Southeast Loch; they are joined by a main channel connecting the harbor to the Pacific Ocean. Grovhoug (1992) notes that Pearl Harbor is relatively isolated from oceanic circulation and that the degree of water exchange is low.

The Pearl Harbor Naval Complex, which includes the entirety of the harbor, has been placed on the National Priorities List (NPL) of the nation’s most contaminated hazardous waste sites (EPA 1992). Toxicity tests using standard marine bioassay organisms have detected the presence of a wide range of contaminants, including metals, organic tin compounds, poly-nuclear aromatic hydrocarbons, semi-volatile organic compounds, chlorinated pesticides, polychlorinated biphenyls, dioxins and furans, and compounds related to ordnance.

The presence of these toxins and the regularly observed exceedance of State-defined allowable levels of nutrients within Pearl Harbor caused the DOH, pursuant to the Clean Water Act §303(d), to list it as an impaired water body in the *2014 State of Hawai‘i Water Quality Monitoring and Assessment Report’s* List of Impaired Waters as Category 5, “at least one use not attained” due to the presence of polychlorinated biphenyls (PCBs). Pearl Harbor also has a fish consumption advisory; signs have been posted that fish and shellfish should not be consumed.

Pearl City Stream

At one time, Pearl City Stream (also known as Waimanu Stream) flowed between the wetlands associated with Kalua‘o‘opu Spring (AECOS, 2007) through WGS, where it discharged into the East Loch of Pearl Harbor. In 1961, the Stream was redirected into a new channel to a new outlet along the shore approximately 700 feet to the west of its original outlet. The stream flows in a lined channel from above Kamehameha Highway, under the H-1 Freeway and Pearl Harbor Historic Trail bikeway, and finally into a soil-bermed channel to Middle Loch.

Kalua‘o‘opu Spring & Waiau Pond

Waiau Pond is fed by Kalua‘o‘opu Spring, northwest of WGS; the spring has substantial perennial discharge, emanating from the base of the underlying Ko‘olau Basalt. Water from Kalua‘o‘opu Spring flows through the adjacent watercress fields into Waiau Pond. The discharge feeding Waiau Pond is considerable, on the order of 4.5 to 5.1 million gallons per day (mgd) (USGS, 2000). Water from Kalua‘o‘opu Spring is also diverted into a storage tank at WGS, for use as fire suppression water. The remaining water enters Waiau Pond before discharging into Pearl Harbor through a culvert in its southeast corner.

Waiau Pond (see Figure 4-3) is located on the southwestern portion of WGS. The open freshwater pond is fed by Kalua‘o‘opu Stream to the north; water from the harbor does not enter it. The DOH has classified Waiau Pond as a Class 2 Inland Water. Spring-fed marshlands exist further to the west and northwest, and as noted above, are currently used for watercress cultivation. Concrete bulwarks form the northeastern margins of the pond, and a timber pile wall forms the eastern bank; emergent vegetation lines its western bank. Waiau Pond, which was once the cooling water intake basin for the generating station, is now used only as an emergency fire water source.

Typically, water from Kalua‘o‘opu Spring enters Waiau Pond, and then enters a culvert on the northeastern side of the pond before traveling downstream approximately 250 to discharge into the East Loch of Pearl Harbor. During storm events, the water in the pond rises, spilling over the concrete weir at its southern end, and eventually enters Pearl Harbor via this secondary route. The weir gates and boards enable Hawaiian Electric personnel to regulate the water level in the area, which allows management options to control the growth of aquatic plants and the volume of available fire suppression water.

Waiau Pond was directly affected by the 1996 Chevron Pipeline oil spill, which originated just northwest of the pond where the pipeline crosses Kalua‘o‘opu Spring. Almost 9,000 barrels of oil were discharged into the pond and out into Pearl Harbor. Chevron subsequently implemented a program to remove residual petroleum from the pond. Measures included surface containment, skimming, underwater vacuuming, aeration, and removal of stains from the pond’s concrete sidewalls. On November 18, 1996, the U.S. Coast Guard concluded that no further active product removal activities were required.

Waiau Spring & Stream

Waiau Spring arises some 1,300’ inland of the shore and its perennial discharge, Waiau Stream, flows through small watercress and taro plots, then through a pond and wetland complex, before entering a concrete-lined culvert under Kamehameha Highway and then a narrow channel on the eastern boundary of WGS (AECOS, 2007). The wetland is overgrown with California grass, water hyacinth, and umbrella sedge, with small pond field areas of water spinach (*Ipomoea aquatica*, known locally by its Cantonese name “ong choy”) and taro.

The manmade drainage channel below Kamehameha Highway is unlined and has a natural rock bed. It is likely that this is not the original pathway of Waiau Stream, although it has probably served as the drainage outlet of Waiau Spring since WGS was originally constructed in the 1930s. It is possible that outflow from Waiau Spring originally fed into the complex of ponds and wetlands west of WGS. Currently, Waiau Stream flows through a culvert under the Pearl Harbor Historic Trail and into a mangrove belt along the northern shore of the East Loch of Pearl Harbor.

Makai of the Pearl Harbor Historic Trail, the eastern bank of the channel is lined with mangrove, Indian fleabane, and *koa haole*. The salinity of Waiau Stream, as measured during the 2007 AECOS inventory, was 0 parts per trillion (ppt) from a sample dated December 1, 2006); off the East Loch shoreline west of the mouth and fronting WGS salinity was measured at 5 ppt.

Storm Water

The topography of WGS slopes south from its *mauka* boundary with Kamehameha Highway towards the 40-foot Navy Right-of-Way known as the Pearl Harbor Historic Trail (PHHT) where it levels off to a relatively flat area from the PHHT to its southern boundary. Kamehameha Highway to the north essentially prevents off-site storm water from affecting WGS, while storm water from the WGS site discharges into Pearl Harbor via Hawaiian Electric's privately-owned storm water drainage system. The storm water system at WGS is authorized by DOH Clean Water Branch to discharge storm water associated with industrial activities by Individual Permit No. HI-0000604.

Rainwater that falls on the *mauka* portion of the WGS facility, which consists primarily of hardscape, generally is managed in one of two ways. On the eastern portion of WGS it is collected in swales and storm drains and discharged into Pearl Harbor's East Loch. Rainwater which falls on the western portion of the facility and in the portions of the facility *makai* of the PHHT, which has more unpaved areas, generally percolates into the subsurface or sheet flows to Waiiau Pond or into the East Loch; there are no storm drain catchments in the area *makai* of the trail.

Groundwater

The WGS is situated over the southwest corner of the Waimalu Aquifer System of the Pearl Harbor Aquifer Sector. The U.S. Environmental Protection Agency has designated the Waimalu Aquifer as part of Southern O'ahu Basal Aquifer sole-source aquifer. The Commission for Water Resource Management (CWRM) has assigned the Waimalu Aquifer a code of 30201. DOH indicates there are two aquifers beneath the facility. The shallow basal aquifer consists of unconfined groundwater within sedimentary deposits overlaying lava flow deposits. The deeper basal aquifer consists of confined groundwater within the lava flow deposits. The overlaid sedimentary deposits act as a confining layer.

The shallow sedimentary aquifer is not very extensive in this area. Nearby WGS, on the *mauka* side of Kamehameha Highway, the sedimentary deposits and associated shallow aquifer thins and becomes absent. The groundwater in the lava flow deposits is unconfined from *mauka* of that transition point. The two springs in the vicinity of WGS, discussed above in Section 4.4.1, are situated at the *mauka* extent of the confining sedimentary deposits and are the result of the unconfined nature of the lava flow aquifer at that point.

Both aquifers are considered to be ecologically important and are low in salinity with chloride concentrations of between 250 and 1,000 milligrams per liter (mg/L). The Waimalu Aquifer System has a sustainable yield of 45 mgd; there are numerous municipal wells throughout the aquifer and it provides substantial drinking water for the people and businesses on O'ahu. As with the adjacent Waipahu-Waiawa Aquifer to the west, the direction of flow is toward discharge along the Pearl Harbor shoreline. Gradients in this corner of the aquifer are on the order of one foot per 3,000'. There are no active wells at WGS.

4.4.2 Probable Impacts

Surface Water Impacts

No work will occur in surface water bodies such as streams, ponds, or wetlands, nor will any such water bodies be adversely impacted by the defined projects in Table 1.4 or the categories of development activities described in Table 1.5. These replacements and improvements to the developed area within WGS are not anticipated to increase the quantity, or decrease the quality, of storm water runoff from the facility. None of the developments will utilize substantial amounts of chemicals or other potential contaminants that could affect water quality, nor will they subject facilities or adjacent properties to a greater risk of flooding than is currently the case. In addition, the geographic envelopes which Hawaiian Electric has established for categorical development activities (see Figure 1.4, Figure 1.5, Figure 1.6, and Figure 1.7) are intended to limit new development in or near surface water bodies including East Loch. Table 4.7 below summarizes the factors which will limit the potential for adverse effects to surface water bodies as a result of project implementation.

Table 4.7 Factors Mitigating Impacts to Surface Water Bodies

<i>Project Category</i>	<i>Factors Mitigating Impacts to Surface Water Bodies</i>
1 – Replacements	Category 1 projects are replacements which would be limited to removing old facilities and replacing them with similar, updated facilities in the same or nearby locations. These replacements would be, by definition, in areas which have already been developed and are served by the existing storm water management system at Waiiau. They would not dramatically increase the hardened surface area at the facility and would not alter the overall drainage pattern at WGS.
2 – Improvements without Earthwork	Development in this category is limited to new, unoccupied facilities where little or no (<50 c.y.) earthwork is required. The geographic envelope for Category 2 development activities (see Figure 1.5) is outside of any surface waterbody and well away from Pearl City Stream and the wetlands on the western side of WGS.
3 – Improvements with Earthwork	The geographic envelope for Category 3 projects is outside any surface waterbody and away from Pearl City Stream and the adjacent wetlands fed by Kalua‘o‘opu Spring. In addition, to minimize the potential for harm as result of erosive storm water during earthwork, the geographic envelope for Category 3 development activities (see Figure 1-6) is outside of the 40-foot Shoreline Setback established by the City and County of Honolulu, and observes a 15-foot setback from Waiiau Pond.
4 – Occupied Structures	Similar to Category 3 above, but further limits development in this category to a few areas within the developed portion of WGS which are served by the existing storm water management system in place at the facility.
Source: Planning Solutions, Inc. (2015)	

For all projects and undefined development activities covered by this EA, Hawaiian Electric will require its personnel and contractors to employ BMPs to minimize or eliminate the potential for substantial impacts to water quality as a result of wind- or storm water-borne particulate, chemicals, or other matter entering surface water bodies in the vicinity of WGS. In addition, in the unlikely event that any constituent project or categorical development activity covered by this EA requires ground disturbance in excess of one acre, Hawaiian Electric will obtain a National Pollutant Discharge Elimination System (NPDES) Notice of Intent – Construction (NOI-C) permit from the DOH Clean Water Branch prior to project implementation.

Ground Water Impacts

Neither the proposed replacements and improvements described in Table 1.4, nor the categories of development activities described in Table 1.5 will impact groundwater use, quality, or recharge. They will not increase water use that might lead to, or require, additional groundwater withdrawals for potable consumption or other uses. Their construction and operation would not significantly increase the amount of impermeable surface or entail other changes that could reduce groundwater discharge. Finally, they would not require substantial amounts of chemicals or other potential contaminants that could affect groundwater quality.

4.5 Aquatic Biota

4.5.1 Existing Conditions

Pearl Harbor

Pearl Harbor is Hawai'i's largest natural estuary and possesses a rich diversity of salt-tolerant aquatic species, many of which are of significance to recreational and subsistence fisheries. Freshwater flow into Pearl Harbor has been estimated to be about 187,500 m³/day (or 50 mgd) during dry periods and more than twice that during periods of wet weather (Cox and Gordon 1970). The high volume of freshwater entering the harbor has a significant effect of the distribution of biota, especially on the inner portions of the harbor where WGS is located.

Pearl Harbor has been the hub for the U.S. Navy's operations in the central Pacific since the early 1900's. It contains berthing and maintenance facilities for hundreds of ships, and most of the harbor's shoreline (outside of West Loch) has been heavily modified over the years. The bottom within much of Pearl Harbor is physically disturbed on a regular basis by maintenance dredging of about 9 million cubic yards on four- to five-year cycles (Grovhoug 1992). Major shipping channels within the harbor are kept at a depth of approximately 40 feet. Naval activity, urban development, and agriculture in upland areas have had a significant and adverse effect on biota in the harbor over the years. The State of Hawai'i DOH has issued a health notice warning against the consumption of marine life taken from Pearl Harbor due to bioaccumulation of toxins in fish and shellfish tissues (Brock 2002).

In recent years, populations of numerous introduced non-native species have become established with the harbor, and some commercially important species are now rare or absent (e.g., Kona crab, striped mantis shrimp, nehu, and the two pearl oyster species for which the harbor was named). Coles, et al. (1997) note that introduced or alien species comprise 47 percent of the aquatic biota in the more estuarine habitats of the harbor and native species make up 33 percent

of the total with the remainder being undetermined. Commercially valued species still present in the harbor include several crabs (*Thalamita crenata*, *T. integra*, *Podopthalmus vigil*, *Portunus snguinolentus*), Japanese clams (*Venerupis phillipinarum*), spiny and slipper lobsters (*Scyllarides squamosus*, *Panulirus penicillatus*), oysters (*Crassostrea virginica*, and *C. gigas*), grey mullet (ama'ama or *Mugil cephalus*), milkfish (awa or *Chanos chanos*), bonefish (o'io or *Albula vulpes*), and many other food fish and baitfish species important to inshore fisheries (Brock 2002). However, as noted above, many of these species of fish are not suitable for consumption due to bioaccumulation of toxins in their tissues and high levels of coliform bacteria present in the harbor. For additional discussion of hazardous materials in the project area, see Section 4.9.

In summary, biological communities in Pearl Harbor and the streams that are tributary to it have been subjected to numerous impacts due to human activities for more than 100 years. The species that survive there are for the most part hardy, non-native species.

Waiau Pond

AECOS, Inc. performed an aquatic resources survey of Waiau Pond in 2001. The survey showed that vegetation is mainly concentrated on the western side of the pond (see Figure 4.2) and is dominated by cattail (*Typha sp.*) and California grass (*Bracharia mutica*). Aquatic plants present in Waiau Pond include floating azolla fern (*Azolla filiculoides*), parrot's feather (*Myriophyllum brsiliense*), and submerged tape grass (*Vallisneria sp.*). Invertebrate fauna was limited to common introduced species such as melanid snails (*Melanoides tuberculata*), flume clams (*Corbicula fluminea*), and American crayfish (*Procambarus clarki*). Abundant fish species included two cichlid fishes (*Amphilophus sp.* and *Sartherodon sp.*) and two top-minnows (*Poecilia mexicana* and *Gambusia affinis*). All of the aquatic species observed were non-native and the composition was similar to that observed in 1977-78 survey of the pond (Coles 1979). Given this stability, it is likely that these species persist.

4.5.2 Probable Impacts to Aquatic Biota

As discussed in Section 4.4.2, Hawaiian Electric believes it has planned and will implement the specific projects listed in Table 1.4 and the categories of development activities described in Table 1.5 in a way which will avoid adverse impacts to area waterbodies, and as a consequence, will also avoid adverse impacts to aquatic communities. In particular, the geographic envelopes for each of the categories of development shown in Figure 1.4, Figure 1.5, Figure 1.6, and Figure 1.7 proscribe any work within any of the surface waterbodies within or adjacent to WGS; the more impactful categories (e.g., Categories 3 and 4) are buffered from adjacent waterbodies an additional distance, between 15' and 40' feet.

As previously discussed in Sections 4.4.1 and 4.5.1, present conditions of the aquatic communities in Pearl Harbor and adjacent waterways and wetlands are regularly exposes to high sediment and freshwater input. These and other exposures have resulted in community structures (i.e., species composition, abundance, and distribution) favoring species that are reasonably tolerant to occasional fluctuations in sediment and salinity. Brock (2002) has described the intertidal and shallow subtidal aquatic communities near WGS as primarily non-native and lacking in diversity. The resilience of these communities indicates that construction within the facility is unlikely to have adverse impacts on the neighboring aquatic communities. This low potential for significant impacts to aquatic biota will be further reinforced by the construction

BMPs that Hawaiian Electric will require all of its contractors to employ as it implements the individual projects and development activities covered by this EA.

4.6 Terrestrial and Avian Biota

4.6.1 Existing Conditions

The WGS is not designated as critical habitat for any threatened or endangered species. As discussed in the subsections below, there have been few observations of threatened and endangered species at or near the facility; no such species are known to be present on a frequent basis. The nearest designated wildlife sanctuary is the Pearl Harbor National Wildlife Refuge, more than one mile to the west of along the eastern bank of Pearl Harbor's Middle Loch (see Figure 4-5). The nearest USFWS-designated critical habitat is in the Ko'olau Mountains above residential developments, primarily above 800 feet in elevation.

Figure 4.4 Pearl Harbor National Wildlife Refuge Location



Source: Planning Solutions, Inc. (2015)

Vegetation

There is little vegetation to speak of within the working areas of WGS. The ground cover over most of the facility is pavement and gravel. Because unchecked vegetation poses a fire risk, it is kept to a minimum and controlled by cutting and the occasional application of herbicide. Sparse landscaping is employed in a few areas (e.g., along Kamehameha Highway and the main

entrance), Natural vegetation in this portion of the facility is limited to the periphery of the facility, along the shore of Pearl Harbor, and nearby marshland areas, as described below (AECOS, Inc. 2002; AECOS, Inc. 2007).

The undeveloped areas on the west side of the facility vary greatly from the working areas within WGS. Areas adjacent to fresh water sources such as Kalua‘o‘opu Spring and Pearl City Stream include cultivated watercress and taro patches in the *mauka*, undeveloped portion of the facility. These areas also support dense, thick mats of California grass (*Bracharia mutica*), 3 to 5 feet tall. Shrubs of koa haole (*Leucaena leucocephala*), castor bean (*Ricinis communis*), and sourbush (*Pluchea symphytifolia*) are scattered along the periphery of these areas; all of these are introduced species. This habitat type is found west and northwest of Waiiau Pond near the watercress farms and spring sources.

Makai of this freshwater habitat, Indian pluchea (*Pluchea indica*) shrubs often form dense thickets. In some places along the margins of these plant communities, there are open areas with exposed, often mineral-encrusted soils. The areas support scattered clumps of Australian saltbush, *Leptochloa fusca*, swollen fingergrass, and *Trianthema portulacastrum*. Further *makai*, mudflats and shallow brackish water habitats along the shore support dense patches of pickleweed (*Batis maritima*), a native of tropical and subtropical America and the Galapagos Islands. Pickleweed is a woody, much-branched shrub with succulent, cylindrical leaves, and forms thick mats as much as 3 feet high. There are few other plants found within the solid mats of pickleweed.

American or red mangrove (*Rhizophora mangle*) is the dominant plant cover along the undeveloped areas of the Pearl Harbor shoreline. Mangrove colonized these areas following the advent of mechanical sugar cane harvesting, which increased the sediment outputs of streams that drained fields and created mudflat deltas at the mouths of streams feeding into Pearl Harbor. Mangroves have come to dominate these areas because there are few native species which colonize mudflats and there are no mangrove predators (i.e., herbivores and insects) or diseases in Hawai‘i. The coastal wetlands near WGS offer examples of this habitat-type. The mangrove forms an impenetrable thicket, 20 to 40 feet tall; in some of the more sheltered, inland areas the trees may reach 50 to 60 feet high. Under the mangroves, there is only a dense carpet of leaf litter and propagules, and exposed substrate, usually mud or coral and shell rubble. The *Pearl Harbor Historic Trail Master Plan* indicates that the mangroves are periodically removed from areas east of Lehua Avenue, which would include the area surrounding WGS. The Navy periodically removes mangrove from many areas around Pearl Harbor for habitat restoration and other purposes.

Terrestrial Fauna

Though the natural habitats in the area have been seriously compromised due to the agricultural, industrial, military, and suburban development of the Pearl Harbor area, viable estuarine waterbird habitats are still present in some areas. The various natural and manmade wetland features near the West Loch of Pearl Harbor and the loch waters themselves support native Hawaiian waterbirds, such as the Hawaiian Duck or kōloa (*Anas wyvilliana*), the Hawaiian Coot or ‘alae ke‘oke‘o (*Fulica alai*), the Hawaiian Stilt or ae‘o (*Himantopus mexicanus knudensi*), and the Hawaiian Moorhen or *alae‘ula* (*Gallinula chloropus sandvicensis*). All four species are listed as endangered under both the Federal Endangered Species Act (ESA) and the State of

Hawai'i endangered species statutes (DLNR 1998; Federal Register 1999a). The State of Hawai'i endangered Hawaiian owl or pueo (*Asio flammeus sandwichensis*), may also occur in the Pearl Harbor region.

David (2001) reported a single Kōloa hybrid in Waiau Pond; AECOS, Inc. indicated that no native Hawaiian waterbirds were observed during their 2002 survey. Planning Solutions, Inc. personnel observed a Hawaiian Stilt in Waiau Pond during a site visits on June 28 and September 25, 2015. A flock of cattle egrets (*Bubulcus ibis*) were also present at that time. These observations suggest that there is some incidental use of the area for foraging and loafing, but that because of constant activities on the portions of WGS and the Pearl Harbor Historic Trail adjacent to Waiau Pond, that it is unlikely to be heavily utilized by native waterbirds.

No data exist on terrestrial mammalian fauna in the vicinity. However, based on observations of similar industrial sites, it is probably limited to introduced species such as the Indian mongoose (*Hepestes auropunctatus*), cats (*Felis catus*), and Polynesian rats (*Rattus exulans*).

4.6.2 Probable Impacts

During the course of implementing some of the defined projects listed in Table 1-4 and the types of development activities described in Table 1-5, it is likely that individual birds and other animals within and around WGS could be briefly displaced due to construction noise and human activity. These construction-related impacts would be temporary and would be limited to those few individuals who were in close proximity to the area(s) where construction activities were being undertaken. None of the plant life present at WGS is threatened or endangered, and no construction activities will occur outside of the respective envelopes for categories of development shown in Figure 1.4, Figure 1.5, Figure 1.6, and Figure 1.7.

While some observations of endangered birds have been made in the vicinity of Waiau Pond, in the event that individual birds are disturbed by construction activities, they would find suitable loafing and foraging sites nearby. There would not be any lingering adverse impacts to these birds or other animals that may be temporarily displaced by construction activities, or which would remain so once construction was complete. Nor would significant quantities of chemicals, emissions, or other pollutants be generated by the developments considered in this report which could detrimentally affect terrestrial flora or fauna.

4.7 Natural Hazards

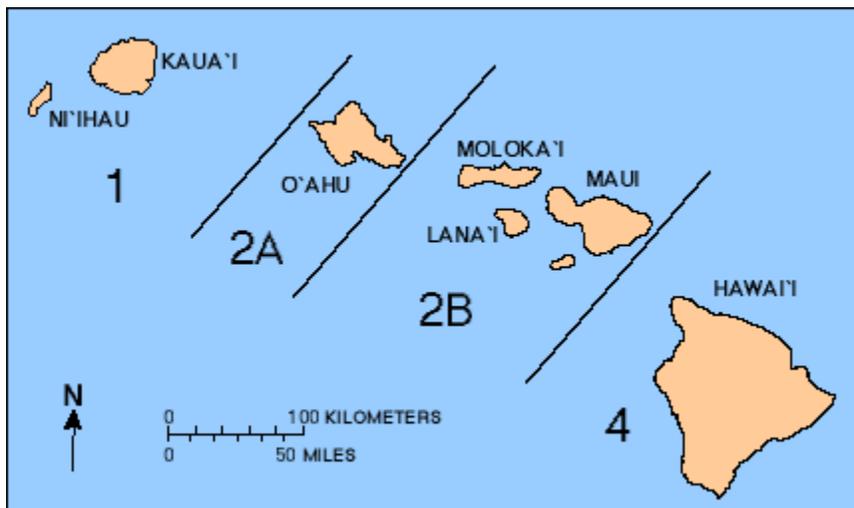
4.7.1 Existing Conditions

WGS was first developed in 1938. While the industrial facilities and equipment at the station has changed over time, there is no record of any significant effects as a result of floods, landslides, earthquakes, or other natural disasters throughout its more than 75 years of service.

Susceptibility to Seismic Damage

The scale for evaluating susceptibility to seismic damage established by the U.S. Geologic Survey (USGS) is from Seismic Zone 0 through Seismic Zone 4, with Seismic Zone 0 being the lowest level for potential seismically-induced ground movement. Like all of the Island of Oahu, the WGS site is designated Seismic Zone 2a (see Figure 4.5 below).

Figure 4.5 Seismic Zones



Source: USGS Hawai'i Volcano Observatory, 1997 Hawai'i Seismic Zone Assignments Map

Existing facilities at the generating station were designed and built in compliance with all building codes applicable at the time of construction. Current building codes, including the Uniform Building Code (UBC), include minimum design criteria for structures to address the potential for damages due to seismic disturbances specific to each seismic zone.

Susceptibility to Flooding and Tsunami Inundation

According to the Federal Emergency Management Agency's National Flood Insurance Program, the Flood Insurance Rate Map (FIRM) designates WGS as being in Flood Zone D, signifying an area where flood hazards are undetermined.⁵ While this classification indicates that a detailed flood analysis has not been conducted, in settled urban areas, the general practice is to assign Zone D status only to areas where there is no history of flooding. Hence, the Zone D rating implies that the proposed facilities are situated in areas with minimal risk of flooding.

The open water just off the Pearl Harbor shoreline is designated Flood Zone VE, which is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves.

Tsunamis pose a risk to many coastal areas on O'ahu. However, due to its location along the protected estuarine coastline of East Loch, it is not a substantial risk to WGS. The bulk of the facility is not located within the City and County of Honolulu's updated 2014 Tsunami Evacuation Map evacuation zones, due to the low-energy system present in Pearl Harbor. As can be seen in Figure 4.6, a thin strip of the facility's low coastal land is within the tsunami evacuation zone; however there is very little development within this area.

⁵ The Zone D designation on NFIP maps is used for areas where there are possible but undetermined flood hazards. In areas designated as Zone D, no analysis of flood hazards has been conducted.

Figure 4.6 Tsunami Evacuation Zone



Source: Planning Solutions, Inc. (2015)

Susceptibility to Hurricane Damage

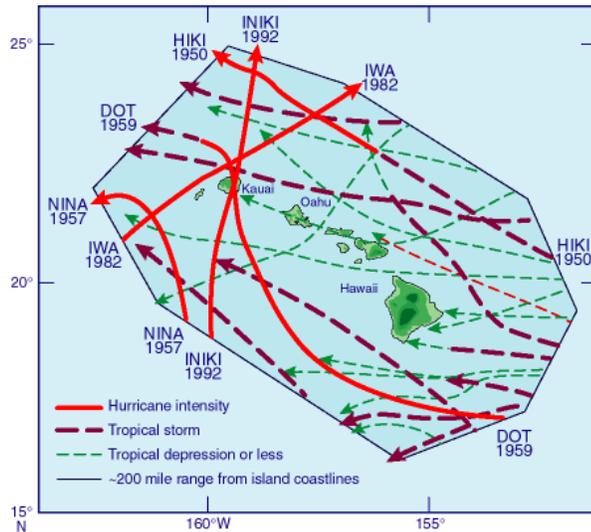
Hurricane season begins in June and lasts through November in the Hawaiian Islands. During the last 60 years many hurricanes and tropical storms have come close to the Hawaiian Islands, but only a handful of hurricanes have had direct impacts. Kaua‘i has been the hardest hit, although O‘ahu and Hawai‘i Islands have suffered significant damage as well. Hurricane Iniki in September 1992 was by far the most destructive storm to strike Hawai‘i in recorded history, with widespread wind and water damage exceeding \$2.2 billion, primarily on Kaua‘i. Losses related to Hurricane Dot in August of 1959 were about \$6 million. Hurricane Iwa in November of 1982 caused over \$250 million in damages. Most recently, Hurricane Iselle – which made landfall on Hawai‘i Island as a tropical storm – in August of 2014 caused approximately \$80 million in damages.

Existing facilities at WGS were designed and built in compliance with the building codes which were in force at the time they were constructed. Current building codes, including the UBC, incorporate minimum design criteria for structures to address wind loading and other potential factors associated with hurricane impact.

4.7.2 Probable Impacts

The relatively minor defined projects listed in Table 1.4 and the categories of development activities described in Table 1.5 would not create any new conditions which would increase the facility's susceptibility to damage by any natural disaster. In addition, all of the proposed development will be designed and constructed to withstand seismic vibration and wind loading specified in the UBC and would, therefore, be expected to escape substantial damage from heavy rains and hurricane force winds similar to those that have been experienced in the Hawaiian Islands in the past. In view of the above, it is likely that while an extremely powerful hurricane (i.e., Category 4 or higher on the Saffir-Simpson Hurricane Scale) or earthquake could damage the new facilities described in this report, they would be constructed so as to withstand all but the most powerful natural hazards.

Figure 4.7 Tracks of Major Hurricanes Affecting Hawai'i



Source: http://www.soest.hawaii.edu/MET/Faculty/businger/poster/hurricane/fig2_tracks.gif and [fig4_kauai_track.gif](http://www.soest.hawaii.edu/MET/Faculty/businger/poster/hurricane/fig4_kauai_track.gif)

4.8 Noise

4.8.1 Regulatory Context

HAR §11-46-3 establishes noise zoning districts in the State of Hawai'i as follows:

- Class A zoning districts include all areas equivalent to lands zone residential, conservation, preservation, public space, open space, or similar type.
- Class B zoning districts include all areas equivalent to lands zoned for multi-family dwellings, apartment, business, commercial, hotel, resort, or similar type.
- Class C zoning district includes all areas equivalent to lands zoned agriculture, country, industrial, or similar type.

HAR §11-46-4 then establishes maximum permissible sound levels that apply to stationary noise sources and equipment related to agricultural, construction, and industrial activities. The maximum permissible sound levels are listed in Table 4-8 below. The permissible sound levels are applicable to the sound level emanating within the specified zoning district at the point of, or beyond, the property line of the premises from which the sound level emanates.

Table 4.8 Maximum Permissible Sound Levels per HAR §11-46-4

<i>Zoning Districts</i>	<i>Noise Limits</i>	
	<i>Daytime (7 a.m. to 10 p.m.)</i>	<i>Nighttime (10 p.m. to 7 a.m.)</i>
Class A (residential, conservation, preservation, public space, open space, or similar type)	55 dBA	45 dBA
Class B (multi-family dwellings, apartment, business, commercial, hotel, resort, or similar type)	60 dBA	50 dBA
Class C (agriculture, country, industrial, or similar type)	70 dBA	70 dBA
<p>Note: dBA = A-weighted decibel sound level; the A-weighting scale discriminates against the lower frequencies according to a relationship approximating the auditory sensitivity of the human ear. The scale is logarithmic, which means that the combined sound level of 10 sources, each producing 70 dB will be 80 dB, not 700 dB. It also means that reducing the sound level from 100 dB to 97 dB requires a 50 percent reduction in the sound energy, not a 3 percent reduction. Perceptually, a source that is 10 dB louder than another source sounds about twice as loud. Most people find it difficult to perceive a change of less than 3 dB.</p>		
Source: HAR §11-46-4		

WGS is zoned I-2 Intensive Industrial; therefore it is a Class C noise zoning district with a maximum permissible sound level of 70 dBA.

Mobile noise sources, such as construction equipment or motor vehicles are not required to meet the 70 dBA noise limit, because they are not stationary sources. Instead, construction noise levels above these limits are regulated using a curfew system whereby noisy construction activities are not normally permitted outside of normal working hours (i.e., 7:00 a.m. to 6:00 p.m. Monday through Friday, and 9:00 a.m. to 6:00 p.m. Saturday). Construction activities, which exceed the limits established for fixed machinery, are typically allowed during the normal daytime work hours using a system involving the issuance of ministerial construction noise permit by the DOH. DOH also oversees a discretionary Noise Variance permit process that can allow elevated levels of construction sound beyond normal working hours if there is good cause and appropriate control measures employed.

4.8.2 Existing Conditions

The only land uses adjacent to WGS with differing applicable noise limits are the Class B business district and the Class A residential neighborhood on the makai side of Kamehameha Highway to the east of the facility. Other Class A and B districts are present nearby, but are separated from the generating station by the Interstate Route H-1 and Kamehameha Highway, both of which generate abundant traffic noise throughout the day and night.

No on-site noise measurements were made during preparation of this document. However, qualitative observations confirm that there are two notable noise sources in the area: (i) vehicles travelling on the adjacent H-1 Freeway and Kamehameha Highway; and (ii) the equipment present at WGS. The sound levels generated at WGS do not exceed 70 dBA at the facility's property line. Noise sources within the facility include the generating units, vehicles travelling on service roads within the facility, and sandblasting in the southwest portion of the facility

adjacent to Waiiau Pond. Other sources of noise in the area include aircraft from Honolulu International Airport and Joint Base Pearl Harbor-Hickam.

4.8.3 Probable Impacts

Construction Period

Construction activities will involve the use of excavators, trucks, and other heavy equipment. As depicted in Table 4.9 below, some of these activities are inherently noisy. Earthmoving equipment (e.g., bulldozers and diesel-powered trucks) would probably be the loudest equipment used in construction. Construction-related noise impacts will be short-term. Moreover, no normal-working-hour noise-sensitive uses (i.e., schools and hospitals) are present near WGS. Noise generated from construction activity and use of machinery will be minimized by requiring contractors to adhere to state and county noise regulations. This will include the use of muffled internal combustion equipment.

All construction activities for all of the projects listed in Table 1.4 and the types of development activities described in Table 1.5 will comply with HAR §11-46, “Community Noise Control.” No earthmoving will be done on weekends or holidays without prior notice to DOH, provided that such work is also in conformance with HAR §11-46.

Operations and Maintenance

Operations of nearly all of the projects described in Table 1.4 and the types of development activities described in Table 1.5 are inherently quiet. While some of the facilities and equipment (e.g., the VFDs) will generate some noise when placed into operation, they will not substantially increase noise at, or adjacent to, WGS over present levels. Some of the new equipment may actually attenuate some of the existing noise as aging equipment and facilities are replaced.

4.9 Solid & Hazardous Materials & Waste

4.9.1 Existing Conditions

Within the working area of WGS and with the exception of what is stored in the existing hazardous materials storage area(s), no hazardous materials are known to exist in the vicinity of the proposed projects and development activities. In the broader geographic context of Pearl Harbor, operations at the U.S. Naval Shipyard are known to have contributed pollutants to the harbor. These include heavy metals from vessel maintenance activities and heat from the operation of the naval power plant (Evans 1974). Other pollutants enter the harbor via the many streams that drain into it, including those waterways adjacent to WGS (see Section 4.4.1). As noted in Section 4.5.1, DOH has previously issued a health notice warning against the consumption of marine life taken from Pearl Harbor due to bioaccumulation of toxins in fish and shellfish tissues.

Table 4.9 Construction Equipment Noise Emission Levels

<i>Equipment</i>	<i>Typical Noise Level (dBA) 50 ft., U. S. Dept. of Trans. study 1979</i>	<i>Average Noise Level (dBA) 50 ft., CA/T Project study 1994</i>	<i>Typical Noise Level (dBA) 50 ft., U. S. Dept. of Trans. study 1995</i>	<i>Lmax Noise (dBA) 50 ft., CA/T Project Spec. 721.560</i>
Air Compressor		85	81	80
Backhoe	84	83	80	80
Chain Saw				85
Compactor	82		82	80
Compressor	90	85		80
Concrete Truck		81		85
Concrete Mixer			85	85
Concrete Pump			82	82
Concrete Vibrator			76	80
Crane, Derrick	86	87	88	85
Crane, Mobile		87	83	85
Dozer	88	84	85	85
Drill Rig		88		85
Dump Truck		84		84
Excavator				85
Generator	84	78	81	82
Gradall		86		85
Grader	83		85	85
Hoe Ram		85		90
Impact Wrench			85	85
Jackhammer*		89	88	85
Loader	87	86	85	80
Paver	80		89	85
Pile Driver, Impact		101	101	95
Pile Driver, Sonic			96	95
Pump	80		85	77
Rock Drill			98	85
Roller			74	80
Scraper	89		89	85
Slurry Machine		91		82
Slurry Plant				78
Truck	89	85	88	84
Vacuum Excavator				85

Note: * There are 82 dBA @ 7 meter rated jackhammers (90 lb. class) available. This would be equivalent to 74 dBA @ 50 ft. These are silenced with molded intricate muffler tools.

Source: http://ops.fhwa.dot.gov/wz/workshops/accessible/Schexnayder_paper.htm

4.9.2 Probable Impacts

If hazardous materials are needed during construction of the of the proposed new facilities listed in Table 1.4 or in the types of development activities described in Table 1.5, then appropriate BMPs, such as the use of secondary containment and the use of non-flammable cabinets, will be utilized. Only small amounts of hazardous materials are likely to be required during construction activities. Removal of older facilities to make way for new projects, such as the 46 kV and 138 kV substation projects (see Section 3.4), will generate construction waste. If feasible, this scrap will be sold to a dealer for recycling; if this cannot be done, the material will be disposed of at an appropriate construction material landfill. Construction of the various projects and development activities will also lead to some other types of solid waste, principally of typical construction and packing material. Solid waste from the proposed projects and development activities will be disposed of at an approved off-site location.

Although certain projects, such as the Vehicle Fuel Aboveground Storage Tank project (Section 3.3.1), will include the storage or use of hazardous materials, none of the projects will result in the use or storage of a hazardous materials not currently utilized at the generating station. No further mitigation measures are expected to be required.

4.10 Historic and Archaeological Resources

4.10.1 Existing Conditions

Hawaiian Electric has assessed the potential for either of the action alternatives (i.e., Alternatives 1 or 2) might have on archaeological resources at WGS. The following subsections summarize the previous archaeological research which it has assembled and reviewed; no new archaeological investigation or survey was conducted for this EA. The separate but closely related subject of cultural impacts is assessed in Section 4.11 below.

Overview of District of 'Ewa

WGS is located on the East Loch of Pearl Harbor, in the *ahupua'a* of Waiau, which was part of the traditional Hawaiian *moku* or district or 'Ewa. The 'Ewa district occupies the southwestern quadrant of the island of O'ahu, encompassing the dry 'Ewa Plain, all of Pearl Harbor (known in pre-contact times as Pu'uloa or Honouliuli), the southern half of the central plateau of the island, and portions of the Wai'anae and Ko'olau mountain ranges. In ancient times the 'Ewa District was a center of power for the island's ruling chiefs (Cordy 1996). It is important to note that at that time the 'Ewa District extended far beyond the area that is commonly referred to as 'Ewa today; hence, care much be taken when interpreting references to sites and traditions of the 'Ewa region.

The legendary origin of the 'Ewa District comes from the land division created by the gods Kāne and Kanaloa (Sterling and Summers 1979:1, quoting Simeon Nāwa'a in 1954):

When Kane and Kanaloa were surveying the islands they came to Oahu and when they reached Red Hill saw below them the broad plains of what is now Ewa. To mark boundaries of land they would throw a stone and where the stone fell would be the boundary line. When they saw the beautiful land lying below them, it was their thought to include as much of the flat level land as possible. They hurled the stone as

far as the Waianae range and it landed somewhere in the Waimanalo section. When they went to find it, they could not locate the spot where it fell. So Ewa (strayed) became known by that name. The stone that strayed.

The 'Ewa District figures prominently in the pre-contact history of O'ahu. According to Cordy (1996), by the 13th century CE, 'Ewa was one of three major competing districts that had developed out of earlier small, independent political units; called 'Ewa-nui, or "Greater 'Ewa" it combined the later districts of 'Ewa, Wai'anae, and Waialua. In the early-1400s CE, the king La'akona, considered the great progenitor of the Ewa chiefs (Fornander 1969:II-48-49), ruled O'ahu. During this time, 'Ewa was the center of power of the O'ahu Kingdom, with the ruling center at Līhu'e on the upland plateau (Cordy 1996). Subsequent generations saw periods of unification and peace alternating with periods of conflict. Although the royal center moved from Līhu'e to Waikīkī, 'Ewa continued to be an important chiefly domain.

By the second half of the 18th century, all of the precincts of O'ahu had been united under a single ruler. At the time of Cook's arrival in 1778, Peleiōhōlani sat on the throne of a kingdom that included Moloka'i and Kaua'i. Shortly after his death, O'ahu was conquered by the king of Maui, Kahekili. Kahekili's reign was short lived, however as only a few years later all of his lands were absorbed into the domain of Kamehameha from Hawai'i.

The district of 'Ewa is traditionally known for its abundance of food resources. The deep bays of Pearl Harbor produced a large variety of shellfish, fish, and waterbirds, including an abundance of *pipi* (pearl oysters). Hawaiians constructed fishponds and fish traps, enabling them to catch deep-sea fish from the influx of tidal waters. At the time of contact, population and land use in 'Ewa centered on Pu'uloa Lagoon (i.e., Pearl Harbor), particularly its inner shore where complex irrigation systems were developed along numerous streams, springs, and floodplains. Fishponds and fish traps lined the deeply indented shoreline (Cordy 1996). Although currently dry, streams in gulches in the southern Wai'anae Mountains may have had water at some time in the past; in other places springs brought fresh water to the surface.

Numerous temples are recorded as having been located in the 'Ewa District, including many in the heights and ridgelines above Pearl Harbor (McAllister 1933; Sterling and Summers 1978:56). The only traditionally recognized site on the 'Ewa Plain is at Pu'uokapolei, described as, "...*the home of the family of Kamapua'a and also the location of a temple*" (Tuggle and Tomonari-Tuggle 1997). Recorded temples in the coastal areas of the lagoon include one *heiau* in the Waiau *ahupua'a*, the same *ahupua'a* where WGS is presently located (McAllister 1933:103-106). In addition, there were many fishing shrines or *ko'a*, signifying the importance of fishing and the population density of this interior region.

The successive conquests of O'ahu by Kahekili and then Kamehameha I in the early post-contact period greatly reduced the power of the island's *ali'i*. In addition, communities shrank and in many cases disappeared entirely due to the precipitous decline in population resulting from disease and migration. 'Ewa was transformed in the early 19th century from a center of power to a rural backwater, far from the political, social, and economic nexus of Honolulu. On the 'Ewa Plain, communities contracted from scattered residential localities on the plain to the well-watered Honouliuli Gulch and places along the inland shore of Pearl Harbor. For brief period of approximately ten years in the 1820s, Pearl Harbor became an important collection and export center for the short lived sandalwood trade. A Christian mission was established in the *ahupua'a* of Waiawa, adjacent to Waiau, in 1834.

By mid-century, ownership of lands in the islands was codified in a system of fee-simple ownership during the reign of King Kamehameha III. The *Māhele* (lit. “dividing up”) of 1848 divided lands among the king, the high chiefs, and the government, not including commoner’s rights to land they lived on and used. Land Commission records of awards (LCAs) to commoners indicate that the irrigated fields and fishponds were still maintained. Dense clusters of award parcels, usually coincident with taro fields and house lots, occurred along the inland shore of Pearl Harbor, particularly near the banks of the major perennial streams and around springs. Two fishponds, located just west of the current site of WGS, were also given by the Land Commission as awards: Loko Kukona (Site No. 50-80-09-114) and Loko Luakahaole (Site No. 50-80-09-115). Both have been mostly or completely filled in since at least 1930 (McAllister 1933). Neither site is listed on the State or National Register of Historic Places.

The second half of the 19th century saw the transformation of the ‘Ewa landscape. Wetland agriculture was still practiced, but it was largely overtaken by Chinese rice farmers who also took over operations of many of the fishponds. The spring at Waiiau (see Figure 4.2 and Section 4.4.1) became the locality of a rice mill. Ranching also began to develop in this period; John Dowsett and John Meek made the initial efforts west of WGS on the ‘Ewa Plain beginning in 1871. Shortly thereafter, most of the ‘Ewa Plain was purchased by James Campbell, who began improving his property by removing the wild cattle on his land, establishing a section for grazing, and converting the remainder to agriculture. Smaller ranches were located inland of West Loch and Waipi‘o Peninsula, a short distance to the west of the present site of WGS (Monsarrat 1913).

In 1889, Benjamin F. Dillingham acquired a 50-year lease on most of Campbell’s Honouliuli lands; a year later he subleased a portion of this to the Ewa Plantation Company for sugarcane cultivation. Dillingham’s main interest was the Oahu Railway and Land Company (OR&L). The company’s system linked Honolulu with rural O‘ahu and brought urban development to the inner shoreline of Pearl Harbor. The OR&L line began rail service in 1889. This was followed a year later by the development of Pearl City, the island’s first planned community. Railway stations serviced the line, including stations at Pearl City, Waiawa, Waipi‘o, Waipahu, Hō‘ae‘ae, Honouliuli, and Ewa Mill.

By the dawn of the 20th century, the landscape of the ‘Ewa district reflected commercial agricultural development, budding urbanization, and scattered remnants of earlier, small-scale farms and communities. Ewa Plantation Company had transformed the ‘Ewa Plain into vast fields of sugarcane irrigated by a series of 72 artesian wells. On the southern slopes of the central plateau, the Oahu Sugar Company, formed in 1897, was undertaking a similar transformation of the island landscape. Along the inland shoreline of Pearl Harbor, Chinese-operated rice fields were extensive and Chinese managers continued to harvest fish from converted Hawaiian ponds, although many of the smaller fishponds were filled in or fell into disuse. The OR&L rail line was a conspicuous feature of this shoreline, cutting alongside the ponds and fields.

The modern history of Pearl Harbor is inextricably linked to the emergence of commercial agriculture and the U.S. military. The early 20th century saw commercial agriculture in Southern O‘ahu at its height. During this same period, the military was beginning to shape the Pearl Harbor landscape. Following the overthrow of the Hawaiian monarchy in 1893 and annexation of the islands by the United States in 1898, the development of Pearl Harbor as a naval base

began. The first decade of the 20th century saw sand dredging of the central lagoon, condemnation of private lands along the lagoon's edge, and massive channelization of the harbor entrance. The major facilities of the naval base and submarine base were constructed between 1910 and 1918.

As part of a general buildup of facilities on O'ahu, in the 1930s the military acquired ever more land around Pearl Harbor. A major section of Campbell Estate in Honouliuli was developed for naval magazine facilities, an Army coastal defense battery was built at Pu'ukapolei, Army and Marine training facilities, and a Marine Corps airfield. Just one month prior to the commencement of the Second World War, other Pearl Harbor facilities underwent major expansion, including acquisition of most of the Waipi'o and Pearl City Peninsulas.

The war brought changes to 'Ewa, not the least of which was the intensification of land use along the perimeter of Pearl Harbor and military control over railroad operations. After the war, the Navy retained much of the lands over which it had assumed control, and the railroad lost its primacy in island transportation. The Ewa Plantation Company ended its use of railroad (Condé and Best 1973), but continued to use rail easements for automotive vehicles. At the end of 1947, the Oahu Railway and Land Company ran its last train. Although sugarcane cultivation continued to flourish for several decades after the war, by the 1970s, evolving world economies made commercial sugar agriculture in Hawai'i less competitive, and both Ewa Plantation and Oahu Sugar Company closed their doors. In recent times, urban development has been the main driver of landscape change in 'Ewa.

Historic and Archaeological Sites in Waiau Ahupua'a

The first published accounts of the archaeology of Waiau *ahupua'a* are from J. Gilbert McAllister's *Archaeology of Oahu*, published in 1933 by the Bernice Pauahi Museum. An additional published source of modern information is Sroat and McDermott's *Archaeological Monitoring Plan for Construction Phase 2 of the Honolulu High-Capacity Transit Corridor Project, Waiawa, Manana, Waimano, Waiau, Waimalu, Kalauao, 'Aiea, and Halawa Ahupua'a, 'Ewa District, Island of O'ahu, TMK: [1] 9-7.9-8, and 9-9 (Various Plats and Parcels)*, prepared for the Federal Transit Administration and the City and County of Honolulu as part of the Honolulu Area Rapid Transit project and *Archaeological Assessment for 98-113 Kaulike Drive, Waiau Ahupua'a, 'Ewa District, O'ahu, Hawai'i* by D. Filimoehala and T.M. Rieth.

Within the immediate vicinity of WGS there are two sites which appear on the State Inventory of Historic Places (SIHP): (i) Loko Kukona (Site No. 50-80-09-114) fishpond; and (ii) Loko Luakahaole (Site No. 50-80-09-115). Neither of these sites is listed on the State or National Register of Historic Places. These sites, and the relative uncertainty regarding their exact location, are described briefly below.

Site -114 was first recorded by McAllister in 1933 as Kukona Pond – elsewhere referred to as Loko Kukona – located on the shoreline of East Loch, and was a fishpond that at one time encompassed 27 acres. McAllister describes the pond as having a wall only 2' high and a width between 4' and 5'. The wall was constructed from coral and basalt, without a *mākāhā* or sluice gate. Cobb (1905:748) places Loko Kukona in the adjacent ahupua'a of Waimano, and reports that it's area was 2.7 acres; since McAllister cites Cobb for Site -115 (see below), it seems likely that Cobb's 2.7-acre measurement of area is the correct one.

Site -115, Loko Luakahaole was also placed by McAllister (1933) within the *ahupua'a* of Waiau, as located “just above Loko Kukona (Site -114)” and originally covering one acre. He described it as having already been filled in at the time of his survey. McAllister’s small-scale map plots Site -115 north or northwest of Loko Kukona, up a shared stream above Loko Kukona. The *ahupua'a* where it is located is not labeled in McAllister’s map. Alternatively, Cobb (1905:748) places Kukona Pond in the adjacent Waimano *ahupua'a*. Sterling and Summers (1979) locate both Site No. -114 and -115 in Waimano *ahupua'a*, and furthermore plots Loko Luakahaole next to Loko Kukona on its northeast side, a location that described as “above” Loko Kukona. The two flank a stream that appears straightened, as though channelized. It seems likely that both ponds then were located in Waimano *ahupua'a*, not in Waiau.

In 2012, Cultural Surveys Hawai'i, Inc. (Sroat and McDermott 2012) conducted an archaeological inventory survey for construction of Phase 2 of the Honolulu High-Capacity Transit Corridor and identified one property on the *mauka* side of Kamehameha Highway from the generating station consisting of potentially historic features according to Criterion D, and has been given the SIHP No. 50-80-09-7150.⁶ Two cultural deposits consisting of silty clay strata containing organic material, yellowish-red mottling, oxidized root tubes, and charcoal flecking were recorded there. The inclusions within these deposits, designated Strata IIIa, are consistent with those in abandoned and buried *lo'i* soils. The deposits were covered within a historically documented land court award (LCA) 9385, where pondfield agriculture was practiced, and near two taro patches first described in 1945. Two charcoal samples recovered from bulk samples of the two soils yielded a calibrated radiocarbon date range of 1414 to 1480 CE.

Filimoehala and Allen (2014) identified three sites—all of which are *mauka* of Kamehameha Highway—during archaeological monitoring for the Waiau Sewer Rehabilitation Project: Site Nos. 50-80-09-7569, -7570, and -7571. Site -7569 is a buried pre-contact charcoal deposit interpreted as associated with former traditional Hawaiian irrigated cultivation. *Chenopodium oahuense* charcoal was collected from Site -7569, which was dated (via two separate methods) to between 1518 and 1593 and 1618 to 1664, suggesting a late pre-contact origin, if it is assumed that the charcoal relates to the use of the agricultural soil. Site -7570 is an isolated fire feature of an unknown age, and Site -7571 consists of two charcoal concentrations known as Features 1 and 2. Feature 1 may have been a fire feature or a refuse deposit; it yielded post-contact items. Feature 2 may date to either the late pre- or early post-contact period.

Historic Architectural Structures

In addition to the archaeological properties identified above (which are “historic properties”), some structures adjacent to and within WGS have been included in, or identified as eligible for inclusion in, the State and National Register(s) of Historic Places (SRHP/NRHP), including Pearl Harbor (Site No. 50-80-13-9992) and the OR&L rail line right-of-way (Site No. 50-80-12-9714). During development of the Honolulu High-Capacity Transit Corridor Project (HHCTCP), Hawaiian Electric’s Waiau generator building, which originally housed Waiau generating units 1 and 2, was identified as an architectural property eligible for inclusion in the National Register under Criterion A, being “associated with events that have made an important contribution to the

⁶ Hawai'i Administrative Rules (HAR) §13-275 is the implementing regulations for HRS Chapter 6E, relating to the state’s historic preservation program. Pursuant to §13-275-6(b), to be significant, a historic property shall possess integrity of location, design, setting, materials, workmanship, feeling, and association and meet one additional criterion. Sites eligible under Criterion D, “Have yielded, or are likely to yield, information important for research on prehistory or history.”

broad patterns of our history” for its connection with the history of electric power generation on O‘ahu.

The generation of electricity was begun by Hawaiian Electric Company near downtown Honolulu. An early power plant was the 1894 generator on Honolulu’s waterfront; this plant received its first steam turbine in 1907. The WGS was the company’s first “expanded generating facility” (Pratt 1988), and as noted above, was completed in 1938 to deliver power to the people of O‘ahu west of Iwilei, where a substation was located. A building permit for the new 7-story power plant building was issued in May of 1945 (Waiau 3 and 4; Table 1.1). In 1950 a 40-megawatt (MW) turbine generator and boiler system was added to the WGS under the terms of a building permit issued in April, 1949. The architectural description of the Waiau power plant structure which originally housed Waiau generating units 1 and 2 prepared by Mason Architects, Inc. (2009) states:

This large building has square massing with a stepped-back section at its uppermost story that has two large smokestacks. Along its sides, the lower section of the building has closely spaced pilasters (with no capitals) that extend to just below the inset cornice of the main mass. The pilasters interrupt horizontal bands of short awnings. The uppermost stepped-back section has an encircling awning band and a cornice with a slight projection. At its west end the building is lower with a double hip roof.

Today this building has been repurposed to provide office space for Hawaiian Electric personnel, which involved the removal of the bulk of the old generators and construction of an office building within the shell of the old building. The exterior and some interior generator components have been retained. The Mason Architects report goes on to say that although the facility has been modified over the decades, its “modifications are part of the history of development in the area and of O‘ahu in general.”

While most of the other structures at WGS have no apparent architectural distinction, and no known association with an important historic context, in some cases, other structures may also be considered significant for their association with the early history of the area, despite the fact that many of them have received subsequent additions or modifications. This appears unlikely as all the buildings on TMKs 9-8-003:010 and 9-8-004:003 (the working portion of the station mauka of the Pearl Harbor Historic Trail) were evaluated as part of the review performed for the HHCTCP.

4.10.2 Probable Impacts

Because of their geographic specificity, none of the identified projects listed in Table 1.4, or the types of development activities described in Table 1.5, have the potential to adversely affect archaeological historic properties which may be present (such as fishponds) outside of the working area of WGS. In addition, there are no known archaeological properties or sites located within WGS, which is largely built on fill material placed there during the 20th century (see Section 4.1.1). Nonetheless, for projects (i.e., Categories 3 and 4) which require some subsurface disturbance, Hawaiian Electric will instruct its contractor(s) for all development activities to immediately cease work in the unlikely event that cultural deposits or human remains are uncovered during construction, and notify the State Historic Preservation Division

(SHPD), the O‘ahu Island Burial Council, the Medical Examiner, and the Honolulu Police Department as appropriate, pursuant to HAR §13-300-40.

With regard to architectural historic properties, there is at least one structure – the original power plant building – which has been determined to be eligible for inclusion in the SRHP/NRHP. To minimize and mitigate the potential for adverse impacts to the original power plant building and other potentially historic properties, Hawaiian Electric will consult with SHPD prior to the implementation of projects not listed on Table 1.4 but that are deemed to qualify for one of the categories listed in Table 1.5. SHPD will also be provided with a copy of this EA for review and comment.

4.11 Cultural Impact Assessment (CIA)

In accordance with the provisions of HRS Chapter 343 and its implementing regulations contained in HAR §11-200, Hawaiian Electric has worked with its consultants to perform a detailed analysis of the potential effects that implementation of the projects listed in Table 1.4, and the types of development activities described in Table 1.5, could have on the cultural practices, resources, and features in an around WGS. The disclosure of this information is intended to promote transparent and responsible decisions-making in accordance with Articles IX and XII of the Constitution of the State of Hawai‘i, other state laws, and the courts of the state, all of which mandate government agencies to endeavor to promote and preserve the cultural practices of native Hawaiians and other ethnicities.

In addition to the content requirements of Chapter 343 and HAR §11-200, on November 19, 1997, the State of Hawai‘i’s Environmental Council issued specific *Guidelines for Assessing Cultural Impacts*. The guidance provides a methodological and content protocol for projects that may have the potential to affect cultural resources, stipulating specific matters that should be addressed in cultural impact assessments such as this. Table 4.10 below summarized the guidance and identifies the sections in this report which address each item. The remainder of this section summarizes Hawaiian Electric and its consultants’ findings with respect to each of the required topics. Each informational requirement identified is discussed in one of the following subsections, with a summary of findings and conclusions.

Table 4.10 Guide to Discussion of Cultural Impact Topics

<i>Number</i>	<i>Requirement</i>	<i>Discussion in EA</i>
1	A discussion of the methods applied and results of consultation with individuals and organizations identified by the preparer as being familiar with cultural practices and features associated with the Project Area, including any constraints or limitations which might have affected the quality of the information obtained.	§4.11.3
2	Descriptions of methods adopted by the preparer to identify, locate, and select the persons interviewed, including a discussion of the level of effort undertaken.	§4.11.3
3	Ethnographic and oral history interview procedures, including the circumstances which the interviews were conducted, and any constraints or limitations which might have affected the quality of the information obtained.	§4.11.3
4	Biographical information concerning the individuals and organizations consulted, their particular expertise, and their historical and genealogical relationship to the Project Area, as well as information concerning the persons submitting information or interviewed, their particular knowledge and cultural expertise, if any, and their historical and genealogical relationships to the Project Area.	§4.11.3
5	A discussion concerning historical and cultural source materials consulted, the institutions and repositories searched, and the level of effort undertaken. This discussion should include, if appropriate, the particular perspective of the authors, any opposing views, and any other relevant constraints, limitations, or biases.	§4.11.1
6	A discussion concerning the cultural resources, practices and beliefs identified, and, for resources and practices, their location within the broad geographical area in which the proposed action is located, as well as their direct or indirect significance or connection to the Project Area.	§4.11.2
7	A discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the Project Area, affected directly or indirectly by the proposed development.	§4.11.2
8	A discussion of confidential information that has been withheld from public disclosure in the assessment.	§4.11.3
9	A discussion concerning any conflicting information in regard to identified cultural resources, practices, and beliefs.	§4.11.3
10	An analysis of the potential effect of any proposed physical alteration on cultural resources, practices or beliefs; the potential of the proposed action to isolate cultural resources, practices or beliefs from their setting; and the potential of the proposed action to introduce elements which may alter the setting in which cultural practices take place.	§4.11.4
11	A bibliography of references, and attached records of interviews which were allowed to be disclosed.	Chapter 7.0

Source: State of Hawai'i Environmental Council, *Guidelines for Assessing Cultural Impacts* (1997)

4.11.1 Source Materials

Research references cited in this study include, but are not limited to, Hawaiian Land Commission Award records from the Māhele ‘Āina, the (1844) *Narrative of the United State Exploring Expedition During the Years 1838, 1839, 1840, 1841, 1842* by Charles Wilkes; and J. Gilbert McAllister’s *Archaeology of Oahu* (1933). The CIA also relied on several modern archaeological works including D. Filimoehala and T. Rieth (2014), M.J. Tomonari-Tuggle (2012), A. Fornander (1969), R. Cordy (1996), G. Barrat (1988), and M.K. Pukui (1943). Historical and archival resources were located in the collections of the Hawai‘i State Archives, the online library of the Office of Environmental Quality Control, the Hawaiian Historical Society, the University of Hawai‘i, and in private collections.

4.11.2 Historical and Cultural Research

The traditional Hawaiian name for Pearl Harbor, as noted previously, is Pu‘uloa or more fully, Pu‘u-awa-lau-o-Pu‘uloa, “the many harbored sea at the place with distant hills” (Pukui 1943:56). Elsewhere, Pukui et al. (1986) translate Pu‘uloa as “long hill.” In early post-contact times, it was referred to as the “Pearl River,” “Pearl Lochs,” “Ewa or Pearl River,” or the “Harbor of Ewa or Pearl River,” (Fitzpatrick 1986). Wilkes (1844) refers to it as the “Pearl River or harbor.” Of these various English names, “Pearl River” was the most frequently employed throughout the 19th century, until the U.S. Navy began development of the central lagoon basin at the turn of the 20th century (Tomonari-Tuggle 2012).

In the early history of ‘Ewa, the residence of royalty centered in the upland area called Līhu‘e (the area around Wahiawā), with its associated *ali‘i* birthplace called Kukaniloko and the associated *heiau* named Ho‘olonopahu. This was a region associated with the ancient Lō Ali‘i (Fornander 1969; Cordy 1996), source of the chiefly lineages of O‘ahu. However, at the time of contact, the main centers of the *ali‘i* of ‘Ewa were on the coastline, in the rich productive irrigation lands of ‘Ewa, which likely included low lying areas near Waiau. Numerous places of chiefly residence are recorded in oral traditions.

Hālaulani in Waipi‘o ahupua‘a, the fourth ahupua‘a west from Waiau was one such place (Kamakau 1991). Kūki‘iahu and Pā‘aihu, in Kalauao ahupua‘a east of Waiau, were the homes of the ruler of O‘ahu, Kala‘i-manuia. The chief Ha‘o had a residence somewhere in coastal Waikele ahupua‘a, the unit to the west of Waipi‘o. The chief Kākuhihewa was raised in Waipi‘o, Waiawa, and Manana, three contiguous ahupua‘a a short distance west of Waiawa. During the chief Kahekili’s occupation of O‘ahu, several of his *ali‘i* resided in ‘Ewa, with at least one residing at Waikele, probably near the shore. During Kamehameha I’s time, some of his relatives resided at Waimalu ahupua‘a, which borders on Waiau to the east; Kamehameha I himself stayed at Hālaulani in Waipi‘o.

In the 19th century Kamehameha II, known as Liholiho, lived in Pu‘uloa (Kamakau 1992), possibly on the western shore of Pearl Harbor’s entrance channel. Kauikeaouli—Kamehameha III—also visited the “Pearl River.”

Waiau Ahupua‘a

Waiau *ahupua‘a* extends from the Eastern Loch of Pearl Harbor, also known as Waimalu Loch, upward to the Ko‘olau mountain range, along each side of Waiau Gulch. Waiau, which means

“swirling water” (Pukui et al. 1986) may derive its name from Waiau Spring and Waiau Pond, both of which are found near the East Loch coastline. Formerly, small terraces of crops were planted to the south and west of the spring and pond (Sterling and Summers 1979).

Legends surrounding Waiau indicate that a hairless dog named Kū-īlio-loa lived in a cave in the *ili* – a small land division within an *ahupua‘a* – of Kalua‘ōlohe. Kū-īlio-loa would appear during momentous periods in history marked by the death of a ruling chief or other things pertaining to governance of the land (Sterling and Summers 1979). Kū-īlio-loa is believed to have been descended from the royal lineage of Waiau, which was said to have been a land of *ali‘i* in the olden days.

In 1816, the Russian explorer Otto von Kotzebue mentions visiting a village belonging to Kareimoku known as Vauiau, “a name taken from the rapid stream that flowed from there down to the sea” (Barratt 1988). “Kareimoku” likely refers to Kalanimōkū, a chief advisor to King Kamehameha I, and “Vauiau” is probably von Kotzebue’s rendering of Waiau. Kalanimōkū was one of the most powerful men in the kingdom in this early post-contact period, residing with the royal court and likely serving as an absentee *haku‘āina* (landowner) of Waiau (Tomonari-Tuggle 2012). Kalanimōkū also had landholdings in Honouliuli, the large *ahupua‘a* that encompasses the southwest corner of ‘Ewa, and in Waimalu *ahupua‘a*, on the east side of Waiau. In these areas he would have had rights to fish and grow taro, as well as to command labor, through his influence over the residents of these *ahupua‘a*. In his writings, von Kotzebue mentions that, “the inhabitants of this village had had orders from Kareimoku to entertain us well.” This record would appear to confirm Kalanimōkū’s authority in Waiau and his active role as an absentee landlord.

Traditional Land Use in Waiau Ahupua‘a

Inland areas at Waiau were important agricultural areas in pre- and early post-contact times, with extensive terraced *lo‘i* systems for traditional Hawaiian wetland agriculture in lower inland areas along Waimalu stream and in gulches including Waimalu Gulch. Campbell (1819) describes the coastal plain at the head of Pearl Harbor as follows:

We passed by foot-paths winding through an extensive and fertile plain, the whole of which is in the highest state of cultivation. Every stream was carefully embanked, to supply water for the taro beds. Where there was no water, the land was under crops of yams and sweet potatoes. The roads and numerous houses are shaded by cocoa-nut trees, and the sides of the mountains covered with wood to a great height.

Among the cultivated varieties of taro, the *kai* variety was native to ‘Ewa (sometimes called *Kai o ‘Ewa*) and was regarded as a rare and delicious variety (Handy and Handy 1972). “It was the *kai keokeo* which was described as fragrant (*‘ala*); from this was made the *poi* reserved for the *ali‘i (poi ali‘i).*”

Where water resources were limited, non-irrigated dryland, or *kula*, agriculture was widely practiced in Waiau. Food and other plants with economic value could be collected or cultivated without irrigation, including: banana (*Musa sp.*), sweet potato (*Ipomoea batatas*), coconut palm (*Cocos nucifera*), sugarcane (*Saccharum sp.*), and other food crops. Other cultivated crops included *milo (Thespesia populnea)* for its fiber and wood, *noni (Morinda citrifolia)* a medicinal

and famine food, and *kī* (commonly known as *tī*, *Cordyline fruticosa*) widely used for wrappings, clothing, thatch, and the starchy root as food. In the drier, semi-arid karst portions of the 'Ewa plains dryland agriculture was employed intensively, utilizing sinkholes and stone mounds (McAllister 1933). Other utilitarian plants grown without irrigation were available for a variety of purposes (Athens et al. 1999), such as: *pili* grass (*Heteropogon contortus*) used for thatching, wood such as '*ahakea* (*Bobea sp.*) used for construction of houses and doors, *kauila* (*Colubrina oppositifolia*) wood for tools and weapons, *wiliwili* (*Erythrina sandwicensis*) for canoe floats, and *lama* (*Diospyros sandwicensis*) which was considered particularly essential for the construction of heiau. *Ma'o* and *noni* were commonly used for cloth and dyes, in addition to medicinal applications.

Although most of the archaeological evidence for wetland cultivation may have been destroyed by time and development, McAllister (1933) located one traditional site, Loko Weloka (SIHP No. -116), a pre-contact fishpond, on Pearl City Peninsula. In many cases, a fishpond or *loko* and taro *lo'i* were closely connected. *Loko i'a kalo*, irrigated taro fields also stocked with fish, were one of the traditional fishpond types. Kikuchi (1976) believes the fishponds may have developed from *lo'i kalo* (taro pond fields) as the seaward component in a coordinated and integrated system that combined cultivation and aquaculture.

Fishing and fishpond aquaculture were important subsistence activities traditionally conducted in Waiiau and surrounding ahupua'a. McAllister (1933) describes four fishponds in the vicinity of WGS, in Waiiau, Waimano, and Waimalu. In Pearl Harbor, more than 30 fishponds and four fish traps have been documented (Kukuchi 1973; McAllister 1933). Hawaiian fishponds, which once occupied much of the inland margin of the lagoon, were used to raise striped mullet ('*ama'ama* or *Mugil cephalus*) or milkfish (*awa* or *Chanos chanos*), as well as other ocean fish. Shellfish, including pearl oysters for which the harbor is named (*pipi* or *Pinctada radiata*), also grew throughout the lochs of the harbor.

Otto von Kotzbue marveled at the skill and ingenuity of the native Hawaiian planters, who designed fields into which fish that were, "caught in distant streams thrive admirably when put into them." When his party was fed at Waiiau, the fish "were brought from the taro fields" (Barratt 1988).

The importance of fishing and marine resources is also suggested by the close association of the shark '*aumakua* within the Pu'uloa area. One of the more notable guardian sharks was Ka'ahupāhau, who lived in Pu'uloa. Ka'ahupāhau translates to "cloak well cared for" (Sterling and Summers 1979), symbolizing both her status as chiefess and the feather cloaks *ali'i* wore as a symbol of their chiefly status. Ka'ahupāhau was Pu'uloa's dominant shark goddess and was a sister of the volcano deity Pele who had traveled with her to Hawai'i from the ancient homeland of Kahiki. Ka'ahupāhau and other shark gods of Pu'uloa are associated with protection, as well as the necessity to make offerings for well-being and fishing success.

The early post-contact period saw the beginning of a precipitous decline in the native Hawaiian population. While no accurate records of the decline exist (the first census was not conducted until 1831-1832) it is clear that a combination of warfare, disease, decline in fertility rates, and outmigration had a drastic effect on the native population. This trend continued into the 1870s, when the native Hawaiian population reached an all-time low of approximately 54,000. The missionary census of 1831-1832 identified 253 total residents in Waiiau and Waimano ahupua'a,

and 4,015 residents in all of the ‘Ewa district; four years later in 1836 the ‘Ewa Mission Station counted 3,423 residents in ‘Ewa, a decline of 592 (17 percent) in just four years.

Waiau in the 19th Century

During the 19th century, the three events which most shaped the culture of this region were: (i) the establishment of the sandalwood trade; (ii) the 1848 Māhele; and (iii) the development of commercial agriculture and ranching and the closely-linked extension of the OR&L railroad to Waiau and the rest of the ‘Ewa Plain. In particular, the Māhele redistributed Hawaiian land first to the *ali‘i*, then to wealthy foreigners, and finally to the common people or *maka‘āinana* through the Kuleana Act.

As a result of the Māhele, traditional methods of economic exchange were rapidly replaced by commercial trade. One of the most important exports in the early phase of this shift was sandalwood (*‘iliahi* or *Santalum spp.*). The sandalwood industry had first been established as early as 1791—just 13 years after contact—by Captain John Hendrick, a former fur trader from Boston. It peaked between 1810 and 1820, and finally ended by 1840 by which time Hawai‘i’s forests had been completely depleted of sandalwood.

The income generated by the sandalwood trade was lucrative for landowning *ali‘i*. Kamehameha I, among the first to be involved in the trade, profited enormously from it. Don Francisco de Paula Marin became an important figure in the trade and was instrumental in negotiating the ruler’s profitable sandalwood contract. In areas with productive forests such as Wai‘anae, Wahiawā, Waialua, and Waimea, the *ali‘i* forced the commoners to harvest the trees and transport them to harbors. Later, as sandalwood became increasingly scarce, forests were occasionally set ablaze so that the collectors could trace the valuable wood by its fragrance. A network of trails connected forested areas of central and west O‘ahu with the harbors where ships waited for their next loads of sandalwood. Long trails connected Ka‘ena Point and other places, including Mākaha, with a major east-west trail that cross through Waiau and the ‘Ewa Plain, and was joined by other trails from forested areas to end at Pearl Harbor (I‘i 1993).

Don Marin acquired four parcels of land in Waimalu. The uppermost parcel spanned 407.33 acres and was described by the Land Commission as a wilderness of impenetrable forests, broken hills, and valleys. Marin harvested sandalwood from the dense forests of his property and used Waimalu Stream, which ran the length of his property, to transport the wood down to the harbor below.

The *maka‘āinana* labor which was required for the sandalwood collection and transport severely disrupted subsistence activity and resulted in the neglect of fishponds and taro *lo‘i*. The commoners surrounding Pearl Harbor made up much of the labor force for the local sandalwood harvesting. In addition, the reckless harvesting of sandalwood resulted in massive erosion which further damaged the systems of *lo‘i* and nearshore fishponds.

As the native subsistence agriculture in Waiau *ahupua‘a* and the surrounding ‘Ewa region declined through the 19th century, commercial agriculture increasingly took its place. During the latter half of the 19th century, with the discovery of subsurface water resources, the sugar industry expanded throughout the ‘Ewa plain, commencing the Hawaiian sugar plantation era. Cultivation of other crops, especially rice, which had begun soon after Chinese immigrants

began arriving in 1852 accelerated when a relatively unsuccessful Chinese rice strain was replaced with seed rice from South Carolina and a soon rice cultivation exploded across O‘ahu.

By the 1880s, Chinese immigrants began leasing and purchasing lots of former taro lands around Pearl Harbor to convert to rice cultivation. By 1892, approximately 3,336 acres of swamp land were reclaimed in Waiau and the nearby *ahupua‘a* of Mānana, Waiawa, Kalauao, and ‘Aiea for rice. Historical accounts document a large rice mill in Waiau, where the cultivated rice was processed and transported from the area by the OR&L line. Rice farmers also took over operations of many of the fishponds surrounding the area. Coulter and Chun (1937) recount that the floodplain of the Waiawa River and surrounding areas were once former rice lands; by 1936 most had been converted to sugarcane, fodder crops, and vegetables. Rice mills and threshing floors, as well as Chinese orange, mango, and lychee were often the sole remnants of the passing Chinese land ownership; by the time of the Second World War rice cultivation was almost extinct in the ‘Ewa region.

4.11.3 Interview Selection and Methodology

In addition, to the important cultural-historic documentary research carried out in the preparation of this CIA, Hawaiian Electric and its consultants also attempted to identify cultural informants who could act as sources of oral history relating to WGS and the Waiau *ahupua‘a*. Because the site has been in continuous use as an electrical generating station since 1938, access has been limited to Hawaiian Electric employees, contractors, and a relatively few other individuals. This presented particular challenges in locating individuals who might possess knowledge regarding cultural resources, practices, or beliefs relating to the project area. To address this challenge, Hawaiian Electric made inquiries with several long-term employees at WGS to determine if they possessed such knowledge or were aware of individuals who did. None of the Hawaiian Electric employees contacted possessed such knowledge of cultural resources or processes.

The only activity in the project vicinity which could be categorized as a traditional or customary activity was the wetland farming of taro and watercress on the western edge of the property adjacent to Waiau Pond. The two farms active on the property are Kobashigawa Farm and Watabu Farm. Contacts were made with the operator of each farm; one full interview and one partial interview were conducted by telephone. A transcript was prepared for the complete interview. Ultimately, it was concluded that despite having multi-generational ties to the area, neither possessed knowledge of any cultural beliefs, resources, or practices ties to the area. For these reasons, the interviews are not reproduced here.

No conflicting information was collected as part of this CIA and no information of relevance to the discussion has been kept confidential.

4.11.4 Analysis of Potential Effects

The results of Hawaiian Electric’s investigation and outreach revealed no current or recent use of the project area by native Hawaiian—or any other—cultural practitioners exercising traditional and customary access or use rights of the project area. The site has been used almost exclusively by Hawaiian Electric for electrical generation since its initial construction in the 1930s. The results also showed that those contacted did not have any direct knowledge of any specific traditional cultural properties located within the project area. In view of the above findings, Hawaiian Electric has concluded that none of the project alternatives considered in this report are

anticipated to have the potential to adversely affect cultural resources, practices, or beliefs associated with or present in the project area.

4.12 Recreation

4.12.1 Existing Conditions

The Pearl Harbor Historic Trail (PHHT) is located within the Navy's ROW, which transects WGS along an east-west axis (see Figure 4.8). The trail is on the former Oahu Railway and Land Co. (OR&L) narrow-gauge railway line and ROW, which was taken over by the Department of the Navy. The *Pearl Harbor Historic Trail Master Plan* (2001) defines the PHHT as part of Central O'ahu's open space network and establishes the goal of preserving it for the recreational and educational use of the community.

No other recreational resources are present in the immediate vicinity of WGS. The nearest recreational facility is Neal S. Blaisdell Park, which is separated from WGS by a mixture of commercial and residential uses. Neal S. Blaisdell Park is approximately 1,000 feet to the east-southeast; the PHHT also passes through this park. Typical recreational use of the PHHT includes individuals and groups bicycling and walking along the trail; in some areas it may also accommodate recreational fishermen accessing various points along the shoreline.

The four lochs of Pearl Harbor are not considered a recreational resource because it is an active Naval Harbor, closed to recreational boaters. As noted above, people do fish recreationally from the banks of Pearl Harbor, however the DOH has issued a fish and shellfish consumption advisory (see Section 4.4.1) for Pearl Harbor and signs have been posted at intervals along the shoreline cautioning against consumption of these resources. Unauthorized entry into Pearl Harbor is prohibited by law.

Figure 4.8 Pearl Harbor Historic Trail and Navy ROW



Source: Planning Solutions, Inc. (2015)

4.12.2 Probable Impacts

Neither construction nor operations and maintenance activities related to either the defined projects listed in Table 1.4 or the types of development activities listed in Table 1.5 will take place within the PHHT with the possible exception of needed utility connections. Such utility connections (e.g., communication and power lines) may have to cross the PHHT; this would be accomplished using the existing utility bridges and conduits that currently cross the path. Therefore, no new obtrusive items would be installed within the PHHT and Hawaiian Electric will not seek to acquire any of the PHHT.

At times, construction vehicles, material, and equipment may cross the ROW as Hawaiian Electric implements projects on the *makai* side of the ROW, but will not obstruct it or interfere with typical uses along the PHHT. Passage of pedestrians and bicycles will not be impaired. Some construction activities in areas adjacent to PHHT may be audible and visible to trail users for relatively short periods of time, but are not expected to detract from their ability to use and enjoy the trail. Neither are the brief periods when construction vehicles are crossing the PHHT expected to curtail public access or recreational use of the trail, as Hawaiian Electric vehicles

already transit the trail regularly in conducting daily operations. At most it may cause a slight increase in the number of vehicles passing over the trail for brief periods.

None of the defined projects or types of development activities which Hawaiian Electric is seeking coverage for would require or result in the acquisition of any PHHT property. Neither will they result in any lasting increases in airborne pollutant emissions, noise, or other adverse impacts which could be a nuisance to trail users. The sole exception to this is that some of the projects which could be implemented on the *makai* side of the PHHT may be visible to pedestrians, bicyclists, and other users, but would be limited to the developed portion of the generating station and would not obstruct viewplanes out over the East Loch.

4.13 Scenic and Aesthetic Resources

4.13.1 Existing Conditions

Regional Views, Viewpoints, Viewshed, and Viewer Groups

The City and County of Honolulu's *Visual and Aesthetic Resources Technical Report for the Honolulu High-Capacity Transit Corridor Project* (2008) summarize its aesthetic priorities as:

"...the preservation of scenic resources such as mature trees, scenic views and vistas, key landmarks, and historic and cultural features; the use of urban design principles that emphasize aesthetic compatibility while meeting functional standards; and reviewing standards to ensure that the character of older communities is maintained while still allowing for new construction and maintaining older facilities."

These values are further developed in the *Primary Urban Center Development Plan* (PUCDP; 2004), the regional development plan for Honolulu's urban core, including WGS. Its focus is on preserving historic and cultural sites and panoramic views, including landmarks and the urban skyline. Planning and design, as well as adaptive reuse, are promoted to allow for new uses while preserving historic value. The PUCDP identifies panoramic views of Pearl Harbor as an important scenic resource, and includes a call to create public open space along the Pearl Harbor waterfront, strengthening physical and visual connections between the urban center and the water. Specifically, it states that:

"Residents and visitors also enjoy the broad waterfront of Pearl Harbor's East Loch. The historic OR&L bikeway and promenade links extensive parks, including Aiea Bay State Recreation Area, the new park at McGrew Point, and an expanded Neal S. Blaisdell Park. Restored historic sites on Ford Island, together the U.S.S. Missouri and U.S.S. Arizona Memorial, make Pearl Harbor the nation's most important site for World War II history."

The *Historic Effects Report for the Honolulu High-Capacity Transit Corridor Project* (pg. 79) includes a discussion related to WGS. It states, in part, "the property's [WGS's] location adjacent to Pearl Harbor represents its only historically significant feature of its setting or a significant viewshed. Other properties and features within the property's setting and viewshed do not contribute to its historic significance."

The primary transportation thoroughfares in the area which offer views of WGS are Kamehameha Highway (State Route 99) and Interstate Route H-1. Generally, views of WGS are

curtailed by the elevated nature of the freeway in this area and the typical rate—albeit varied—of travel.

Facility Visual Elements and Visual Character

WGS has a heavy industrial visual character, consistent with its I-2 Intensive Industrial zoning designation. Principle visual elements on the *mauka* side of the PHHT include:

- Generating units; from west to east these include:
 - Administration building, former generating units 1 and 2, which is 82 feet tall;
 - Generating units 3 and 4, which have a building façade that is 109 feet tall;
 - Generating units 5 and 6, which do not have a façade and are 108 feet tall; and
 - Generating units 7 and 8, which do not have a façade and are 124 feet tall.
- Warehouses, shop buildings, and other small out buildings, which generally do not exceed a height of 30 feet. These facilities are generally nearer the PHHT than Kamehameha Highway except warehouse number 10, which is in the northern portion of the facility near Kamehameha Highway and the Interstate Route H-1 viaduct.
- Electrical transformers and switching stations located between the generating units and Kamehameha Highway. These facilities are not buildings but consist of ground-mounted equipment with poles and bents supporting associated overhead cables. The more solid ground-mounted equipment typically does not exceed 20 feet in height and the cables and support structures typically reach a height of 90 feet.
- Storage tanks, including:
 - In the northwest portion of the facility three fuel tanks with heights of 40 to 50 feet;
 - South of generating units 7 and 8 near the PHHT there are a number of tanks associated with water treatment and control. The three largest tanks are 40 feet tall; and
 - Other smaller tanks near the generating units that are dwarfed by the scale of the generating units.

Principle visual elements on the *makai* side of the PHHT include:

- Storage tanks with associated secondary containment, from west to east these include:
 - Two fuel tanks on the west side of Waiiau Pond that are 48 feet tall with vertical concrete containment walls; and
 - A fuel tank *makai* of generating units 3 and 4 that is 55 feet tall with dikes for secondary containment.
- Generating units 9 and 10, which are *makai* of former generating units 1 and 2 and approximately 50 feet high.
- Small single-floor out buildings near generating units 9 and 10.

There are also a number of powerlines within and extending from the facility, particularly along Kamehameha Highway. Together, these vertical facilities and the generally hardened nature of

the working portion of WGS create a heavily-developed industrial viewscape. The relatively undeveloped and agricultural use on the western portion of the facility contrasts with the industrial appearance of the working portion of the facility. The proximity of the H-1 Freeway (Interstate Route H-1), which is elevated on a viaduct in this area, provides another significant vertical element that is most visible in the western portion of the facility. The height of H-1 varies, but is similar to the 50-foot tall fuel tanks adjacent to it.

View from Kamehameha Highway

Kamehameha Highway is the major public thoroughfare in closest proximity to WGS and the coastline, and provides potentially important views of the facility and Pearl Harbor. However, the intermittent view of Pearl Harbor from Kamehameha Highway near WGS is not identified as an important vista in any county or state planning documents. Planning documents do indicate that the primary view of Pearl Harbor from Kamehameha Highway is in the area near Neal S. Blaisdell Park, which is roughly 1,000 feet to the east. This is at least partially due to the fact that the generating station, which has occupied the site since the 1930s, obstructs views from the highway towards Pearl Harbor. The generating station facilities, including landscaping, overhead lines and poles, and the generator structures themselves all contribute to prevent views of Pearl Harbor from Kamehameha Highway in the area fronting WGS. Figure 4.9 provides two views towards WGS from Kamehameha Highway, one westbound and one eastbound; Pearl Harbor is visible in neither.

Figure 4.9 Views of WGS from Kamehameha Highway



View southwest towards WGS from the westbound side of Kamehameha Highway at its intersection with Kuleana Road.



View southeast towards WGS from Kamehameha Highway adjacent to the facility's main entrance.

Source: Google Streetview (2015)

View from Interstate Route H-1

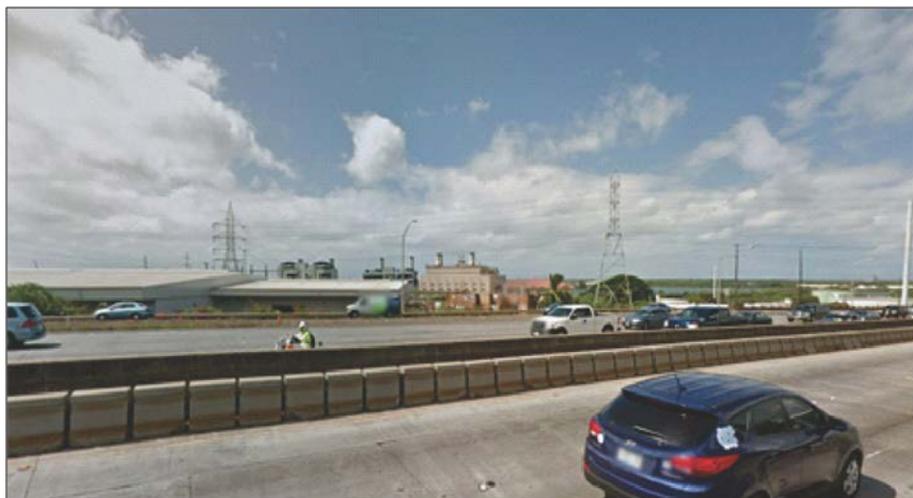
Views from H-1 (Interstate Route H-1) in this area are not identified in any planning documents as being important vistas. However, both residents and visitors to Honolulu frequently travel through the area on H-1 in both the westbound and eastbound directions, and the view from H-1 may be their only view of Pearl Harbor on a regular basis. Views of Pearl Harbor are possible

from H-1 in the vicinity of WGS, primarily from the Honolulu-bound lanes prior to passing over Kamehameha Highway. Because H-1 is elevated on the Pearl City viaduct in this area, views from H-1 include Pearl Harbor, as well as the Ko‘olau and Wai‘anae Mountain Ranges (depending on the direction subject vehicles are traveling). Certain facilities at the generating station, and associated powerline and poles, inhibit or degrade some views from H-1, particularly *makai* views towards Pearl Harbor. Figure 4.10 provides two views towards WGS from H-1 Freeway, one westbound and one eastbound; intermittent views of Pearl Harbor are visible in both.

Figure 4.10 Views of WGS from H-1 Freeway



View southeast towards WGS from the makai lane of H-1 Freeway.



View south towards WGS from westbound lanes of H-1 Freeway.

Source: Google Streetview (2015)

View from Honolulu Transit

The Honolulu Rail Transit Project is currently under construction and scheduled to be operational sometime between 2016 and 2025, the time period which this EA considers for minor developments at WGS. The transit project's guideway will pass by the WGS elevated over Kamehameha Highway. Where Kamehameha Highway passes under H-1, the transit guideway will be elevated over H-1. Because of this added height, the views of Pearl Harbor, the Ko'olau, and Wai'anae Mountain Ranges are anticipated to be superior to those which are currently available from H-1 or Kamehameha Highway. Nevertheless, certain generating station facilities and associated powerlines and poles will be visible at some points along the train's path, particularly for views in the direction of Pearl Harbor.

View from Pearl Harbor Historic Trail

The primary stationary view of Pearl Harbor from PHHT identified in planning documents, including the City's PUCDP, is the view of the harbor from the trail at its intersection with Neal S. Blaisdell Park, approximately 1,000 feet to the east of WGS. The view of Pearl Harbor from PHHT where the trail passes through the facility is similar to the view available from Neal S. Blaisdell Park. Most individuals transiting the PHHT in the vicinity of WGS have accessed the trail from either Neal S. Blaisdell Park or from Lehua Avenue, and are likely to have views of the harbor along most of that trail segment.

As pedestrians and bicyclists pass along the PHHT through the eastern portion of WGS, individuals have continuous *makai* and lateral views of coastline and central basin of Pearl Harbor. In the central portion of the facility there are some developments, including tanks and generating units 9 and 10, on the *makai* side of the PHHT that inhibit views of the harbor and coastline, making the view of the harbor intermittent. Another distinctive view element present in this central part of the facility are elevated pipelines, conduits, and a utility bridge that intersect the PHHT, passing overhead of pedestrians and bicyclists. In the western portion of the generating station the shoreline veers away from the PHHT, so that nearshore ponds and watercress farm features are the primary view there.

4.13.2 Probable Impacts

Hawaiian Electric worked with project planners to identify four distinct viewer groups (see Section 4.13.1) which have the potential to be affected by implementation of the defined projects listed in Table 1.4 and the types of development activities described in Table 1.5. They are: (i) vehicular traffic on Kamehameha Highway; (ii) vehicular traffic on H-1 Freeway; (iii) pedestrians and bicyclists traveling on the PHHT; and (iv) passengers aboard the HRTP train(s), currently being constructed. Table 4.11 below summarizes the potential impacts of implementing the projects in Table 1.4 in relationship to each of these viewer groups.

Figure 4.11 Summary of Visual Impacts by Viewer Group

<i>Development Category</i>	<i>Project</i>	<i>Project Visibility by Viewer Group</i>			
		<i>Kamehameha Highway</i>	<i>H-1 Freeway</i>	<i>Pearl Harbor Historic Trail</i>	<i>Honolulu Rapid Transit Project</i>
1	C&M Trailer Replacement	No	No	No	No
2	Perimeter Fence Lighting	Yes	Yes	Yes	Yes
	Vehicle Fuel Aboveground Storage Relocation	No	No	No	No
	Variable Frequency Drive	No	No	Yes	No
	12 kV Substation Demolition	Yes+	No	No	Yes+
3	138 kV Substation Retrofit	Yes	Yes	No	Yes
	46 kV Substation Replacement	Yes+	Yes	No	Yes
	Former Waste Water Pond Modification	Yes+	No	Yes+	Yes+
	Hawaiian Electric does not have any Category 4 projects planned at WGS at this time.				
4	Hawaiian Electric does not have any Category 4 projects planned at WGS at this time.				
Notes: + = Positive net benefit.					

It is not possible to characterize the visual impact of the individual developments that will qualify for the categories described in Table 1.5 before their locations and nature have been fully articulated. However, it is possible to make certain generalizations about the impacts to scenic and aesthetic resources these developments may have due to the constraints imposed by qualifying for a category. Category 1 projects will have little impact to visual and aesthetic resources as they represent replacements of existing facilities already present within the developed portion of WGS. Category 2 and 3 projects are fundamentally similar, generally minor unoccupied structures, with or without earthwork. These projects will be visible, depending on location, to one or more of the various viewer groups discussed above, but will not

represent a new visual presence in the context of the heavily developed industrial character of WGS.

Category 4 projects, consisting of structures large enough for human occupation, will be the most impactful category both in terms of visual weight and the number of different viewer groups likely to be affected. However, as can be seen in Figure 1-7, projects in this category will be limited to the developed portion of the facility where such structures are already present. In addition, no Category 4 projects will be located *makai* of the PHHT where it passes through WGS near the shoreline, but will be limited to makai areas west of the existing fuel tank and berm, where it veers away from the water. Finally, once the specific developments are fully designed, Hawaiian Electric will provide the Department of Planning and Permitting with additional information and analysis as part of the Condition Use Permit (CUP) modification process.

Overall, the visual and aesthetic impact of the minor projects, both defined (Table 1.4) and categorical (Table 1.5) will be minor and less than significant in the context of the heavily developed industrial character of WGS where no significant views have been identified in planning documents.

4.14 Land Use & Socioeconomic Environment

4.14.1 Existing Conditions

WGS is bordered by the Joint Base Pearl Harbor-Hickam on the south and west, by H-1 Freeway (Interstate Route H-1) on the northwest, Kamehameha Highway to the north, and by commercial and residential property along Waiau Stream to the east.

The generating station is located within the Pearl City Neighborhood Board Area (Neighborhood Board No. 21), as shown at right, which is part of the City and County of Honolulu's Primary Urban Center Development Plan Area. Pearl City is a Census Defined Place (CDP), with a population in 2010 of 47,698; this represented approximately 5 percent of the county's total population that year. Population growth in Pearl City has been significant over the past two decades, growing by 54 percent between the 2000 and 2010 according to U.S. Census counts.

Pearl City began as the first planned community in the Kingdom of Hawai'i in 1890, when the Oahu Railway and Land (OR&L) Company announced a new destination along their railroad line. Pearl City was originally laid out with streets and 350 lots and by the turn of the century, the region contained small farms, a railroad depot, a dance pavilion, a yacht club, and several homes. By the end of World War II, as demand for single-family homes grew, Pearl City offered a residential alternative to the urban core of Honolulu.



Housing subdivisions were created as sugar plantations contracted; Pearl City Heights was the first subdivision to be developed, followed by Pearl City Highlands in 1955, Momilani in 1959, and Pacific Palisades and Manana in 1965.

With some exceptions, housing areas are situated *mauka* of Kamehameha Highway, and those areas along the highway are commercial and light-industrial in nature. The regional Pearlridge Shopping Center, several smaller shopping complexes, and industrial establishments are situated along Kamehameha Highway. Over the recent past, development along Kamehameha Highway has been driven by new construction in mauka areas, new infill development, or redevelopment of aging facilities.

Currently, redevelopment along Kamehameha Highway in the Pearl City and Aiea region is anticipated to accelerate, driven by Transit Oriented Development (TOD) as the Honolulu Rapid Transit Project (H RTP) becomes operational. In addition, much of the buildings and infrastructure in the area was developed in the 1950s and 60s, and have reached or surpassed their design life. In September 2014, the City and County of Honolulu published the *Aiea-Pearl City Neighborhood TOD Plan*. The goal of that plan is to “foster more livable communities that take full advantage of the benefits of transit—specifically, creating new transportation options while encouraging economic growth and attractive redevelopment.”

The nearest Honolulu Transit station to WGS will be the Pearlridge Station, roughly 0.8 mile (4,000+ feet) away. The Pearl Highlands Station will be over 1.5 miles away. Significant TOD redevelopment is not anticipated to take place more than 0.5 miles from the stations. Thus, the immediate vicinity around WGS, and the majority of the area between Waimalu Stream and Waimano Home Road will not be directly affected by the TOD Plan, neither is it expected to be affected by significant transit-related redevelopment pressure.

According to the U.S. Census Bureau’s American FactFinder, approximately 7.7 percent of the labor force in Pearl City CDP is a member of the armed forces.⁷ According to the U.S. Census Bureau records for Pearl City CDP, in 2010 the median income per household was \$62,036, and the median income per family was \$67,246; the per capita income was \$21,683. At that time, 6.2 percent of the population, and 4.0 percent of families were below the poverty line.

For a comprehensive discussion of all relevant land use related plans, policies, and controls, please refer to Chapter 5 below.

4.14.2 Probable Impacts

None of the defined projects listed in Table 1.4 or the types of development activities described in Table 1.5 will adversely impact or alter land use within WGS or the surrounding community. No new property would be acquired, no existing uses would be displaced, and access to nearby uses would not be affected. The proposed actions are being taken to support the existing industrial use of the facility with no significant changes to the use or character of the facility. The construction expenditures related to labor and the purchase of equipment will not have a substantial effect on the local economy at a county or state level; at most the construction of the relatively minor projects analyzed in this EA would provide short-term employment. The

⁷ Retrieved on the web at: http://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml

projects would not appreciably increase the number of employees at WGS over the ten year period covered by this report, nor would it draw new residents to the Pearl City area.

4.15 Transportation

4.15.1 Existing Roadways, Traffic, and Parking

There are several well-maintained paved roadways within WGS, all of which are typical of an industrial facility and which are not accessible to the general public. There are three locations where facility roads cross the PHHT, all of which are gated and monitored by Hawaiian Electric security personnel.

WGS has two established points of ingress and egress off of Kamehameha Highway. The primary access point, or “main entrance” off of Kamehameha Highway is an unsignalized 3-way “T” intersection with Kamehameha Highway roughly 400 feet east of the H-1 Freeway overpass; only traffic exiting WGS is required to stop at this point. The secondary access point off of Kamehameha Highway is an unsignalized four-way intersection consisting of: (i) Kamehameha Highway eastbound; (ii) Kamehameha Highway westbound; (iii) Kuleana Road; and (iv) the facility driveway. This intersection is approximately 600 feet east of the primary access and both the facility driveway and Kuleana Road are required to stop.

Kamehameha Highway, designated as State Route 99, is part of the State of Hawai‘i’s National Highway System and is classified as a principal arterial. It has three lanes in each direction (east-west), a grassed median, a sidewalk on the *makai* side of the highway, and no bicycle accommodations. Table 4.11 summarizes traffic counts conducted by the State Department of Transportation (HDOT) on Kamehameha Highway at the H-1 overpass in October, 2013.

Table 4.11 Kamehameha Highway Traffic Volumes, October 2013

<i>Time Period</i>	<i>Time</i>	<i>Honolulu-Bound</i>	<i>‘Ewa-Bound</i>	<i>Total</i>
Morning Peak Hour	6:15 to 7:15	2,001	586	2,587
Afternoon Peak Hour	3:00 to 4:00	848	1,406	2,254
24-Hour (ADT)		17,511	20,776	38,287

Source: HDOT (2013)

According to the HDOT traffic counts, the Average Daily Traffic (ADT) on this section of Kamehameha Highway is lower than in nearby stretches of Kamehameha Highway adjacent to commercial areas. The ADT at Kalauao Bridge, near Pearlridge Shopping Center, in 2013 was greater than 56,000; the ADT between Acacia Road and Waimano Home Road (near Pearl Highlands) was greater than 63,000. These counts suggest that the ADT on Kamehameha Highway adjacent to WGS is less than 70 percent of the ADT along portions of the highway in nearby commercial areas.

WGS has approximately 300 parking stalls distributed across nine parking areas within the facility. No parking is allowed on Kamehameha Highway. Fuel deliveries are made by pipeline and do not contribute to area traffic.

4.15.2 Probable Impacts

Construction of the defined projects identified in Table 1.4 and implementation of the types of development activities described in Table 1.5 will slightly increase the number of vehicles entering and leaving WGS during the construction phase of the project(s). This increase will be due to construction workers and equipment accessing the facility plus materials delivery and waste removal. Examples of materials that will be delivered include steel risers for substation retrofits, fuel tank, enclosures, select fill, and various utility-scale electrical equipment (e.g., variable frequency drives, transformers, insulators, cables, conduits.) Examples of waste materials requiring removal include items from the 12 kV substation (see Section 3.4.1) and 46 kV substation (see Section 3.4.3), which, as outlined in Section 4.9.2, will be recycled if possible.

Construction activities related to the projects or development activities considered in this report will typically last no longer than a period of a few months, although multiple projects may have some overlap that will lead to longer spans of increased traffic volumes. These projects and development activities will each increase the number of vehicle-trips into and out of WGS by fewer than 20 vehicle-trips per day during their respective construction phases. However, because these projects and activities will be initiated across a period of ten years, these increases in traffic volumes would be intermittent and temporary.

Normal operations and maintenance of the facilities covered by this report do not have the potential to significantly affect area transportation volumes or the level of service on area roadways.

None of the projects or development activities will have any effect on air or ocean transportation facilities.

4.16 Utilities and Public Services

4.16.1 Police, Fire, and Emergency Services

WGS is located within Beat 358 of the Honolulu Police Department's (HPD) District 3. Pearl City Police Station, HPD's main station for District 3, is located in Pearl City at 1100 Waimano Home Road. The Honolulu Fire Department's (HFD) station closest to WGS is the Pearl City Fire Station (HFD Station No. 20), located at 886 1st Street in Pearl City (less than 1 mile away); the Waiiau Fire Station (HFD Station No. 38) is also nearby. In addition, Hawaiian Electric has integral fire suppression equipment located within WGS, which draws water from Waiiau Pond. The nearest medical facilities are Straub Pearlridge Clinic at 98-151 Pali Momi Street, and Queen's Medical Center West O'ahu at 91-2141 Fort Weaver Road.

4.16.2 Public Schools

The public elementary school nearest to WGS is Lehua Elementary School, located 0.25 miles to the west at 791 Lehua Avenue. The public middle school closest to WGS is Highlands Intermediate School, located at 1460 Ho'olaulea Street. The nearest public high school is Pearl City High School, located at 2100 Ho'okiekie Street. All of these facilities are operated by the State of Hawai'i Department of Education.

4.16.3 Utilities

Electrical service at WGS is supplied by the same local distribution circuit with which Hawaiian Electric powers area businesses and residents. The facility is served by the municipal sewer system operated by the City and County of Honolulu's Department of Environmental Services. Pearl City, including WGS, is part of the Honouliuli Sewershed and wastewater from Hawaiian Electric's facility is pumped by the Pearl City Waste Water Pump Station to the Honouliuli Waste Water Treatment Plant (WWTP), where it is treated and eliminated via the Honouliuli WWTP ocean outfall. Drinking water is provided by the municipal potable water system operated by the Department of Water Supply.

4.16.4 Probable Impacts

Implementation of the defined projects identified in Table 1.4 and of the types of development activities described in Table 1.5 will not increase the burden on existing public services or facilities. They will not alter the level of fire and police protection that is needed at WGS, nor will they significantly increase the number of people working at the facility or the potential demand for emergency medical services. Because none of these projects or activities will lead to an appreciable increase in employment at WGS, these relatively minor projects will not place additional demand on drinking water, educational, or healthcare services in the region.

5.0 CONSISTENCY WITH EXISTING POLICIES, CONTROLS, AND LAND USE PLANS

In accordance with the requirements of HAR §11-200-17(h), this chapter discusses the relationship of the proposed action(s) to land use plans, policies, and controls for the area that would be affected by the proposed improvements to WGS. It identifies the extent to which the proposed action(s) would conform or conflict with established objectives and specific terms of approved or proposed land use plans, policies, and controls. The discussion is organized first by jurisdiction (i.e., county, state, or federal) and then by specific ordinance, regulation, or law.

There is no meaningful difference between Alternatives 1 and 2 when considering their consistency with existing policies, controls, and land use plans. Alternative 1 has the potential to result in the implementation of a greater number of individual “minor” projects at the generating station; however, by qualifying for the categories outlines in Table 1.5, all the individual projects will be consistent in their compliance with the applicable policies, controls, and land use plans.

5.1 City & County of Honolulu

5.1.1 O‘ahu General Plan

The *O‘ahu General Plan* established broad, generalized objectives for utilities (Section V, Transportation and Utilities, Objective C): “*To maintain a high level of service for all utilities.*” With specific regard to energy production and usage, Section VI of the Plan (Energy, Objective A) requires Hawaiian Electric, as the electrical utility provider on Oahu, “*To maintain an adequate, dependable, and economical supply of energy for Oahu residents.*” Objective B further urges the provider, “*To conserve energy through the most efficient means of use.*”

All of the defined projects identified in Table 1.4, and the types of development activities listed in Table 1.5, while relatively minor in scale and scope, are intended to help Hawaiian Electric obtain the objectives identified in Table 1.3. The first three objectives, briefly summarized, are to: (i) maintain its facilities in good working order; (ii) upgrade its facilities to improve efficiency and safety; and (iii) provide for adequate security. All three of these objectives are consistent with, and supportive of, the policies and objectives of the *O‘ahu General Plan*, and will allow Hawaiian Electric to continue to deliver reliable and affordable power to the people, businesses, and public institutions on O‘ahu.

The fourth objective, to provide for future compliance with environmental regulations, will uphold the Plan’s objectives noted above related to energy, as well as its objectives related to the natural environment. Section III – Natural Environment, Objective A, Policy 7 indicates that it is the City and County’s policy to, “*protect the natural environment from damaging levels of air, water, and noise pollution.*” As regulation is generally intended to strengthen environmental protections, Hawaiian Electric’s continued compliance will reduce the potential for activities at WGS to contribute to degradation of the natural environment.

5.1.2 Primary Urban Center Development Plan

The City and County of Honolulu has divided O‘ahu into eight Development/Sustainable Community Plan areas. Areas designated for growth, (e.g., urban Honolulu and the ‘Ewa plain), are guided by Development Plans, and areas where planning is oriented towards moderate growth or equilibrium are subject to Sustainable Community Plans. Each plan updates and implements the objectives and policies of the *O‘ahu General Plan*, and serves as a guide for public policy, investment, and decision making within their respective region. WGS is located within Honolulu’s Primary Urban Center planning area. The current *Primary Urban Center Development Plan* (PUCDP) was adopted into law on June 21, 2004, as Ordinance 04-14. The PUCDP includes policy objectives for electrical power, the most relevant of which in relation to the proposed improvements at WGS states (Section 4.3.2, page 4-6):

Support retention and upgrade of the Waiau and Honolulu Power Plants as part of a strategic plan to improve the reliability of the Primary Urban Center’s electrical power system.

As noted above, the defined projects identified in Table 1.4 and the types of development activities described in Table 1.5 would contribute to continuous, safe, and efficient operation of WGS and thus is consistent with the objectives and policies of the PUCDP.

5.1.3 Aiea-Pearl City Livable Communities Plan

The *Aiea-Pearl City Livable Communities Plan* (APC-LCP) is part of a national Livable Communities Initiative Program funded by the Federal Transit Administration, an agency within the U.S. Department of Transportation, which compiles statistics and makes recommendations relating to mass transit. The APC-LCP was adopted by the Honolulu City Council on April 6, 2005 as Resolution 05-04 CD1. The primary purpose of the APC-LCP is to help the community develop a comprehensive, integrated transportation plan coordinated with logical patterns of local land use.

Neither the projects identified in Table 1.4 nor the types of development activities described in Table 1.5 have the potential to create significant impacts on local or regional transportation infrastructure (see Section 4.15.2), thus most of the objectives and policies outlined in the APC-LCP are not applicable. A notable exception to these concerns a key component of the Community Vision Plan set forth in the APC-LCP, which expresses the desire to expand open space and views along the Pearl Harbor shoreline. Specific goals include: (i) adding and maintaining connections to the PHHT, and (ii) acquiring open space along the shoreline. The APC-LCP cites the *Pearl Harbor Historic Trail Master Plan’s* goals of establishing landscaping and rest areas along the trail as well.

As discussed in Section 4.13.2, the proposed project(s) and development activities will not impact existing significant views towards Pearl Harbor. While some of the developments may be visible to some viewer groups, these generally small structures will occur within the context of the heavily developed working portion of WGS, where the generator buildings, stacks, tanks, and warehouses already provide, at best, intermittent views of Pearl Harbor. Nor will any of the project(s) or potential development prevent or interfere with the City’s ability to install landscaping along the PHHT, to buffer it from the surrounding commercial and industrial milieu, as the 40-foot PHHT right-of-way provides ample space for additional landscaping. It is

important to note that Hawaiian Electric currently maintains landscaping along and adjacent to the PHHT as it passes through the working portion of the generating station. Hawaiian Electric's tenant, which operates the watercress farm in the western portion of the facility, also provides maintained green-scape along the trail.

5.1.4 Pearl Harbor Historic Trail Master Plan

As shown in Figure 4.8, the PHHT bisects WGS into two segments, one *mauka* and the other *makai* of the PHHT right-of-way, which is owned by the U.S. Navy. Then-mayor Jeremy Harris' preface to the *Pearl Harbor Historic Trail Master Plan* (2001) summarizes the vision for the PHHT this way:

"...To become a world-class heritage and recreational facility linking Leeward communities from 'Aiea to Nānākuli that will enhance the quality of life for Hawai'i residents and visitors. Bicyclists, joggers, walkers, birdwatchers, schoolchildren, and senior citizens who come to appreciate the unique historic, cultural, and natural resources will all benefit."

The Plan's goals and objectives focus on four key characteristics of the vision for the Pearl Harbor Historic Trail; they are (page 2-1):

- *Outdoor recreation/physical fitness network;*
- *Historic preservation and education;*
- *Economic revitalization; and*
- *Environmental preservation and education.*

None of the defined projects identified in Table 1.4 or the types of development activities described in Table 1.5 would conflict with any of the goals or objectives of the *Pearl Harbor Historic Trail Master Plan*. As is currently the case, the PHHT would continue to be present and well-maintained where the Navy's ROW bisections WGS. The project will not require any new uses on the PHHT or within the Navy's ROW, but could potentially involve modifications to existing uses, such as the utility bridges, which may be replaced, maintained, or minimally upgraded. The PHHT would continue to serve as a public recreational resource as it does at the present time and none of the characteristics listed above would be adversely affected.

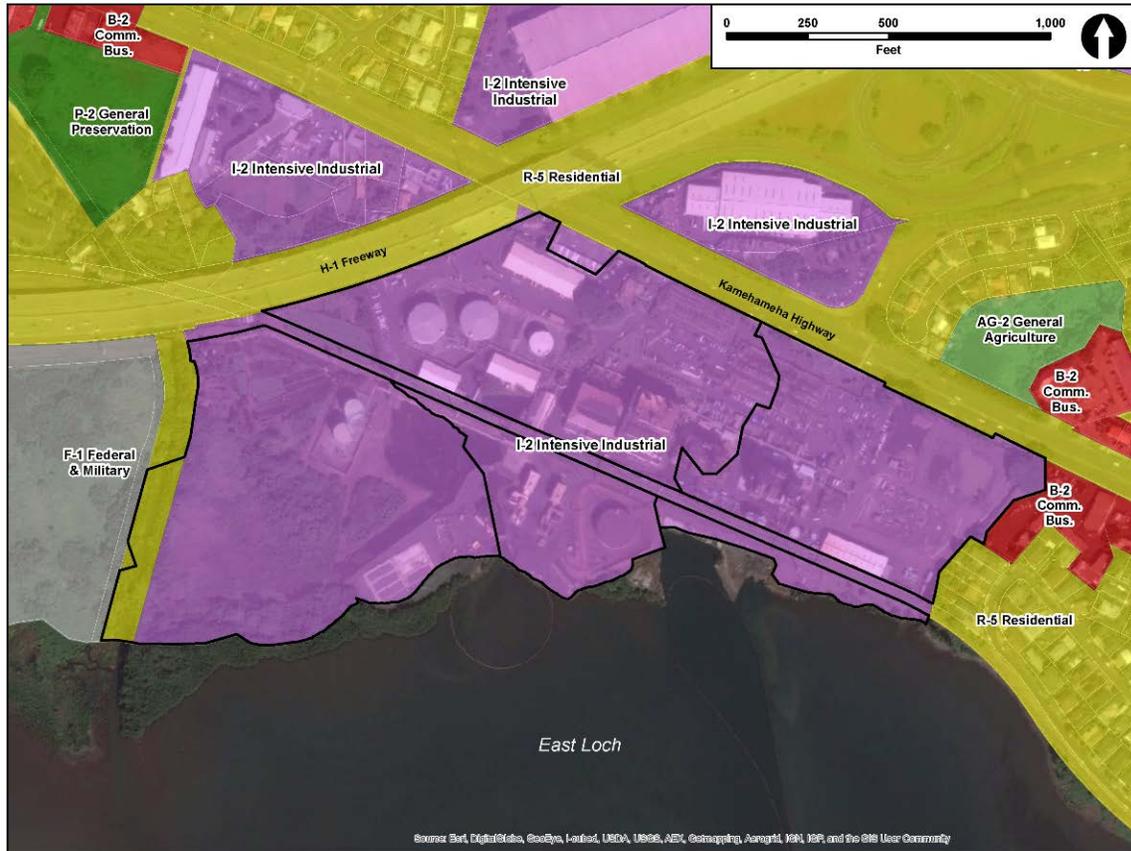
5.1.5 City and County of Honolulu Land Use Ordinance (LUO)

The purpose of the City and County of Honolulu's Land Use Ordinances (LUO) is to regulate land use in a manner that will encourage orderly development in accordance with adopted land use policies. It does this by establishing zoning districts and specifying the kinds of development standards that must be adhered to within each zoning district.

The WGS is located in the I-2 "Intensive Industrial" Zoning District (see Figure 5.1). The projects identified in Table 1.4 and the types of development activities described in Table 1.5 would all be consistent with all applicable height limitations, setback requirements, and other design standards of this zoning district (LUO §21-3.130). As discussed in Sections 4.8.3, 4.14.2, and 4.15.2, construction of the projects and development activities discussed in this report are

not anticipated to significantly impact surrounding properties, which may have more sensitive zoning and land uses, or area roadways.

Figure 5.1 County Zoning



Source: City and County of Honolulu GIS (2015)

WGS was granted a Conditional Use Permit for a Type B Utility Installation in 1989 (89/CUP1-47). Hawaiian Electric would seek a minor modification to the CUP for the projects and development activities covered by this report prior to initiating any construction or installation activities.

5.1.6 Special Management Area Review

As discussed in Section 1.1 and Table 1.2, all of the proposed improvements to WGS would take place within the SMA, and therefore will require SMP coverage prior to being initiated (see Figure 5.2). The following subsections discuss the project's consistency with the SMA Review Guidelines contained in ROH, Chapter 25 which related to shoreline management. Each subsection addresses one of the guidelines listed in this ordinance. For ease of review, the guidelines are reproduced in *italics*, followed by a discussion of the project's consistency with them.

Impacts on Recreation Areas and Wildlife Reserves

All development in the special management area shall be subject to reasonable terms and conditions set by the council to ensure that:

§25-3.2a(2): Adequate and properly located public recreation areas and wildlife preserves are reserved;

Discussion: As discussed in Section 4.12, the only recreational resource near WGS is the PHHT; the next nearest recreational facility is Neal S. Blaisdell Park, approximately 1 mile to the east. The nearest wildlife reserve is the Pearl Harbor National Wildlife Refuge, located approximately 1.25 miles to the west (see Figure 4.4 and Section 4.6). Some of the projects and development activities covered by this report would involve work on the *makai* side of the PHHT; this would slightly increase the number of vehicles crossing the PHHT during construction activities, but there would be no long-term increase in traffic across the PHHT or other adverse effects. The improvements also would not affect the ability of government agencies to reserve adequate and properly located public recreation areas or wildlife preserves.

Impacts on Solid and Liquid Waste Treatment Facilities

All development in the special management area shall be subject to reasonable terms and conditions set by the council to ensure that:

§25-3.2a(3): Provisions are made for solid and liquid waste treatment, disposition, and management which will minimize adverse effects upon special management area resources;...

Discussion: The projects and development activities considered in this report would not significantly alter the use or character of WGS; they are relatively minor projects which are needed in order to achieve the objectives summarized in Table 1.3. Aside from brief periods during construction, these projects and development activities will not cause increases in the numbers of workers at the facility (see Section 4.14.2) nor will they necessitate any long-term increase in the number of employees. As discussed in Section 4.16, waste treatment facilities are able to treat, dispose, and manage the waste generated at WGS at the present time; with no major changes in the industrial processes or numbers of employees, no significant impacts are anticipated.

Impacts on Land Forms, Vegetation, and Water Resources

All development in the special management area shall be subject to reasonable terms and conditions set by the council to ensure that:

§25-3.2a(4) Alterations to existing land forms and vegetation; except crops, and construction of structures shall cause minimum adverse effect to water resources and scenic and recreational amenities and minimum danger of floods, landslides, erosion, siltation or failure in the event of earthquake.

Discussion: The defined projects and types of development activities which Hawaiian Electric is proposing would not significantly affect area landforms or vegetation (see Section 4.1.2). The facility would continue to have the same general physiographic and topographic characteristics, and thus would have the same overall appearance as it currently does.

None of the defined projects or development activities considered in this report will have a focus on landscaping or vegetation. Some of the projects may incorporate a landscaping component (e.g., the Former Waste Water Pond Modification Project; see Section 3.4.4), and others may result in minor disturbances to existing landscaping during the construction period. Overall, the facility will continue to have a heavily-developed, industrial appearance with minimal vegetation in the working areas. The current level of vegetation and landscaping will not be significantly altered (see Section 4.6.2).

Surface water resources, including Waiiau Pond and the watercress-taro wetlands, will not be directly affected by any of the projects or development activities (see Section 4.4.2). Storm water runoff would continue to be similar to current conditions. However, with relatively small changes in site topography and hardscape, there will be small changes to storm water runoff. These modifications are not anticipated to result in significant changes to storm water quality or quantity (see Section 4.4.2.)

The project site was first developed into WGS in 1938. The station has not been significantly affected by floods, landslides, earthquakes, or other natural disasters throughout its more than 75 years of service as a power plant. As discussed in Section 4.7.2, the relatively minor projects that are covered by this report would not create any new conditions that have the potential to increase the facility's susceptibility to damage by any natural disasters.

Cumulative Impacts and Impacts on Planning Options

No development shall be approved unless the council has first found that:

§25-3.2b(1) The development will not have any substantial, adverse environmental or ecological effect except as such adverse effect is minimized to the extent practicable and clearly outweighed by public health and safety, or compelling public interest. Such adverse effect shall include, but not be limited to, the potential cumulative impact of individual developments, each one of which taken in itself might not have a substantial adverse effect and the elimination of planning options;

Discussion: None of the projects or development activities proposed in this EA are anticipated to have substantial adverse environmental effects, as established by the discussion in Chapter 4. In addition, the proposed improvements are not part of a larger action which could have substantial adverse effects, or which would eliminate planning options in the future.

Consistency with CZMP Objectives and Policies and with the State SMA Guidelines

No development shall be approved unless the council has first found that:

§25-3.2b (2)The development is consistent with the objectives and policies set forth in Section 25-3.1 and area guidelines contained in HRS Section 205A-26;

Discussion: As discussed in further detail in Section 5.2.3 below, the improvements are consistent with the objectives of the Coastal Zone Management (CZM) Program. The City and County of Honolulu's SMA Review Guidelines, discussed in this Chapter, are based upon and consistent with the State of Hawai'i's CZM Guidelines. The Planning Office of the State of Hawai'i's Department of Business, Economic Development and Tourism (DBEDT) was

provided with a copy of the EA to permit their confirmation that the project is consistent with the CZM Program's policies and objectives. The projects and development activities described in this report do not require a CZM consistency certification.

Consistency with County General Plan, Development Plans, and Zoning

No development shall be approved unless the council has first found that:

§25-3.2b(3) The development is consistent with the county general plan, development plans and zoning. Such a finding of consistency does not preclude concurrent processing where a development plan amendment or zone change may also be required.

Discussion: Section 5.1 documents the consistency of the projects with the appropriate county plans and zoning requirements.

Impacts on Bays, Salt Marshes, River Mouths, Sloughs, or Lagoons

The council shall seek to minimize, where reasonable:

§25-3.2c(1) Dredging, filling or otherwise altering any bay, estuary, salt marsh, river mouth, slough or lagoon;

Discussion: Construction and operation of the improvements described in this EA would not include any dredging, filling, or other modifications to any bay, estuary, salt marsh, river mouth, slough or lagoon.

Impacts on Beaches and Public Recreation

The council shall seek to minimize, where reasonable:

§25-3.2c(2) Any development which would reduce the size of any beach or other area usable for public recreation;

Discussion: The proposed improvements would have no impact on the size of any beach or other area usable for public recreation. The only area suitable for public recreation in the project area is the PHHT. As discussed in Section 4.12.2, Hawaiian Electric is not seeking to acquire any land from the PHHT; thus, the size of this public recreation area would not be reduced.

Impacts on Other Coastal Resources within the Special Management Area

The council shall seek to minimize, where reasonable:

§25-3.2c(3) Any development which would reduce or impose restrictions upon public access to tidal and submerged lands, beaches, portions of rivers and streams within the special management area and the mean high tide line where there is no beach;

Discussion: The projects and development activities which Hawaiian Electric is proposing will not restrict public access to any coastal resource in the area.

Impacts on Lines of Sight Toward the Sea

The council shall seek to minimize, where reasonable:

§25-3.2c(4) Any development which would substantially interfere with or detract from the line of sight toward the sea from the state highway nearest the coast;...

Discussion: The state highways nearest to the project area are Interstate Route H-1 and Kamehameha Highway. The projects and development activities which Hawaiian Electric is proposing would not lead to substantial modifications to the existing line of sight toward the sea from these arterials (see Section 4.13.2). The existing facilities at WGS do currently, and would continue to, detract from views of Pearl Harbor from these highways. However, the station has been present on this site since 1938, predating the vast majority of the development in the region and SMA rules. The relatively minor projects and development activities which are covered by this report would not result in any substantial interference with, or reduction of, existing views toward Pearl Harbor from Kamehameha Highway and H-1 Freeway.

Impacts on Water Quality, Open Water, Fisheries, Fishing Grounds, Wildlife Habitats & Agricultural Land Use

The council shall seek to minimize, where reasonable:

§25-3.2c(5) Any development which would adversely affect water quality, existing areas of open water free of visible structures, existing and potential fisheries and fishing grounds, wildlife habitats, or potential or existing agricultural uses of land.

Discussion: As discussed in Section 4.4.1, none of the projects or development activities which Hawaiian Electric is proposing in this EA would require work or result in discharges into area waterbodies. No adverse impacts to area water quality, fisheries, fishing grounds, wildlife habitat, or agricultural lands are anticipated as a result of these activities.

5.1.7 Artificial Lighting

Special Management Area Permits may only be issued for development in the SMA if it is consistent with HRS Chapter 205A, which contains all the relevant provisions related to artificial lights at privately owned non-hotel/hotel-condominium properties (see HRS Section 205A-30.5 “Prohibitions”.) The relevant provision therein states:

(a) No special management area use permit or special management area minor permit shall be granted for structures that allow artificial light from floodlights, uplights, or spotlights used for decorative or aesthetic purposes when the light:

(1) Directly illuminates the shoreline and ocean waters; or

(2) Is directed to travel across property boundaries toward the shoreline and ocean waters.

Discussion: The proposed projects and development activities discussed in this report do not involve the installation or operation of floodlights, uplights, or spotlights for decorative or

aesthetic purposes. In addition, no part of the proposed action will involve illuminating the shoreline or ocean waters.

The only outdoor lighting which is incorporated in the defined projects summarized in Table 1.4 is the Perimeter Fence Lighting Project (see Section 3.3.1). This lighting is intended to provide the minimum illumination needed to ensure the safety and security of workers who must access the area after dark and to deter trespassing. Unless barred from doing so by regulations intended to provide for the safety of workers or the security of the facility, Hawaiian Electric will use fully-shielded lights with lighting controls that allow them to be illuminated only when needed.

In view of the foregoing, Hawaiian Electric anticipates that lighting associated with the proposed projects and types of development activities will be fully consistent with the provisions of HRS Section 205A-20.5.

5.2 State of Hawai‘i

5.2.1 Hawai‘i State Plan

The *Hawai‘i State Plan* is intended to guide the long-range development of the State of Hawai‘i 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 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 *Hawai‘i State Plan* is a policy document. It depends upon implementing laws and regulations to achieve its goals. The sections of the *Hawai‘i State Plan* that are most relevant to the proposed projects and developments at WGS between 2016 and 2025 are contained in Sections 226-18(a) and (b), which establish objectives and policies relating to energy facilities and systems. These sections are reproduced below in italics, followed by a discussion of the proposed action’s consistency with them.

§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;

Discussion: Similar to its consistency with the *O‘ahu General Plan* (see Section 5.1.1), the proposed improvements would be consistent with the *Hawai‘i State Plan*. The proposed improvements would contribute to the efficiency of WGS while maintaining environmental quality and maintaining costs to Hawaiian Electric customers at a reasonable level. Therefore the proposed improvements to the facility are consistent with this provision of the State Plan.

5.2.2 Chapter 205, Hawai‘i Revised Statutes - Land Use Law

HRS Chapter 205 establishes the State Land Use Commission (SLUC) and gives this body the authority to designate all lands in the state as Urban, Rural, Agricultural, or Conservation district lands. The counties make all land use decisions within the Urban District in accordance with their respective county general plans, development plans, and zoning ordinances. The counties also regulate land use in the state Rural and Agricultural Districts, but within the limits allowed by HRS Chapter 205.

WGS and all surrounding properties are in the Urban District. Hawai‘i Administrative Rules (HAR) §15-15-18 characterizes the Urban District as exhibiting “city-like” concentrations of people, structures, streets, an urban level of services and other related land uses. It also stresses the importance of ensuring availability of basic services and utilities in urban areas. WGS is consistent with the land uses envisioned for the State’s Urban District. The proposed improvements will contribute to its existing use and will not alter the facility’s overall character or purpose; thus, they are consistent with the intent of the Urban District.

5.2.3 Coastal Zone Management Program

As noted in Section 5.1.6, the objectives of the Hawai‘i CZM Program are set forth in HRS 205A. The program is intended to promote the protection and maintenance of valuable coastal resources. All lands in the State of Hawai‘i are classified as valuable coastal resources. The State Office of Planning administers Hawai‘i’s CZM Program. A general discussion of the proposed action’s consistency with the objectives and policies of Hawai‘i’s CZM Program follows; however, the projects and development activities described in this report do not require a CZM consistency certification.

Recreational Resources

Objective: *Provide coastal recreational opportunities accessible to the public.*

Policies:

Improve coordination and funding of coastal recreational planning and management; and

Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:

Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;

Requiring replacement of coastal resources having significant recreational value including, but not limited to, surfing sites, fishponds, and sand beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the State for recreation when replacement is not feasible or desirable;

Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;

Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;

Ensuring public recreational uses of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;

Adopting water quality standards and regulating point and nonpoint sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;

Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and

Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, and county authorities; and crediting such dedication against the requirements of section 46-6.

Discussion: The defined projects in Table 1.4 and the types of development activities described in Table 1.5 would have no effects on coastal recreational resources. The sole recreational resource in the immediate vicinity of WGS is the PHHT. No land would be acquired from the PHHT (or the Navy ROW) and no construction would occur within the PHHT. The possible exception is that a project may involve work on the utility bridges across the PHHT; such work could include replacing, maintaining, or minimally upgrading the utility bridges.

Construction activities *makai* of the trail or on the utility bridges would require crossing the PHHT and its associated bikeway more frequently than typical operations at the facility require. However, as discussed in Section 4.12, these impacts would be limited to the relatively brief construction period and would occur at the location of a crossing already used by Hawaiian Electric workers and vehicles on a daily basis.

Historic Resources

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

Policies:

Identify and analyze significant archaeological resources;

Maximize information retention through preservation of remains and artifacts or salvage operations; and

Support state goals for protection, restoration, interpretation, and display of historic resources.

Discussion: The potential for the proposed action to affect historic resources in the area is discussed in detail in Section 4.10. The defined projects and types of development activities which Hawaiian Electric is seeking SMP coverage for will all be located in previously-disturbed

areas within WGS, which has been in continuous service as a power plant since 1938. Nonetheless, for projects (e.g., Categories 3 and 4) which require some subsurface disturbance, Hawaiian Electric will instruct its contractor(s) for all development activities to immediately cease work in the unlikely event that cultural deposits or human remains are uncovered during construction, and notify the State Historic Preservation Division (SHPD), the O‘ahu Island Burial Council, the Medical Examiner, and the Honolulu Police Department as appropriate, pursuant to HAR §13-300-40. In addition, SHPD will be provided a copy of this EA with a request for review and comment. Any comments or guidance received will be reproduced in full in the Final EA.

Scenic and Open Space Resources

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

Policies:

Identify valued scenic resources in the coastal zone management area;

Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;

Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and

Encourage those developments that are not coastal dependent to locate in inland areas.

Discussion: As discussed in Section 4.13.2, coastal open space and scenic resources will not be affected by the proposed action of granting SMP coverage to the defined projects listed in Table 1.4 and the types of development activities described in Table 1.5. The proposed action will not substantially alter the use or character of WGS or require any major alteration to natural landforms or existing public views towards or along the shoreline. Some of the improvements may be visible to some viewer-groups, such as bicyclists and pedestrians on the PHHT, by they will not represent a fundamental change in the visual character of the heavily-developed industrial facility.

Coastal Ecosystems

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

Policies:

Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;

Improve the technical basis for natural resource management;

Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;

Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and

Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.

Discussion: The proposed action will not affect coastal ecosystems. Section 4.4.2 discusses the measures that Hawaiian Electric will employ to minimize or eliminate construction related impacts to water bodies or area water quality.

Economic Uses

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

Policies:

Concentrate coastal dependent development in appropriate areas;

Ensure that coastal dependent development such as harbors and ports, and coastal related development such as visitor industry facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and

Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:

Use of presently designated locations is not feasible;

Adverse environmental effects are minimized; and

The development is important to the State's economy.

Discussion: The proposed action would not lead to any changes in the concentration or location of coastal developments. All of the projects and activities covered by this EA would be limited to WGS, an area designated for intensive industrial use, and would not change the character or use of the facility.

Coastal Hazards

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

Policies:

Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards;

Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint source pollution hazards;

Ensure that developments comply with requirements of the Federal Flood Insurance Program; and

Prevent coastal flooding from inland projects.

Discussion: Section 4.7.1 confirms that the proposed action is outside a designated Special Flood Hazard Area. Because WGS is located on the East Loch of Pearl Harbor, it is relatively protected from storm surges and tsunamis. None of the proposed improvements would increase the facility's susceptibility to storm waves, tsunamis, flood erosion, subsidence, or other natural hazards, or increase emissions of hazardous pollutants.

Managing Development

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

Policies:

Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;

Facilitate timely processing of applications for development permits and resolve overlapping or conflicting permit requirements; and

Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life cycle and in terms understandable to the public to facilitate public participation in the planning and review process.

Discussion: Hawaiian Electric has distributed this EA to, and will continue to work cooperatively with, all government agencies with oversight responsibilities to facilitate efficient processing of permits and informed decision making by the responsible parties.

Public Participation

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

Policies:

Promote public involvement in coastal zone management processes;

Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal issues, developments, and government activities; and

Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.

Discussion: Pursuant to the requirements of HAR §11-200, the public will have an opportunity to review and comment on this EA. In addition, the public will have an additional opportunity to participate during the processing of the SMP, which will include a public notice and hearing.

Beach Protection

Objective: *Protect beaches for public use and recreation.*

Policies:

Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion;

Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities; and

Minimize the construction of public erosion-protection structures seaward of the shoreline.

Discussion: The proposed action poses no risk to beaches and will not interfere with natural shoreline processes. No structures are planned seaward of the shoreline and no interactions with littoral processes would be involved.

Marine Resources

Objective: *Promote the protection, use, and development of marine and coastal resources to assure their sustainability.*

Policies:

Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;

Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency;

Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;

Promote research, study, and understanding of ocean processes, marine life, and other ocean resources in order to acquire and inventory information necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and

Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

Discussion: The proposed action does not have the potential to affect marine resources or the Pearl Harbor coastline. Hawaiian Electric will require all of its employees and contractors to observe all relevant BMPs during construction activities to minimize or eliminate the potential

for substantial impacts to water quality as a result of wind- or storm water-borne particulate, chemicals, or other matter entering surface water bodies in the vicinity of WGS.

5.3 Federal Acts and Legislation

Because the proposed actions do not require federal approvals and will not utilize federal funding via appropriations or grants, many of the federal regulations do not directly apply. Nevertheless, the following sections review how the proposed actions are consistent with select federal regulations associated with environmental resources.

5.3.1 Archeological and Historic Preservation Acts

As documented in Section 4.10, Hawaiian Electric has worked to identify historic resources in the project area and consider the action's potential effects on those resources. Hawaiian Electric also has a documented history of considering historic resources at the generating station. This is exemplified by the preservation of the one structure previously identified as eligible for listing on the National Register – the original power plant building which formerly housed generator units 1 and 2. When considering the minor projects discussed in this document, Hawaiian Electric believes they will have no adverse effect on historic resources. Furthermore, as outlined in Section 4.10.2, to minimize the potential for adverse impacts to the original power plant building and other potentially historic properties, Hawaiian Electric will consult with SHPD prior to the implementation of projects not listed on Table 1.4 but that are deemed to qualify for one of the categories listed in Table 1.5. SHPD will also be provided with a copy of this EA for review and comment.

5.3.2 Clean Air Act (42 U.S.C. § 7506(c))

As discussed in Section 4.3, any emissions of fugitive dust during construction of the projects are expected to be temporary and relatively minor. The contractors will employ BMPs to control fugitive dust emissions during construction activities. Normal operation of the improvements described in this EA will not produce significant on-site emissions, will not alter air flow in the vicinity or region, and will have no other measurable effect on the area's micro-climate.

Projects to improve generator efficiency or comply with changing air quality emission standards, which are two of the objectives outlined in Table 1.3, could reduce the generating station's air emissions.

5.3.3 Clean Water Act

The Clean Water Act (Federal Water Pollution Control Act, 33 U.S.C 1251, et seq.) is the principal law governing the control and water quality of the nation's waterways. No part of the proposed action will require work in, or discharge into, navigable waters of the United States. While it is possible that construction activities will disturb more than one acre of land, there are no water bodies in the project area that will be affected by construction activities. If Hawaiian Electric's preliminary research indicates that it will disturb more than one acre of land, it will obtain a National Pollutant Discharge Elimination System Notice of Intent Construction Permit (NPDES-NOI-C) from the State of Hawai'i Department of Health prior to initiating construction

activities. Hawaiian Electric will require contractors to implement storm water BMPs regardless of the construction disturbance area.

5.3.4 Coastal Zone Management Act (16 U.S.C. § 1456(c) (1))

Enacted into law as HRS Chapter 205A, the State of Hawai‘i CZM Program was promulgated in 1977 in response to the Federal CZM Act of 1972. The CZM area encompasses the entire State of Hawai‘i, including all marine waters seaward to the extent of the state’s police power and management authority, as well as the 12-mile U.S. territorial sea and all archipelagic waters. Section 5.2.3 above discusses the consistency of the proposed action with the policies and objectives of the CZM Program.

5.3.5 Endangered Species Act (16 U.S.C. 1536(a)(2) and (4))

The Endangered Species Act (ESA; 16 U.S.C. §§1531-1544) was enacted into law on December 28, 1973, and amended in 1976, 1982, 1984 and 1988. It provides broad protection for species of fish, wildlife, and plants that are listed as threatened or endangered in the U.S. or elsewhere. The ESA mandates that federal agencies seek to conserve endangered and threatened species, and use their authority in furtherance of the Act’s purpose. It also provides for listing species, as well as for recovery plans and the designation of critical habitat for listed species. The ESA outlines procedures for federal agencies to follow when taking actions that have the potential to jeopardize listed species, and contains exceptions and exemptions.

As discussed in Section 4.6 of this EA, there is very little biota within the working portion of WGS, and no known rare, threatened, or endangered species are present in or immediately adjacent to the project site that would be adversely affected by implementation of the proposed action.

5.3.6 Floodplain Management (42 U.S.C. § 4321, Ex. Order No. 11988)

As described in Section 4.7, WGS lies within Flood Zone D, signifying an area with undetermined flood hazards. The proposed improvements comply with the standards of the National Flood Insurance Program. Once constructed, these improvements will not exacerbate existing flood hazards in the area.

5.4 Required Permits and Approvals

As noted in Section 1.1 and Table 1.2, all of WGS is located within the SMA (see Figure 5.2). ROH Chapter 25 establishes the SMA, the purpose of which is to “preserve, protect, and where possible, to restore the natural resources of the coastal zone in Hawai‘i. Special controls on development within an area along the shoreline are necessary to avoid permanent loss of valuable resources and foreclosure of management options, and to insure that adequate public access is provided to publicly-owned or used beaches, recreation areas, and natural reserves, by dedication or other means.” Because the facility is within the SMA, Hawaiian Electric is required to obtain a SMP for any development, as defined by ROH Chapter 25, within the facility.

The City and County of Honolulu requires Conditional Use Permits (CUPs) in some situations (ROH Chapter 21). Certain uses in some zoning districts require a CUP and will receive one if

certain minimum standards and conditions are met. The applicant must demonstrate that the use meets all pertinent standards and the City can condition the CUP to ensure compatibility with adjacent uses and structures. The generating station requires a CUP, and has one, because it handles and stores large quantities of petroleum products. The proposed improvements will require Hawaiian Electric to obtain a minor modification to the CUP for WGS. These approvals will be obtained on a project by project basis prior to commencing construction.

Certain projects that qualify for Category 1 or 2 may trigger the need for a Shoreline Setback Variance (SSV) if they are within 40 feet of the Pearl Harbor Shoreline. Category 3 and 4 projects will not be placed within that setback area because the envelopes (see Figure 1.6 and Figure 1.7) do not include the setback area. The SSV process, if required, will rely on this EA for compliance with HRS Chapter 343. The permits and approvals required for the proposed projects are listed in Table 5.1.

Table 5.1 Summary of Required Permits and Approvals

Permit	Issuing Agency	Project			
		Category 1	Category 2	Category 3	Category 4
PUC Authorization	Public Utility Commission	Yes, for all projects valued over \$2.5 million.			
Department of the Army Individual Permit/Clean Water Act Section 404 Permit	U.S. Department of the Army	No	No	No	No
Clean Water Act Section 401 Water Quality Certification	State of Hawai‘i Department of Health	No	No	No	No
Coastal Zone Management Program Consistency Determination	State of Hawai‘i Coastal Zone Management Office, DBEDT	No	No	No	No
Special Management Area Use Permit (SMP)	City and County of Honolulu Dept. of Planning and Permitting	Yes	Yes	Yes	Yes
Shoreline Setback Variance	City and County of Honolulu Dept. of Planning and Permitting	Yes, if within 40 feet of Pearl Harbor shoreline		No	No
Minor Modification to the existing Conditional Use Permit (CUP) for WGS	City and County of Honolulu Dept. of Planning and Permitting	Yes	Yes	Yes	Yes
Building Permit	City and County of Honolulu Dept. of Planning and Permitting	Yes	Yes	Yes	Yes
National Pollutant Discharge Elimination System (NPDES) permit	Stat of Hawai‘i Department of Health, Clean Water Branch	Yes, only if disturbance area exceeds 1 acre.			

Source: Compiled by Planning Solutions, Inc. (2015).

6.0 DETERMINATION

6.1 Significance Criteria

Hawai'i Administrative Rules 11-200-11.2 establishes procedures for determining if an Environmental Impact Statement (EIS) should be prepared, or if a Finding of No Significant Impact (FONSI) is warranted. §11-200-11.2(1) provides that applicants should issue an EIS Preparation Notice (EISPN) for actions that it determines may have a significant effect on the natural or human environment. Hawai'i Administrative Rules §11-200-12 lists the following criteria to be used in making that determination.

In most instances, an action shall be determined to have a significant effect on the environment if it:

1. Involves an irrevocable commitment to loss or destruction of any natural or cultural resource;
2. Curtails the range of beneficial uses of the environment;
3. Conflicts with the State's long-term environmental policies or goals as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders;
4. Substantially affects the economic or social welfare of the community or State;
5. Substantially affects public health;
6. Involves substantial secondary impacts, such as population changes or effects on public facilities;
7. Involves a substantial degradation of environmental quality;
8. Is individually limited but cumulatively has considerable effect on the environment or involves a commitment for larger actions;
9. Substantially affects a rare, threatened, or endangered species, or its habitat;
10. Detrimentally affects air or water quality or ambient noise levels;
11. Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters;
12. Substantially affects scenic vistas and view planes identified in county or state plans or studies; or,
13. Requires substantial energy consumption.

6.2 Findings

The potential effects of the projects and development activities described previously in this document were evaluated using these significance criteria. The findings, with respect to each criterion, are summarized below.

6.2.1 Irrevocable Loss or Destruction of a Resource

The proposed projects would be constructed entirely within an existing Hawaiian Electric facility which has been in continuous use as a generating station since 1938. They do not involve the loss of any significant cultural or natural resources.

6.2.2 Curtails Range of Beneficial Uses

Construction and operation of the projects and developments discussed in this EA would not curtail beneficial uses of the site; they are intended to support efficient and safe operations and would not curtail any beneficial use currently underway at WGS.

6.2.3 Conflicts with Long-Term Environmental Policies or Goals

The proposed action is consistent with the *Hawaii State Plan*, the *Oahu General Plan*, and with the State of Hawaii's long-term environmental policies and goals as expressed in HRS Chapter 344 and elsewhere in state law. For a complete discussion of consistency with long-term environmental plans, policies, and controls refer to Chapter 5.0.

6.2.4 Substantially Affects Economic or Social Welfare

The proposed action is intended to maintain a safe, secure, and efficient working environment for employees at WGS. They will not have any substantial effect on the economy or social welfare except insofar as they allow Hawaiian Electric to improve the efficiency of its operations and to continue to provide electricity to the people of O'ahu at a low cost while maintaining environmental quality.

6.2.5 Public Health Effects

The proposed action will not adversely affect air quality or any water sources used for drinking or recreation. Neither will it generate large amounts of solid waste or produce other emissions with the potential to have a significant adverse effect on public health.

6.2.6 Produce Substantial Secondary Impacts

The proposed projects and development activities will not produce significant secondary impacts. They are not designed to foster population growth or promote economic development. Instead, they are intended to support Hawaiian Electric's current operations at WGS.

6.2.7 Substantially Degrade Environmental Quality

The proposed action will not have any substantial long-term environmental effects. Some of the projects and development activities described in this EA will temporarily have less than significant effects, such as elevated noise levels or increased traffic within or nearby WGS, but these effects will be localized and of limited to the construction period. The proposed action will not substantially degrade environmental quality at WGS or in adjacent areas.

6.2.8 Cumulative Effects or Commitment to a Larger Action

The improvements which Hawaiian Electric is proposing do not represent a commitment to a larger action, and are not intended to facilitate substantial population growth in the region. They are part of regular, ongoing maintenance of WGS.

6.2.9 Effects on Rare, Threatened, or Endangered Species

Threatened or endangered water birds are observed to periodically visit Waiiau Pond within the Waiiau Generation Station despite its proximity to the working generating station, PHHT, and watercress farm activities. In the event that individual birds are disturbed by construction activities, they would find suitable loafing and foraging sites nearby. There would not be any lingering adverse impacts to these birds or other animals that may be temporarily displaced by construction activities, or which would remain so once construction was complete (see Section 4.6). The proposed action will not utilize or adversely impact any resource needed to the protection of rare, threatened, or endangered species.

6.2.10 Affects Air or Water Quality or Ambient Noise Levels

Construction and operation of the proposed projects and development activities will not have any lasting measurable effect on air or water quality. Some temporary and localized increases in emissions due to the use of construction equipment and vehicles may accompany the construction period, but these will be limited by strict adherence to BMPs (see Section 4.3.2). Noise levels will temporarily increase during construction of the improvements but are not anticipated to affect any noise-sensitive uses, as discussed in Section 4.8.3. None of the projects or development activities discussed in this report will involve work in any surface water body such as a stream, pond, or wetland, or involve any discharge into area waters; thus, no impacts to area water quality are anticipated (see Section 4.4.2).

6.2.11 Environmentally Sensitive Areas

There are no environmentally sensitive areas or resources within WGS. The project site is outside defined flood and tsunami hazard zones. The improvements which Hawaiian Electric is proposing will all be constructed consistent with the Hawai'i Uniform Building Code for Earthquake Zone 2a.

6.2.12 Affects Scenic Vistas and View planes

The proposed improvements are not within a designated scenic area. They will not significantly alter the visual character of WGS, or significantly change views across it (see Section 4.13.2).

6.2.13 Requires Substantial Energy Consumption

Construction of the improvements will use some energy, however once in operation they will not require substantial energy consumption and will require only infrequent maintenance.

6.3 Determination

In view of the foregoing, Hawaiian Electric and the Department of Planning and Permitting have concluded that the proposed action will not have a significant adverse impact on the environment. Consequently, DPP anticipates issuing a Finding of No Significant Impact for the proposed action.

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8.0 CONSULTATION & DISTRIBUTION

The City and County of Honolulu’s Department of Planning and Permitting distributed copies of this Draft Environmental Assessment to the parties listed in Table 8.1. All copies distributed were in electronic format unless specified otherwise.

Table 8.1 Distribution of the Draft Environmental Assessment

<i>State Agencies</i>	<i>City and County of Honolulu</i>
Office of Environmental Quality Control (1 printed, 1 electronic)	Department of Planning and Permitting
Department of Agriculture	Board of Water Supply
Department of Accounting and General Services	Department of Community Services
Department of Business, Economic Development and Tourism (DBEDT)	Department of Design and Construction
DBEDT – Energy Division	Department of Environmental Services
DBEDT – Office of Planning	Department of Facility Maintenance
Department of Defense	Department of Parks and Recreation
Department of Education	Department of Transportation Services
Department of Hawaiian Home Lands	Honolulu Fire Department
Department of Health (DOH) – Environmental Planning Office	Honolulu Police Department
DOH – Clean Air Branch	<i>Elected Officials</i>
DOH – Clean Water Branch	U.S. Senator Brian Schatz
DOH – Wastewater Branch	U.S. Senator Mazie Hirono
Department of Human Services	U.S. Representative Mark Takai
Department of Labor and Industrial Relations	U.S. Representative Tulsi Gabbard
Department of Land and Natural Resources (DLNR) (5 printed)	State Senator Breene Harimoto
DLNR – Historic Preservation Division	State Representative Gregg Takayama
Department of Transportation	City Council Member Brandon Elefante (District 8)
Hawaii Housing Finance and Development Corp.	Pearl City Neighborhood Board No. 21, Chairperson Larry Veray
Office of Hawaiian Affairs	<i>Libraries and Depositories</i>
University of Hawai‘i – Environmental Center	Hawai‘i State Library – Hawai‘i Documents Center
<i>Federal Agencies</i>	Pearl City Regional Library

U.S. Department of the Army – Corps of Engineers, Regulatory Branch	<i>Other</i>
U.S. Fish and Wildlife Service – Pacific Islands Fish and Wildlife Office	Friends of the Pearl Harbor Historic Trail
Source: Planning Solutions, Inc. (2015)	

Appendix A. PAST PROJECTS AT WGS REQUIRING SMP COVERAGE

To better understand the categories it is also informative to review SMPs obtained by Hawaiian Electric in the recent past for developments that would qualify for the categories outlined in Table 1.5. Table A.1 lists select projects completed by Hawaiian Electric over the last 10 years at WGS which required an SMP. If these projects had been deferred until after this EA and SMP Major permit process was complete, then the company believes they would have qualified for the category indicated in Table 3.2.

Table A.1 Past Projects Requiring SMP at WGS (by Category)

Project Name	Summary of Project Objective	
Category 1 – Replacements		
Waiau Trailer SMP 2014	Replacement of two modular office trailers which were aged and in disrepair. The project had a value of \$270,000.	
Category 2 – Unoccupied improvements without earthwork (i.e., <50 c.y. of fill)		
Chlorine dioxide (ClO ₂) System Upgrade	In 2008 a SMP Minor permit was obtained for this project, which involved the construction of a 22' by 33' by 10' high single story structural steel roof on a concrete slab to protect ClO ₂ equipment and tanks and other items used for the plant operation from the sun and rain. The facility is located on the <i>mauka</i> side of unit W-6. The project had a value of \$65,000.	
Units W-7 and W-8 Utility Bridge	<p>A SMP Major permit was obtained in 2010 to replace underground utilities serving units W-7 and W-8 with new lines on a utility bridge. The project addressed water issues associated with underground service in the saturated subsurface. The bridge was roughly 25 off the ground and spanned from the wastewater treatment tank (near the fence separating the station from the historic trail) to unit W-8, a distance of roughly feet. The foundation consisted of 2' diameter by 28' deep drilled shafts, resulting in less than 50 cubic yards of material being handled. The project had a value of \$636,000.</p> <p>This development exceeded the \$500,000 limit for SMP Minors. An EA/FONSI for the development was accepted by DPP prior to the SMP Major application being submitted. This project is an instance where, due to the nature and scale of the “minor” developments required to maintain/support the existing use, the development value exceeded the \$500,000 limit but the impact was far from significant given the context of the existing facilities. A number of similar developments, similar in the fact that they exceed the \$500,000 limit but have no significant impacts, are likely to occur over the ten year period proposed in this document.</p>	 <p style="text-align: right;">the feet 65</p>
Exciters	A SMP Minor permit was obtained in 2012 for the installation of exciters for units W-5 and W-6. The exciters are devices that help control the generator output voltage; they are contained within a roughly 20' by 10' by 20' high enclosure on a concrete pad placed on the <i>mauka</i> side of the units. Less than 50 c.y. of materials were handled as part of the project. The project had a value of \$75,000.	

<p>Battery Enclosures Nos. 9 & 10</p>	<p>A SMP Minor permit was obtained in 2014 for the installation of two 6'10" by 16' by 8' high prefabricated battery enclosures – constructed of metal framing, wall panels, and roofing on a new concrete pad with a micropile foundation. It was installed next to generating unit No. 9 on the makai side of the historic trail (Figure 1.3). Less than 50 cubic yards of materials were handled as part of the project. The project had a value of \$90,000.</p>	
<p>Category 3 – Unoccupied improvements with earthwork (i.e., >50 c.y. of fill)</p>		
<p>Pavement Upgrade, Makai Working Area</p>	<p>A SMP Minor permit was obtained in 2013 for upgrades to pavement in the portion of the station known as the sand blasting area between generating unit W-10 and the drying beds (Figure 1.3). The pavement was upgraded so the area could be used for equipment storage and layout. Roughly 10" existing material was removed and replaced with 6" of compacted base course and 4" of asphaltic concrete pavement throughout the area, which was slightly less than an acre. The project had a value of \$419,580. A photograph of the area in 2015 is provided below.</p>	 <p style="text-align: right;">of</p>
<p>Upper Former Wastewater Pond Gravel Parking Area</p>	<p>A SMP Minor permit was obtained in 2013 for modifications of the former upper wastewater pond located in the northeast portion of the station (Figure 1.3). The pond was partially filled with select borrow to create a relatively flat surface throughout the former pond area and a 6-inch thick layer of course gravel applied to the surface (roughly 5,280 cubic yards of material). The project had a value of \$425,000.</p> <div style="display: flex; justify-content: space-around;"> <div data-bbox="418 915 898 1276">  <p style="text-align: center;"><i>Pre-Project</i></p> </div> <div data-bbox="930 915 1414 1276">  <p style="text-align: center;"><i>Post-Project</i></p> </div> </div>	
<p>Category 4 – Occupied equipment and structures</p>		
<p>Modular Office for Power Supply Engineering Department (2011/SMA-16)</p>	<p>A SMP Minor permit was obtained in 2011 for the installation of a 56' by 12' prefabricated modular office trailer on the mauka side of the laboratory building and Diamond Head of generating unit No. 7 (between unit 7 and former wastewater pond). The work included the installation of stairs, an access ramp, plus electrical and communication hookups. The unit provides space for 6 work stations. The project had a value of \$113,000, which didn't include the cost of the modular office trailer because it was already owned by the Company.</p>	
<p>Source: Hawaiian Electric (2015)</p>		

Appendix B. TOPICS TO BE ADDRESSED BY HAWAIIAN ELECTRIC WHEN PRESENTING A PROJECT TO DPP FOR ASSESSMENT OF QUALIFICATION TO A CATEGORY

Once this EA process is complete and an SMP Major awarded, as outlined in Alternative 1, then Hawaiian Electric will present projects to DPP as they come up over the next 10 years for consideration of qualifying for one of the four categories (Table 1.5). In a letter to DPP, Hawaiian Electric will provide the following information so that DPP to make an informed determination of each project's qualification to a category.

- Potential to alter the use or character of the generating station
- Rationale for its qualification to the category based on factors such as size, use, earthwork quantity, and location
- Potential for controversy
- Potential for unusual or significant impacts
- Does it conflict with analysis in this EA or SMP conditions, which include (note, this list will be expanded to address SMP conditions, if any):
 - No work will occur in surface water bodies such as streams, ponds, or wetlands
 - Category 3 and 4 projects will not alter the ground level by more than 10 feet or be within the 40 foot shoreline setback
 - Substantial amounts of chemicals will not be used and no hazardous material not currently utilized will be required
 - Design complies with UBC
 - Noise at, or adjacent to, WGS will not substantially increase over present levels
 - Viewplanes from the PHHT out over the East Loch will not be obstructed
 - Vehicle-trips into and out of WGS will increase by fewer than 20 vehicle-trips per day during the construction phase
 - The number of employees at WGS will not appreciably increase

The letter to DPP will also be copied to SHPD.