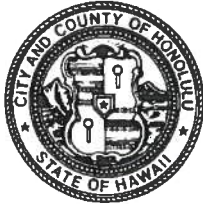


DEPARTMENT OF ENVIRONMENTAL SERVICES
CITY AND COUNTY OF HONOLULU
DIVISION OF REFUSE COLLECTION AND DISPOSAL
1000 ULUOHIA STREET, SUITE 201, KAPOLEI, HAWAII 96707
TELEPHONE: (808) 768-3401 • FAX: (808) 768-3434 • WEBSITE: <http://envhonolulu.org>

PETER B. CARLISLE
MAYOR



TIMOTHY E. STEINBERGER, P.E.
DIRECTOR

SILVESTRE L. ULEP, P.E.
INTERIM ASSISTANT CHIEF

IN REPLY REFER TO:
RH-12-020

March 28, 2012

FILE COPY

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

APR 23 2012

DEPT. OF ENVIRONMENTAL
QUALITY CONTROL

12 APR -5 P 3:08

RECEIVED

Dear Mr. Hooser:

Subject: Draft Environmental Assessment for Solid
Waste-to-Energy Truck Receiving Station, Sewage Sludge

The Department of Environmental Services (ENV) reviewed the Draft Environmental Assessment (DEA) for the subject project, and anticipates a Finding of No Significant Impact. Please publish notice in the next available Office of Environmental Quality Control (OEQC) Environmental Notice.

We have enclosed a completed OEQC Publication Form, and one (1) hard copy and a CD in pdf format of the DEA. Please contact Ahmad Sadri at 768-5453 or e-mail him at asadri@honolulu.gov, if you have any questions.

Sincerely,


Timothy E. Steinberger, P.E.
Director

Enclosures

Project Name: SOLID WASTE TO ENERGY TRUCK RECEIVING STATION FOR SEWAGE SLUDGE

**Publication Form
The Environmental Notice
Office of Environmental Quality Control**

Instructions: Please submit one hardcopy of the document along a with determination letter from the agency. On a compact disk, put an electronic copy of this publication form in MS Word and a PDF of the EA or EIS. Please make sure that your PDF documents are ADA compliant. Mahalo.

Applicable Law: HRS Ch. 343
Type of Document: Draft Environmental Assessment
Island: Oahu
District: Ewa
TMK: 9-1-026-030 H-POWER
Permits Required: State Department of Health Solid Waste and Air permits
Applicant or Proposing Agency: ENV-Refuse-HPOWER
Address 91-174 Hanua St. Kapolei, HI 96707
Contact & Phone Stephen F. Langham, PE; 808-768-5455
Approving Agency/ Accepting Authority: City and County of Honolulu Environmental Services Department (ENV)
Address 1000 Uluohia St. Suite 308 Kapolei HI 96707
Contact & Phone Timothy E. Steinberger, PE; 808-768-3486
Consultant: Same as Proposing Agency

Project Summary: The Solid Waste to Energy Truck Receiving Station for Sewage Sludge is proposed to provide the H-POWER Expansion Project the ability to accept and process dewatered sewage sludge for final disposal. The truck receiving station will be located on the H-POWER site and consists of a receiving bin, pumps, and distribution header for the transfer of sludge into the boiler at H-POWER Expansion.

The proposed action will comply with all permits that have been secured for the H-POWER Expansion Project. The project will not change emission requirements and will employ the Maximum Achievable Control Technology (MACT compliance) as exists in the industry for control of air emissions and hazardous air pollutants as required by the Clean Air Act. Odor control systems will be utilized to manage odors from the sludge receiving, storage and processing.

Traffic and roadway impacts will be minimal with only slightly increased traffic counts. There are no further impacts including cultural, noise, visual, socioeconomic, solid waste, energy or human health that do not already exist.

Based on the significance criteria set forth in HAR, Title 11, Chapter 200, Environmental Impact Statement Rules, the proposed action is not anticipated to result in significant environmental impacts. In fact, the proposed action is anticipated to result in significant benefits, including increased landfill diversion and energy recovery.

The recommended preliminary determination for the proposed project is a Finding of No Significant Impact (FONSI).

DRAFT ENVIRONMENTAL ASSESSMENT

**SOLID WASTE TO ENERGY
TRUCK RECEIVING STATION FOR SEWAGE SLUDGE**

Campbell Industrial Park, Kapolei, Hawaii

Proposing Agency:

City and County of Honolulu
Department of Environmental Services
Refuse Division
1000 Uluohia Street, Suite 201
Kapolei, Hawaii 96707

April 2012

DRAFT ENVIRONMENTAL ASSESSMENT
SOLID WASTE TO ENERGY
TRUCK RECEIVING STATION FOR SEWAGE SLUDGE

Draft and Final Environmental Assessment Checklist

FOR OEQC USE ONLY

Date Received:
Date of Publication:
Draft EA Comment Deadline:
Draft EA Place in Public Library:

Project Name: SOLID WASTE TO ENERGY TRUCK RECEIVING STATION FOR SEWAGE SLUDGE

Draft Environmental Assessment

Conditions Which Triggered Ch. 343, HRS, EIS Law. Check All That Apply:

Applicable sections (check all that apply):

- | | |
|---|--|
| <input checked="" type="checkbox"/> use of state or county lands or funds | <input type="checkbox"/> use of land in the Waikiki district |
| <input type="checkbox"/> use of conservation district lands | <input type="checkbox"/> amendment to county general plan |
| <input type="checkbox"/> use within shoreline setback area | <input type="checkbox"/> reclassification of conservation lands |
| <input type="checkbox"/> use of historic site or district | <input type="checkbox"/> construction or modification of helicopter facilities |
| <input checked="" type="checkbox"/> wastewater facility, waste-to-energy facility, landfill, oil refinery, or power-generating facility | |

Content Requirements; Draft EA (see Sec. 11-200-10 thru 13, HAR)

- Agency submittal letter and anticipated determination
- Identification of applicant or proposing agency
- Identification of approving agency
- Identification of agencies, citizen groups, and individuals consulted in making the assessment
- General description of the action's technical, economic, social, and environmental characteristics; time frame; funding source
- Summary description of the affected environment, including suitable and adequate regional, location and site maps such as Flood Insurance Rate Maps, Floodway Boundary Maps, or United States Geological Survey topographic maps
- Impacts to cultural practices and resources, past and current (Act 50, 2000)
- Identification and summary of impacts and proposed mitigation measures
- Alternatives considered
- Discussion of findings and reasons supporting the agency anticipated determination
- List of all required permits and approvals (State, federal, county), if any
- Written comments and responses to the comments under the early consultation under HAR 11-200-9(a)(1), 11-200-9(b)(1), or 11-200-15.

DRAFT ENVIRONMENTAL ASSESSMENT
SOLID WASTE TO ENERGY
TRUCK RECEIVING STATION FOR SEWAGE SLUDGE

**Final Environmental Assessment
Finding of No Significant Impact (FONSI)**

- ___ Agency submittal letter
- ___ Agency determination
- ___ Discussion of findings and reasons supporting the agency determination
- ___ Written comments and responses to the comments under the statutorily prescribed public review periods

DRAFT ENVIRONMENTAL ASSESSMENT
SOLID WASTE TO ENERGY
TRUCK RECEIVING STATION FOR SEWAGE SLUDGE

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DRAFT ENVIRONMENTAL ASSESSMENT
SOLID WASTE TO ENERGY
TRUCK RECEIVING STATION FOR SEWAGE SLUDGE

SUMMARY

1. **APPLICANT:** City and County of Honolulu
Environmental Services Department
Refuse Division
1000 Uluohia Street, Suite 201
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2. **APPROVING AGENCY** City and County of Honolulu
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3. **ANTICIPATED
DETERMINATION** FONSI (Finding of No Significant Impact)

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DRAFT ENVIRONMENTAL ASSESSMENT
SOLID WASTE TO ENERGY
TRUCK RECEIVING STATION FOR SEWAGE SLUDGE

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DRAFT ENVIRONMENTAL ASSESSMENT
SOLID WASTE TO ENERGY
TRUCK RECEIVING STATION FOR SEWAGE SLUDGE

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Pacific Islands Fish and Wildlife Office
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Program Administrator
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Honolulu, HI 96813

DRAFT ENVIRONMENTAL ASSESSMENT
SOLID WASTE TO ENERGY
TRUCK RECEIVING STATION FOR SEWAGE SLUDGE

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Kapolei, HI 96707

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DRAFT ENVIRONMENTAL ASSESSMENT
SOLID WASTE TO ENERGY
TRUCK RECEIVING STATION FOR SEWAGE SLUDGE

Neighborhood Board #34
Makakilo-Kapolei
George Yamamoto
92-1539 Aliinui Dr.
Kapolei, HI 96707

- | | | |
|----|---------------------------------|-----------------------------|
| 5. | <u>TAX MAP KEY NUMBERS:</u> | (1)9-1-026-030 H-POWER |
| 6. | <u>PROPERTY OWNER:</u> | City and County of Honolulu |
| 7. | <u>LAND USE CLASSIFICATION:</u> | I-2 Intensive Industrial |
| 8. | <u>SPECIAL DESIGNATION:</u> | None |

DRAFT ENVIRONMENTAL ASSESSMENT
SOLID WASTE TO ENERGY
TRUCK RECEIVING STATION FOR SEWAGE SLUDGE

Summary Project Description

The Solid Waste to Energy Truck Receiving Station for Sewage Sludge is proposed to provide the H-POWER Expansion Project the ability to accept and process dewatered sewage sludge for final disposal.

The truck receiving station will be located on the H-POWER site as shown in Figure S1 and consists of a receiving bin, pumps, and distribution header for the transfer of sludge into the boiler at H-POWER Expansion. Sludge is loaded onto roll-off bins at the treatment plants and trucked to the receiving station. Solids are discharged into the receiving station bin from the tipping floor. Pumps below the bin transfer the sludge directly into the boiler. Pumping rate is controlled to maintain an appropriate mix of solid waste and sludge.

The ability to accept and dispose of sewage sludge at H-POWER will provide the City and County of Honolulu with necessary redundancy considering that the No Action Alternative would leave the City at risk for sludge disposal when the landfill is not available and at risk for anaerobic digestion failure at Sand Island WWTP.

The proposed action will comply with all permits that have been secured for the H-POWER Expansion Project, including the Solid Waste Management Permit and the Covered Source/PSD Air Permit, both issued by the State Department of Health. The project will not change emission requirements and will employ the Maximum Achievable Control Technology (MACT compliance) as exists in the industry for control of air emissions and hazardous air pollutants as required by the Clean Air Act. Odor control systems will be utilized to manage odors from the sludge receiving, storage and processing. Measures include control of odor releases through air management systems and the use of odor control systems.

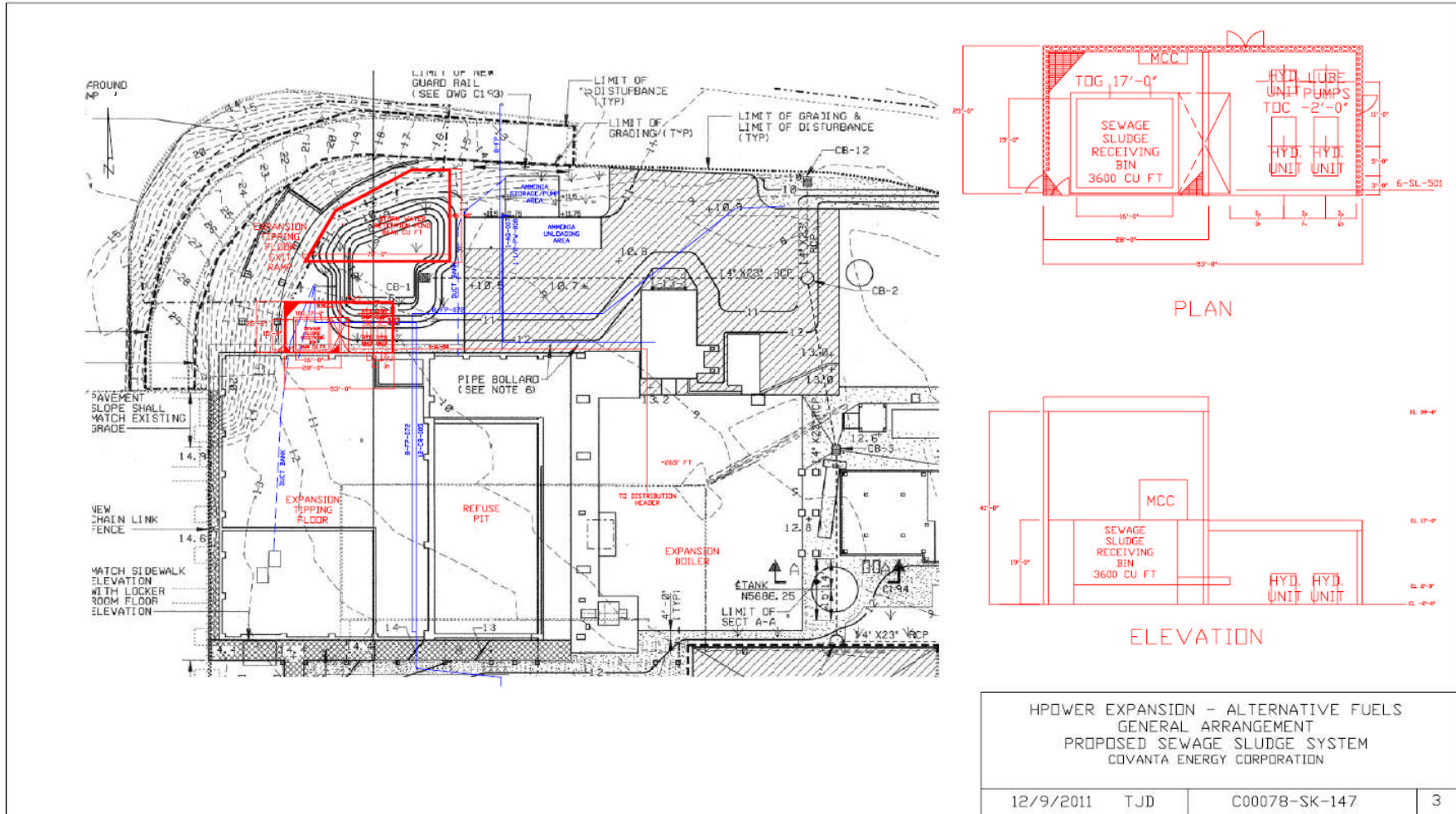
Traffic and roadway impacts will be minimal with only slightly increased traffic counts. There are no further impacts including cultural, noise, visual, socioeconomic, solid waste, energy or human health that do not already exist.

Based on the significance criteria set forth in HAR, Title 11, Chapter 200, Environmental Impact Statement Rules, the proposed action is not anticipated to result in significant environmental impacts. In fact, the proposed action is anticipated to result in significant benefits, including increased landfill diversion and energy recovery.

The recommended preliminary determination for the proposed project is a Finding of No Significant Impact (FONSI).

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 SOLID WASTE TO ENERGY
 TRUCK RECEIVING STATION FOR SEWAGE SLUDGE

Figure S1: Proposed Receiving Station Layout



Section 1 - General Description

1.1 Technical Characteristics

The H-POWER Expansion Facility is a large mass burn Municipal Waste Combustor (MWC) unit that is being added to the existing H-POWER Facility. The H-POWER Expansion unit will process Municipal Solid Waste (MSW), as-received, and will process certain other solid wastes including municipal raw and dewatered sludge (sludge). The MSW will be stored in a three day capacity storage pit and will be charged by two large refuse cranes into the mass-burn unit feed chute. Sludge will be processed at a rate up to ten percent of the thermal capacity utilizing a separate delivery, storage and charging means as noted below. The sludge will be injected into the refuse feed chute through a series of injection nozzles just prior to where the MSW is introduced to the charging ram and combustion grate. The sludge injection nozzles will be controlled with a valved system to allow the sludge to be blended throughout the feed chute and introduced in a manner that will allow for complete burnout of the sludge. In this manner, the feed rate will be controlled and sludge will be distributed allowing for more stable and consistent operation.

The MSW and sludge will be charged together onto the combustion grate by the charging ram. The ram will allow metered control of the feedstock for a consistent heat release. The grate system is a Martin reverse reciprocating inclined grate with drying, combustion, and burn out zones. In total, five combustion zones are provided each with its own underfire combustion air control system. As the mixed MSW and sludge moves down the inclined grate, movable grate bars push the solid waste backward and upward promoting through mixing and exposure of the material to the combustion air resulting in very complete burnout to ash and residuals. The remaining ash and residuals are held on the grate by the clinker roll. As the clinker roll slowly turns, the ash and residue fall into one of two ash extractor quench basins. Hydraulic rams push the quenched ash and residue out of the basins up dewatering inclined chutes where the material will drop onto the residue conveyor. The recoverable metal will be separated from the ash in the residue system.

The hot flue gas products of combustion will rise in the furnace and boiler producing steam from the energy released. The steam will be used to drive a steam turbine generator to produce electricity.

The flue gas will first be controlled for nitrogen oxide emissions (NO_x) utilizing Covanta's VLN™ system within the boiler. After the gases pass through the economizer they will enter into a three head rotary atomizer spray dryer absorber (SDA) where lime slurry will quench the gases and allow lime to react with sulfur dioxide (SO₂), hydrogen chloride (HCl), hydrogen fluoride (HF), and other trace acid gases. The spent lime and reaction products will be carried in the flue gas with the fly ash to

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the H-POWER Expansion facility baghouse or fabric filter. The baghouse is a large pulse jet particulate collection device that will capture and remove the particulate and spent SDA reaction products from the flue gas stream. Activated carbon injection will be used to control mercury and certain organic compounds such as dioxins and furans (dioxins). The activated carbon is injected into the flue gas stream as a fine powder and the mercury and dioxins are absorbed onto the surface of the carbon particles. The carbon particles are then captured in the baghouse, effectively controlling these emissions.

In order to accommodate sludge processing at H-POWER Expansion, as noted in the Truck Receiving Station description below, a sludge pumping and feed control system is needed to deliver the sludge to the unit. No other significant equipment changes are required for the facility.

Combustion of sludge may impact the uncontrolled emissions slightly. Since the quantity of sludge is limited to ten percent of the mass throughput at 30% solids, these impacts are manageable for the existing air pollution control (APC) devices. NO_x emissions might increase slightly. This may mean a slight increase in aqueous ammonia consumption but within the design of the existing system. Historically municipal sludge has had some heavy metals such as mercury. Due to better general knowledge and management practices at facilities such as dental, medical, and auto repair facilities heavy metals levels in sludge have generally decreased. The activated carbon injection system is sized to allow for any anticipated impacts. Slight impacts to the acid gas emissions (SO₂ or HCl) and particulate emissions also are within the operation range of the APC systems provided. The H-POWER Expansion unit will still achieve the emission performance required under current regulations and its permit.

Truck Receiving Station

The truck receiving station for sewage sludge consists of a receiving bin, pumps, and distribution header for the transfer of dewatered municipal wastewater sludge into the boiler at H-POWER Expansion. Dewatered sludge is loaded onto roll-off bins at the treatment plants and trucked to the receiving station. Solids are discharged into the receiving station bin from the tipping floor. Pumps below the bin transfer the sludge directly into the boiler. Pumping rate is controlled to maintain an appropriate mix of solid waste and sludge.

The receiving station bin and pumps as selected for H-POWER Expansion are manufactured and provided by Schwing Bioset. The station consists of the following:

1. Receiving storage bin: carbon steel, ¼" plate, 15' wide x 16' long x 15' sidewall height. All steel will be coated with epoxy paint. The bin will be shop fabricated and fitted, then broken down for shipment. On-site erection requires field welding and painting.

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The receiving bin is top equipped with a bar screen spaced 12" on center located approximately 1' below the top of the bin sidewall. The grating prevents large objects from falling onto the live bottom augers and pumps.

The top of the bin is covered with a hydraulically actuated bi-fold door and hatch for odor containment.

2. The live bottom below the storage bin consists of twin auger screw feeders designed to convey sludge from the bin into the piston pumps.

The augers are powered by a hydraulic unit, Model 110L with a 30 gallon fluid reservoir and 10 hp gear pump.

3. The two KSP 12V(HD)L piston pumps are hydraulically driven, twin-cylinder, reciprocating piston type specifically designed to pump sewage sludge. Each pump has a flow capacity of 25 gpm at 1000 psi. The pumps connect to the discharge pipe with a 6" 600 lb flange. Sludge flow is calculated using the cylinder filling efficiency and stroke count. Instantaneous pumping rate is reported in gpm and the total accumulated pumped volume for the previous 24 hours is reported in gallons.

Two hydraulic power units, Model 440L, have a 115 gallon fluid reservoir and a 60 hp gear pump.

4. Because of the high pressures associated with sludge pumping, two pipeline lubrication systems are installed in the pipeline to the boiler. Water injected at multiple points around the pipeline form a boundary layer that reduces the friction and the discharge pressure on the pumps. The systems consist of a high pressure triplex plunger pump (2 hp) that delivers 66 gal/hr (adjustable) at 1200 psi.
5. The discharge pipeline is carbon steel with 600 lb flanges.
6. A manifold at the boiler distributes the sludge at multiple points. Full port Class 600 trunnion mounted ball valves are rated for 1200 psi working pressure. Electric actuators control the distribution of sludge with one valve being open at all times. Manual hand wheel operators can be used in an emergency to close any of the valves.

The receiving station is located on the ground outside of the tipping floor on the east side of the building, see Figure 1. The top of the receiving bin is flush with the tipping floor. Installation will require an opening in the wall of the tipping floor with a rollup door. Installation will also require reconfigure of the storm water retention pond to the east

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with the same storage volume. Power and water for the receiving station are located in the same general area.

1.2 Odor Control

Some odors will be released when the bin doors are open and trucks unload the sludge into the bin. Unloading should require less than 15 minutes per truck. The storage bin doors will be closed except during the period when trucks unload into the top of the bin. There will be an odor control system that will draw air from the sewage sludge building and from the sewage sludge receiving bin. After this air is scrubbed through bio-towers it will be exhausted into the atmosphere.

1.3 Traffic and Roadways

The impact of sludge processing on traffic and roadways is very minimal. The Final Environmental Impact Statement for the H-POWER Expansion demonstrated that the incremental impacts for the H-POWER Expansion were limited. Truck growth was projected to be fifteen percent and would not significantly degrade the level of service (LOS). Sludge processing is expected to only increase traffic by ten or few trucks per day. This is a very small increase in the number of trucks. No additional facility operators and thus no additional cars are anticipated. On site the addition of another inbound scale and planned additional inbound traffic lanes will improve traffic flow. These improvements are expected to more than offset the potential impacts of the extra traffic and maneuvering required on the Expansion tipping floor.

1.4 Funding/Source

The estimated capital budget for the project is \$10M. The City and County of Honolulu has programmed the construction funds in the proposed FY-2013 Capital Improvements budget.

Section 2 – Summary Description of Existing Environment

2.1 Description of the Property

The Project is proposed to occur on the existing H-POWER parcel. That site consists of 24.635 acres (1,073,100 ft²) of industrially zoned and developed property situated within the James Campbell Industrial Park, JCIP, in Kapolei and is included in the Long Range Master Plan for the Kapolei area. Figure 2.1-1 depicts both the Master Plan and the JCIP. The parcel's Tax Map Key number is # (1)9-1-026:030. Figure 2.1-2 depicts the site location on a USGS topographic map and shows the major roadways in the vicinity of the existing H-POWER facility. Due to the site's existing industrial nature, there are no designated environmental site constraints on the parcel. Additional detailed information on the site is presented within this EA.

2.2 Surrounding Land Uses and Zoning

Figure 2.2-1 is an aerial photograph showing the existing industrial nature of the site and the surroundings within 1-mile of the H-POWER site. As can be seen from the aerial photograph, the surrounding land uses are predominantly industrial in nature. To better illustrate the occupants of neighboring parcels, Table 2.2-2 identifies surrounding land uses and their direction relative to H-POWER.

Table 2.2-1: Neighboring JCIP Lots and their Direction Relative to Parcel 30

Direction Relative to Parcel 30	Neighbor
North	Chevron, HECO
South	AES
East	HECO
West	City and County of Honolulu

The JCIP, and most of the area within 1 mile of the site, is zoned 1-2 Intensive, as shown on Figure 2.2-3 Zoning. Under Chapter 21 - Land Use Ordinance (LUO), waste disposal and processing are allowed under a Conditional Use Permit - minor and subject to the Specific Use Development Standards identified in Article 5 of the Ordinance. Although the H-POWER facility is an existing use, alterations, additions, or modifications require a permit. H-POWER will comply with the requirements of the Conditional Use Permit, as well as other federal, state, and local permits and approvals. Each of the required permits and approvals is addressed in this EA.

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 SOLID WASTE TO ENERGY
 TRUCK RECEIVING STATION FOR SEWAGE SLUDGE



Figure 2.1-1: Long-Range Master Plan for the Kapolei Area (http://www.kapolei.com/master_plan.cfm)

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SOLID WASTE TO ENERGY
TRUCK RECEIVING STATION FOR SEWAGE SLUDGE

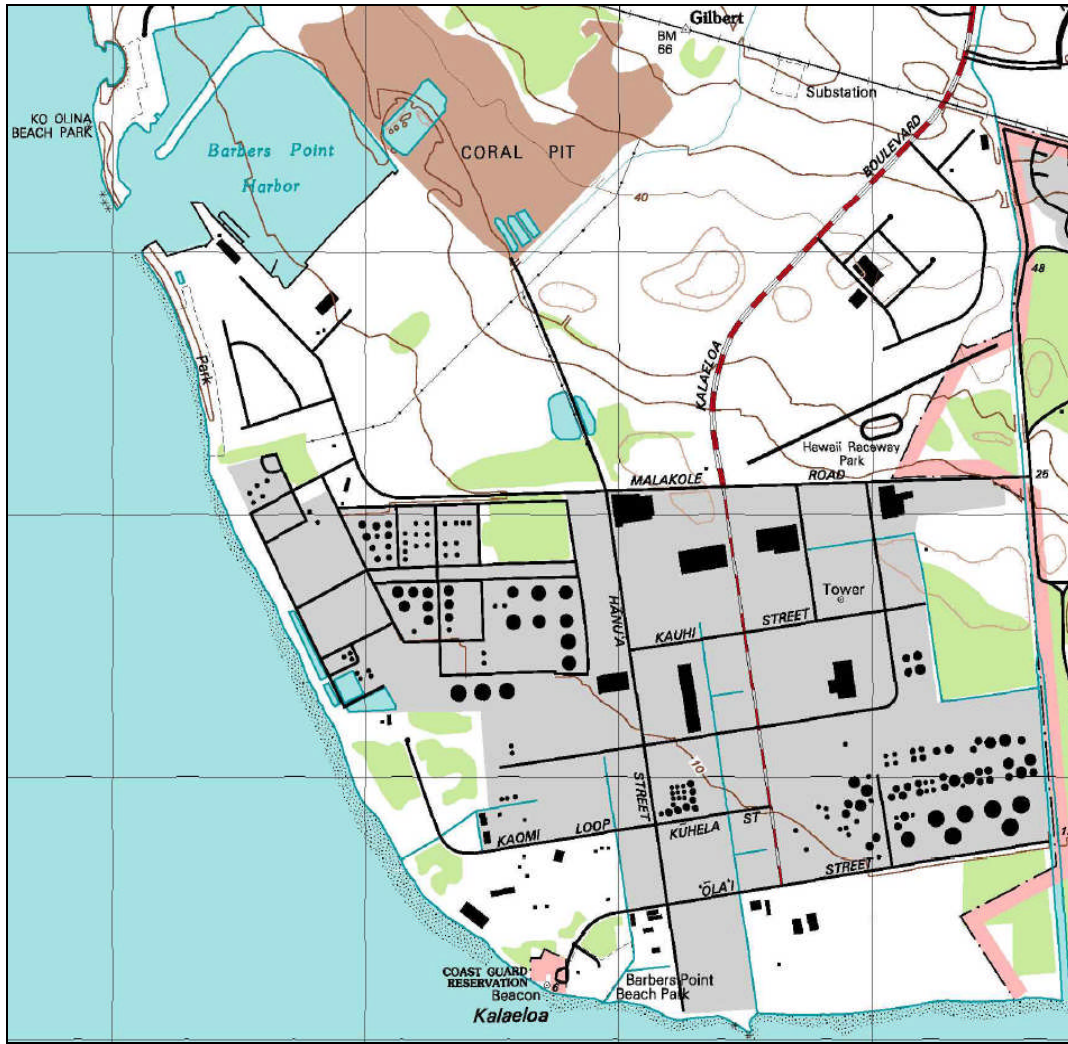


Figure 2.1-2: USGS Topographic Map (UTM NAD83, Zone N, 2000)

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Figure 2.2-1: Satellite imagery of JCIP area

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2.3 Existing Conditions - Geology and Soils

This section discusses the existing geologic environment. Baseline conditions are presented in the context of prior site work that has impacted original conditions on Parcel 30.

The Hawaiian Islands are the exposed parts of the Hawaiian Ridge, a large volcanic mountain range extending northwestward across the central Pacific Ocean (USGS 1999). The island of O'ahu is the eroded remnant of two volcanoes – the older Waianae Volcano in the west and the larger Koolau Volcano in the east. Clastic sedimentary deposits, which primarily are alluvium derived from erosion of the volcanic rocks, have accumulated on the flanks of the island. In some places, the clastic sediments are interbedded with coralline limestone that formed as reef deposits in shallow marine waters. O'ahu has larger areas of sedimentary deposits than any other Hawaiian island and these deposits contain coralline limestone in coastal areas (USGS 1999).

Parcel 30 is situated within the JCIP in Kapolei, Hawaii. This area is underlain by the 'Ewa Plain, which is an emerged coral-algae limestone reef formed during the Pleistocene period when the ocean level was at higher elevation (C.E. Maguire 1986). The 'Ewa Plain extends from sea level at the coastline to approximately 3 to 5 miles inland. Figure 2.3-1, excerpted from a 1986 geotechnical report by C.E. Maguire, presents the extent of the emerged reef deposits on the island of O'ahu and specifically in the project area. The following local and site specific information is in large measure excerpted from that 1986 final geotechnical report conducted for H-POWER facility.

The local geology is typical of mid-Pacific volcanic islands in that the central volcanic core is surrounded and sometimes overlain by a coastal plain of interbedded marine sediments, alluvium, and coral reef formations. In the area of the proposed Bioconversion Facility site, on the basis of a projected dip slope of 5 degrees from the volcanic formation, this overlying coastal plain is estimated to be 600 to 800 feet thick (C.E. Maguire 1986). The coral reef deposits on-site in 1986 (pre-construction of H-POWER) were typical of those found throughout the Barbers Point area. The surficial layer typically consists of corals, calcareous algae, cemented beach sand, and cemented mixtures of coralline sand, gravel and coral fragments often termed "coral rock". This coral rock often contains cavities of various sizes and at various depths. The ground surface topography is termed "shallow karst" topography marked by small sink holes generally 0.5 to 3.0 feet in diameter and from approximately 3 to 10 feet deep, which have been dissolved out of the limestone by fresh rain water (C.E. Maguire 1986).

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Soil throughout the area, and underlying Parcel 30, is classified as Coral Outcrop by the United States Department of Agriculture (USDA) Soil Conservation Service (USDA SCS 1965). This soils data is mapped on Figure 2.3-2.

Prior to construction of the existing H-POWER facility, vegetation was cleared and grubbed in preparation for a proposed refinery project in 1969. Many of the site sinkholes in the area were loosely filled during the site clearing of 1969. In 1985 H-POWER was constructed in accordance with the site preparation and foundation recommendations developed by the geotechnical consultant, C.E. Maguire. Site preparation included initial site subgrade preparation, consisting of clearing, grubbing and stripping of soft silty organic topsoil from the site. Site preparation also consisted of repairing surface cavities and leveling the site. A systematic probing, breakdown and grouting of below surface voids proceeded where cavities were identified. General surface cavity repair was conducted. Proof rolling (with 100 ton vehicles) to detect cavities or weak areas was also conducted in roadways, important equipment areas and footing areas. In areas where excavation was required, heavy equipment was used, but blasting was not permitted due to possible damage to structures supporting coral rock. Thus extensive geologic excavation and the addition of structural fill and construction components have changed much of the native conditions once found on the H-POWER site and increased the site's suitability for construction.

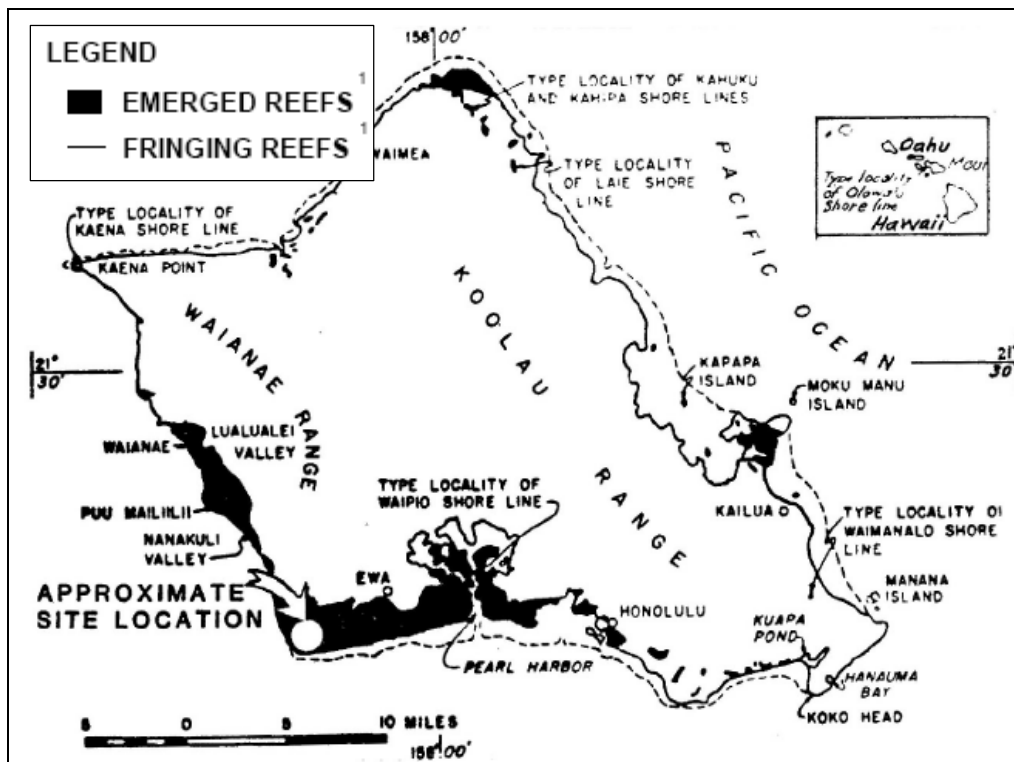
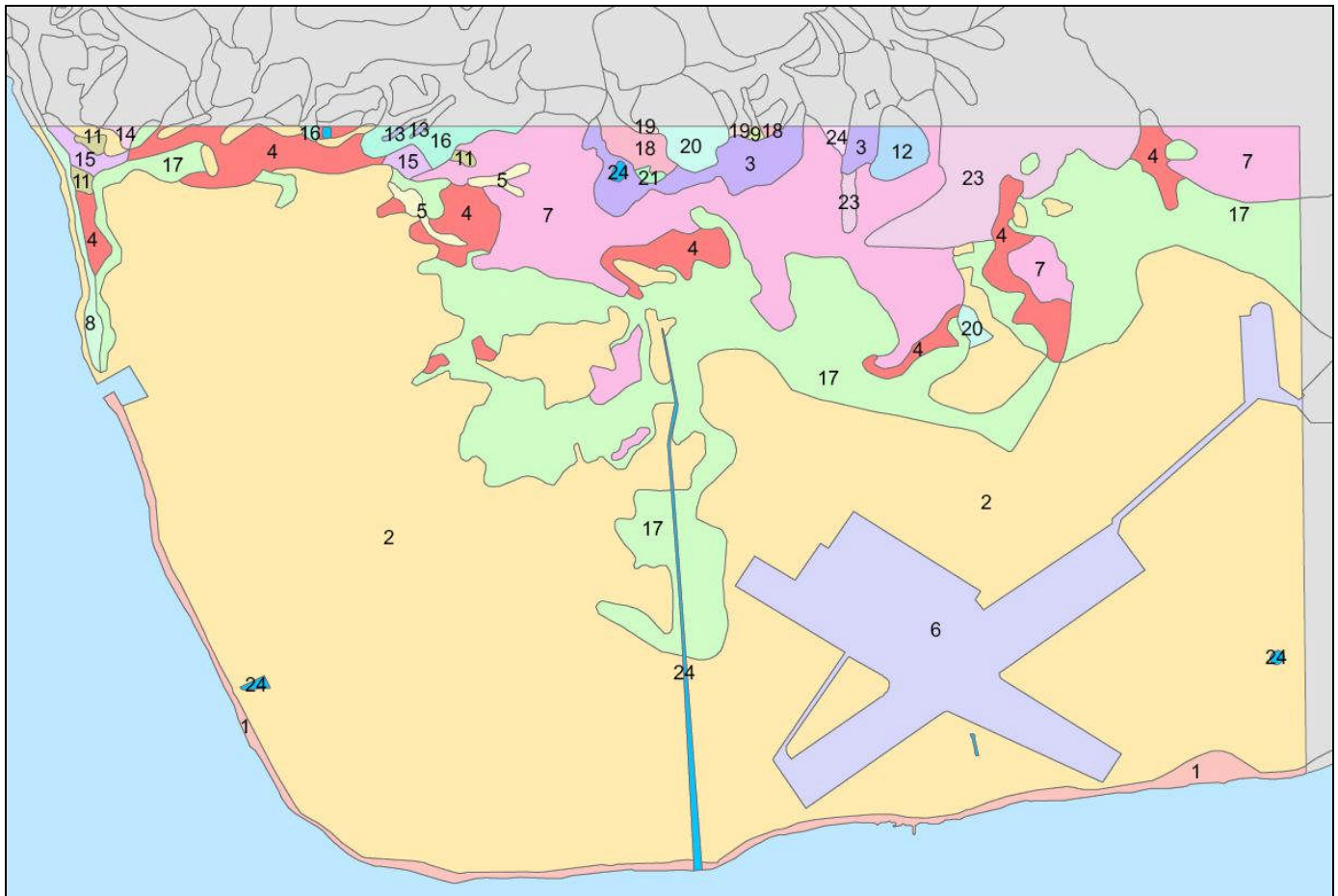


Figure 2.3-1: Emerged and Fringing Reefs of Oahu, ¹From "Geology of the Hawaiian Islands" (Stearns, 1969)

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LEGEND

NAME

1	BEACHES	16	LUALUALEI STONY CLAY, 2 TO 6 PERCENT SLOPES
2	CORAL OUTCROP	17	MAMALA STONY SILTY CLAY LOAM, 0 TO 12 PERCENT SLOPES
3	EWA SILTY CLAY LOAM, 3 TO 6 PERCENT SLOPES	18	MOLOKAI SILTY CLAY LOAM, 15 TO 25 PERCENT SLOPES
4	EWA SILTY CLAY LOAM, MODERATELY SHALLOW, 0 TO 2 PERCENT SLOPES	19	MOLOKAI SILTY CLAY LOAM, 7 TO 15 PERCENT SLOPES
5	EWA SILTY CLAY LOAM, MODERATELY SHALLOW, 2 TO 6 PERCENT SLOPES	20	QUARRY
6	FILL LAND, MIXED	21	STONY STEEP LAND
7	HONOULIULI CLAY, 0 TO 2 PERCENT SLOPES	22	WAIALUA SILTY CLAY, 0 TO 3 PERCENT SLOPES
8	JAUCA SAND, 0 TO 15 PERCENT SLOPES	23	WAIALUA STONY SILTY CLAY, 3 TO 8 PERCENT SLOPES
9	KAWAIHAPAI CLAY LOAM, 0 TO 2 PERCENT SLOPES	24	WATER > 40 ACRES
10	KEAAU CLAY, 0 TO 2 PERCENT SLOPES		
11	KEAAU STONY CLAY, 2 TO 6 PERCENT SLOPES		
12	LAHAINA SILTY CLAY, 7 TO 15 PERCENT SLOPES, SEVERELY ERODED		
13	LUALUALEI CLAY, 0 TO 2 PERCENT SLOPES		
14	LUALUALEI EXTREMELY STONY CLAY, 3 TO 35 PERCENT SLOPES		
15	LUALUALEI STONY CLAY, 0 TO 2 PERCENT SLOPES		

Figure 2.3-2: Generalized Soils (Soils Conservation Service, 1996; downloaded from Hawaii DPP, prepared by AMEC, 2008)

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2.4 Geologic Hazards

This Section identifies and analyzes the potential geologic hazards within O’ahu and more specifically, the JCIP. There are four potential geologic hazards in this region that are evaluated below:

- Subsidence, Settlement and Karst
- Seismic Ground Shaking (earthquake)
- Volcanic Activity
- Tsunami

Subsidence and Settlement

As noted in Section 2.3, Existing Conditions - Geology and Soils, the principal geologic hazard in the region consists of the “shallow karst” topography of this region. It is marked by small sink holes generally 0.5 to 3.0 feet in diameter and from approximately 3 to 10 feet deep, which have been dissolved out of the limestone by fresh rain water. Though previously cleared and grubbed, this shallow karst topography requires special construction measures to ensure the stability of foundations and to increase the load bearing capacity of the local soils. Engineering will ensure that the design and preparation of the site is appropriate and will prepare a geotechnical analysis if necessary.

Seismic Ground Shaking

The entire island of O’ahu is considered to be in Earthquake Hazard Zone 2A of the Uniform Building Code (UBC) seismic provisions (USGS 2001). This corresponds to a value of 0.075g to 0.15g, where g is gravitational force. The UBC seismic provisions contain six seismic zones, ranging from 0 (no chance of severe earthquake occurrence in a 50-year interval) to 4 (10 percent chance of severe earthquake occurrence in a 50-year interval).

The proposed action will be constructed in accordance with the construction standards and seismic provisions of the UBC for Hazard Zone 2A.

Volcanic Activity

The island of O’ahu was formed by two volcanoes, the Waianae Range on the west side of the island and the Koolau Range on the east. Both of these volcanoes are now extinct. The Waianae Range is approximately 2.95 to 3.8 million years old and the Koolau Range is approximately 1.8 to 2.7 million years old (Keinle and Wood 1990). However, there has been volcanic activity on the island of O’ahu since these two volcanoes have gone extinct. The Honolulu Volcanic Series consisted of over 30 separate eruptions ranging from

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approximately 850,000 to 32,000 years ago (Abbott et. al. 1983). Although there has not been any volcanic activity on the island of O'ahu for over 30,000 years, there is a very slight possibility of future volcanic activity on O'ahu.

Tsunami

As quoted from the Honolulu City and County, Department of Emergency Management web site:

Tsunamis (pronounced tsoo-nah'-mee), or seismic sea waves, potentially the most catastrophic of all ocean waves, are generated by tectonic displacement--for example, volcanism, landslides, or earthquakes--of the seafloor, which in turn cause a sudden displacement of the water above and the formation of a small group of water waves having wavelength equal to the water depth (up to several thousand meters) at the point of origin. These waves can travel radially outward for thousands of kilometers while retaining substantial energy. Their speed--characteristic of gravity waves in shallow water and thus equal to the square root of gD , where g is the gravitational constant and D is the depth--is generally about 500 km/h (300 mph), and their periods range from 5 to 60 minutes. In the open ocean their amplitude is usually less than 1 m (3.3 ft); thus tsunamis often go unnoticed by ships at sea. In very shallow water, however, they undergo the same type of increase in amplitude as swell approaching a beach. The resultant waves can be devastating to low-lying coastal areas; the 37-m (120-ft.) waves from the 1883 Krakatoa eruption, for example, killed 36,000 people.

The characteristics of tsunamis as they approach shore are greatly affected by wave refraction over the local bathymetry. Tsunami-producing earthquakes usually exceed 6.5 on the Richter scale, and most tsunamis occur in the Pacific Ocean because of the seismic activity around its perimeter. A tsunami warning system for the Pacific Ocean has been established; it consists of strategically placed seismic stations and a communications network. (Department of Emergency Management, 2009)

Figure 2.4-1 depicts the Department of Emergency Management's Tsunami Evacuation Zone for Kahe Point to 'Ewa Beach. The evacuation zone does not include Parcel 30.

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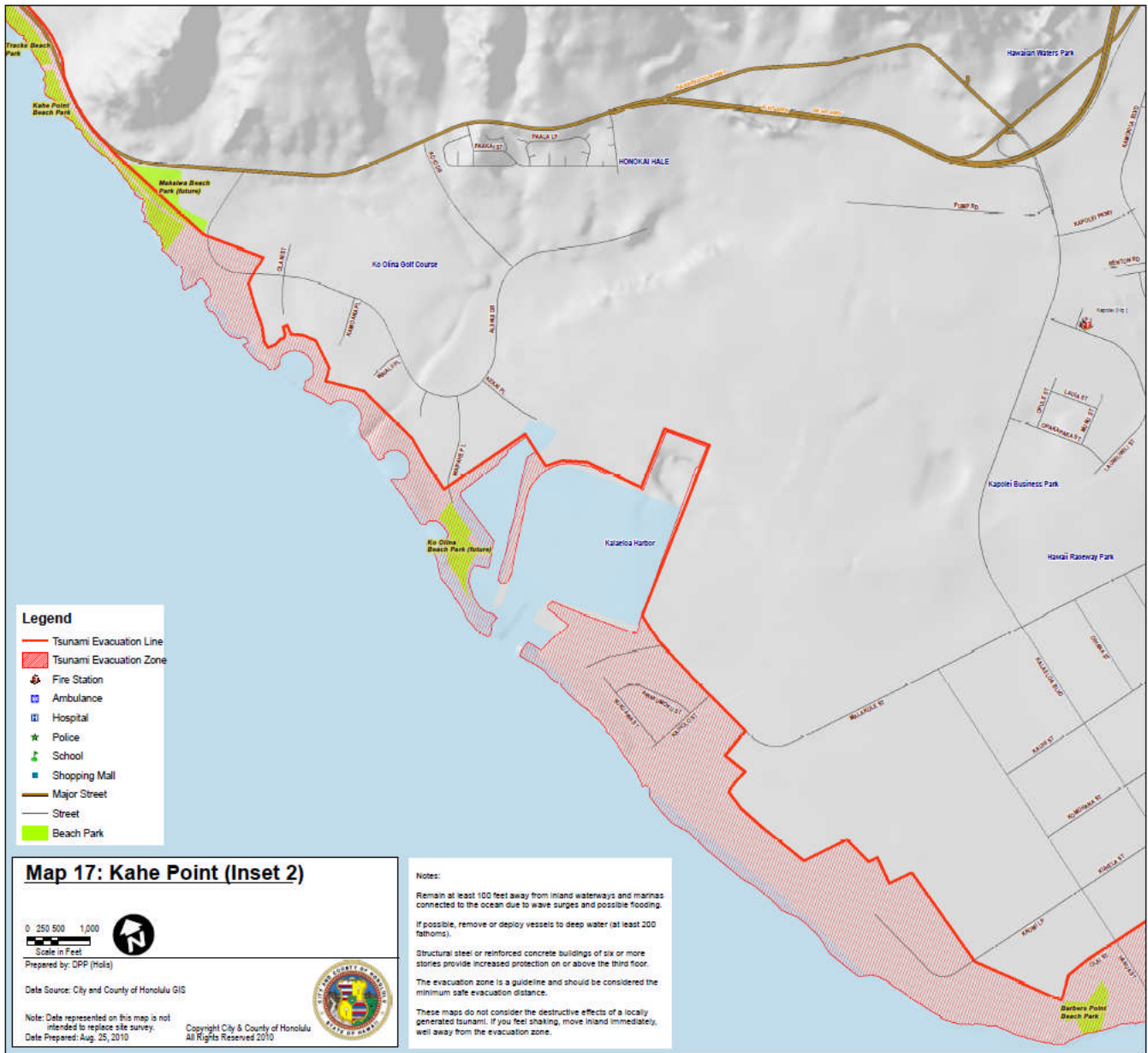


Figure 2.4-1: Tsunami Evacuation Zones

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2.5 Climate and Air Quality

This section discusses the existing climate and air quality of Parcel 30 and the potential impacts of the proposed action.

According to the National Weather Service (NWS) Forecast Office in Honolulu, the climate of Hawaii is characterized by mild temperatures throughout the year, moderate humidity, persistence of northeasterly trade winds, infrequent severe storms but significant differences in rainfall amounts within short distances. When the northeasterly trade winds are weak, onshore, thermally driven sea breeze flows can develop on the normally leeward shores of O'ahu. The resulting southerly winds are referred to as "Kona winds".

The presence of mountains is important as they can obstruct and deflect the prevailing winds directions, and produce local drainage flows at night and upslope flows during the day. The importance of these local flows diminishes rapidly with distance from significant terrain objects. Due to the distance from the mountains, the wind conditions in the vicinity of the JCIP are dominated by the northeast trade winds and to a lesser extent, the southwest Kona winds.

Wind Direction and Speed

From October 1, 1992 through September 30, 1993 a meteorological tower within JCIP gathered the hourly weather data at several levels. Figure 2.5-1 illustrates the windrose generated from the data collected during this period. Figure 2.5-1 illustrates that the prevailing wind is dominated by the northeasterly trade winds. In addition, these data also show that the average wind speed is approximately 3.78 m/s at 10 meters.

Rainfall

The rainfall recorded at the JCIP meteorological tower from October 1, 1992 through September 30, 1993 was 13.5 inches. The average rainfall recorded at the Honolulu NWS station over the 30-year period from 1971-2000 is 18.29 inches.

Temperature

The mean monthly temperature recorded at the JCIP station between October 1992 and September 1993 ranged from 70.16 degrees Fahrenheit to 78.3 degrees Fahrenheit, with an average of 74.6 degrees Fahrenheit. This compares well with the average monthly temperature recorded at the Honolulu NWS station between the 30-year period from 1961-1990, which is 77.2 degrees Fahrenheit.

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Air Quality

The area in the vicinity of JCIP is in attainment with the National Ambient Air Quality Standards (NAAQS) and the State Ambient Air Quality Standards (SAAQS) for the criteria air pollutants. Table 2.5-1 summarizes the maximum measured ambient air concentrations of criteria pollutants on O'ahu ambient air monitoring stations in 2006. Table 2.5-1 shows that, in general, the air quality on O'ahu is excellent.

Impacts and Mitigation

The flue gas produced from sludge combustion, along with all flue gas produced from combustion of municipal solid waste, will first be controlled for nitrogen oxide emissions (NOx) utilizing Covanta's VLN™ system within the boiler. After the gases pass through the economizer they will enter into a three head rotary atomizer spray dryer absorber (SDA) where lime slurry will quench the gases and allow lime to react with sulfur dioxide (SO₂), hydrogen chloride (HCl), hydrogen fluoride (HF), and other trace acid gases. The spent lime and reaction products will be carried in the flue gas with the fly ash to the H-POWER Expansion facility baghouse or fabric filter. The baghouse is a large pulse jet particulate collection device that will capture and remove the particulate and spent SDA reaction products from the flue gas stream. Activated carbon injection will be used to control mercury and certain organic compounds such as dioxins and furans (dioxins). The activated carbon is injected into the flue gas stream as a fine powder and the mercury and dioxins are absorbed onto the surface of the carbon particles. The carbon particles are then captured in the baghouse, effectively controlling these emissions.

Combustion of sludge may impact the uncontrolled emissions slightly. Since the quantity of sludge is limited to ten percent of the mass throughput at 30% solids, these impacts are manageable for the existing air pollution control (APC) devices. NOx emissions might increase slightly. This may mean a slight increase in aqueous ammonia consumption but within the design of the existing system. Historically municipal sludge has had some heavy metals such as mercury. Due to better general knowledge and management practices at facilities such as dental, medical, and auto repair facilities heavy metals levels in sludge have generally decreased. The activated carbon injection system is sized to allow for any anticipated impacts. Slight impacts to the acid gas emissions (SO₂ or HCl) and particulate emissions also are within the operation range of the APC systems provided. The H-POWER Expansion unit will still achieve the emission performance required under current regulations and its permit.

Some odors will be released when the bin doors are open and trucks unload the sludge into the bin. Unloading should require less than 15 minutes per truck. The storage bin doors will be closed except during the period when trucks unload

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into the top of the bin. There will be an odor control system that will draw air from the sewage sludge building and from the sewage sludge receiving bin. After this air is scrubbed through bio-towers it will be exhausted into the atmosphere.

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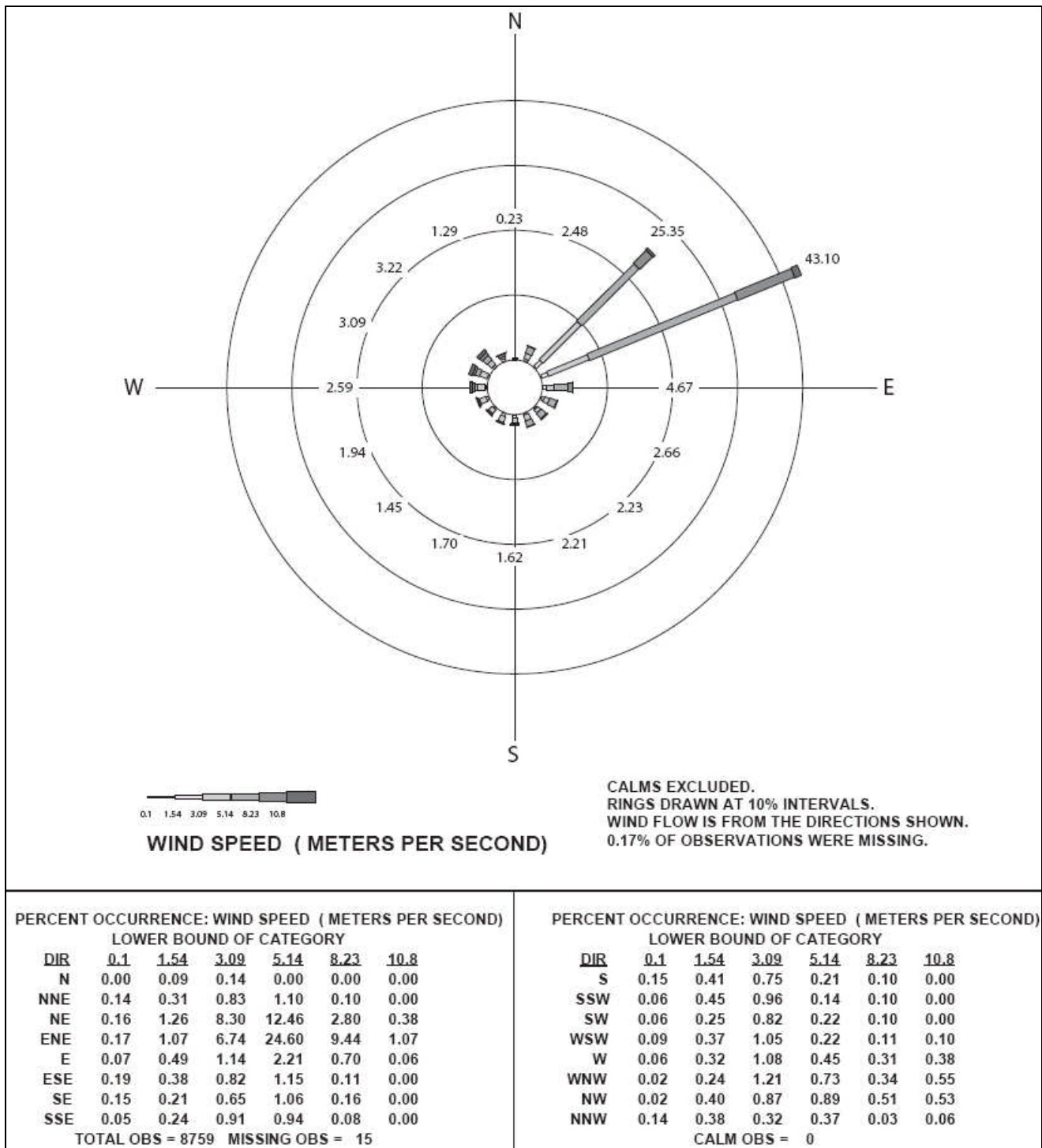


Figure 2.5-1: Joint Frequency Distribution for Raw Data File 64 M CIP (Prepared by AMEC, 2008)

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Table 2.5-1: Air Quality Data – O’ahu 2006 (prepared by AMEC)

Pollutant	Averaging Period	Maximum Concentration (ug/m ³)	Lesser of NAAQS/ SAAQS (ug/m ³)	% of Standard	HDOH Monitoring Station
SO ₂	3-Hr	62	1,300	5%	Makaiwa
SO ₂	24-Hr	17	365	5%	Makaiwa
SO ₂	Annual	5	80	6%	Kapolei
PM ₁₀	24-Hr	59	150	39%	Kapolei
PM ₁₀	Annual ⁽¹⁾	16	50	32%	Kapolei
PM _{2.5}	24-Hr	9	35	26%	Kapolei ⁽²⁾
PM _{2.5}	Annual	4	15	27%	Kapolei
NO ₂	Annual	9	70	13%	Kapolei
CO	1-Hr	1596	5,000	32%	Kapolei
CO	8-Hr	1183	10,000	12%	Kapolei
O ₃	8Hr	83	157	53%	Sand Island
Lead	quarterly	NA ⁽³⁾	1.5 ⁽⁴⁾	NA	NA

⁽¹⁾ The annual NAAQS has been revoked by USEPA.

⁽²⁾ Maximum 24-hr concentration was flagged by HDOH as being elevated due to New Year’s fireworks. Second highest value is shown.

⁽³⁾ Ambient air monitoring for lead in Hawaii was discontinued in October 1997 with USEPA approval.

⁽⁴⁾ USEPA signed the final rule to lower the lead NAAQS to 0.15 ug/m³ on a rolling 3-month basis on October 15, 2008. However, the final rule is not effective until 60 days after publication in the Federal Register.

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2.6 Surface Water

Baseline Surface Water Conditions

Surface waters for the Island of O‘ahu are classified by water quality standards established under Hawaii Administrative Rules, Title 11, Chapter 54 (HAR 11-54). The regulations categorize all State waters as either marine or inland. It is also important to note that “State Waters”, as defined by section 342D-1, HRS, exclude “...drainage ditches, ponds, and reservoirs required as part of a water pollution control system...” Figure 2.6-1 provides a broad overview map of the Water Quality Standards for the island. As can be seen from Figure 2.6-1, Parcel 35 is located within the defined hydrographic area IV and has an Inland (Water) Classification of Class 2. Class 1 waters are more heavily restricted, and it is the objective that Class 1 waters remain in their natural state as nearly as possible. The objective of Class 2 waters is defined as follows: “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 and propagation of fish, shellfish, and wildlife, and with recreation in and on these waters” (HAR 11-54-3).

Figure 2.6-1 also depicts the Marine Classifications and shows that Parcel 30 is located most proximate to Class A marine waters. Class AA marine waters are more heavily restricted, and it is the objective that these waters remain in their natural pristine state as nearly as possible. The objective of Class A waters is defined as follows: “It is the objective of Class A waters that their use for recreational purposes and aesthetic enjoyment be protected. Any other use shall be permitted as long as it is compatible with the protection and propagation of fish, shellfish, and wildlife, and with recreation in and on these waters” (HAR 11-54-3).

As noted earlier (Section 2.3), Parcel 30 is located on what is commonly referred to as the ‘Ewa Plain, an emerged coral-algae reef formed during the Pleistocene period when the ocean was at a higher level. The ‘Ewa Plain today is one of the driest areas on O‘ahu, so dry that it has commonly been characterized as “barren” and “desolate” and even referred to as a desert (Pacific Consultant Services Inc (PCSI), 2008). Site specific water resources are addressed below.

Proposed Action Site Surface Waters

As shown previously in Figure 2.1-2, there are no perennial or intermittent streams, tidal channels or springs located on Parcel 30. The H-POWER site is roughly 24.6 acres in size, or 1,071,576 square feet. Of that, approximately one-

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third, 357,192 square feet is not paved. The remaining area, 714,384 square feet consists of impervious surface area.

Other than the Pacific Ocean, the nearest surface waters are industrial holding ponds and industrial park drainage canals. These consist of: (1) A drainage canal abutting the southeast corner of the H-POWER site that extends south to the Pacific Ocean; (2) drainage canals that exist proximate to the Kaomi Loop bend, that drain to the Pacific Ocean; and (3) nearby holding ponds situated on the industrial Chevron property. Each of these surface waters can be seen on the previously provided Figure 2.1-2.

The proposed action's waste handling operations will take place indoors as described in Section 1 "General Description" to minimize exposure to the elements and for good housekeeping practice. H-POWER personnel are trained in Spill Prevention Countermeasure and Control annually which increases their awareness on the necessity to be careful in handling liquid materials around the proposed action.

The following section presents the system of pollution prevention measures that the H-POWER Expansion Project has been utilizing to (1) minimize pollutants in the project's stormwater discharges, (2) assure compliance with the terms and conditions of both construction and operational NPDES permits, and (3) attenuate peak stormwater runoff discharge rates.

Both structural and non-structural controls will be outlined. A brief summary of some of the controls and practices anticipated during construction, and upon completion, is provided below.

Construction Stormwater Management

To prevent sedimentation and erosion, one of the first steps in the construction process will be the installation of siltation barriers around the limit of work. The barriers will act as a boundary for the limit of work, minimizing intrusion into areas outside the construction zone. In addition, the barriers will collect sediment that may be transported from the construction area and will prevent sediment from leaving the site. The sedimentation barriers and absorbent material will remain in place throughout the construction effort. Routine inspections will be undertaken to ensure that their integrity is maintained, and to remove accumulated sediments following storm events. Details with regard to erosion and sediment control measures undertaken during construction will be included in the Construction Stormwater Pollution Control Plan (SWPCP) which will be prepared prior to construction. This document will outline the measures that will be followed to ensure minimal impact on water quality throughout the construction effort. These measures will remain in place until the site is stabilized.

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Post-Development Stormwater Management

An Operational SWPCP will be required for the project and will comply with stormwater quality standards. Once construction is finished and site stabilization is completed, the temporary construction siltation barriers will be removed. Stormwater runoff associated with the construction activity of the proposed Facility will require coverage under a General Permit for the entire acreage to be affected by these temporary construction impacts. A Notice of Intent (NOI) for coverage under the General Permit will be submitted for construction activities. This NOI will also include a construction site best management practices plan, timetables and nature of the activities proposed, and calculated stormwater runoff quantities for the affected area(s). The contents of the NOI will satisfy the requirements for the General Permit and will describe the measures that will minimize discharge of pollutants via storm water.

Designated Surface Water Resource Areas

A review of known or designated surface water features and coastal constraints was conducted, to determine proximity to potential resources of concern. These included coastal constraints as well as designated floodplains. Figure 2.6-2 depicts these designated areas with respect to Parcel 30.

Coastal Constraint Areas

Surface water constraints on O'ahu are shown on Figure 2.6-2 and are regulated by a variety of state and local agencies. The following is a brief summary of these designated coastal resource areas proximate to Parcel 30.

Coastal Zone

The entire Island of O'ahu is classified as within the Coastal Zone, as footnoted on Figure 2.6-2, with the exception of regulatory exemptions for federally owned lands. Though not mapped, Parcel 30 is within the Coastal Zone. The Hawaii Coastal Zone Management (CZM) Program (under the Department of Business, Economic Development & Tourism's Office of Planning) conducts CZM federal consistency review for certain types of projects.

Shoreline Setback Line

Parcel 30 is not within the Designated Shoreline Setback line, or the Shoreline Buffer Zone Line (Figure 2.6-2). The Designated Shoreline Setback and Buffer Zone Lines are each situated west of Kaomi Loop. The City and County of Honolulu DPP regulates activities within the Shoreline Setback Line.

Tsunami Evacuation Zone

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As described in Section 2.4, tsunamis pose a risk to many coastal areas on O‘ahu. Figure 2.4-1, shown previously, depicts the evacuation zone identified for this area of O‘ahu. The evacuation zones, developed by the National Oceanic and Atmospheric Administration (NOAA) in partnership with the State of Hawaii’s Civil Defense, do not include Parcel 30.

Floodplains

Parcel 30 is located outside of designated Special Flood Areas. Figure 2.6-2 depicts mapped Flood Area (DPP, 2004). A review of the most recent Federal Emergency Management Area (FEMA) Flood Insurance Rate Map (FIRM) was also conducted (FEMA 2008). The FIRM maps were not available in hard copy or electronic format. However, no change from the DPP electronic map data was observed in the project area. A copy of the 2004 FIRM is provided in Figure 2.6-3. Parcel 30 is outside of the designated Flood Hazard Zones. As shown on Figure 2.6-2 and confirmed on the FIRM map, the closest designated Flood Hazard Area is situated west of Kaomi Loop along the coast and is designated Zone AE, which is a flood insurance rate zone that correspond to the 1-percent annual chance floodplains that are determined in the Flood Insurance Study; mandatory flood insurance purchase requirements apply. According to the FIRM map, Parcel 30 is located in Flood Zone D, which is a zone where flood hazards are undetermined, but possible. The Flood Insurance Program does not have any regulations for developments within Flood Zone D.

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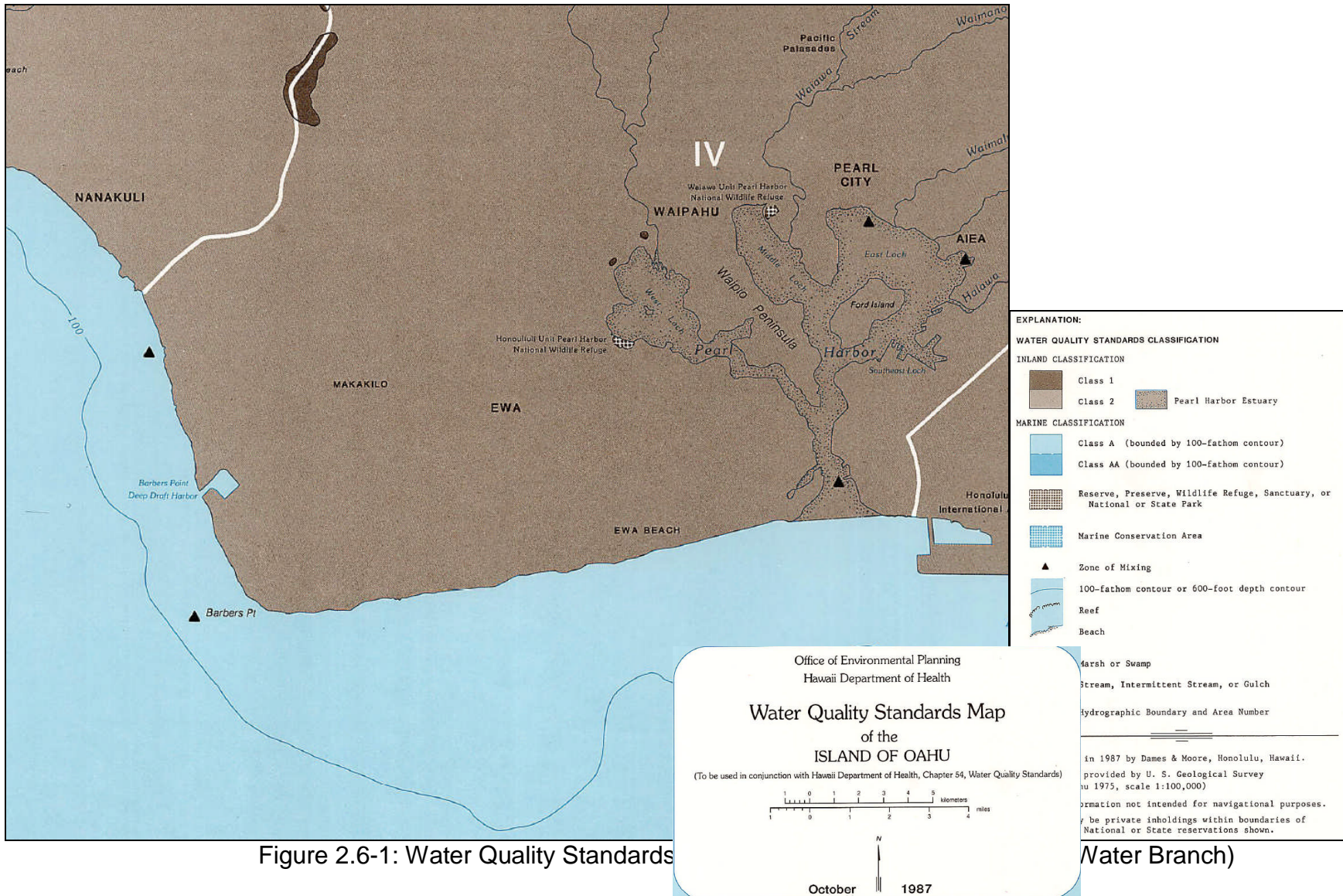


Figure 2.6-1: Water Quality Standards

(Water Branch)

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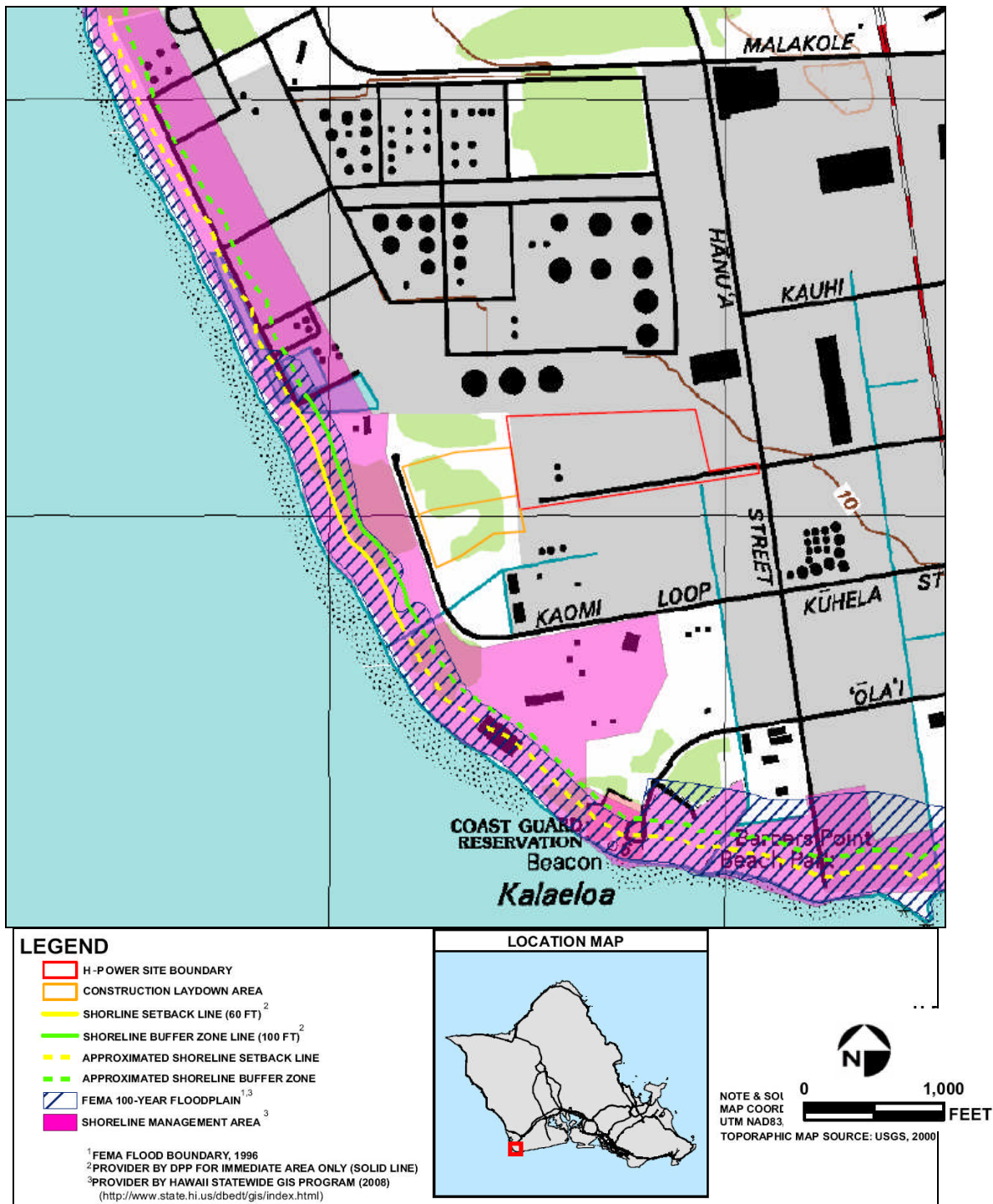


Figure 2.6-2: Surface Water Constraints Map (Prepared by AMEC, 2008)

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Figure 2.6-3: Flood Insurance Rate Map (FIRM) Effective 9/30/2004

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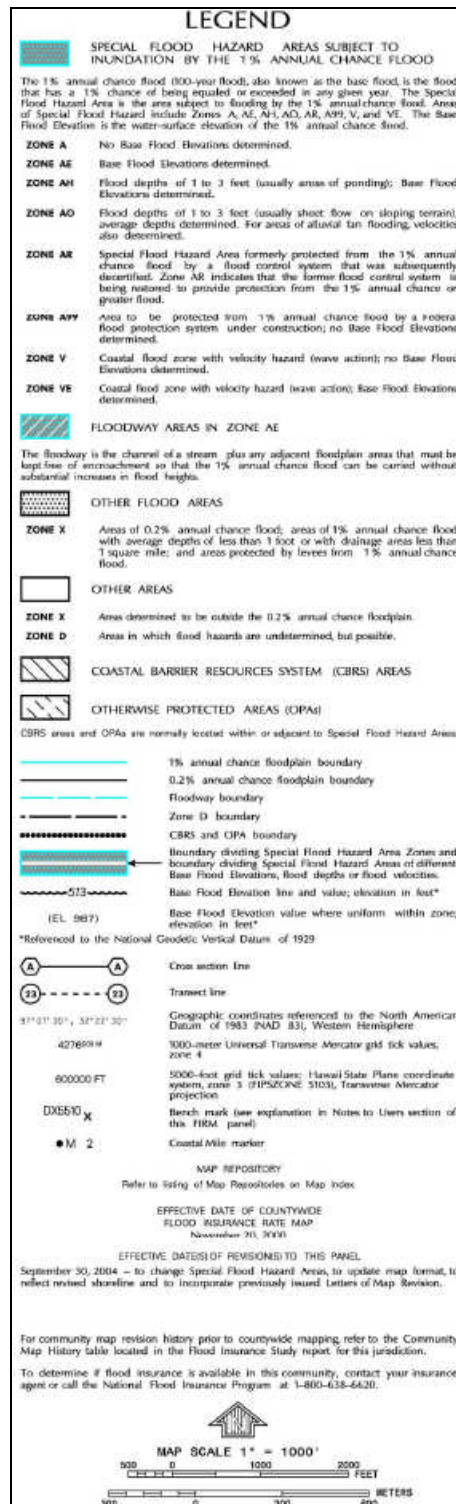


Figure 2.6-3 Legend

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2.7 Groundwater

Baseline Conditions

Groundwater is a key resource for the island of O‘ahu. Of the total freshwater used on O‘ahu, 326 Mgal/d is from ground water and 71 Mgal/d is from surface water. Most of the groundwater on the island of O‘ahu is derived from extensive volcanic aquifers of thin-bedded basalts in central and southern O‘ahu. These aquifers are unconfined and though often at great depth (600-1,000 ft) are essentially “surficial” aquifers and therefore vulnerable to contamination (USGS 1998). As a result, water resource protection and management is important on O‘ahu.

Parcel 30 is located within the ‘Ewa (Limestone) Caprock Aquifer. The ‘Ewa limestone aquifer is a brackish to saline groundwater body that exists as a thin basal lens in the permeable coralline reef deposits that comprise the ‘Ewa Plain. Figure 2.7-1 depicts aquifers, the ‘Ewa Caprock zone, and Parcel 30.

Consistent with the goals of protecting water resources, groundwater governance in Hawaii is split into two distinct aspects: (1) Groundwater withdrawals and (2) injection wells. Groundwater withdrawals, stream diversions and water use are regulated under the State Water Code and its implementing rules. The Commission on Water Resource Management (CWRM), Department of Land and Natural Resources (DLNR) manages the designation and regulation of Water Management Areas, water withdrawals and well construction activities. Groundwater injection wells, typically used for disposal of cooling waters, are governed by rules administered by HDOH.

The permitting of underground injection wells on O‘ahu is also affected by the location of the wells. Figure 2.7-2 shows that in coastal regions where waters can be saline at depth, the underlying aquifers may not be considered a drinking water source and though permit limitations are imposed, wells may be permitted.

Construction Impacts & Mitigation

Potential effects of the construction of the proposed Facility upon groundwater resources are very limited. Construction activities will not involve the use of substantial amounts of chemicals or other potential contaminants, so the potential for impact to groundwater would be limited to contamination from a leak or accidental spill of fuel or lubricants from construction vehicles or equipment. Oil absorbent pads and/or mats will be available at the construction site for use in the event of a spill or leak from construction equipment, and it is not anticipated that significant groundwater impacts would result from construction operations.

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All construction activities will occur in compliance with the H-POWER Expansion project construction SWPCP.

The proposed action will utilize existing H-POWER Expansion project footings. Thus, no significant impact from construction operations would occur.

Operational Impacts & Mitigation

The proposed action will not require any additional water use.

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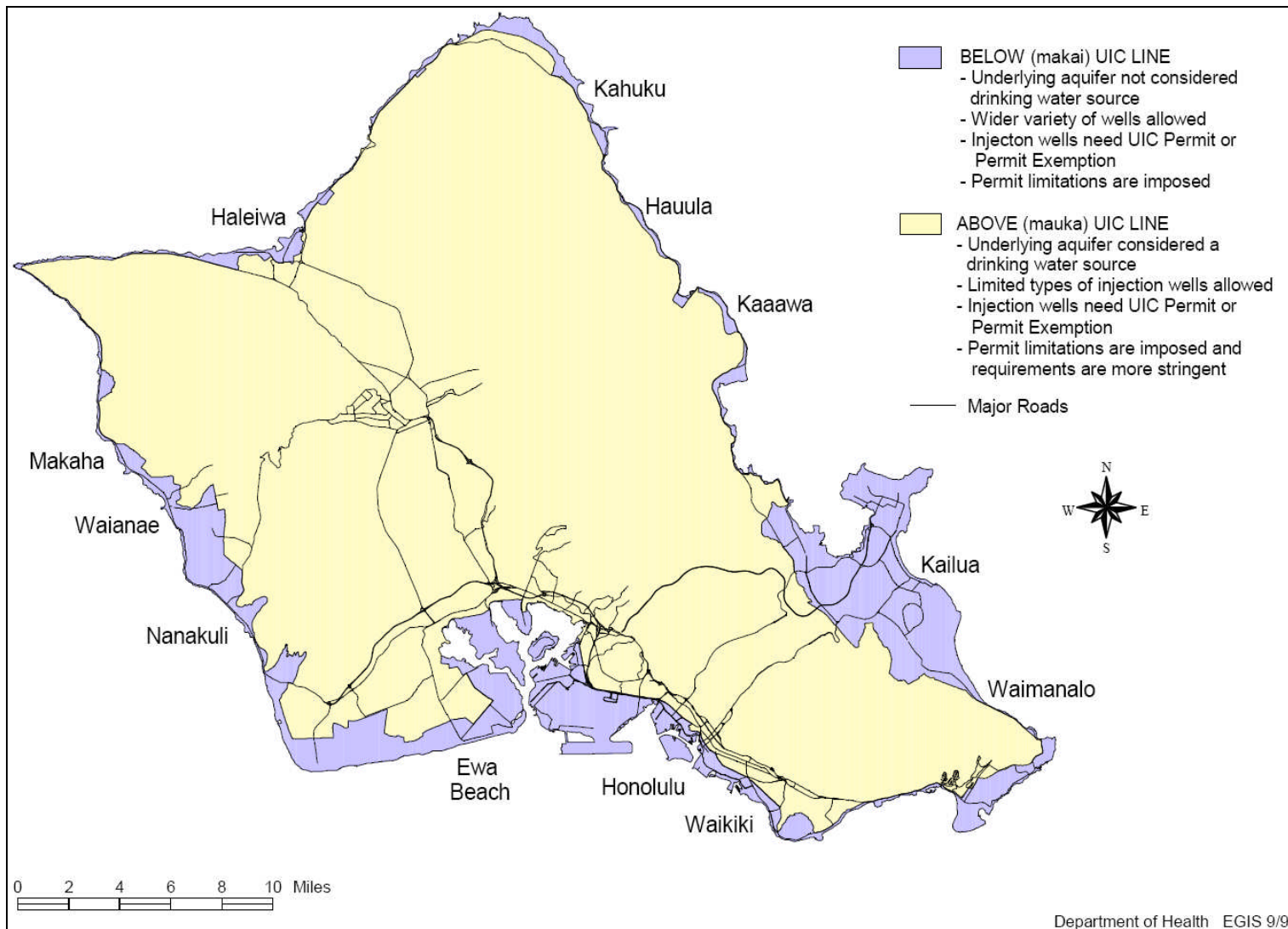


Figure 2.7-2: Underground Injection Control Areas

2.8 Biological Resources

This section discusses the existing biologic environment in and around Parcel 30. Baseline conditions, including resource areas of concern and special status species, are identified and the potential impacts of the proposed action are presented. Mitigation measures, such as stormwater controls and use of buffer areas, are evaluated.

Existing Conditions - Biological Resources

Parcel 30 is located in what is commonly referred to as the 'Ewa Plain. The 'Ewa plain is characterized as:

A semiarid region of intense sunshine, warm tradewinds, and sparse rainfall. At the western end of the plain these conditions are all the more accentuated. Except for a few coastal marshlands and other favored localities, the vegetation is typically xeric and, where undisturbed by modern developments, is dominated by hardy exotics (Davis 1990a).

Figure 2.8-1 depicts National Wetland Inventory (NWI) data for the region surrounding Parcel 30. As shown on that figure, no onsite resources are identified. An initial biological resource site reconnaissance survey of Parcel 30 was conducted by an AMEC biologist during November 9 – 11, 2004. A confirmation biological survey was conducted by an AMEC biologist on August 27, 2008 to update the findings of the initial survey for the H-POWER Expansion EIS. Findings from the August 2008 survey were in agreement with the findings from the November 2004 survey. A list of plant species observed is presented in Table 2.8-1.

Survey Methodology

Methodology for the November 2004 survey included a pedestrian survey of the H-POWER facility perimeter and open lawn areas and transects through Parcels 33-35. Due to limited site access, perimeter-only survey of a fenced enclosure (endangered plant preservation area) within Parcels 33 and 34 was also conducted in the November 2004 survey.

The methodology for the August 2008 survey was modified from the 2004 survey since the vegetation throughout Parcels 33-35 had become more dense (over 12 feet tall in the fenced enclosures and typically at least four feet tall outside the enclosures). A pedestrian survey was conducted of perimeter and open lawn areas of Parcel 30. For Parcels 33-35, bordering access roads and transects were also surveyed in open areas around the perimeter. Dense surrounding

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vegetation provided only limited access to the fenced enclosures within parcels 33-35. When openings in the vegetation permitted, the perimeter of the fenced enclosure was surveyed.

The majority of the H-POWER site consists of developed infrastructure (e.g., concrete parking lots, asphalt roads, buildings, ancillary facilities, etc.). Undeveloped areas consist of manicured lawns with ornamental trees and shrubs.

Flora

The open lawn areas of the H-POWER facility area consists of introduced and ornamental vegetation, including Bermuda grass (*Cynodon dactylon*), monkey pod trees (*Samanea saman*), autograph trees (*Clusia rosea*), *Hibiscus sp.*, and milo trees (*Thespesia populnea*). Other plant species included coconut trees (*Cocos nucifera*), beach naupaka (*Scaevola sericea*), and yellow oleander (*Cascabela thevetia*).

Fauna

Animals currently found in the area include feral cats and a variety of other non-native species wildlife such as mongoose, mice, and rats. Bird species observed included: zebra doves (*Geopelia striata*), spotted doves (*Streptopelia chinensis*), sharp-tailed sandpipers (*Calidris acuminata*), mynah birds (*Acridotheres tristis*), feral chickens (*Gallus gallus*), red vented bulbuls (*Pycnonotus cafer*), common waxbills (*Estrilda astrild*), and cattle egrets (*Bubulcus ibis*). These animal species are transient over much of the 24.6 acres of the facility. Additionally, the ornamental trees and bushes may serve as nesting sites for various bird species.

Special Status Species

Flora and Invertebrate Fauna

On October 8, 2004, the U.S. Fish and Wildlife Service (USFWS) replied to a letter requesting a list of rare, threatened, or endangered species, and significant natural communities that may be affected by the proposed H-POWER Expansion. The USFWS list included one endangered plant, *Achyranthes splendens var. rotundata*, as occurring in Parcels 33-35 (USFWS 2004a). This species is a low shrub varying in height from 1½ to 6½ feet. Three locations within Parcels 33-35 have been fenced and are currently protected as plant preservation areas. Due to limited site access, only the perimeters of the three fenced enclosures were surveyed during the November 2004 biological site reconnaissance. When the dense surrounding vegetation occasionally permitted access, the perimeters of the fenced enclosures were surveyed in August 2008.

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The enclosures within Parcels 33-35 are maintained annually. Maintenance consists of clearing invasive species and protecting native or endangered species. According to Mr. Kane, the enclosures within Parcels 33-35 shelters the last naturally occurring populations of the endangered plant, *Achyranthes splendens var. rotundata*. Mr. Kane also shared his observation that condensation from precipitation and runoff that collects in the sinkholes within the plant preservation enclosures appears to support the *Achyranthes* populations, especially during the drier summer months.

Additionally, prior communication on July 20, 2004 with USFWS (USFWS 2004b) indicated that the endangered plant *Chamaesyce skottsbergii var. skottsbergii* is known from the surrounding area. The July 2004 correspondence also indicated that an invertebrate species of concern, *Lyropupa perlonga*, is thought to be present in an area adjacent to the project site, though a specific location was not identified, and no individuals of this species were observed during the November 2004 and August 2008 site reconnaissance surveys.

Vertebrate Fauna

The shoreline, estuarine, and freshwater areas associated with Pearl Harbor are known habitat for four species of endemic waterfowl which are listed by both federal government and by the State of Hawaii as endangered species: the Hawaiian moorhen (*Gallinula chloropus sandvicensis*), the Hawaiian coot (*Fulica americana alai*) the Hawaiian duck (*Anas wyvilliana*) and the Hawaiian stilt (*Himantopus mexicanus knudseni*) [50 CFR Part 17]. Previous sightings of three of these four species (Hawaiian coot, Hawaiian moorhen and Hawaiian stilt) have been documented in the vicinity of the project area (USFWS 2004a). Population levels of these endangered waterfowl have been severely reduced primarily because of the loss of wetland habitat. Other threats to these species include predation by introduced mammals, invasion of wetlands by alien plants and fish, hybridization, disease, and possibly environmental contaminants (USFWS 1994). No endangered waterfowl species were observed during the November 2004 and August 2008 site reconnaissance surveys.

Two additional species of birds, listed as threatened or endangered by the State of Hawaii, but not listed by the federal government, are found in the vicinity of Pearl Harbor. These two species include the state-threatened white tern (*Gygis alba rothschildi*), a diminutive, arboreal-nesting seabird which can be seen around Pearl Harbor, and the state-endangered Hawaiian owl (*Asio flammeus sandwichensis*) an endemic race of the crepuscular, ground-nesting shorteared owl). Neither of these species was encountered during the November 2004 and August 2008 site reconnaissance surveys.

Impacts and Mitigation

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Though not likely to occur due to the existing dryland habitat and industrial nature of the site, construction workers are to be trained to suspend construction activities if transient bird species of concern are encountered at or near the site. A biologist will conduct the initial training and provide a short information packet so that workers are familiar with (1) the endangered Hawaiian coot or alae keokeo (*Fulica alai*), (2) the Hawaiian gallinule or alae ula (*Gallinule chloropus sandvicensis*), and (3) the black-necked stilt or aeo (*Himantopus mexicanus knudsenii*). Workers will be instructed to notify their supervisor who will contact an on-call biologist for confirmation. If confirmed, the biologist will contact the Pacific Islands Fish and Wildlife Office. In the event that the on-call biologist is unavailable the construction supervisor will be provided with the contact information and will be instructed to contact the Pacific Islands Fish and Wildlife Office directly.

The lack of wetland habitat onsite minimizes the potential for impacts to waterfowl species due to lack of proper habitat. Silt fencing and petroleum abatement measures will surround the construction areas.

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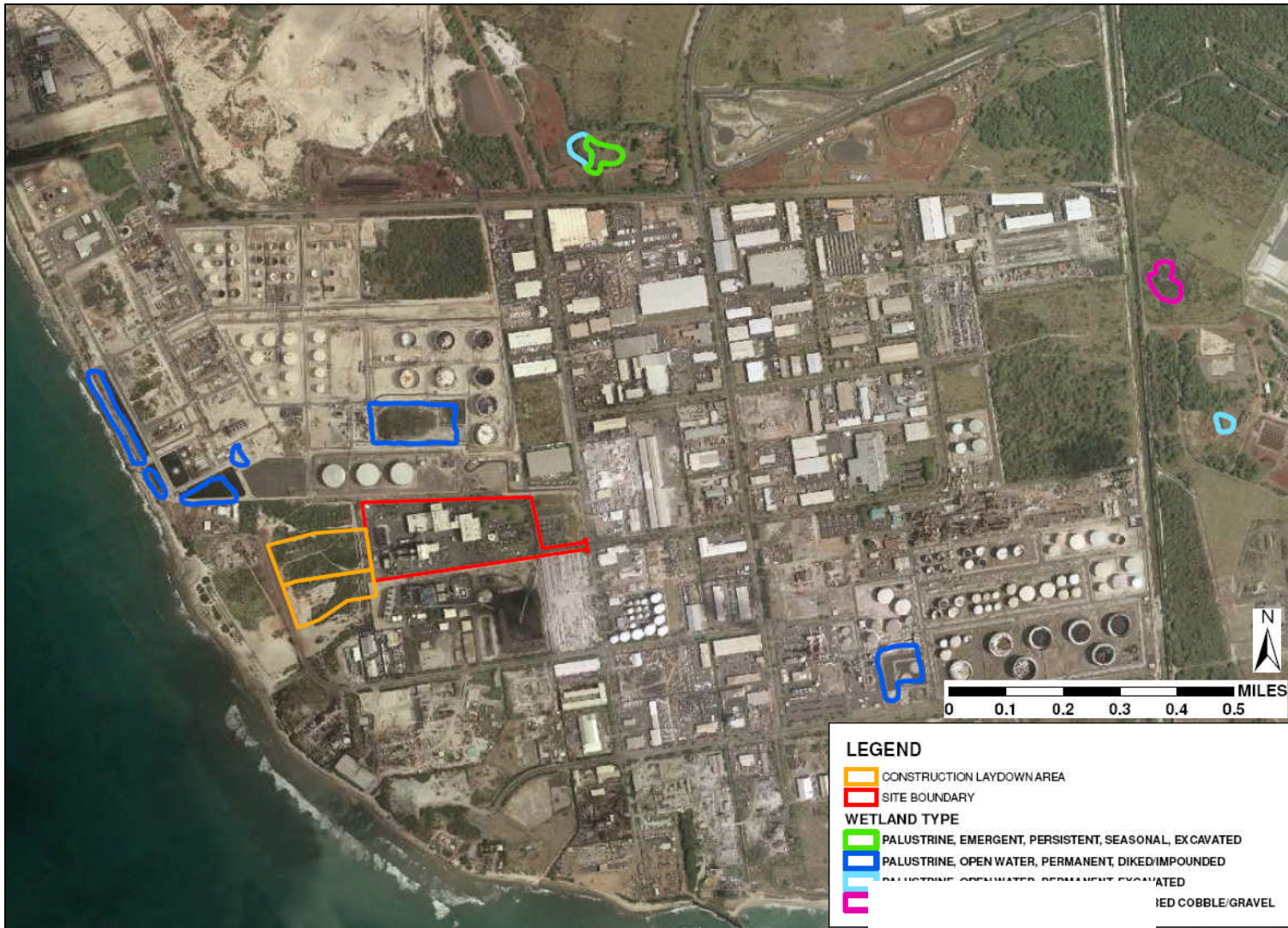


Figure 2.8-1: National Wetlands Inventory (Prepared by AMEC, 2008)

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Table 2.8-1 Plant Species Observed or Known to Occur on Parcels 30 and 33-35
(November 2004 Biological Reconnaissance Survey)

Plant Species	Common Names	Family	Status
<i>Asystasia gangetica</i>	Chinese violet	Acanthaceae	non-native
<i>Sesuvium portulacastrum</i>	akulikuli; sea purslane	Aizoaceae	indigenous; common
<i>Achyranthes splendens var. rotundata</i>	--	Amaranthaceae	endemic; endangered
<i>Amaranthus spinosus</i>	spiny amaranth	Amaranthaceae	non-native
<i>Amaranthus viridis</i>	slender amaranth	Amaranthaceae	non-native
<i>Cascabela thevetia</i>	yellow oleander; be-still tree	Apocynaceae	non-native
<i>Schefflera actinophylla</i>	octopus tree	Araliaceae	non-native
<i>Cocos nucifera</i>	coconut tree; niu	Arecaceae	non-native
<i>Bidens alba</i>	beggar's tick	Asteraceae	non-native
<i>Pluchea indica</i>	Indian pluchea; Indian fleabane	Asteraceae	non-native
<i>Pluchea symphytifolia</i>	sourbush	Asteraceae	non-native
<i>Tridax procumbens</i>	coat buttons	Asteraceae	non-native
<i>Verbesina encelioides</i>	golden crown-beard	Asteraceae	non-native
<i>Batis maritima</i>	pickleweed; salt wort	Bataceae	non-native
<i>Heliotropium curassavicum</i>	seaside heliotrope; kipukai; nena	Boraginaceae	indigenous; common
<i>Heliotropium procumbens</i>	--	Boraginaceae	non-native
<i>Opuntia ficus-indica</i>	prickly pear cactus; panini	Cactaceae	non-native
<i>Capparis sandwichiana</i>	maiapilo; pilo; pua pilo	Capparaceae	endemic, vulnerable
<i>Atriplex semibaccata</i>	Australian saltbush	Chenopodiaceae	non-native
<i>Clusia rosea</i>	autograph tree	Clusiaceae	non-native
<i>Ipomea cairica</i>	ivy-leaved morning glory; koali ai	Convolvulaceae	non-native
<i>Momordica charantia</i>	balsam pear; bitter gourd	Cucurbitaceae	non-native
<i>Chamaesyce hirta</i>	garden spurge	Euphorbiaceae	non-native
<i>Acacia farnesiana</i>	klu	Fabaceae	non-native
<i>Alysicarpus vaginalis</i>	alysicarpus	Fabaceae	non-native
<i>Desmanthus virgatus</i>	slender mimosa; virgate mimosa	Fabaceae	non-native
<i>Leucaena leucocephala</i>	haole koa; koa haole; wild tamarind	Fabaceae	non-native
<i>Mimosa pudica</i>	sensitive plant; sleeping grass	Fabaceae	non-native
<i>Prosopis pallida</i>	kiawe; mesquite	Fabaceae	non-native

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Table 2.8-1 Plant Species Observed or Known to Occur on Parcels 30 and 33-35
 (November 2004 Biological Reconnaissance Survey)

Plant Species	Common Names	Family	Status
<i>Samanea saman</i>	monkeypod tree	Fabaceae	non-native
<i>Scaevola sericea</i>	beach naupaka; naupaka kahakai	Goodeniaceae	non-native
<i>Abutilon grandifolium</i>	hairy abutilon	Malvaceae	non-native
<i>Sida fallax</i>	ilima	Malvaceae	indigenous, common
<i>Myoporum sandwicense</i>	naio; naeo; naieo; bastard sandalwood	Myoporaceae	indigenous; common
<i>Boerhavia coccinea</i>	--	Nyctaginaceae	non-native
<i>Oxalis corniculata</i>	wood sorrel; 'ihi' ai	Oxalidaceae	non-native
<i>Passiflora foetida</i>	love-in-a-mist; wild passionfruit; pohapoha	Passifloraceae	non-native
<i>Brachiaria subquadripara</i>	--	Poaceae	non-native
<i>Cenchrus ciliaris</i>	buffel grass	Poaceae	non-native
<i>Chloris barbata</i>	swollen finger grass; mau'u lei	Poaceae	non-native
<i>Cynodon dactylon</i>	Bermuda grass; manienie	Poaceae	non-native
<i>Dactyloctenium aegyptium</i>	beach wiregrass	Poaceae	non-native
<i>Eleusine indica</i>	goose grass; manienie ali'i	Poaceae	non-native
<i>Sporobolus diander</i>	Indian dropseed	Poaceae	non-native
<i>Lycopersicon pimpinellifolium</i>	cherry tomato	Solanaceae	non-native
<i>Nicotiana glauca</i>	tree tobacco; Indian tobacco; makahala	Solanaceae	non-native
<i>Waltheria indica</i>	uhaloa	Sterculiaceae	indigenous; common

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Figure 2.8-2: Aerial Photograph (Early 1990's)

Section 3 - Cultural Impacts

ASSESSMENT OF THE EXISTING HUMAN ENVIRONMENT, POTENTIAL IMPACTS, AND MITIGATIVE MEASURES

This chapter describes the existing human environment in the area of the proposed action that would potentially be affected. Because the human environment can be regional in nature, regional issues are addressed where necessary to establish an appropriate perspective on the human environment.

This chapter also assesses the environmental consequences to the human environment that may result from the proposed action. Potential temporary and permanent impacts are described and evaluated and mitigation measures that would eliminate and/or reduce potential adverse impacts are identified.

3.1 Archaeological and Cultural Resources

Pacific Consulting Services, Inc. (PCSI) undertook an archaeological and cultural impact assessment study in support of the proposed H-POWER Expansion Project. PCSI, a Honolulu-based consulting firm offering professional archaeology services, evaluated both the H-POWER site, consisting of 24.635 acres of industrially zoned land and designated by Tax Map Key (TMK) number 9-1-026:030, and the adjacent parcels, 9-1-026:033, 9-1-026:034, and 9-1-026:035, consisting of vacant land and totaling an additional 22.86 acres. The proposed action will take place on Parcel 30. The PCSI analysis, provided in Appendix A, included an evaluation of baseline (existing) and potentially existing resources, as well as an assessment of the effect that the H-POWER Expansion Project might have upon archaeological or cultural resources. This section summarizes the results of that study that are applicable to the proposed action. Standards and guidelines for archaeological and cultural resource assessments are presented, baseline conditions described, anticipated impacts are evaluated and the potential for mitigation discussed.

Standards and Guidelines for Archaeological and Cultural Resource Assessments

Various local and federal agencies have established guidelines and standards for assessing archaeological and cultural impacts. The applicable guidelines and standards are summarized below:

National Historic Preservation Act

The National Historic Preservation Act (NHPA) was passed in 1966 which, in the words of the Act, the Federal Government's role would be to "provide leadership" for preservation, "contribute to" and "give maximum encouragement" to preservation, and

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"foster conditions under which our modern society and our prehistoric and historic resources can exist in productive harmony."

To achieve this, NHPA and related legislation sought a partnership among the Federal Government and the States that would capitalize on the strengths of each. The Federal experience in studying, managing, and using historic resources, would provide funding assistance, basic technical knowledge and tools, and a broad national perspective on America's heritage.

The States, through State Historic Preservation Officers appointed by the Governor of each State, would provide matching funds, a designated State office, and a statewide preservation program tailored to State and local needs and designed to support and promote State and local historic preservation interests and priorities. In Hawaii the State Historic Preservation Office is referred to as the State Historic Preservation Division (SHPD).

State Historic Preservation Division

The Hawaii SHPD issued draft guidelines for the preparation of archaeological studies in December 2002 and the requirements for certain archaeological assessments are described in Chapters 13-275 and 13-276 of the Hawaii Administrative Rules. Section 13-275 (a) 5(A) states that:

An archaeological assessment shall include the information on the property and the survey methodology as set forth in subsections 13-276-5(a) and (c), as well as a brief background section discussing the former land use and types of sites that might have been previously present.

The archaeological assessment that was undertaken follows the draft guidelines issued by SHPD and the Hawaii Administrative Rules.

State Office of Environmental Quality Control

The State OEQC publishes Guidelines for Assessing Cultural Impact, which are designed to comply with the requirements of Chapter 343 HRS as amended in 2000 and approved by the Governor as Act 50 that same year. The archaeological assessment that was undertaken follows these guidelines.

3.2 Study Methodology and Scope

The study methodology and scope of the work conducted included the following:

- Archival background research on the culture history and previous land uses of the project area;

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- Literature review of previous archaeological studies within and surrounding the proposed action site
- Verbal and written consultation with the Office of Hawaiian Affairs (OHA);
- Interviews with community members recommended by the State Historic Preservation Division; and
- Reconnaissance survey of parcels 30 and 33-35 to determine the presence/absence of cultural resources

An archaeological reconnaissance survey and follow-up test excavations of possible historic sites of Parcel 30 were undertaken as part of the environmental review process for H-POWER in 1983-84 (Ahlo and Hommon 1983; Hommon and Ahlo 1984). No historic properties were found at that time. Human remains were found during construction of H-POWER, in 1986. However, there is little or no possibility that more burials might be found during the construction phase of the proposed action, as additional excavation work is not necessary. Nonetheless, the proposed action site will be monitored as part of the H-POWER Expansion Project.

The results of the site reconnaissance of parcels 30 and 33-35 and cultural resource investigations form the basis of the summary of existing conditions that follows in Section 3.3 below.

3.3 Existing Conditions - Archeological and Cultural Resources

In discussing existing conditions for archaeological and cultural resources, it is important to understand that much of the evaluation must focus on resource potential and oral history. Though some information about identified resources does exist, often, existing conditions are defined on the basis of resources suspected to have existed or on the basis of those potentially remaining at a given location. The project area is located on what is commonly known today as the 'Ewa Plain, a vast expanse of land that is part of an emerged Pleistocene age coral reef that was subsequently covered to varying depths with a mantle of marine sediments, alluvium and a shallow calcareous soil mantle, except for a few places on or near the shoreline where the reef surface is still exposed. The surface of the reef is pock-marked with solution cavities or "sinkholes" of widely varying sizes. The soil survey map for O'ahu shows the project area as coral outcrop (Foote et al. 1972)

Archaeological Resources

As noted above, Parcel 30 - the H-POWER site – is heavily industrialized and has undergone extensive ground disturbance at depth during construction of the original H-POWER facility. Though archaeological resources are therefore not likely, the fact that human remains were found during construction of the facility in 1986 indicates that however remote, there is a possibility that more burials may exist nearby. However, there is little or no possibility that more burials might be found during the construction phase of the proposed action, as additional excavation work is not necessary.

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Nonetheless, the proposed action site will be monitored as part of the H-POWER Expansion Project.

A brief reconnaissance of the proposed location of the H-POWER Expansion Project was conducted on August 13, 2008. This location, immediately east (mauka) of the existing H-POWER plant, includes the plant's existing parking lot and adjacent landscaped lawn areas. While the karst landscape of the 'Ewa Plain no longer exists in the H-POWER Expansion Project site, Burial Site 6684 is located nearby.

Cultural Resources

The cultural impact assessment for this project involved: (1) a literature search prior to the archaeological field assessment to determine the presence/absence of Traditional Cultural Properties; (2) verbal and written consultation with the Office of Hawaiian Affairs (OHA), and (3) field interviews with two individuals from the Kapeolei area, Ms. Lynette ("Auntie Nettie") Tiffany and Mr. Shad Kane, who were recommended by Muffet Jourdane (Assistant O'ahu Archaeologist) and Nathan Napoka (History and Culture Branch Chief) of the State Historic Preservation Division (SHPD). Auntie Nettie, who is employed by the Estate of James Campbell, is the supervisor (kahu) for Lanikuhonua. She is also a member of the O'ahu Island Burial Council. Mr. Kane, who is actively involved in community affairs in the 'Ewa area, also manages the plant sanctuaries on Parcels 32-33 and 33-34 for the City. He was hired by the City to assist in the preparation of a habitat preservation plan and the establishment of "wild sites" for the endangered species contained within the sanctuaries.

The site visit with Auntie Nettie and Shad Kane took place on November 16, 2004. After an initial meeting in the office of Colin Jones, which included an overview of the proposed project and examination of the aerial photographs showing recent changes to the project area, Mr. Rodney Smith (Covanta) accompanied PCSI to the site of the re-interred burial.

Following a brief discussion about the burial, Mr. Kane took PCSI into the plant sanctuary on Parcels 33-34, which contains *Achyranthes splendens* var. *rotundata*, *naio* (*Myoporum sandwicense*) and various other plants. Mr. Kane noted the presence of an endemic shrimp ('ōpae'ula) in the brackish water located in the sinkholes within the enclosure. According to Mr. Kane, the sinkholes fill up with water after heavy rains. There are two species of 'ōpae'ula (*Halocaridina rubra* and *Metabetaeus lohena*). It is unclear which of the two species occur in these particular sinkholes. The 'ōpae'ula was used in traditional times as bait for 'ōpelu fishing (Pukui and Elbert 1986:291). Mr. Kane expressed a concern that the 'ōpae'ula population could be adversely affected by contaminants entering the water table, depending on what kinds of equipment and supplies will be temporarily placed in the laydown area. Both Mr. Kane and Auntie Nettie emphasized the importance of preserving more sinkholes in the Kalaeloa area and other areas because of the native plants, human remains, and other evidence of past human uses that are often found in and around them. The sinkholes, which once

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numbered in the thousands and formed part of a vast natural and cultural landscape in the Kalaeloa area, are now restricted to a small number of undeveloped or undisturbed properties. The sinkholes contained within the two plant enclosures and in the kiawe thicket in Parcel 35 represent some of the last remaining examples of this landscape in the local area. Auntie Nettie and Mr. Kane also expressed a concern that more attention be given to protecting the shoreline area across the road from the proposed laydown area.

No information on beliefs, cultural practices, or culturally important places within the boundaries of the proposed project area or adjacent areas was provided, except for a story Auntie Nettie related about her mother, Leilani Fernandez, exchanging dried fish and salted meat for 'ōkole hao, a liquor made from ti plants, that was made by a man who lived somewhere nearby. No response was received from OHA to a letter dated October 14, 2004 requesting information on traditional Hawaiian beliefs, cultural practices, and culturally significant sites (now commonly referred to in the Cultural Resource Management (CRM) literature as Traditional Cultural Properties) in or near the proposed project area. A second letter was sent to OHA on August 13, 2008 requesting information concerning traditional cultural practices and places. OHA's response, dated September 4, 2008, requested that burials and plant sanctuaries be protected during Expansion activities and reiterated the elevated potential of additional undiscovered subsurface burial sites existing in the area (Appendix A of H-POWER Expansion Final EIS).

On current evidence, there are no known Traditional Cultural Properties or on-going cultural practices within or near the Area of Potential Effect (APE) based on a review of the pertinent literature for the area and the consultation with Auntie Nettie and Mr. Kane. While it is likely that culturally significant sites did exist at one time within or in close proximity to the H-POWER plant, the nearest (approximately 2.7 miles) known surviving site with cultural significance is Pu'uokapolei, a small cinder cone that is the most prominent landmark on the 'Ewa Plain and the former site of Fort Barrette. In their synthesis of cultural resource studies on the 'Ewa Plain, Tuggle and Tomonari-Tuggle (1997:21) noted that Pu'uokapolei was the sacred center of that part of O'ahu:

Probably the most important of all traditional locales on the 'Ewa Plain is the hill known as Pu'uokapolei. This volcanic cone at the inland edge of the 'Ewa Plain was the location of a temple, (of unknown affiliation), a residence of the family of the demi-god Kamapua'a, a reference point for solar observation, and a traveller's landmark (McAllister 1933:108; Kamakau 1976:14; li 1959:27; Thrum 1907:46).

Additional information on Pu'uokapolei is summarized in Sites of O'ahu (Sterling and Summers 1978:33-34).

In 2008, follow-up consultation was conducted in the form of contacting Mr. Shad Kane and Ms. Lynette (Auntie Nettie) Tiffany, as well as the Office of Hawaiian Affairs. When

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Auntie Nettie was contacted, she indicated that she did not have any further concerns regarding the HPOWER project.

3.4 Impacts and Mitigation - Archaeological and Cultural Resources

The proposed action is not expected to have any impacts to known or potential archaeological or cultural resources. Nonetheless, the site will be monitored as part of the H-POWER Expansion Project.

Section 4 – Impacts / Mitigations

4.1 Short Term Impacts

Impacts will occur during the construction period including short term positive impacts to the economy resulting from construction period employment and associated spending for construction equipment and supplies. No long term impact will result including impact to schools or other public services or facilities.

During construction there will also be impact to geology and soils through use of the previously developed offsite construction laydown, staging, parking and fabrication area however this will occur on previously disturbed land appropriately zoned for this purpose and the increased activity will be minor.

Air Quality and noise impacts will occur from construction activities including operation of mobile construction equipment however these impacts will be a minor change to the on-going impacts.

Roadways and Traffic will not be impacted during construction with any significant increase in vehicle traffic. The additional sludge receiving, storage and processing equipment will not require a significant increase in the traffic over the construction period.

Surface water quality could be impacted from construction period run off however an erosion and sedimentation control program will be employed.

Biological Resources will be protected within the established sanctuary areas of the parcels designated for construction laydown.

4.2 Long Term Impacts

There are no long term impacts to air quality and human health through the processing of sludge since there are no changes to the emission limits.

Long term impacts to odor control are expected to be improved by receiving, handling and processing sludge with the system provided rather than disposal at the landfill.

Permanent disturbance has been made to geology and soils in the area where the sludge receiving, storage and processing system will be installed.

No impact will occur to water resources as no additional process water will be required. Storm water will continue to be captured and Best Management Practices are in effect through the facility NPDES General Permit.

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No archaeological, historic or cultural impacts are anticipated. Construction phase excavation will be controlled and activities will be interrupted if discoveries are made.

4.3 Construction Period Mitigation

An Erosion and Sedimentation Control program has been established through a NPDES Construction phase permit. Best Management Practices (BMP) will be employed including interception of run off, silt fences/barriers and protection of existing storm water features and devices including catch basins and culverts. Intercepted runoff will be directed to settling ponds if required.

Fencing will be maintained to protect sensitive areas including plant sanctuaries. Water trucks will be utilized to minimize dust as needed.

Construction equipment will be equipped with noise mufflers and emissions control devices as required by law.

Construction parking will be limited to encourage carpooling.

Deliveries will be scheduled to minimize traffic peaks associated with normal shift work within the industrial park. A separate construction entrance has been established to prevent traffic congestion at key intersections.

The construction laydown area has been designed to avoid disturbance of both the established plant sanctuaries including a buffer zone and to avoid to the extent possible the northern parcel where sink holes are known to exist.

4.4 Long Term Mitigation

The project will not change emission requirements and will employ the Maximum Achievable Control Technology (MACT compliance) as exists in the industry for control of air emissions and hazardous air pollutants as required by the Clean Air Act.

Odor control systems will be utilized to manage odors from the sludge receiving, storage and processing. Measures include control of odor releases through air management systems and the use of odor control systems.

Traffic and roadway impacts will be minimal with only slightly increased traffic counts. There are no further impacts including cultural, noise, visual, socioeconomic, solid waste, energy or human health that do not already exist.

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Section 5 - Alternatives

5.1 No Action

The No Action Alternative would include on-going use of the landfill for disposal of sludge and pelletizing at Synagro. The quantity of sludge hauled to the landfill and for reuse are listed in Table 1. Dewatered sludge from Honouliuli, Waianae, and Kailua wastewater treatment plants are hauled to landfill for disposal. Sludge from the Sand Island is pelletized and used for agricultural purposes, however, a portion of the pellets do not form properly and are taken to the landfill. Excess sludge is dewatered and hauled to the landfill.

Table 1 Summary of Biosolids Hauling for 2011

Division of Wastewater Treatment and Disposal									
Biosolids Production Report - January 1 to December 31, 2011									
Facility	Permit Type	Other Plant(s) Processing Sludge	To Other Plants		To Reuse (Composting or Marketing)		To Landfill		Annual Average Percent Solids
			Dry weights		Dry weights		Dry weights		
			Tons	Metric Tons	Tons	Metric Tons	Tons	Metric Tons	
Honouliuli (1)	NPDES	NA					2,602.6	2,361.0	26.7%
Paalaa Kai (2)	UIC	Honouliuli	14.9	13.5					1.0%
Wahiawa (3)	NPDES	Honouliuli	866.9	786.4					3.4%
Waianae (4)	NPDES	NA					211.8	192.1	22.9%
Sand Island (5)	NPDES	NA							
* Synagro Dewatered							45.2	41.0	29.9%
* Synagro Pelletized					3,138.3	2,847.0	593.9	538.8	89.0%
for Feasibility Study		Waipahu PS to Honouliuli	16.8	15.3					
SI Total					3,138.3	2,847.0	639.2	579.8	69.3%
Kahuku (6)	UIC	Kailua	87.9	79.8					0.7%
Kailua Regional (7)	NPDES	NA					764.3	693.4	20.9%
Laie (8)	NA								
Waimanalo (9)	UIC	Kailua	95.3	86.5					1.3%
Totals					3,138.3	2,847.0	4,217.8	3,826.3	
Grand Total (Landfill + Reuse)							7,356.1	6,673.3	

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These quantities are listed as dry weight solids, the actual weight of solids and water must be determined by dividing the dry weight by the annual average percent solids. For example, the total tons hauled to the landfill from Honouliuli is = $2,602 / 0.267 = 9,745$ tons over the 365 days or 27 tons per day. Anaerobic digestion removes $\frac{1}{2}$ of the volatile solids (80% of the total). Thus 1.8 times more solids are produced as raw sludge.

The No Action Alternative leaves the City at risk for sludge disposal when the landfill is not available and at risk for anaerobic digestion failure at Sand Island WWTP.

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5.2 Landfill

Current Conditions

Currently there is no alternative to the landfill for sewage sludge disposal. On January 13, 2011 stormwater caused the landfill to close and it was not reopened until after January 28. During that time sewage sludge was stockpiled and held until the landfill could reopen.

Alternative 1 Composting Facility

Hawaiian Earth Recycling has proposed to construct an in-vessel composting facility in Waialua. The project will have the capacity of 150,000 tons per year of green waste, food waste, and dewatered sewage sludge to produce a marketable compost product. The composting facility is currently under development and may be able to receive sludge early in 2013.

Providing that sufficient green waste is available, the composting facility will have a capacity of 15,000 to 20,000 tons per year of sewage sludge. Honouliuli, Kailua, and Waianae WWTPs total 7,600 tons per year and, with the landfill out of service, an additional 650 tons per year of dried sludge from Sand Island results in a total of 8,300 tons per year. Therefore, composting could serve as a backup to landfill disposal from these treatment plants and visa versa.

If the pelletizer facility were out of service, the Sand Island WWTP would generate 12,700 tons per year of dewatered sludge. This quantity exceeds the capacity of the composting operation when included with the other plants.

Providing that sufficient green waste is available, the proposed composting facility has the capacity to take the sewage sludge currently being taken to the landfill.

Alternative 2 H-POWER

The sewage sludge currently taken to the landfill could be taken to H-POWER and co-mingled with other waste streams and burned in the boiler. The H-POWER Expansion boiler can accept raw or dewatered sludge, however, because of the increased fuel value and higher solids concentration, dewatered raw sludge is preferred.

The receiving bin and pumps are sized for 90 tons per day and sludge can be processed 24 hours per day at a maximum blending rate of ten percent of the total heat input to the combustion unit which is adequately sized for the sludge from all of the treatment plants.

5.3 Anaerobic Digester at the Sand Island WWTP

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There is a single anaerobic digester at the Sand Island WWTP. The digestion process is a critical step preceding pelletizing. The digester is near its capacity and is at risk for foaming. Biological foaming results from overfeeding a digester resulting in operational problems, shutdown of the pelletizing facility, and potential spills. Foaming problems may take weeks to resolve. In addition, the anaerobic digester has no backup and failure of the digester would result in shutdown of the pelletizer and loss of digestion.

A second digester is under design, but will not be completed for 2 to 3 years.

Alternative 1 – Liquid Hauling

Sand Island WWTP currently produces approximately 31.5 tons per day of raw sludge. If the digestion process were to fail, it would take 26 trucks per day to haul the liquid sludge and the total quantity of sludge to be treated exceeds the treatment capacity at Honouliuli, Kailua, and Waianae. This alternative is not practical.

Alternative 2 – Composting

Raw sludge could be dewatered hauled for composting. Composting raw sludge does not create a marketable (EPA Class A Biosolids). The resulting compost would have to be landfilled or burned at H-POWER. Hawaiian Earth was not set up to receive and process raw sludge. This alternative is not viable.

Alternative 3 – H-POWER

Raw sludge could be dewatered and hauled to H-POWER for processing. The plant currently produces about 3,800 tons per year of dry weight solids. The quantity of sludge to be handled varies with the final condition of the sludge:

1. Pelletized - 15 wet tons per day at 68% solids
2. Dewatered and anaerobically – 35 wet tons per day at 30% solids
3. Dewatered raw sludge – 58.5 wet tons per day at 32% solids

Recommended Plan

The H-POWER sewage sludge receiving system serves as a backup to the landfill disposal and potential composting of Honouliuli, Kailua, and Waianae WWTP sludge and provides for complete backup for all of the sludge generated at the Sand Island WWTP. Selection was based on:

1. Capability to receive all of the sludge generated by all facilities;
2. Ability to accept raw and anaerobically dewatered cake as well as dried sludge and pellets;
3. Technical feasibility;

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4. Low initial cost; and
5. Completion in 2012.

Section 6 – Findings

6.1 Significance Criteria

Based on the significance criteria set forth in HAR, Title 11, Chapter 200, Environmental Impact Statement Rules, the proposed action is not anticipated to result in significant environmental impacts. The recommended preliminary determination for the proposed project is a Finding of No Significant Impact (FONSI). The findings and reasons supporting this determination are summarized as follows:

- 1. Involves an irrevocable commitment to loss or destruction of any natural or cultural resource*

The proposed action will not result in the adverse loss of natural or cultural resources. Given the historical use of the area, and the composition of the underlying soils, historic or archaeological sites are not known to be present at the site. However, in the unlikely event of a discovery of significant cultural, historic or archaeological resources, the SHPD will be immediately notified for appropriate action and treatment. As required, work will be temporarily halted as instructed by SHPD.

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

The subject property is zoned for intensive industrial use. The proposed use is consistent with the industrial designation of the site and will be contained entirely within the property. The proposed action does not curtail beneficial uses of the environment.

- 3. Conflicts with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 343, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders*

The proposed action is consistent with the environmental policies, goals and guidelines expressed in HRS, Chapter 343. Potential sources of adverse impacts have been identified and appropriate measures have been developed to either mitigate or minimize potential impacts to negligible levels.

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

The operation of the proposed action will be regulated in accordance with County, State and Federal regulations. It is expected to improve the social and economic environment of O'ahu by aiding in the management of sludge by diverting it away from the landfill while beneficially producing energy.

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5. Substantially affects public health

Factors affecting public health, including odors and air emissions, are expected to be only minimally affected by the proposed action. The sludge receiving vessel will include a biofilter to capture and treat odors. Air emissions are expected to remain well below permitted limits.

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

The proposed action is expected to have no substantial secondary or indirect impacts such as population changes or effects on public facilities based on the limited scope and scale of the action. The proposed action will however provide an essential service to a region that is experiencing increasing constraints on waste management and disposal facilities.

7. Involves a substantial degradation of environmental quality

Impacts to air and water quality, noise levels, natural resources, and land use associated with the planned project are anticipated to be minimal. Mitigation measures will be employed as practicable to minimize potentially negative effects to the environment. The proposed Action does not involve substantial degradation of environmental quality, but in fact improves it through landfill diversion. The receiving vessel includes a biofilter which will capture and treat odors. Beneficial products such as energy will also be produced.

8. Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions.

The proposed action is not expected to cause adverse cumulative impacts to the environment, nor involves a commitment for larger actions in that all work required will be limited to use of the project site. The proposed action is in accordance with the land use plans and policies of the State and City and County of Honolulu.

9. Substantially affects a rare, threatened or endangered species

The proposed action is not expected to cause adverse impacts to any rare, threatened, or endangered species.

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

On a short-term basis, ambient air and noise conditions may be affected by construction activities related to the proposed action, but these are short-term potential impacts and can be controlled by mitigation measures as described in this EA. Once the action is completed, noise in the project vicinity will be allowed to return to conditions consistent

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with the surrounding land uses. Erosion control measures and other BMPs will be employed to prevent untreated storm water runoff from construction activities entering State waters. Air quality will be improved compared to landfill disposal through the nature of the process allowing for capture of odors.

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

The proposed action site is not located within an environmentally sensitive area.

- 12. Substantially affects scenic vistas and viewplanes identified in county or state plans or studies*

The proposed action will not obstruct any significant scenic features and viewplanes due to its elevation and existing similar industrial activities in close proximity to the project site. The proposed action will not substantially affect any existing views from surrounding areas.

- 13. Requires substantial energy consumption*

Construction and daily activities associated with the proposed Action will not require substantial amounts of energy. In fact, the action will result in positive energy recovery.

6.2 Findings

In accordance with the provisions set forth in HRS, Chapter 343, and the significance criteria in HAR, Section 11-200-12 of Title 11, Chapter 200, it is anticipated that the proposed Action will have no significant adverse impacts to water quality, air quality, existing utilities, noise levels, social welfare, archaeological sites, or wildlife habitat. All anticipated impacts are expected to be temporary in duration and will not adversely impact the environmental quality of the area. In fact, the proposed Action is expected to have significant benefits such as the production of energy and increased diversion of waste from landfills. It is expected that an Environmental Impact Statement (EIS) will not be required, and that a Finding of No Significant Impact (FONSI) will be issued for this project.

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Section 7 – List of Permits / Approvals

The following permits have been secured for the H-POWER Expansion Project:

Approving Agency/Authority	Approval/Permit	Date of Approval	Permit/File Number
Federal Aviation Administration (FAA)	Notice of Construction	29-Jun-11	Study Notice 2010-AWP-947-0E
Hawaii Department of Health (HDOH). Clean Air Branch	Covered Source/PSD Air Permit, Chapter 60.1 of Title 11 of HAR	23-Dec-09	CSP No. 0255-01-C
HDOH, Clean Water Branch	Notice of General Permit Coverage NPDES Construction Stormwater Discharge Permit	29-Jan-10	N/A
HDOH, Indoor and Radiological Health Branch	Construction Noise Permit	1-Aug-09	O 09-177
HDOH, Safe Drinking Water Branch	UIC Permit Modification	25-Feb-11	UO 1376
HDOH, Solid and Hazardous Waste Branch	Solid Waste Management Permit	22-Dec-11	IN-0049-11
DLNR, Commission on Water Resource Management	Groundwater Use Permit Modification	19-Dec-08	WUP No. 863
DLNR, Commission on Water Resource Management	Well Construction /Pump Installation Permit	14-Feb-11	UO 1376A

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City and County of Honolulu Department of Planning and Permitting (DPP)	Building Permit	4-Feb-10	BP #652421
City and County of Honolulu Department of Planning and Permitting (DPP)	Conditional Use Permit Modification [Waiver of Land Use Ordinance (LUQ) Sections 21-3:13Q-1(b) [Table 21-3.5], 21-4.60(a), and 21-4.70(b)]	7-Jul-09	2009/W-39
City and County of Honolulu Department of Planning and Permitting (DPP)	Grading Permit and Drainage Plan Approval	12-Nov-09	GP2009-11-0671

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Section 8 – Agencies and Organizations Consulted

Notice of the Draft Environmental Assessment for the Air Pollution Control System Improvement Project was published in the Office of Environmental Quality Control Environmental Notice of April 8, 2012. Copies of the Draft Environmental Assessment were mailed to the agencies and organizations listed below. Publication in the Environmental Notice initiated a 30-day public comment period.

State

Dept of Agriculture
Dept of Accounting and General Serv
Department of Business Economic Development & Tourism
DBEDT – Energy Division
DBEDT – Office of Planning
Dept of Defense
Dept of Education
Dept of Hawaiian Homelands
Dept of Health
Dept of Human Services
Dept of Labor and Industrial Relations
Dept of Land and Natural Resources
DLNR – Historic Preservation Div
Dept of Transportation
Hawaii Housing Fin. and Dev. Corp.
Office of Hawaiian Affairs
UH Environmental Center

Federal

US Fish and Wildlife Service

City

Board of Water Supply
Dept of Community Services
Dept of Design and Communication
Dept of Environmental Services
Department of Facility Maintenance
Department of Planning and Permitting
Department of Parks and Recreation
Dept of Transportation Services

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Other

Nearest State Library
Hawaiian Electric Company
Neighborhood Board #34, Chair