5 EXISTING ENVIRONMENT, IMPACTS AND MITIGATION MEASURES

This section discusses preliminary findings and information on the existing environment, potential impacts and mitigation measures for the proposed project. The existing environmental conditions in the project area are presented where data is available; however, where sufficient detail to characterize the area is not available, general information and characteristics on the larger sewer basin or the island are provided. Geographic information system (GIS) information used in this document is from the following sources: 1) HoLIS provided by the CCH DPP, 2) Hawaii State GIS Program provided by the DBEDT, and 3) data from the United States Census Bureau (USCB) and the Oahu Metropolitan Planning Organization (OMPO) (incorporated into GIS for socioeconomic analysis). The study area (the geographic area that would be most affected by the proposed expansion and upgrading of the Honouliuli WWTP and relocating of non-process related functions and facilities from the Sand Island WWTP and other locations to the Honouliuli WWTP) for each environmental parameter is typically within the immediate vicinity of the Honouliuli WWTP unless otherwise discussed (i.e., socioeconomics). A future baseline or future without the project was considered for some technical analyses (i.e., traffic, air, and noise), when applicable.

Whenever practicable, potential impacts are divided into Construction Impacts and Operational Impacts. Construction Impacts are, in general, short term impacts due to construction activities. Operational Impacts are, in general, long term impacts from normal operation of the facilities. Mitigation measures that would reduce the impact of construction or operation of the alternatives on the natural environment are presented. No off site work is proposed as part of the proposed project; therefore, the potential direct impacts associated with the project reflect proposed activities solely within the Honouliuli WWTP site.

This project would be designed to the extent possible to: 1) avoid, 2) minimize and 3) mitigate impacts of the proposed project on existing resources in the project area.

5.1 Climate

5.1.1 Existing Setting

The climate in Hawaii is considered subtropical with annual temperatures in the project area ranging from 60°F to 85°F and mean monthly temperatures ranging from 73°F in January and February to 81°F in August. The mean annual rainfall in the project area ranges from 50 to 76 cm (20 to 30 inches). The project area is located within the leeward physiographic zone of Oahu; therefore, the area experiences relatively low rainfall. The islands are exposed to trade and Kona winds. Trade winds are from the northeast and prevail approximately 70 percent of the time. Kona winds are from the south. Average wind in the area ranges from 15 to 25 mph with gusts over 35 mph.

5.1.2 Impacts and Mitigation Measures

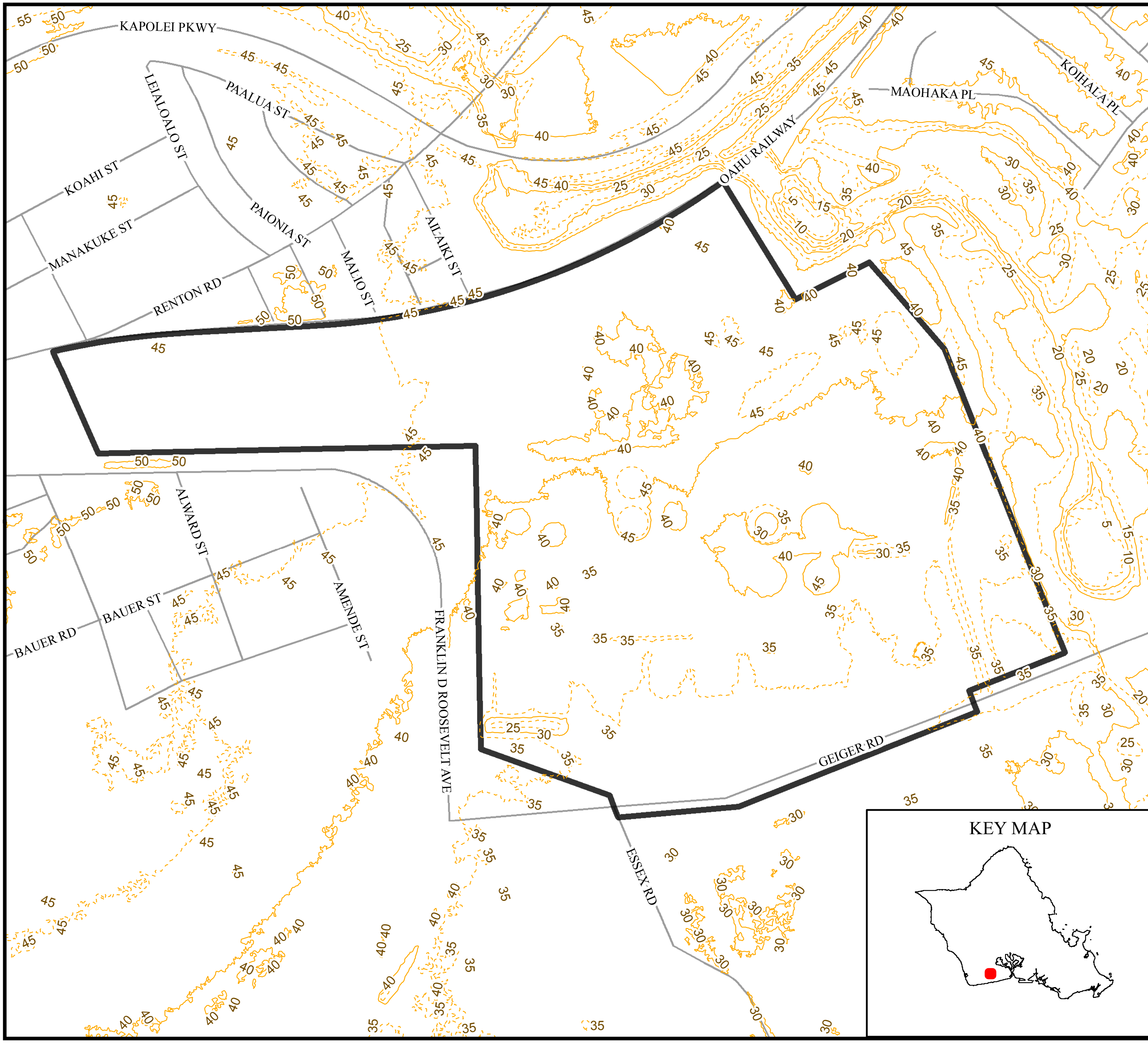
No significant impacts on climate in the project area are anticipated as a result of construction or operation regardless of the alternative selected. Parameters such as temperature, wind, or rainfall levels are not anticipated to be affected. Therefore, no mitigation measures are proposed.

5.2 Physiography

5.2.1 Geology and Topography

5.2.1.1 Existing Setting

The eastern portion of the island of Oahu, where the WWTP site is located, was created by the (inactive) Waianae volcano. The WWTP is located within the coastal plain area called the Ewa Plains, south of the Schofield plateau. Topography within the Ewa plains in the vicinity of the WWTP is gently sloping and relatively flat. Elevation at the WWTP property ranges from 25 ft mean sea level (MSL) in the southern portion of the site to 45 ft MSL in the northern portion of the site (Figure 5-1).



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HONOULIULI/ WAIPAHU/ PEARL CITY WASTEWATER FACILITIES PLAN

FIGURE 5-1

TOPOGRAPHY

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1001 BISHOP ST, STE 1600
HONOLULU, HAWAII 96813

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5.2.1.2 Construction Impacts and Mitigation Measures

Regardless of the alternative selected, construction of the project is not anticipated to impact the geology of the project area. The WWTP site, in which the proposed upgrades and secondary treatment improvement alternatives and the potential siting of new facilities would be located (as well as proposed roadway improvements and construction of new WWTP site entrances), is highly developable (relatively flat to moderately sloping) land, so relatively minimal alterations to the topography of the site would be required. Excavation and trenching may be necessary for construction of facilities and installation of utilities.

5.2.1.3 Operational Impacts and Mitigation Measures

It is anticipated that the normal operation of the proposed facilities would not affect the topography or geology of the project site. Excavation and trenching may be necessary for emergency work on the proposed facilities.

5.2.2 Soils

5.2.2.1 Existing Setting

Three soil suitability studies have been prepared for lands in Hawaii. The principal focus of these studies is to describe the physical attributes and relative productivity of different land types for agricultural production within the State of Hawaii. The three studies are the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (formerly U.S. Soil Conservation Service) Soil Survey, the University of Hawaii Land Study Bureau Detailed Land Classification, and the State of Hawaii Department of Agriculture’s Agricultural Lands of Importance to the State of Hawaii (ALISH).

According to the USDA Soil Conservation Service (SCS) Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii (USDA SCS 1972), there are seven soil associations on Oahu, one of which is located at the WWTP site. The soil association in the project area is Lualualei-Fill land-Ewa association defined as: deep, nearly level to moderately sloping, well-drained soils that have a fine textured or moderately fine textured subsoil or underlying material and areas of fill land located on coastal plains.

Soils on the site are classified primarily as Mamala stony silty clay loam, 0 to 12% slopes; with a small portion of Ewa silty clay loam, moderately shallow, 0 to 2% slopes; and Waialua silty clay on 0 to 3% slopes in the southeastern corner of the Honouliuli WWTP property (Figure 5-2).

Other soil information was gathered from the Hawaii Statewide GIS Program website including information on erosion potential of the land, agricultural productivity and ALISH. The erosion potential of the land in the project area is considered potentially highly erodible.

Agricultural productivity within the limits of the WWTP site is considered unclassified, with the exception of an area of prime agricultural land in the southeastern corner of the site, as shown on Figure 5-2. Prime agricultural land/prime farmland is defined by the USDA Natural Resource Conservation Service (NRCS) as land best suited for the production of food, feed, forage and fiber crops. Although the area has historically been utilized for agricultural purposes, the WWTP site has since been developed and urbanized; therefore, it would be considered unsuitable for crop production, either because the land value of the property is too high for unsubsidized agricultural use or because crop production would be incompatible with surrounding land uses. There are no regulations specific to this designation; however, federally assisted/managed/funded projects may be subject to the Farmland Protection Policy Act (FPPA) (USDA NRCS 1981). According to Part 523, Subpart B, 523.10B(ii) of the FPPA Manual, lands identified as “urbanized area” (UA) on USCB maps are not subject to provisions of the FPPA (USDA NRCS 2013). The Honouliuli WWTP is located within an area designated as UA as shown on the 2010 Census – Urbanized Area Reference Map for Urban Honolulu (USCB 2012); therefore, it is not anticipated that the project would be subject to the FPPA.

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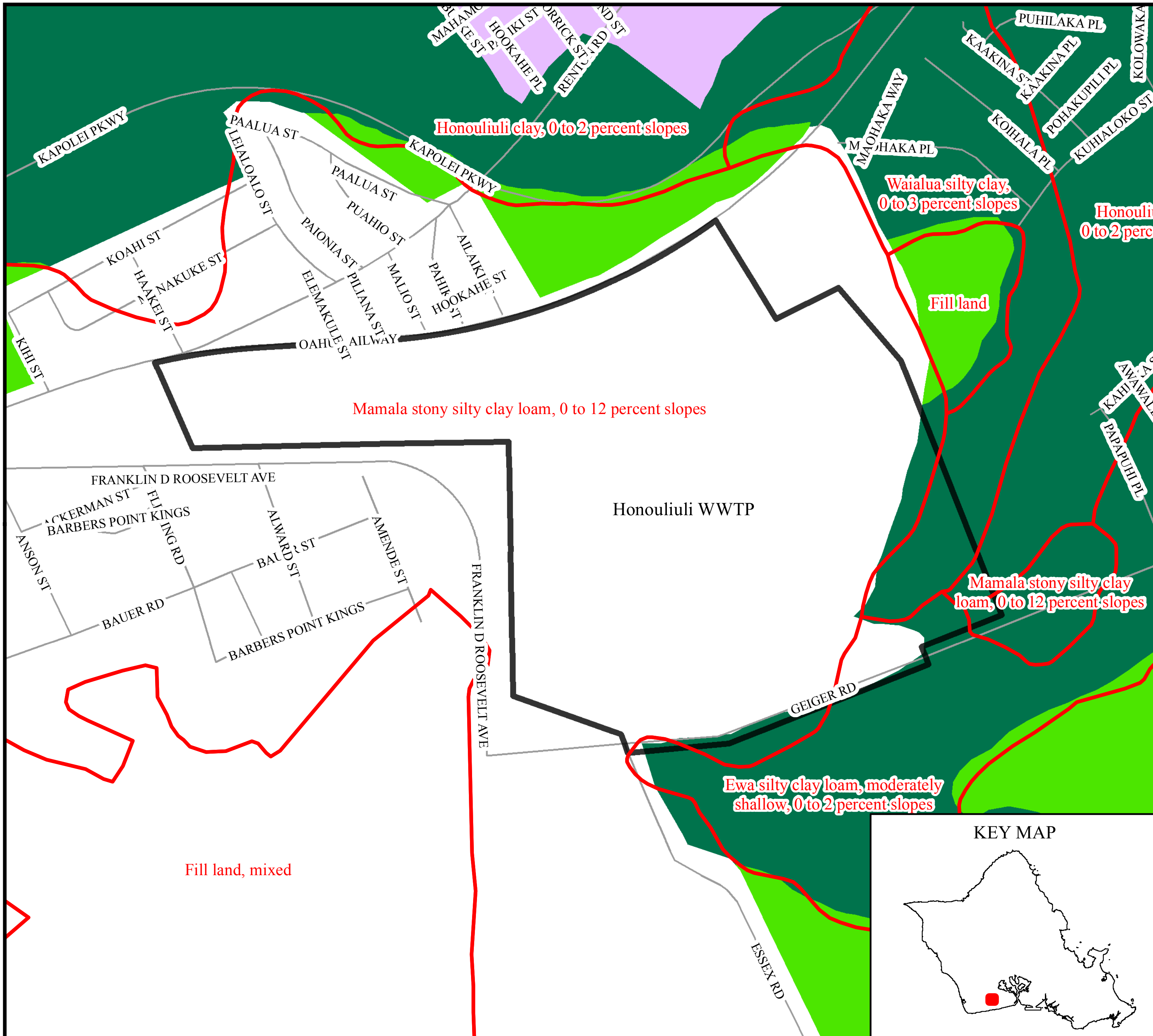

Legend

- Honouliuli WWTP
- Street
- Soils

Agricultural Land Type

- Unclassified
- Other lands
- Prime lands

0 600 Feet

1 inch = 600 feet

FIGURE 5-2

SOILS AND AGRICULTURAL LAND OF IMPORTANCE TO THE STATE OF HAWAII (ALISH)

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5.2.2.2 Construction Impacts and Mitigation Measures

For all alternatives considered, construction activities would result in impacts to the soils in the project area, including soil loss. Excavation of approximately 673,250 cubic yards is likely to be necessary for the construction of new structures within the WWTP site; not including the potential for construction of an underground parking garage (the option to build underground parking is currently conceptual). Roadway improvements and construction of new entrances may also impact local soils. Section 5.13.3.2 provides more detail on the excavation quantities. The majority of the soil would be reused on site.

In addition, regardless of the alternative selected, localized contamination of soils could result from construction activities, as there is the potential for accidental release of construction equipment fluids (e.g., oil and grease) or damage to existing utility lines.

Mitigation measures would be implemented during construction activities to minimize the potential for impacts. Since construction of the project would require grading of 7,500 square feet or more of land, a drainage and erosion control plan would be prepared by an engineer and submitted for approval by the CCH Department of Planning and Permitting, in accordance with the CCH Permits, Bonds and Inspection for Grading, Soil Erosion and Sediment Control Regulations (14 Regulations of Honolulu 14.2(c)). Construction methods to preserve the integrity of existing facilities would be implemented and construction equipment would be maintained in good working condition to reduce the potential for accidental spills. In addition, although construction activities would involve grading and excavation, mitigation measures such as erosion and sedimentation controls (i.e., silt fence, filter bags) would be implemented to reduce impacts to the natural environment. Soil which is not immediately used for backfilling would be stockpiled and covered or otherwise protected (e.g., surrounded by silt fence) to prevent erosion or sedimentation. In addition, temporary seeding and mulching may be used to minimize soil erosion and provide soil stabilization on slopes.

For more details on construction impacts and mitigation refer to Section 5.13.3.2. – *Solid Waste Disposal, Construction Impacts and Mitigation Measures.*

5.2.2.3 Operational Impacts and Mitigation Measures

The primary objective of all the alternatives is to upgrade and improve the existing WWTP; thereby, providing capacity for future flows and secondary treatment. However, even with an improved system, there is the potential for wastewater spills to occur which would result in contamination of the soils. Soils stability inspections near the proposed facilities would need to be conducted periodically to make sure there are no issues with the foundation of the facilities.

The larger stormwater BMP system, including stormwater detention/infiltration basins at several locations within the project area and vegetated drainage swales, would enhance drainage and erosion control during operation. With the implementation of the BMP system, this project is not anticipated to result in operational impacts to soils.

5.3 Hydrology

5.3.1 Groundwater

5.3.1.1 Existing Setting

The Honouliuli WWTP site is located within the Waipahu-Waiawa system within the Pearl Harbor State of Hawaii Department of Land and Natural Resources (DLNR) aquifer sector. The sustainable yield for the Waipahu-Waiawa system is approximately 16 MGD, and it is the primary source of drinking water for the study area. The closest well to the WWTP site is approximately 3.1 miles to the north. The WWTP site is also located within the Southern Oahu Basal Aquifer, which is designated as a Sole Source Aquifer by the EPA. EPA review is required for federally funded projects within a Sole Source Aquifer to determine if there is potential for contamination. EPA review is not required for state, local, or privately funded projects (EPA 2014).

Groundwater moves downward until it encounters impermeable geological features and contributes to the freshwater (Ghyben-Herzberg) lens or emerges as springs. In Hawaii, the thickness of the lens generally decreases seaward, but it can be "dammed" near the coastline by sediments or limestone caprock. The majority of the water supply on Oahu is from the freshwater within these aquifer systems. There are no public groundwater wells within a one-mile radius of the WWTP site (SWCA 2015).

Groundwater recharge is a potentially feasible effluent use in addition to irrigation and industrial use that has been identified for Honouliuli effluent. According to *Water Reuse: Issues, Technologies, and Applications* (Metcalf & Eddy 2007), "groundwater recharge has been used to: (1) reduce, stop, or even reverse declines of groundwater levels; (2) protect underground freshwater in coastal aquifers against saltwater and brackish water intrusion; and (3) store surface water, including flood or other surplus water and reclaimed water, for future reuse." In groundwater recharge, the effluent moves from the surface water to the groundwater via the vadose layer. The soils, sand, and roots in the vadose layer act as a filter before the effluent reaches the groundwater.

5.3.1.2 Construction Impacts and Mitigation Measures

It is anticipated that limits would be applied to the Honouliuli WWTP effluent if the reclaimed water from the HWRF were considered for aquifer recharge, or reuse irrigation per current *Guidelines for the Treatment and Use of Recycled Water* (DOH 2002), hereafter referred to as the *Reuse Guidelines.* The proposed limits are shown in Table 5-1. Discharge locations for groundwater recharge have not been identified yet.

Table 5-1. Irrigation or Groundwater Recharge Criteria

Parameter	Limit
BOD_5, mg/L	30
TSS, mg/L	30
Total Nitrogen, mg/L	10
Total Phosphorus, mg/L	1
Turbidity, NTU	2
Fecal Coliform, per 100 mL	2.2 [(1)]

Legend: mL = milliliter.
Source: DOH 2002
[(1)] For disinfected R-1 Water.

Regardless of the alternative selected, construction activities could potentially impact groundwater if encountered during construction (e.g., potential for accidental release of construction equipment fluids (e.g., oil and grease)). Mitigation measures would be implemented during construction activities to preserve the integrity of existing infrastructure (sewer piping, etc.) and keep construction equipment in good working condition to prevent accidental spills. Also, dewatering may be necessary for construction that occurs below the groundwater table, including construction of a potential underground parking facility. Any construction activity occurring in or near groundwater would be conducted in accordance with applicable regulations. In addition, appropriate BMPs (e.g., silt fences, proper storage and movement of spoil), monitoring of groundwater and careful site preparation would be utilized to minimize adverse impacts.

5.3.1.3 Operational Impacts and Mitigation Measures

The stormwater detention/infiltration basins proposed at several locations within the project area may have an effect on the local groundwater table by raising the local groundwater table near the basins during and for some time after rain events (groundwater mounding). Since these basins would be designed as part of a larger stormwater BMP system including vegetated drainage swales, this system is anticipated to enhance the quality of stormwater recharge to groundwater.

Regardless of the alternative selected, this project is being implemented to reduce the potential of sanitary sewer overflows (SSOs) by increasing capacity of the existing treatment system for current and future needs. The proposed increase in capacity could also enable and/or encourage currently unsewered areas to connect to a centralized system, as was conservatively assumed for flow projections for design purposes. Unsewered areas in the sewer basin are on individual wastewater systems (IWSs). IWSs, if not maintained properly, may contaminate groundwater.

The conversion of existing on-site wastewater treatment population to sewered population may also result in a reduction to local groundwater recharge, as its wastewater no longer would be discharged to the groundwater, but would be conveyed to the WWTP and discharged at the ocean outfall. Depending on the sub-basin area, this could have localized effects on groundwater levels.

As with any wastewater system, there is the potential for leakage and breakage in sewerlines that would result in impacts to groundwater; therefore, mitigation measures for the operational impacts include proper operation and maintenance of the proposed facilities.

5.3.2 Surface Water

A natural resources survey, including a discussion of streams in the vicinity of the proposed project, was conducted by SWCA in November 2014 (SWCA 2015), and is attached as Appendix B and summarized below as it pertains to the project site and immediate vicinity.

5.3.2.1 Existing Setting

A National Wetland Inventory (NWI)-mapped wetland (former drainage ditch) is located in the eastern portion of the property, generally oriented north-south, as shown on Figure 5-3. This wetland is part of the abandoned irrigation system from when the area was used for agricultural purposes and no longer functions as an active irrigation ditch. Some standing water may be observed during rain events; however, surface water does not appear to persist throughout the year.

In addition, the Kaloi Gulch Stream lies to the north of the site and several small ponds associated with Coral Creek Golf Course are located to the east of the project site, as shown on Figure 5-3. Wetlands. Several of these small ponds are connected by small stream segments.

5.3.2.2 Construction Impacts and Mitigation Measures

Erosion and sedimentation measures would be employed where necessary during construction activities; therefore, nearby off site surface waters are not anticipated to be impacted as a result of stormwater during construction activities. Construction activities will also be conducted in compliance with a CWA 402 NPDES Construction Stormwater Permit issued by the Department of Health – Clean Water Branch.

The existing abandoned irrigation ditch described above would be permanently impacted (filled) during site construction. Since this ditch is no longer used for irrigation purposes, no impacts to the ability to irrigate within the vicinity of the proposed project are anticipated. The project team will consult with the Army Corps of Engineers, U.S. Fish and Wildlife, CCH, and other regulatory agencies, as necessary, to determine whether filling the former irrigation ditch is jurisdictional under current regulations. If the ditch is determined to be jurisdictional by one or more agencies, then the project team would work with the appropriate agencies to determine acceptable mitigation options. A Stream Channel Alteration Permit (SCAP) may be required from the DLNR Commission on Water Resource Management for any temporary or permanent activity within the former irrigation ditch, and a wetland survey may be required.

New CCH drainage standards requiring low impact development strategies went into effect in June 2013 (DPP 2012). The design storm runoff from 1 inch of rainfall must be retained on-site to the maximum extent practicable, using Post-Construction Treatment Control BMPs. The design of stormwater retention and quality basins must take into consideration the soil type, proximity to the groundwater table, and stormwater discharge permit limits.

Stormwater management retention/infiltration basins and related facilities are proposed throughout the WWTP site, as shown on Figure 4-6, the Site Layout for Phase 1. The stormwater basins at the Honouliuli WWTP site would be shallow dry basins except during and after storm events, until infiltration and/or evaporation of basin contents is complete. Surface flow conveyance would be used to the greatest extent possible by incorporating vegetative drainage swales to address constructability issues as well as to enhance stormwater quality.

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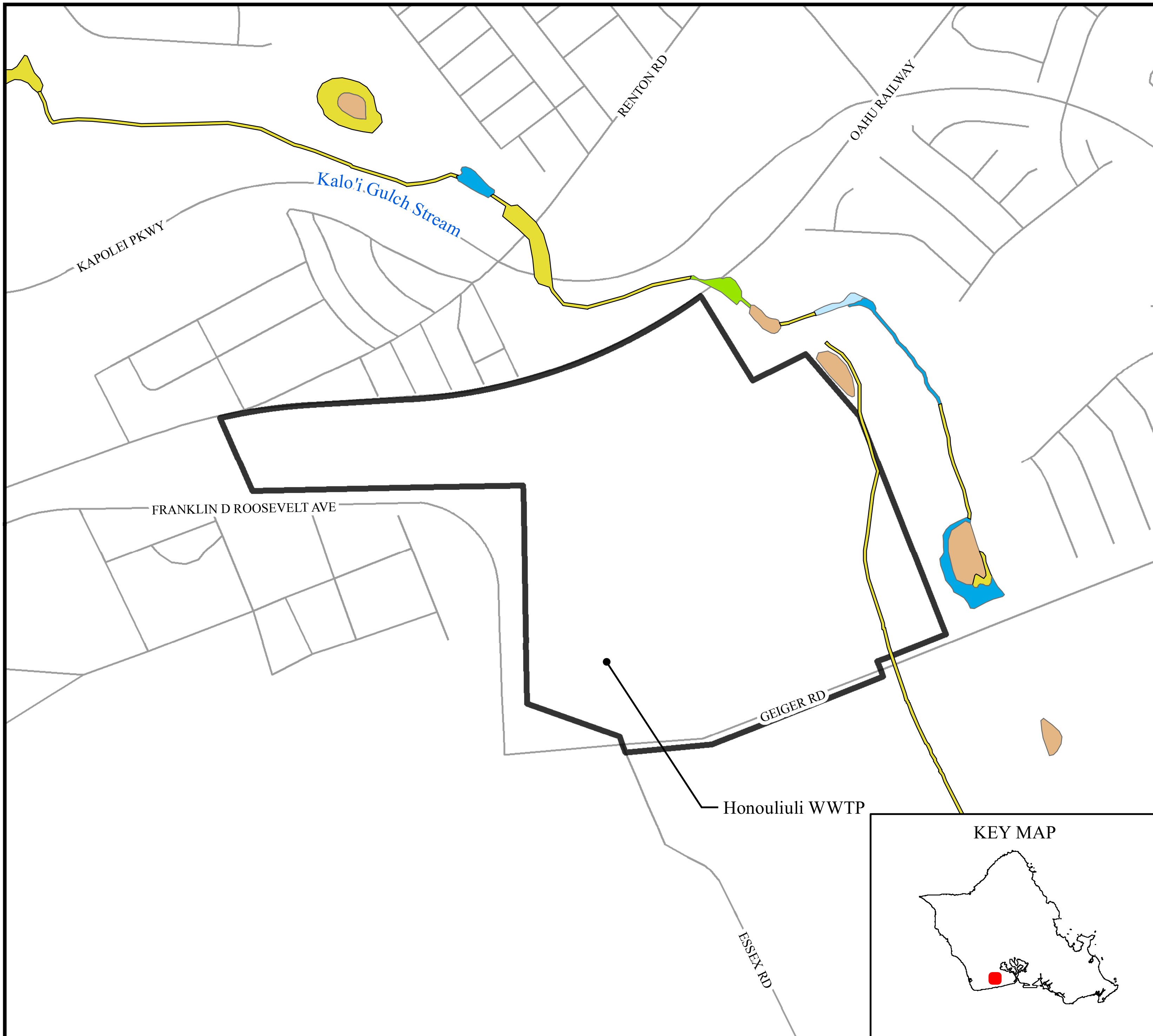

Legend

- Honouliuli WWTP

Wetland Type

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Freshwater Unconsolidated Shore/ Temporarily Flooded
- Riverine
- Street

0 700
Feet
1 inch = 700 feet

FIGURE 5-3

WETLANDS

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Consideration would be given to implementation of various best management practice structures from the new drainage standards that can serve as demonstration-type installations for future developments. In addition, the road frontage area along Geiger Road with large trees and a landscaped area would be used as a vegetative buffer and for stormwater management. This area would provide overland flow of stormwater across a vegetated area that would perform as both a vegetated swale and an infiltration area.

5.3.2.4 Operational Impacts and Mitigation Measures

The project may result in an increase in future effluent discharged to Mamala Bay via the Barbers Point Deep Ocean Outfall. However, with the implementation of BMPs on site, this project is not anticipated to result in operational impacts to nearby surface waters.

5.3.3 Coastal Waters

A natural resources survey was conducted by SWCA in November 2014 (SWCA 2015). It is attached as Appendix B and information relevant to coastal waters is summarized below.

5.3.3.1 Existing Setting

The nearest coastal water to the project site is West Mamala Bay (and Pacific Ocean), located approximately 1.8 miles south of the project site. Pearl Harbor (West Loch) is located approximately 2.2 miles northeast of the project site.

The effluent from the Honouliuli WWTP is discharged to Mamala Bay via the Barbers Point Deep Ocean Outfall. As described in Section 2.3, the 84-inch diameter outfall extends approximately 8,760 ft into the ocean and discharges treated effluent approximately 200 ft below the surface through a 1,750-ft long diffuser pipe. The marine environment in the vicinity of the Barbers Point outfall comprises a barren area of low-relief, calcium carbonate sand bottom, although the outfall pipe and armor rock provide areas of increased habitat complexity (Smith and Dollar 1987). Smith and Dollar (1987) observed very few macro-benthic invertebrates or fish in the outfall environment.

5.3.3.2 Construction Impacts and Mitigation Measures

Since the nearest coastal water is located approximately 1.8 miles from the project site, it is unlikely that construction activities at the Honouliuli WWTP would directly impact coastal waters as a result of stormwater runoff and sedimentation. However, potential impacts would be mitigated by adherence to Federal, State, and City water quality regulations governing grading, excavation, stockpiling, and sedimentation and erosion by stormwater during construction. No construction activities are proposed in the vicinity of the outfall.

5.3.3.3 Operational Impacts and Mitigation Measures

Operation of the proposed project is for purposes of compliance with the consent decree which requires treatment facilities necessary to comply with secondary treatment standards, as discussed further in Section 5.7, Water Quality. In addition, this project would minimize the potential of additional SSOs from the existing conveyance and treatment system. The increase in the capacity would allow the connection of currently unsewered areas on IWSs into the CCH's wastewater system and would be consistent with Primary Urban Center (PUC) and Ewa Development Plans and the Central Oahu Sustainable Communities Plan; therefore reducing the chances of contamination to coastal waters.

There is a potential for indirect impacts due to additional development allowed by sewered areas, including an increase in wastewater flow to the Honouliuli WWTP and effluent discharged to Mamala Bay.

5.4 Natural Hazards

5.4.1 Hurricanes

5.4.1.1 Existing Setting

Tropical storm systems that have sustained winds exceeding 73 miles per hour, form in warm tropical waters near the equator, and strike in the Atlantic and Eastern Pacific Oceans are known as hurricanes. Similar tropical storm systems that strike in the Western Pacific Ocean, Indian Ocean and Southern Pacific Oceans are called typhoons and cyclones, respectively. Due to the geographic location of Hawaii within the Eastern Pacific Ocean, tropical storms that strike Hawaii are referred to as hurricanes. In Hawaii, hurricane season runs from June 1st to November 30th. The last major hurricane (Category 4) was Iniki, which passed over Kauai on September 11, 1992. Although most of the damage was on Kauai, Oahu also experienced some damage from wind and storm surge, which did not impact the Honouliuli WWTP. When a hurricane hits the island, the wastewater management facilities are just as likely to be damaged as any other structure in the area.

5.4.1.2 Impacts and Mitigation Measures

Regardless of the alternative selected, neither construction nor operation related activities are expected to impact hurricanes or the frequency of hurricanes in the project area. However, during construction, there is the potential that a hurricane could occur. A public emergency siren operated by the State of Hawaii Department of Defense (HDoD), which would be used in the event of a hurricane, is located at Ewa Makai Middle School approximately 0.6 miles southeast of the site. This alarm may not be audible at the WWTP site, as these sirens are typically audible within 0.5 miles. However, information would also be available via television, internet, and radio.

In the event that a hurricane is predicted, construction equipment would be secured and all applicable Federal, State, and CCH requirements would be implemented to reduce potential damage. Emergency procedures outlined in the Honouliuli WWTP Health and Safety Plan would be followed. If evacuation is required, the nearest Public Emergency/ Hurricane Evacuation Shelter is located at Ewa Elementary (see Figure 5-13), approximately 0.7 miles north of the WWTP site. The closest open shelter can also be found by texting “shelter 96706”, which is the zip code of the Honouliuli WWTP, to “43362” (4FEMA) (FEMA 2014).

As a long-term measure, the wastewater management facilities would be designed and constructed to meet all applicable International Building Code (IBC) and Federal, State, and CCH requirements to help protect against potential structural impacts resulting from a hurricane or accommodate future meteorological events related to climate change. Back-up power supply would be available at the facilities to help prevent SSOs during emergencies and power outages.

5.4.2 Tsunamis

5.4.2.1 Existing Setting

Tsunamis are a series of waves that are created by sea floor movements caused by earthquakes, landslides, or volcanic eruptions. The Hawaiian Islands are always at risk for tsunamis, as the islands are susceptible to tsunamis generated from earthquake and volcanic activity from the area bordering the Pacific Ocean (also known as the “Rim of Fire”). The last major tsunami was the 1960 Hilo tsunami. Although this particular tsunami did not affect Oahu, tsunamis can be a hazard on Oahu.

The CCH Department of Emergency Management (DEM) completed revised Oahu tsunami evacuation zone maps in 2010. According to the tsunami evacuation zone maps, the WWTP site is not located within a tsunami evacuation zone. The Honouliuli WWTP is located approximately 1.5 miles north of the shoreline (areas within 1 mile of the coastline are at greater risk, according to the Federal Emergency Management Agency [FEMA]).

5.4.2.2 Impacts and Mitigation Measures

Regardless of the alternative selected, neither construction nor operation related activities are expected to impact tsunamis or the frequency of tsunamis in the project area.

As mentioned in Section 5.4.1, Hurricanes, the HDoD public emergency siren located at Ewa Makai Middle School would be used in the event of a tsunami. As previously mentioned, this alarm may not be audible at the WWTP site. Information would also be available via television, internet, and radio.

In the event that a tsunami alert is given, construction equipment would be secured and all applicable Federal, State, and CCH requirements would be implemented to reduce potential damage. Emergency procedures outlined in the Honouliuli WWTP Health and Safety Plan should be followed. FEMA recommends moving to higher ground, at least two miles from the coastline (FEMA 2014). If evacuation is required, the closest Public Emergency/ Hurricane Evacuation Shelter located greater than 2 miles from the shoreline is located at Ewa Elementary (see Figure 5-13), approximately 0.7 miles north of the WWTP site. The closest open shelter can also be found by texting “shelter 96706” to “43362” (4FEMA) (FEMA 2014).

As a long-term measure, the wastewater management facilities would be designed and constructed to meet all applicable IBC and Federal, State, and CCH requirements to help protect against potential structural impacts resulting from a tsunami. Back-up power supply would be available at the facilities to help prevent SSOs during emergencies and power outages.

5.4.3 Earthquakes

5.4.3.1 Existing Setting

Oahu does not have any active volcanoes; therefore, the island is not subject to significant earthquakes from volcanic activity. However, earthquakes are not uncommon in Hawaii. Most earthquakes in the Hawaiian Islands are caused by volcanic activity on the island of Hawaii, the Big Island. Earthquakes that reach Oahu are generally not strong and cause little or no damage. One of the larger and more recent earthquakes occurred offshore of Puakō, Hawaii. The earthquake measured 6.7 on the Richter scale and caused minor damages on the island of Oahu. When an earthquake hits the island, the wastewater management facilities are just as likely to be damaged as any other structure in the area.

The IBC classifies likelihood of seismic activity into zones ranging from 0 to 4. Seismic Zone 0 represents no chance of severe ground shaking and Seismic Zone 4 represents a 10% chance of severe shaking in a 50-year interval. The IBC classifies Oahu as Seismic Zone 2A.

5.4.3.2 Impacts and Mitigation Measures

Regardless of the alternative selected, neither construction nor operation related activities are expected to impact earthquakes or the frequency of earthquakes in the project area. However, there is the potential for an earthquake to occur during construction or operation. Therefore, all applicable Federal, State, and CCH requirements would be implemented to minimize impacts that may result during the construction of the proposed project. In addition, as a long-term measure, the proposed wastewater management facilities would be designed and constructed to meet Seismic Zone 2A requirements and all applicable IBC and Federal, State, and CCH requirements. Back-up power supply would be available at the facilities to help prevent SSOs during emergencies and power outages.

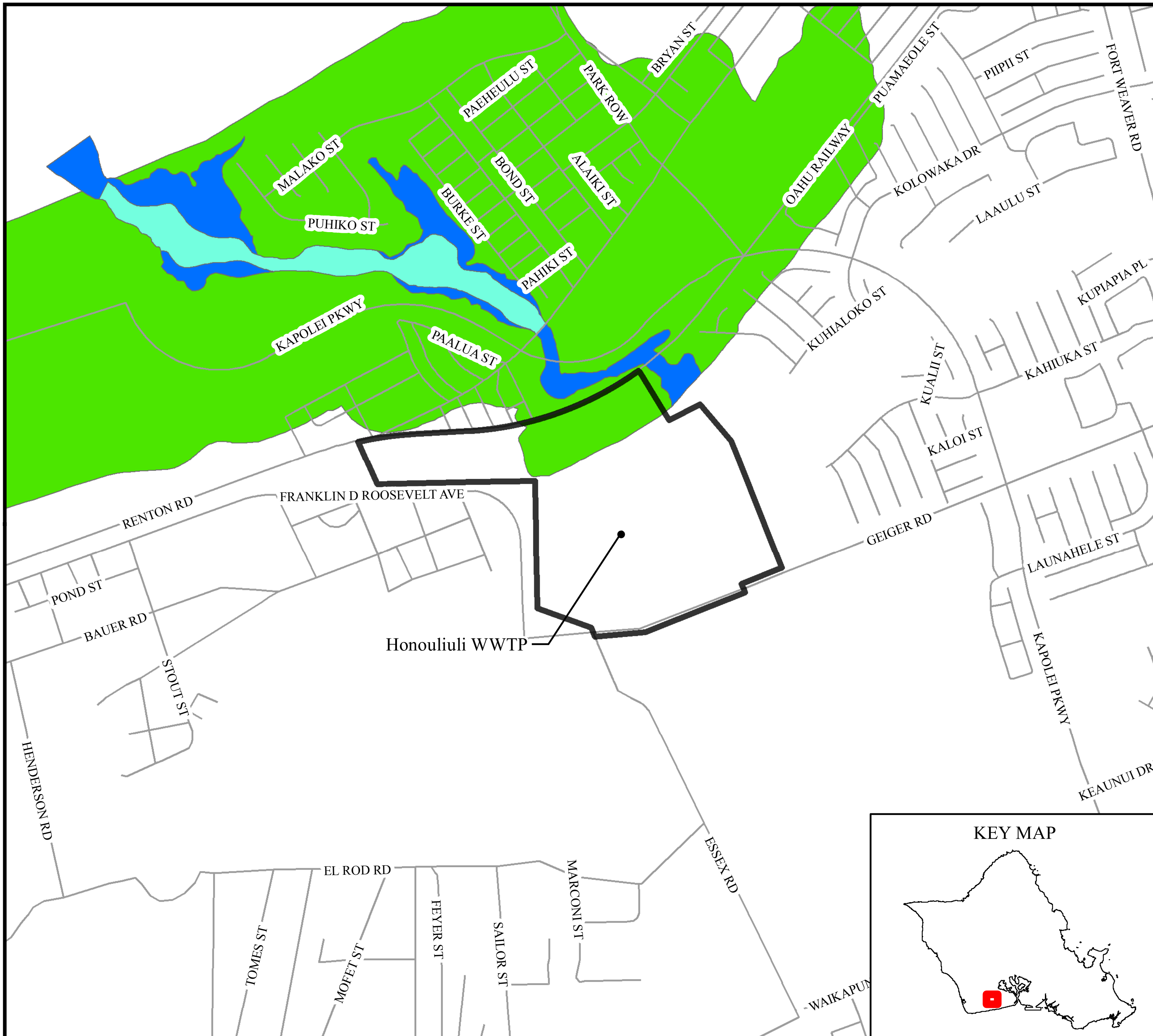
5.4.4 Flood Hazard

5.4.4.1 Existing Setting

The Honouliuli WWTP is located to the north of the southwestern coastline on the island of Oahu. The CCH DPP has digitized FEMA’s flood insurance rate maps from 2006 to 2007 into a GIS flood zone layer. According to the digitized flood zone layer, the WWTP is not located within a flood prone area (Figure 5-4).

5.4.4.2 Construction Impacts and Mitigation Measures

The existing Honouliuli WWTP is not located within a flood zone; therefore, regardless of the alternative implemented, no flood hazard impacts are anticipated.



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Legend

- Honouliuli WWTP
- Street

Flood Zones

- AE = 100 Year Flood, Base Flood Elevation Determined
- AEF = 100 Year Flood, Flood Way Area With AE
- X = Beyond 500 Year Flood Plain

0 — 1,200

Feet

1 inch = 1,200 feet

FIGURE 5-4

PROJECT AREA FIRM

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5.4.4.3 Operational Impacts and Mitigation Measures

No permanent changes in grade within the flood zone are proposed. Therefore, no operational impacts are anticipated.

5.4.5 Climate Change

5.4.5.1 Existing Setting

Planning for climate change is challenging as there are several changing and unknown factors. The risks of climate change include changes in rainfall intensity, sea level rise, groundwater levels, and impacts from storm hazards. The United States Army Corp of Engineers (USACE) has developed tools and references for guidance. One such tool, available on the USACE Climate Change website, is the USACE sea level rise calculator – which may be used to provide sea level predictions. In addition to the USACE tools and reference, there are also ongoing efforts at the State and CCH to evaluate changes that need to be made to current rules, regulations, and practice standards, with the ultimate goal of establishing a standard that can be implemented State wide. It is anticipated that as additional data is collected over the next 10 to 20 years, trends and future projections are refined, and new standards and codes are developed, the planning for the next phase at the WWTP site will be adjusted accordingly for the site buildout by 2050. The projected trends in meteorological events currently show a range of projections, but a convergence of the projections is expected as more data is obtained and the models are refined.

Regarding the sea level rise issue, the Honouliuli WWTP site varies from 25 to 40 feet above sea level, and is well above the projected sea level change for Honolulu which ranges from a low of 0.3 ft. to a high of 1.5 ft. through the year 2050, as calculated utilizing the Army Corps of Engineers' Sea-Level Rise Calculator. Resiliency in withstanding flood events will be appropriately addressed during the design phase in accordance with the standards that are in affect. New flood standards that will be developed in the future to address climate changes will affect the planning and design of future improvement projects for the site buildout by 2050.

5.4.5.2 Operational Impacts and Mitigation Measures

At grade improvements constructed under the proposed project varies from 25 to 40 feet above MSL. Since the potential rise through 2050 ranges from 0.3 to 1.5 feet, the near term impacts to the WWTP will be minimal. State and City policies and regulations on sea level rise mitigation are still in the process of development. As these issues become clearer, the planning for additional long-range improvements at the Honouliuli WWTP will need to appropriately address these issues in the future. Changes in sea levels are anticipated to occur gradually and over many years, which should provide CCH sufficient time to plan and implement the necessary measures.

It is likely that over time, the existing ocean outfall will experience reduced flow capacity due to the effects of sea level rise. Addressing all the impacts of sea level rise on this outfall system will likely be done in future planning efforts.

CCH recognizes the threat of climate change and the importance of planning for its effects. Full support and cooperation will be provided towards the ongoing efforts to establish State-wide policies and regulations. The Department of Environmental Services intends to work with other State and County agencies in the future as the guidance and policies to address climate change are further developed.

5.5 Natural Environment

A natural resources survey was conducted by SWCA on November 16, 2014 (SWCA 2015). The survey included the area within the fence line of the original WWTP site as well as the area to the immediate north, northwest and east of the bounds of the existing Honouliuli WWTP (hereafter referred to as the expansion property). The *Biological Resource Assessment* summarizing the results of this survey is attached as Appendix B and is summarized below (SWCA 2015).

5.5.1 Flora

5.5.1.1 Existing Setting

In general, the vegetation observed within the surveyed area is typical of the vegetation typically found within disturbed urban areas. Within the fenceline of the original WWTP site, the areas around the treatment works are generally paved or covered with gravel to facilitate maintenance. Areas typically not requiring access for treatment works are manicured grass. Several large well-established cultivated trees are located sporadically throughout the property and along Geiger Road to the south of the site. The majority of vegetation on the expansion property is grass, brush, and small trees, as further described below. Open areas with extensive patches of bare ground, gravel, and asphalt exist within this area; the expansion area has been disturbed by past and current land uses (SWCA 2015).

During the natural resources survey, a total of 79 plant taxa were observed within the survey area, including four species native to the Hawaiian Islands: ʻaʻaliʻi (*Dodonaea viscosa*), hinahina (*Vitex rotundifolia*), ma ʻo hau hele (*Hibiscus brackenridgei*), and ʻuhaloa (*Waltheria indica*), which are all common throughout the Hawaiian Islands. Of the four indigenous plant species, only one, the ma ʻo hau hele (the Hawaiian state flower), is a Federally-listed species. However, this species was observed within a garden adjacent to a facility building; therefore, it is likely cultivated and not naturally occurring. No other State- or Federally-listed threatened, endangered, or candidate plant species were observed in this area during the survey. Although the Honouliuli WWTP is located within the historical range of the endangered koʻoloaʻula (*Abutilon menziesii*), the species was not observed during the natural resources survey and is not known to have recently been documented in the project area. According to the Threatened and Endangered Plants layer from the Hawaii Statewide GIS Program, there are no known threatened or endangered plants in the project area.

The vegetation in expansion property portion of the survey area is primarily characterized as a highly disturbed kiawe (*Prosopis pallida*) forest that covers approximately 47.8 acres with sparse Guinea grass (*Urochloa maxima*) cover in the understory due to the presence of leaf litter, dry conditions, and grazing (Figure 5-5). Metal scraps, debris, and graveled and asphalt areas were observed within portions of the surveyed area. The kiawe trees range from 4.5–8 meters (15–26 ft) tall and comprise approximately 70% of the tree cover throughout the survey area. Large koa haole (*Leucaena leucocephala*) and Manila tamarind (*Pithecellobium dulce*) trees sparsely scattered throughout the kiawe forest comprise most of the remaining tree cover. Two herbaceous species, lion's ear (*Leonotis nepetifolia*) and golden crown-beard (*Verbesina encelioides*), are widely distributed throughout the understory. Other non-native herbaceous and shrub species scattered sparsely throughout the area or in isolated patches include khaki weed (*Alternanthera pungens*), spiny amaranth (*Amaranthus spinosus*), wild bean (*Macroptilium lathyroides*), hairy abutilon (*Abutilon grandifolium*), bracted fanpetals (*Sida ciliaris*), and Cuban jute (*Sida rhombifolia*). The non-native, parasitic western field dodder (*Cuscuta campestris*) was also found within larger trees during the survey.

Figure 5-5. Kiawe Forest within the Expansion Property with Sparse Guinea Grass Cover in the Understory (SWCA 2015).

5.5.1.2 Construction Impacts and Mitigation Measures

The total anticipated area of grading, grubbing, and clearing for construction activities is approximately 75 acres. Regardless of the alternative implemented, it would be necessary to clear vegetation for the construction of new facilities within the expansion property. Tree clearing for improvements within the existing WWTP site would not be required. Given that the area has been highly altered by human activity and generally lacks environmentally sensitive naturally occurring species, the proposed work is not expected to result in any significant adverse impact on the flora within the WWTP site. Native Hawaiian plants are recommended for landscaping within the project area, including species such as: koʻoloaʻula, kou (*Cordia subcordata*), ʻilieʻe (*Plumbago zeylanica*), and ʻaʻaliʻi.

5.5.1.3 Operational Impacts and Mitigation Measures

Although construction of new structures would result in permanent impacts to the plants present at the WWTP site, the proposed facilities would be located within previously disturbed areas. Areas with new facilities would be landscaped after construction; native plant species are recommended for landscaping whenever possible. Therefore, no significant operational impacts to flora in the area are anticipated, regardless of the alternative implemented.

5.5.2 Fauna

5.5.2.1 Existing Setting

The fauna within the surveyed vicinity of the WWTP site is dominated by non-native birds and mammals. Nine introduced and one indigenous bird species were recorded during the natural resources survey in the surveyed vicinity of the WWTP site. The common myna (*Acridotheres tristis*) was the most frequently observed, as well as the zebra dove (*Geopelia striata*) and spotted dove (*Streptopelia chinensis*). All of these species are common to the main Hawaiian Islands, particularly in urban or disturbed areas (HAS 2005; as referenced in SWCA 2015).

Only one native species, the migratory Pacific golden plover (*Pluvialis fulva*), was observed in this area. This species is abundant throughout Hawaii.

The WWTP site is located directly adjacent to the Coral Creek Golf Course, which contains water features that are attractive to waterbirds. As a result, it is possible that endangered Hawaiian stilts (*Himantopus knudseni*) could be present in close proximity to the proposed project area. Hawaiian stilts, as well as Hawaiian coots (*Fulica alai*), are highly mobile and may occupy newly, sometimes unintentionally, created habitat for foraging and even nesting such as areas that hold standing water after heavy rainfall. There are currently no nesting water birds within the proposed project area.

Four migratory bird species protected under the amended Migratory Bird Treaty Act (MBTA) of 1918 were observed during the survey, including the cattle egret (*Bubulcus ibis*), Hawaiian duck–mallard hybrids, Pacific golden plover, and house finch (*Haemorhous mexicanus*).

Other fauna observed during the survey included mammals: feral cats (*Felis catus*) and small Asian mongooses (*Herpestes javanicus*); and invertebrates: the globe skimmer (*Pantala flavescens*) and two butterflies, including the Gulf fritillary (*Agraulis vanillae*) and the western pygmy blue butterfly (*Brephidium exilis*). The globe skimmer is native to Hawaii. No reptiles or amphibians were observed during the survey.

No State- or Federally-listed threatened, endangered, or candidate bird, mammal, or insect species were observed during the survey of the Honouliuli WWTP site. The endangered pueo (*Asio flammeus sandwichensis*) was not observed during the survey; however, this bird species occurs in habitat found at the WWTP site, including wet and dry forests, grasslands, shrublands, and urban areas. The endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*) is the only native land mammal in Hawaii, and there are no native reptiles or amphibians in Hawaii. Surveys were not conducted for the endangered Hawaiian hoary bat, but this species is not likely to utilize the highly fragmented and urban area in the vicinity of the WWTP site.

No aquatic fauna was observed or is known to occur at the proposed project site. Aquatic fauna that may occur in the vicinity of the Barbers Point ocean outfall in Mamala Bay include large numbers of fish such as bluestripe snapper (*Lutjanus kasmira*), *blotcheye soldierfish* (*Myripristis berndti*), and bigeye scad (*Selar crumenophthalmus*) and mammals including spinner dolphins (*Stenella longirostris*). Federally endangered species that may occur in Mamala Bay in limited numbers include humpback whales (*Megaptera novaeangliae*), Hawaiian monk seals (*Monachus schauinslandi*), and green sea turtles (*Chelonia mydas*). The monk seal is not common in the main Hawaiian Islands. Marine mammals are protected under the Marine Mammal Protection Act.

5.5.2.2 Construction Impacts and Mitigation Measures

Regardless of the alternative selected, the proposed project activities are not expected to impact non-native and native species.

Considering the presence of endangered waterbirds in the vicinity of the WWTP site, endangered/listed species may be attracted to construction sites or facilities if (temporary) habitat is created. Construction activities could create temporary depressions at the work sites that, if they accumulate standing water, might attract waterbirds, particularly the endangered Hawaiian stilt. Should this happen, activities in the area would be disrupted and may be stopped temporarily in compliance with the Endangered Species Act (ESA). Other BMPs, including conducting nest searches during nesting periods (February to August for the Hawaiian stilt) prior to the start of construction may be employed, as recommended in SWCA 2015.

Construction lights are known to blind and disorient migratory birds. Therefore, during construction, mitigation measures including shielding lights and facing the lights downward would be used to minimize impacts to migratory birds. All work would be in accordance with Federal, State and CCH regulatory requirements including, but not limited to the MBTA and the ESA.

Due to the presence of suitable habitat for the endangered pueo in the vicinity of the WWTP, mitigation measures would be implemented to reduce disturbance to the species, including suspending work with heavy machinery or vehicular traffic within 300 feet of any area where indications of nesting are observed until young birds have the opportunity to fledge (SWCA 2015).

Although the potential for encountering Hawaiian hoary bats is small, measures to avoid impacts include: avoiding the use of barbed wire on the top of any fences erected for the proposed project to help prevent entanglement and avoiding trimming trees taller than 15 ft between June 1 and September 15 during the period when juvenile bats may be roosting.

No construction activities are proposed in the vicinity of the outfall; therefore, impacts to marine fauna in the vicinity of the outfall are not anticipated.

5.5.2.3 Operational Impacts and Mitigation Measures

Few long-term impacts to fauna are anticipated from operation and maintenance, regardless of the alternative implemented. Fauna observed within the area would likely find suitable habitat in nearby areas. The operation of an upgraded (secondary treatment) Honouliuli WWTP is expected to improve the quality of the wastewater discharged; thus reducing the chance of altering the marine environment. The upgrade is likely to reduce nutrient and chemical pollution from the wastewater.

5.5.3 Wetlands

5.5.3.1 Existing Setting

The U.S. Army Corps of Engineers, EPA, and DOH define wetlands as areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.

The Kalo‘i Gulch Stream is located to the north and east of the project site. Manmade ponds located within the golf course to the north and east of the project area are connected to this stream. The USFWS’s NWI classifies these ponds as “PUBHx“ (Palustrine Unconsolidated Bottom, permanently flooded, and excavated). One manmade pond located within the golf course is located adjacent to the WWTP property. In addition, an abandoned irrigation ditch flows from this pond south through the existing WWTP facility and is classified as “PSS3Ax” (Palustrine Scrub-Shrub, Broad-Leaved Evergreen, temporarily flooded, and excavated wetland). Figure 5-3 illustrates wetlands identified by the U.S. Fish and Wildlife Service’s (USFWS) NWI within the vicinity of the project area.

5.5.3.2 Construction Impacts and Mitigation Measures

During design, facilities would be located to: 1) avoid to the maximum extent practicable, 2) minimize and 3) mitigate impacts to the wetland resources in the project area. However, it is anticipated that the former irrigation ditch located on the project site would need to be filled to construct the various site components in that location. The project team will consult with the Army Corps of Engineers, USFWS, CCH, and other regulatory agencies, as necessary, to determine whether filling the abandoned irrigation ditch is jurisdictional under current regulations. If the ditch is determined to be jurisdictional by one or more agencies, then the project team would work with the appropriate agencies to determine acceptable mitigation options. A SCAP may be required from the DLNR Commission on Water Resource Management for any temporary or permanent activity within the former irrigation ditch, and a wetland survey would likely be required. All work would be performed in accordance with Federal, State, and CCH regulatory requirements including, but not limited to the Section 404 of the Clean Water Act, if applicable.

5.5.3.3 Operational Impacts and Mitigation Measures

This project is not anticipated to result in operational impacts to nearby wetlands. Wetlands may be indirectly affected by the lowering of groundwater due to increased water demand from the projected increase in population and potential subsequent reduction of groundwater recharge. However, there is potential that treated effluent would be used for groundwater recharge, thereby minimizing impacts to groundwater. Discharge locations for groundwater recharge have not been identified yet.

5.6 Archaeological and Historical Resources, and Cultural Impact Assessment

As defined in HRS Chapter 6E and Chapter 50.

At the request of AECOM, Cultural Surveys Hawai'i, Inc. (CSH) prepared an archaeological assessment (Yucha et al. 2015) and a Cultural Impact Assessment (Cruz e al. 2011) for the proposed project. The assessments are attached as Appendix C and summarized below. The scope of work for the archaeological and cultural impact assessment comprised:

1. Historical research including study of archival sources, historic maps, Land Commission Awards (land titles), and previous archaeological reports to construct a history of land use and determine if archaeological sites have been recorded on or near the project area.
2. A pedestrian inspection of the southwestern portion of the project area, including the heavily built-out WWTP, to identify any surface archaeological features and to investigate and assess the potential for impact to such sites. This inspection was undertaken to identify sensitive areas that may require further investigation or mitigation before the project proceeds.
3. Consultation with Hawaiian organizations, agencies, community members and cultural practitioners in the vicinity of the Honouliuli WWTP in order to identify individuals with cultural expertise and/or knowledge of the Project area and the vicinity. The organizations consulted included SHPD, the Office of Hawaiian Affairs (OHA), the Oahu Burial Council (OIBC) and community and cultural organizations.
4. Preparation of the assessment report including the results of the historical and cultural research and the fieldwork with an assessment of archaeological potential based on that research, and with recommendations for further archaeological work, if appropriate. Mitigation recommendations, if there are archaeologically sensitive areas that need to be taken into consideration, also would be provided.

5.6.1 Existing Setting

The project area is within an inland, dry coral plain that in pre-Contact times had a thin to absent soil layer. Due to its distance from the coast and Pearl Harbor, and from an adequate source of fresh water, this inland area was little used during the period prior to Western contact. Within or in the vicinity of the project area, there are no Land Commission Awards, indicating that during the division and redistribution of land in 1848 there were no verified claims to lands in the area. Trails passed through the vicinity but are not believed to have passed through the project site. From the late 1800s through the late 1900s, a century of commercial sugar cane cultivation was enabled by the drilling of groundwater wells and the diversion of surface water from distant stream systems, as well as by the hydraulic transport of soils from mountain slopes to the plain. The intensive land disturbance associated with the establishment and operation of the cane plantations probably removed most of any evidence of pre-Contact use that may have existed.

Previous archaeological studies have not reported archaeological resources within or in the vicinity of the project area, and the archaeological sensitivity of the area is generally regarded as low. O'Hare et al. (2011) noted that the project area has been extensively disturbed by prior infrastructure construction and is of relatively low archaeological concern. In another study, O'Hare et al. (2007) focused on the area in the vicinity of the expansion property, along the north and east sides of the Honouliuli WWTP, but identified no historic properties. This study found evidence of extreme ground disturbance and did not find Hawaiian traditional features on the surface. O'Hare et al. (2007) concluded that it is highly unlikely that there are any subsurface Hawaiian features intact. The existing WWTP is not known to have been the subject of previous formal archaeological investigation; however, the property has undergone extensive land disturbance associated with the construction of the infrastructure at the plant. Table 5-2 list recorded historic sites within a 0.5-mile radius of the project area.

Table 5-2. Historic Sites 0.5 Miles of the Project Area

State Inventory of Historic Properties Number	Site Type	Description	Significance
50-80-12-5127	Military	World War II ‘Ewa runway site	Recommended eligible for National Register of Historical Places
50-80-12-9708	Sugar plantation infrastructure	Waialua Agricultural Company Engine No. 6	On National Register of Historic Places
50-80-12-9714	Sugar plantation infrastructure	Oahu Railway and Land Company right of way	On National Register of Historic Places
50-80-12-9761	Sugar plantation infrastructure	Railway rolling stock	On Hawaii Register of Historic Places
50-80-12-9786	Sugar plantation infrastructure	‘Ewa Village Historic District	On National Register of Historic Places

Source: Yucha et al. 2015.

On October 24, 2014, CSH conducted a pedestrian inspection of the southwestern portion of the project area which has been entirely developed with infrastructure related to the Honouliuli WWTP, and a reconnaissance of the remainder of the project area which comprised relatively undeveloped contiguous areas to the north and east of the plant. No historic properties were identified within either the WWTP portion or the undeveloped portion of the project area.

CSH recommends no further cultural resource management work for the proposed project.

5.6.1.1 Construction Impacts and Mitigation Measures

Although shallow subsurface work may be conducted within the project area, the proposed project would not involve construction activities in the vicinity of previously identified historical or archaeological sites listed or eligible for listing on the Hawaii Register of Historic Places or the National Register of Historic Places. In addition, surface conditions observed during field inspections on and in the vicinity of the project area suggest a low probability of encountering archaeological, cultural, or historic resources during construction activities. The project area has a low level of archaeological concern; therefore, construction in this area is not anticipated to adversely impact cultural or archaeological resources. CSH’s effect recommendation for the proposed project is “no historic properties affected” (Yucha et al. 2015).

Potential impacts to any archaeological, cultural, or historic resources that may be encountered during construction of the proposed improvements would be mitigated by complying with HRS Chapter 6E, Historic Preservation. The proposed approach is to identify areas of concern and provide data for the determination of appropriate mitigation prior to implementation of specific projects. The DLNR State Historic Preservation Division (SHPD) would be consulted regarding the proper handling of such resources within the project area prior to implementation of the project. Should any significant archaeological, cultural, or historic sites be found during construction activities, all work in the vicinity would cease and the DLNR SHPD would be promptly notified.

5.6.1.2 Operations Impacts and Mitigation Measures

Operation of the wastewater system once the project has been completed is not anticipated to impact archaeological or historic resources.

5.7 Water Quality

5.7.1 Existing Setting

The Honouliuli WWTP discharges via the Barbers Point outfall to Mamala Bay, which is classified in the Hawaii DOH Water Quality Standards (HAR Section [§]11-54-2) as a Class A “dry” (defined as the average fresh water inflow from the land is less than one percent of the embayment volume per day) “open coastal water” (defined as marine waters bounded by the 183 meters or 600 ft depth contour and the shoreline). Permitted effluent discharges in Mamala Bay include point sources such as the Sand Island, Honouliuli, and Fort Kamehameha WWTPs and NPDES permitted industrial and agricultural sources and non-point sources such as stormwater. Long term studies of benthic organisms in the vicinity of the Barbers Point ocean outfall compared to control sites indicate that effects of the existing effluent are negligible (SWCA 2015).

The Honouliuli WWTP is governed by NPDES Permit No. HI0020877 (effective March 30,2014). The 2010 Consent Decree has interim limits until full secondary treatment is completed. Table 5-3 shows the Honouliuli WWTP 2010 Consent Decree effluent limits.

Table 5-3. Honouliuli WWTP Effluent Limits

<table>
<tr><th colspan="5">Discharge Limitations</th><th colspan="2">Monitoring Requirements</th></tr>
<tr><th>Discharge Parameter</th><th>Average Monthly</th><th>Average Weekly</th><th>Maximum Daily</th><th>Units</th><th>Minimum Frequency</th><th>Sample Type</th></tr>
<tr><td>Flow (1)</td><td>report</td><td>report</td><td>report</td><td>mgd</td><td>continuous</td><td>recorder or totalizer</td></tr>
<tr><td rowspan="2">BOD_5 (1)</td><td>53,679</td><td>166
55,424</td><td>report</td><td>mg/L
lbs/day</td><td rowspan="2">daily</td><td rowspan="2">24-hour composite</td></tr>
<tr><td colspan="4">As a monthly average, not less than 30% removal efficiency from influent stream</td></tr>
<tr><td rowspan="2">TSS (1)</td><td>50
16,721</td><td>53
17,580</td><td>report</td><td>mg/L
lbs/day</td><td rowspan="2">daily</td><td rowspan="2">24-hour composite</td></tr>
<tr><td colspan="4">As a monthly average, not less than 60% removal efficiency from influent stream</td></tr>
<tr><td>pH (2)</td><td colspan="4">Not less than 6.0 standard units nor greater than 9.0 standard units</td><td>five times/week</td><td>grab</td></tr>
</table>

Legend: — = not applicable; lbs/day = pounds per day.
Source: 2010 Consent Decree (Civil No. 94-00765 DAE-KSC); 2014 Reissued NPDES Permit No. HI0020877
Notes:
(1) 2010 Consent Decree interim limits.
(2) The terms and conditions of the reissued NPDES Permit HI0020877 remain in full force for parameters other than flow, BOD_5, and TSS.

The 2012 and 2013 effluent data (Table 5-4) provided by CCH indicates that the Honouliuli WWTP consistently complies with the 2010 Consent Decree interim limits. However, additional treatment will be necessary to meet the treatment limits that would be associated with future full secondary treatment requirements.

Table 5-4. 2012 and 2013 Honouliuli WWTP Effluent Outfall Discharge Data

Discharge Parameter	Average Monthly (1)	Average Weekly (2)	Daily Average (3)	Maximum Daily	Minimum Daily	Monthly Removal Efficiency (4)
2012						
Flow, mgd	23.0	27.9	20.5	32.1	16.3	—
BOD_5, mg/L	133	143	121	176	79	68.0%
TSS, mg/L	38	42	35	50	22	89.9%
2013						
Flow, mgd	23.6	25.2	21.5	29.5	17.2	—
BOD5, mg/L	122.3	135	116	180	77.5	67.4%
TSS, mg/L	39.3	50	36	68	22	88.7%

Legend: — = not applicable
Source: 2012 CCH Honouliuli WWTP data, as presented in *Technical Memorandum 12.O, Honouliuli WWTP Concept Design Report*
Notes:
(1) Highest of the 12 actual monthly averages.
(2) Highest of the 52 actual weekly averages (Sunday to Saturday).
(3) Average of 365 days.
(4) Lowest of the 12 actual monthly averages.

Upgrades to the Honouliuli WWTP would be designed to comply with the 2010 Consent Decree and would result in the reduction in biological oxygen demand (BOD) and total suspended solids (TSS), as shown in Table 5-5. Although effluent flow to Mamala Bay is anticipated to increase due to the projected population growth within the sewershed, effluent concentrations and overall loads would decrease as a result of the proposed upgrade to secondary treatment.

Table 5-5. Reduction in BOD and TSS anticipated from proposed upgrades to the Honouliuli WWTP

Parameter	Existing	Proposed	% Change
Flow (average daily) (gpd) (1)	25,800,000	45,000,000	57.3
Flow (liters/day)[1]	97,660,000	170,343,540	57.3
BOD (mg/L)	120	15	-87.5
BOD (mg/day)	12,083,035,104	2,555,153,100	-78.9
BOD (lb/day)	26,639	5,633	-78.9
TSS (mg/L)	36	15	-58.3
TSS (mg/day)	3,624,910,531	2,555,153,100	-29.5
TSS (lb/day)	7,992	5,633	-29.5

Note: (1) Based on 2012effluent data presented in *TM 12.O, Honouliuli WWTP Concept Design Report*

As previously mentioned in Section 5.3.2 Surface Water and Section 5.5.3 Wetlands, a mapped wetland (former drainage ditch) is located in the eastern portion of the WWTP site; however, this wetland no longer functions as an active irrigation ditch.

Since it is the State's position that all projects must reduce, reuse, and recycle to protect, restore, and sustain water quality and beneficial uses of State waters, project planning should:

- Treat storm water as a resource to be protected by integrating it into project planning and permitting.
- Include statements regarding the implementation of methods to conserve natural resources.
- Consider storm water BMP approaches.

- Consider the use of green building practices, such as pervious pavement and landscaping with native vegetation.
- Identify opportunities for retrofitting or bio-engineering existing storm water infrastructure to restore ecological function while maintaining hydraulic capacity.

Further planning and design will be performed to confirm that the project will meet the pertinent Clean Water Branch requirements for Section 401 WQC as well as NPDES requirements during construction. The wastewater plans shall conform to applicable provisions of Hawaii Administrative Rules, Chapter 11-62, 'Wastewater Systems" as amended on March 21, 2016.

5.7.1.1 Construction Impacts and Mitigation Measures

In the short-term, potential construction impacts to the mapped wetland located within the project area would be mitigated by adherence to State and CCH water quality regulations governing grading, excavation, and stockpiling.

The proposed stormwater basins at the Honouliuli WWTP site would be shallow dry basins except during and after storm events, until infiltration and/or evaporation of basin contents is complete. Vegetative drainage swales would be used when feasible to help enhance stormwater quality.

5.7.1.2 Operations Impacts and Mitigation Measures

With the proposed treatment processes, permit compliance will be accomplished in the following ways.

- Influent and effluent flow meters compliant with DOH standard conditions would measure the flow. Influent flow would be measured by a magnetic flow meter downstream of the influent pumps. Effluent flow would be measured by a flow meter in the outfall. The flow meters would be tied into the SCADA system and data logged in the Real Time Historian for use in NPDES reporting.
- There would be composite samplers on the influent and effluent flow streams to collect samples for daily composite reporting requirements. The influent sampler would continue to be located upstream of the influent screens. The effluent sampler would be located downstream of where the brine from the recycled water facility joins with secondary clarifier effluent. Both composite samplers would be flow paced based on the respective (influent or effluent) flow signal.
- Standard sample locations would be provided to plant operations for collection of grab samples.

Overall, the proposed project will provide wastewater treatment facilities necessary to comply with secondary treatment standards and have beneficial long-term water quality impacts on groundwater (due to the potential to replace IWSs, which may contaminate groundwater, with a centralized sewer system) and surface and coastal waters, as it would better manage peak wastewater flows. The proposed alternatives also provide for storage of peak wet-weather inflow and infiltration to prevent or minimize wastewater spills.

5.8 Air Quality

Air quality is defined by ambient air concentrations of specific pollutants of concern with respect to the health and welfare of the general public. Air quality can be affected by air pollutants produced by mobile sources, such as vehicular traffic, non-road equipment used for construction activities, etc.; and by fixed or immobile facilities, referred to as “stationary sources”. Stationary sources can include combustion and industrial stacks and exhaust vents. Potential air quality impacts in the vicinity of the Honouliuli WWTP would occur from both construction and operational activities associated with implementation of the proposed improvements. The analysis of these potential air quality impacts was conducted and is detailed in an air quality analysis technical memorandum prepared by AECOM in November 2014 (AECOM 2014c). It is attached as Appendix D and is summarized below.

5.8.1 Existing Setting

Regional and local climate, together with the amount and type of human activity, generally dictate the air quality of a given location. The climate of the project area is very much affected by its leeward and coastal situation. Winds are predominantly trade winds from the east/northeast, except for occasional periods when Kona storms may generate strong winds from the south or when trade winds are weak and land breeze/sea breeze circulations may develop. Wind speeds typically vary between approximately 5 and 15 miles per hour, providing relatively good ventilation much of the time. Temperatures in leeward areas of Oahu are generally very moderate, with average daily temperatures ranging from approximately 70°F to 84°F. The extreme minimum temperature recorded at Honolulu Airport is 54°F, while the extreme maximum temperature is 95°F. This area of Oahu is one of the drier locations in the state, with rainfall often highly variable from one year to the next. Monthly rainfall has been measured to range from as little as a trace to as much as 10 inches. Average annual rainfall is approximately 20 to 30 inches, with summer months typically the driest.

To protect public health and welfare, the EPA, under the requirements of the 1970 Clean Air Act (CAA) as amended in 1977 and 1990, has established National Ambient Air Quality Standards (NAAQS) for six air pollutants known as criteria pollutants (40 CFR 50): carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM_{10} [particulate matter with a diameter ≤ 10 micrometers], and $PM_{2.5}$ [particulate matter with a diameter ≤ 2.5 micrometers]), lead (Pb), and sulfur dioxide (SO_2). Note that O_3 is not emitted directly into the atmosphere; instead it is created by the combination of nitrogen oxides (NO_x) and volatile organic compounds (VOC), which are referred to as O_3 precursors.

The state of Hawaii has essentially adopted the NAAQS, although the Hawaii standards for CO are more stringent than the national standards. In addition to criteria pollutants, Hawaii also has an ambient standard for H_2S.

Existing ambient air quality conditions can be illustrated based on the attainment or nonattainment status of the NAAQS and Hawaii standards. Based on air quality data collected and published by the EPA and DOH, the State of Hawaii complies with all applicable ambient standards, including the NAAQS and State Ambient Air Quality Standards. The air in Hawaii is clean and low in pollutants, and the area where the project is located is designated as attainment for all air quality standards.

In addition to the NAAQS, the CAA also sets permit rules and emission standards for stationary pollution sources of certain sizes. The DOH has adopted the EPA-established stationary source regulations and acts as the administrator to enforce stationary source air pollution control regulations in Hawaii (DOH, Title 11, Chapter 60.1, Air Pollution Control). DOH grants an air permit to applicable facilities for not only federal enforceable major sources but also non-major sources in the state. The Honouliuli WWTP is a minor source for criteria pollutants and is operating under a non-covered source permit (No. 0215-020N) issued by the DOH.

Since H_2S is the primary compound in wastewater collection and treatment systems that causes odor, the DOH-established ambient standard 0.025 parts per million by volume (ppmV) in any 1-hour period at the property line of a facility can be used as a measure of potential odor effects. The Honouliuli WWTP has six separate odor control systems that collect and treat foul air from the WWTP. Odor Control System Permit No. 0215-02-N limits the H_2S concentrations at each individual odor control system outlet. Ongoing monitoring is conducted at 13 fenceline monitoring locations along the original property line and at the outlet stacks of each odor control system in compliance with permit requirements.

Although there are currently no greenhouse gas (GHG) emission limits for CCH WWTPs, in 2007 the Hawaii State Legislature passed Act 234, "Global Warming Solutions Act" which Governor Linda Lingle signed into law. Act 234 required the DBEDT and DOH to update their Inventory of Greenhouse Gas Emissions Estimates for 1990 by December 31, 2008 and to reduce the amount of GHG emissions in Hawaii to levels at or below 1990 levels by 2020. As a result of Act 234, ICF International completed the Hawaii Greenhouse Gas Inventory: 1990 and 2007 in December 2008 for DBEDT.

5.8.1.1 Construction Impacts and Mitigation Measures

Regardless of the alternative selected, short-term impacts to air quality would result from the proposed project either directly or indirectly as a consequence of project construction.

The major potential short-term air quality impact of the project would occur from emission of fugitive dust during construction activities. During construction phases, emissions from engine exhausts would also occur both from on-site construction equipment and from vehicles used by construction workers and from trucks traveling to and from the project construction site.

However, given the phasing of construction activities over several years, hot spot air quality concerns associated with concentrated equipment operations would be limited. Moreover, the construction equipment required for the proposed project is typical of equipment used for routine infrastructure development projects in urban areas. Short-term emissions, including GHG emissions, from the small number of construction equipment would be inconsequential compared to regional emissions or the US inventory for GHG emissions, factoring in the substantially greater number of unrelated on-road vehicles and associated emissions that constitute the majority of baseline mobile emissions in the project area. Therefore, construction equipment impacts are anticipated to be less than significant.

During the worst-case construction year, 2021, it is anticipated that a total of 185 construction workers would arrive at the site during the AM peak hour and 185 construction workers would exit the site during the PM peak hour, in addition to 8 total trips (4 entering and 4 exiting) generated by cement trucks during each of the AM and PM peak hours of traffic. According to the traffic impact analysis described in Section 5.10, the level of service with or without the project at affected intersections would remain at similar levels. Therefore, the air quality impacts from on-road mobile source operations associated with construction activities would be temporary and comparable to the 2021 baseline condition, resulting in no significant impacts.

It is anticipated that a short-term increase in GHG emissions would occur associated with construction activities. However, such an increase would be temporary and would be further evaluated during the final design stage when proposed project component is well defined and emissions can be reasonably forecasted.

Although mitigation measures are not warranted during the construction period, BMPs to control construction emissions would be implemented to minimize visible fugitive dust emissions at the property line. The BMPs would include watering of active work areas, using wind screens, keeping adjacent paved roads clean, and covering open-bodied trucks. Additional measures can also be considered if necessary, such as using newer equipment, reducing truck on-site idling time, and moving construction materials and workers to and from the project sites during off-peak traffic hours.

5.8.1.2 Operational Impacts and Mitigation Measures

After construction activities are completed, the long-term operational air quality impacts with the implementation of the proposed project would include an upgrade to the standby power capacity, possible introduction of a new energy saving combined heat and power (CHP) system, and an increase in mobile source operation due to the plant expansion and an increase in wastewater treatment capacity.

Under future operational conditions, three smaller existing generators would continue to provide emergency power to the current load, and new diesel powered generators would provide standby power to the new loads. Given their emergency usage purposes, potential air quality impacts would be short in duration and would be unlikely to cause significant air quality impacts.

A CHP facility may be incorporated at the Honouliuli WWTP to make beneficial use of digester biogas. If such a facility is incorporated at the Honouliuli WWTP, it would need to be permitted according to State and Federal air regulations. Since this facility would be a new stationary source, the emissions at the Honouliuli WWTP would increase resulting in adverse air quality impacts on the local level. However, because the feasibility of constructing such a facility is still under evaluation and has no design specifics, the potential air emissions from the facility cannot be reasonably estimated. If the CHP facility option is elected in the future, the CHP facility would need to be considered for future air quality permitting in conjunction with the biosolids disposal process during the design stage. During the air permitting process, it is anticipated that a separate air quality impact modeling analysis would be conducted to address potential air quality impacts associated with the CHP facility.

With an anticipated 55 peak hour vehicles entering the project site under the future operational condition, the traffic movements with and without the project at affected intersections in 2030 would remain operating at similar levels of service. Therefore, the air quality impacts from on-road mobile source operations associated with operational activities would be comparable to the 2030 baseline condition, causing less than significant off-site mobile source air quality impacts.

The proposed project recommends replacing the existing Primary Odor Control System with new biological odor control systems. Similarly, odor control would be provided to the new treatment facilities. In addition, grit covers, primary clarifier covers, and primary effluent channel covers are recommended for odor containment. These project activities and upgrades to components are common to each of the secondary treatment options. Therefore, compounded with the improvements to the existing Primary Odor Control System and the proposed secondary treatment alternative, the odor impacts under the proposed plant improvement plan are not anticipated to be significant. The ambient odor monitoring program to be implemented after the completion of the project would demonstrate compliance with the DOH ambient odor standard in terms of H_2S concentration levels.

Similar to the criteria pollutants, it is anticipated that an increase in GHG would occur associated with the project. However, such an increase would be further evaluated during the final design stage when the proposed project component is well defined and emissions can be reasonably forecasted. Given its global effects, such a typical infrastructure development project in an urban area would unlikely cause any meaningful global warming effects.

The potential long-term air quality impacts to the project area are not anticipated to be significant, although there is the potential to increase on-site stationary and mobile source emissions due to an increase in the plant operational capacity. These project-induced emissions are mostly short in duration, with the exception of the operation of a potential CHP facility. Thus, mitigation measures in excess of odor control measures would unlikely be necessary during the operational period. Compliance with all applicable ambient standards, including odor in terms of H_2S concentration levels, would be further demonstrated 1) during the final design stage of the project when the air permit is modified for applicable criteria pollutants and 2) after the completion of construction with an ambient monitoring program for odor.

5.9 Noise

An acoustical study, which included an analysis of noise near the WWTP site, was prepared by Ebisu & Associates in January 2015 (Ebisu & Associates 2015). It is attached as Appendix E and is summarized below.

5.9.1.1 Existing Setting

Daytime and nighttime noise measurements were obtained in October 2014 at or near the boundary lines of the Honouliuli WWTP site to provide a basis for describing the existing background noise levels at noise sensitive receptors in the project environs and to determine if the facility is in compliance with DOH noise limits. The project is located within the AG-1 (Restricted Agriculture) and I-2 (Intensive Industrial) zoning districts, within which the current DOH noise limit is 70 dBA for both daytime and nighttime periods. DOH stipulates that noise levels shall not exceed the maximum permissible sound levels for more than 10% of the time within any 20 minute period, at any time except by permit or variance. Figure 1 of Appendix E identifies the measurement locations, and Table 1 of Appendix E presents the results of the noise measurements. The major noise sources at the existing Honouliuli WWTP are identified on Figure 2 of Appendix E and include: Dewatering Building Centrifuge, Influent Pump Station, Blower Building #1 (Primary), BioTower Pump Station Booster Fan, and Caustic Scrubber Odor Control Blower. These five major noise sources are anticipated to remain at their present general locations through the evaluation period (i.e. through 2030). During the daytime, motor vehicle traffic and aircraft noise become the dominant noise sources along the Honouliuli WWTP property lines, and the noise measurements were influenced by these off-site noise sources more than the WWTP noise sources. Based on the recorded measurements, the Honouliuli WWTP site is in full compliance with the 70 dBA DOH noise limit for both the daytime and nighttime periods.

Also, traffic noise level measurements were performed in the vicinity of the Honouliuli WWTP site in December 2014. Table 3 and Figure 3 of Appendix E present the results and locations, respectively, of these measurements. Table 4 of Appendix E presents the calculated hourly average, or Leq(h), traffic noise levels at 50, 75, and 100 feet setback distances from the roadways' centerlines during the PM peak traffic hour, which reflects the highest hourly volume of traffic on the project area roads. The Hawaii State Department of Transportation considers traffic noise levels less than 66 Leq(h) to be acceptable for noise sensitive land uses. This criterion level was exceeded at 50 feet from the centerlines of Geiger Road and Roosevelt Avenue.

The U.S. Department of Housing and Urban Development (HUD) uses the Day-Night Average Sound Level (or DNL) descriptor in evaluating acceptable noise levels at noise sensitive locations. The DNL descriptor incorporates a 24-hour average of daytime and nighttime noise levels, with the nighttime noise levels increased by 10 decibels (or dB) prior to computing the 24-hour average. A noise level of 65 DNL is considered to be acceptable for noise sensitive uses by HUD. Traffic noise levels in DNL may be estimated by adding 1 unit to the peak hour Leq(h), so a traffic noise level of 66 Leq(h) during the PM peak hour would result in a 67 DNL value, or 2 DNL units above the HUD noise standard.

Table 5 in Appendix E presents the existing setback distances to the 65, 70, and 75 DNL traffic noise contour lines for unobstructed line-of-sight conditions along the roadways in the immediate environs of the WWTP site. As indicated in Table 5, setback distances in the order of 68 to 70 feet from the centerlines of Geiger Road and Roosevelt Avenue are required to not exceed the HUD 65 DNL noise standard.

5.9.1.2 Construction Impacts and Mitigation Measures

The potential construction noise levels associated with the proposed project were evaluated for the potential impacts and relationship to the current Federal Housing Administration (FHA)/HUD noise standard.

Audible construction noise would be unavoidable during the project construction period. The construction work required for the project would be performed in phases and would move from one location to another throughout the construction period; thus, the length of exposure to construction-related noise at any receptor location would be less than the construction period for the entire project. Also, most of the work would be performed during the normally permitted hours of 7:00 am to 6:00 pm on weekdays, and between 9:00 am to 6:00 pm on Saturdays. Figure 5 in Appendix E depicts the range of noise levels of various types of construction equipment that may be used at the project site when measured at 50 feet from the equipment. The decrease in construction equipment noise with increasing distance from the noisier equipment is shown in Figure 6 of Appendix E.

The predicted increases in traffic noise levels attributable to project-related traffic during the peak construction year (2021) were also evaluated, and it was concluded that these increases would not exceed 1 dB along Renton Road between Kapolei Parkway and the proposed WWTP site entrance road, hereafter referred to as “Honouliuli Driveway 5 (DW5)”. Along all other roadways in the immediate environs of the WWTP site, increases in traffic noise levels associated with the project construction traffic were expected to be less than 0.5 dB. Therefore, noise impacts associated with construction-related traffic are not expected at noise sensitive receptors within the immediate environs of the WWTP site.

Noise sensitive residences that are predicted to experience the highest noise levels during construction activities are located northwest of the WWTP site along Phillipine Sea and Renton Road. Predicted construction noise levels at these residences during the site preparation phase of the work in northwest portion of the WWTP site range from 62 to 71 dBA (plus or minus 5 dBA). The highest predicted noise levels during construction are expected to occur at the Coral Creek Golf Course during proposed infrastructure improvements along the eastern boundary of the WWTP site. The closest residences located to the east of the WWTP site are beyond the Coral Creek Golf Course and are anticipated to experience construction noise levels of 65 dBA (plus or minus 5 dBA). Impacts associated with construction noise are not expected to be in the “public health and welfare” category due to the temporary nature of the work conducted within normally permitted hours. Instead, these impacts would be limited to the temporary degradation of the quality of the acoustic environment in the immediate vicinity of the WWTP site.

As is typically the situation with construction projects, it would not be practical or feasible to reduce or eliminate all construction noise to inaudible levels because of the relatively long period of actual construction activities and the relatively low levels of background noise in the surrounding areas. However, special construction noise mitigation measures would be implemented during construction activities. These measures would include: sound attenuation treatment of fixed machinery which operate continuously, so as to limit their combined maximum noise levels to 65 dBA at the closest receptors (i.e. the adjacent golf course and nearest residences) during the daytime and to 45 or 50 dBA at the property lines toward the closest residences during the nighttime; and requiring the use of broadband back-up alarms for vehicles which operate on the construction sites in place of the more commonly used high frequency, beeper back-up alarms. The use of properly muffled construction equipment would also be required on the job site.

Construction activities would be carried out in accordance with HRS Chapter 342F, Noise Pollution, Hawaii Administrative Rules (HAR) Title 11, Chapter 46, Community Noise Control and all Federal, State, and CCH laws and regulations. According to HAR Title 11, Chapter 46, construction activity is permitted Monday through Friday from 7:00 am to 6:00 pm and Saturday from 9:00 am to 6:00 pm. Construction activities associated with the proposed project would comply with these time restrictions to the extent practicable. A Community Noise Variance would be required to exceed the maximum permissible sound levels or for work outside of normal hours.

5.9.1.3 Operational Impacts and Mitigation Measures

Estimates of future WWTP noise levels were conducted by modeling the source noise levels of the WWTP equipment and facilities expected to be in operation following completion of the proposed Phase 2 improvements in 2030. Figure 4 in Appendix E depicts the locations of the future noise sources that were included in the noise modeling, and Table 8 in Appendix E presents the estimated noise levels of these sources at a 50-foot distance. Sound attenuation measures such as enclosures, the addition of silencers or mufflers or acoustical louvers, the use of sound absorptive interior finishes, or the use of sound rated doors were not included in the noise modeling assumptions. The proposed emergency generators in the Main Electrical Building (Building #201E) were not included in the noise modeling because of their intermittent operation during testing or emergencies and since they would likely be sound attenuated so as to not exceed the DOH noise limit of 70 dBA at the WWTP site property boundary during their operation.

Table 9 in Appendix E presents the results of the calculations of predicted plant noise levels at the WWTP site's perimeter at locations A through J without sound attenuation treatments applied to the various noise sources. The results in Table 9 were controlled by the dominant noise sources located in Building #0331 (the blower building) and Building #201F (the grit building). The utilization of sound attenuation treatments to all proposed noise sources (with the exception of the emergency generators) would not likely be required to comply with the 70 dBA DOH noise limit along the WWTP site property boundary. However, acoustical treatments of louder noise sources would be incorporated into the project design to reduce their contributions to the total WWTP site noise levels.

Future road traffic noise levels associated with operation of the proposed project in 2030 were also assessed. By 2030, traffic noise level increase attributable to project traffic is expected to be less than 1.0 dB at all roadways in the project environs, except along the section of Renton Road between Kapolei Parkway and the proposed DW5 entrance. The estimated increases in future traffic noise levels along this section of Renton Road are 0.9 dB due to non-project traffic and 2.0 dB due to project traffic. Since existing traffic volumes along this section of roadway are relatively low (approximately 343 vehicles per hour), and since this area is currently undeveloped within 50 feet of the roadway's centerline, these increases in future traffic noise levels are not expected to result in exceedances of traffic noise level criteria along this roadway section.

Along Renton Road west of the proposed DW5 entrance where existing residences are located, future traffic noise level increases associated with the project are not expected to occur. Also, along Roosevelt Avenue in the vicinity of Phillipine Sea, future traffic noise level increases associated with project traffic are anticipated to be less than 0.2 dB by the year 2030. Along Geiger Road and Roosevelt Avenue where existing traffic noise levels exceed the 66 Leq(h) and 65 DNL noise impact thresholds, future increases in traffic noise levels due to project traffic are lower than the increases associated with non-project traffic, and are predicted to be less than 0.8 Leq(h) or DNL. These increases are not considered to be significant.

5.10 Traffic

A traffic impact analysis report (TIAR), which includes an analysis of traffic near the Honouliuli WWTP site, was prepared by Austin Tsutsumi & Associates, Inc. (ATA) in November 2014 (ATA 2014). It is attached as Appendix F and summarized below.

5.10.1 Existing Setting

Primary access to the Honouliuli WWTP is through an entrance on Geiger Road, hereafter referred to as “Honouliuli Driveway 1 (DW1)”, west of the Coral Creek Golf Course and south of the Honouliuli WWTP Control Building. The Septage Receiving Station is accessed through a separate entrance from Geiger Road east of the main entrance, hereafter referred to as “Honouliuli Driveway 2 (DW2)”. The expansion property can currently be accessed from the north from Malio Street via Renton Road and from Geiger Road east of the Septage Receiving Station entrance. The Ewa Convenience Center is accessed from Geiger Road west of the main WWTP entrance at DW1.

The majority of parking is located near the main entrance from Geiger Road and distributed around the Control Building, Maintenance Building Number (No.) 1, Chlorination Building, and Maintenance Building No. 2. Minor additional parking is located at the Locker Room Building and Biotower Pump Station. Golf carts are parked where convenient around the site. HWRF has parking within its facility.

ATA conducted manual turning movement counts and field observations for critical intersections during the peak hour and at a time when schools were known to be in-session. Existing traffic volumes, lane configuration and movement level of service (LOS) are illustrated in Figure 5-6. Manual turning movement traffic counts and field observations were conducted at the following study intersections in the vicinity of the WWTP site (intersection numbering below corresponds with numbering in Figure 5-6):

1. Kualakai Parkway/Kapolei Parkway – northwest of the Honouliuli WWTP property
2. Renton Road/Kapolei Parkway – immediately north of the Honouliuli WWTP property
3. Renton Road/Phillipine Sea – west of the Honouliuli WWTP property
4. Roosevelt Avenue/Phillipine Sea – southwest of the Honouliuli WWTP property
5. Roosevelt Avenue/Geiger Road/Essex Road – immediately southwest of the Honouliuli WWTP property
6. Geiger Road/Ewa Refuse Convenience Center Driveway (ECRC) – in the southwest corner of the Honouliuli WWTP
7. Geiger Road/DW1 – located at the southern boundary of the Honouliuli WWTP property
8. Geiger Road/DW2 – located in the southeast corner of the Honouliuli WWTP property
9. Geiger Road/Kapolei Parkway – southeast of the Honouliuli WWTP property
10. Fort Weaver Road/Geiger Road/Iroquois Road – east of the Honouliuli WWTP property
11. Renton Road/Fort Weaver Road – northeast of the Honouliuli WWTP property

Analysis for the study intersections was performed by ATA using methodologies prescribed by the Highway Capacity Manual (TRB 2010). The analysis included control delay results, based on intersection lane geometry, signal timing inputs and hourly traffic volume for signalized and unsignalized intersections. Traffic software calculations, as confirmed or refined by field observations, constituted the technical analysis. Using the peak hour manual count volumes, the traffic software was run and a Level of Service (LOS) was assigned to each intersection. LOS is used to analyze roadways and intersections by categorizing traffic flow and assigning qualitative levels of traffic, with values ranging from free-flow conditions at LOS A to congested conditions at LOS F.

The weekday morning (AM) and afternoon (PM) peak hour turning movement data utilized in this report was collected on Wednesday, September 3, 2014. Based on this traffic count data, the weekday AM peak hour of traffic was determined to be from 7:00 AM to 8:00 AM and the PM peak hour of traffic was determined to be from 4:00 PM to 5:00 PM.

At all signalized study intersections, with the exception of Fort Weaver Road intersections, most vehicles typically cleared each intersection within one signal cycle without any heavy queuing or congestion. All study intersections operate at LOS D or better with adequate capacity except for the following intersections (none of which are located immediately adjacent to the Honouliuli WWTP property):

- Renton Road/Kapolei Parkway (intersection #2 on Figure 5-6 located to the north of the Honouliuli WWTP):
  All movements of this intersection currently operate at LOS D or better during the AM and PM peak hours of traffic with the exception of the northbound left-turn movement, which operates at LOS E during the AM peak hour of traffic. Although the northbound left-turn movement operates at LOS E during the AM peak hour of traffic, adequate capacity is provided.
- Geiger Road/Kapolei Parkway (intersection #9 on Figure 5-6 located to the southeast of the Honouliuli WWTP):

  The eastbound left-turn movement operates at LOS E(E) during the AM(PM) peak hours, but is generally low volume movements of only 8(45) vehicles, respectively. All remaining movements of this intersection operate at LOS D or better during the AM and PM peak hour of traffic.
- Fort Weaver Road/Geiger Road/Iroquois Road & Renton Road/ Fort Weaver Road (intersections #10 and #11 on Figure 5-6 located to the east of the Honouliuli WWTP):

  The majority of movements at these intersections currently operate at LOS E/F conditions during the AM and PM peak hours of traffic mainly due to long delays as a result of requisite long cycle lengths (approximately 4 minutes long). These two intersections also provide split-phase signal operation on the side streets and long pedestrian crossing times across Fort Weaver Road, which contribute to the long delays. During the AM peak hour, the northbound traffic is generally heavier, while during the PM peak hour, traffic is heavier in the southbound direction.

5.10.1.1 Base Year 2021

The year 2021 was selected as the base year to reflect the anticipated peak year of construction activity, which was assumed to occur during Phase 1 construction of the Honouliuli WWTP. It is anticipated that by year 2021, traffic will have increased significantly over existing conditions due to the continuing development of the Ewa-Kapolei region. The following intersections are anticipated to operate at LOS E/F in 2021:

- Kualakai Parkway/Kapolei Parkway intersection (intersection #1 on Figure 5-6, located to the northwest of the Honouliuli WWTP):

  Upon build-out of the Ka Makana Alii Shopping Center, one of the proposed accesses to the shopping center is anticipated to be provided as a new south leg extension from the existing Kualakai Parkway/Kapolei Parkway intersection, ultimately providing a 4-legged intersection. With the improvements at the intersection, the low volume northbound left-turn movement is projected to operate at LOS F during the AM peak hour with only 5 vehicles anticipated to make the left-turn onto Kapolei Parkway. During the PM peak hour, all left-turn movements will operate at LOS E conditions.
- Renton Road/Kapolei Parkway (intersection #2 on Figure 5-6):

  This intersection is forecast to operate similar to existing conditions during the AM and PM peak hours of traffic. However, the southbound left-turn movement will worsen to LOS E during the AM peak hour of traffic and the northbound left-turn movement will worsen to LOS E during the PM peak hour of traffic.
- Geiger Road/Kapolei Parkway (intersection #9 on Figure 5-6):

  The intersection is anticipated to operate overall at LOS D during the AM and PM peak hours of traffic. Due to increased traffic, all left-turn movements are anticipated to operate at LOS E during both peak hours, with the low volume eastbound left-turn movement of 10 vehicles, operating at LOS F.
- Fort Weaver Road/Geiger Road/Iroquois Road & Renton Road/Fort Weaver Road (intersections #10 and #11 on Figure 5-6 located to the east of the Honouliuli WWTP):

  Similar to Existing conditions, the intersections along Fort Weaver Road through the Ewa region will continue to experience LOS F at some movements. However, this is generally ascribed to requisite long traffic signal cycle lengths, split phase operation, and generally long crosswalk lengths across Fort Weaver Road.

All unsignalized study intersections will continue operating at LOS D or better during the AM and PM peak hours of traffic. Table 2 (in Appendix F) shows the Existing and Base Year 2021 LOS at the study intersections.

5.10.1.2 Base Year 2030

The year 2030 was selected as the base year to reflect the anticipated build-out of the Honouliuli WWTP. By year 2030, traffic will continue to increase due to the continuing development of the Ewa-Kapolei region. Based on a LOS comparison between Base Year 2021 and Base Year 2030, the majority of individual movements that are projected to operate at LOS E/F for Base Year 2021 conditions will continue operating at similar levels of service for Base Year 2030 conditions during the AM and PM peak hours of traffic except for the following:

- Kualakai Parkway/Kapolei Parkway (intersection #1 on Figure 5-6):

  The low volume northbound left-turn movement will operate at LOS F during the PM peak hour.

- Renton Road/Kapolei Parkway (intersection #2 on Figure 5-6):

  During the AM peak hour, the northbound approach will worsen to LOS E conditions, with the mainline through movement along Kapolei Parkway nearing its capacity. In addition, the westbound and southbound left-turn movements will operate at LOS E during the PM peak hour of traffic. In order to mitigate the deficiencies of the intersection, dual southbound left-turn lanes were recommended to accommodate the relatively high 275(320) southbound left-turn vehicles during the AM(PM) peak hours. With the dual southbound left-turn lanes, all movements at the intersection are forecast to operate similar to Base Year 2021 conditions.

- Roosevelt Avenue/Philippine Sea (intersection #4 on Figure 5-6 located to the southwest of the Honouliuli WWTP):

  The southbound shared left/through/right-turn lane is anticipated to worsen from LOS D to LOS E. With a low 15(20) vehicles making the southbound left-turn movement, the heavier southbound right-turn movement should not be heavily impacted. Based on existing observations, the southbound queues did extend beyond four vehicles, with the majority of queues typically consisting of only one vehicle.

- Geiger Road/Kapolei Parkway (intersection #9 on Figure 5-6):

  During the AM peak hour, the westbound and southbound left-turn movements will worsen to LOS F. In addition, northbound left-turn movement will worsen to LOS F at overcapacity conditions. During the PM peak hour, the westbound left-turn movement will worsen to LOS F, and the southbound through movement along Kapolei Parkway will operate near capacity. In order to mitigate the deficiencies of the intersection, dual northbound left-turn lanes were recommended to accommodate the high 470(215) northbound left-turn vehicles during the AM(PM) peak hours. Also, the eastbound approach along Geiger Road was restriped from one left-turn, one through and one shared through/right to one left-turn, one through and one right-turn. With the dual northbound left-turn lanes and eastbound restriping, all movements are forecast to operate similar to Base Year 2021 conditions.

- Fort Weaver Road/Geiger Road/Iroquois Road & Renton Road/Fort Weaver Road (intersections #10 and #11 on Figure 5-6):

  The intersections along Fort Weaver Road through the Ewa region will experience LOS F and over-capacity conditions at some movements. However, this is generally ascribed to requisite long traffic signal cycle lengths, split phase operation and generally long crosswalk lengths across Fort Weaver Road.

Table 3 in (in Appendix F) shows the Base Year 2021 and Base Year 2030 LOS at the study intersections.

5.10.2 Construction Impacts and Mitigation Measures

Future year 2021 trip generation is the anticipated peak year of construction activity, which was assumed to occur during Phase 1 construction of the Honouliuli WWTP. It was estimated that the project would generate 185 construction workers to/from the site, with the assumption of 1 vehicle trip per construction worker. Therefore, 185 construction workers would arrive to the site during the AM peak hour and 185 construction workers would exit the site during the PM peak hour. This was assumed to be a relatively conservative estimate, since workers may commute outside the studied peak hours of traffic and carpooling would likely occur.

In addition to the 185 construction workers, 8 total trips (4 entering and 4 exiting) were assumed to be generated by cement trucks during each of the AM and PM peak hours of traffic. This was also a conservative estimate, since it is likely that these trucks would probably avoid peak hours of traffic.

Figure 5-7 illustrates the Project Generated Traffic Volumes for Year 2021. Refer to Appendix F for illustrations of the forecast traffic volumes, lane configuration, and LOS for Future Year 2021 conditions. Additionally, Table 5 (in Appendix F) summarizes the delay, volume to capacity (v/c), and LOS at the study intersections for Base Year 2021 and Future Year 2021 conditions.

Based on a LOS comparison between Future Year 2021 and Base Year 2021, the majority of individual movements that are projected to operate at LOS E/F for Base Year 2021 conditions will continue operating at similar levels of service for Future Year 2021 conditions during the AM and PM peak hours of traffic except for the following:

- Fort Weaver Road/Geiger Road/Iroquois Road & Renton Road/Fort Weaver Road (intersections #10 and #11 on Figure 5-7):

  The intersections along Fort Weaver Road through the Ewa region will experience LOS F and over-capacity conditions at some movements. However, this is generally ascribed to requisite long traffic signal cycle lengths, split phase operation and generally long crosswalk lengths across Fort Weaver Road.

- Geiger Road/DW2 (intersection #8 located in the southeast corner of the Honouliuli WWTP property on Figure 5-7):

  The southbound shared left/through/right-turn lane is anticipated to operate at LOS E during the PM peak hour. The southbound left-turn movement currently operates with 20 vehicles and queues were not observed to extend beyond a couple vehicles long. An additional 30 left-turn vehicles generated by construction worker trips should have minimal impacts to the queues along the southbound approach.

Future Year 2021 Project trips were assigned to all existing driveways in addition to three new proposed accesses, as shown on Figure 5-7. Trip distribution is based on existing traffic flow patterns throughout the study area. All movements at the three new project driveway intersections will operate adequately at LOS D or better during the AM and PM peak hours of traffic. The first access is proposed to be located approximately 600 feet east of the existing Geiger Road/DW2 intersection (intersection #8 on Figure 5-6) and will hereafter be referred to as "Honouliuli Driveway 3 (DW3)" (intersection #12 on Figure 5-7). The second access is proposed to be located approximately 600 feet east of the existing Roosevelt Avenue/Phillipine Sea intersection (intersection #4 on Figure 5-6) and will hereafter be referred to as "Honouliuli Driveway 4 (DW4)" (intersection #13 on Figure 5-7). The third access is proposed to be located along Renton Road adjacent to the Malio Street intersection. The new access is proposed near Malio Street. For purposes of this study, this new access along Renton Road will hereafter be referred to as DW5 (intersection #14 on Figure 5-7).

Although entering traffic volumes at the proposed project driveways are anticipated to operate with adequate LOS, eastbound left-turn lanes are recommended along Geiger Road and Roosevelt Avenue at the intersections with Honouliuli Driveways, including DW1, DW2, DW3 and DW4, and a westbound left-turn lane is recommended at the Renton Road/DW5 intersection (intersection #14 on Figure 5-7). In addition, the left-turn lanes entering these driveways should provide for a minimum storage of at least 50 feet, while the Renton Road/DW5 intersection should provide a minimum of at least 125 feet of storage.

Due to increased regional growth along the major thoroughfares and slight increase in exiting proposed project traffic, the Geiger Road/DW2 intersection will operate at LOS E conditions along its southbound approach but should not experience heavy queuing due to its low volume.

In summary, the following roadway improvements are recommended:

<u>Geiger Road at its intersection with Honouliuli Driveways: DW1, DW2 and DW3 (intersections 7, 8, and 12 on Figure 5-7)</u>

1. Eastbound Approach
   a. Widen to provide a left-turn storage lane.
   b. Provide for a minimum storage of at least 50 feet.

Roosevelt Avenue/DW4 Intersection (intersection 13 on Figure 5-7)

1. Eastbound Approach
   a. Widen to provide a left-turn storage lane.
   b. Provide for a minimum storage of at least 50 feet.

Renton Road/DW5 Intersection (intersection 14 on Figure 5-7)

1. Westbound Approach
   a. Widen to provide a left-turn storage lane.
   b. Provide for a minimum storage of at least 125 feet.

Future operational needs at this facility should be addressed in order to mitigate any traffic conflicts at the proposed driveway alignments. The design should ensure that adequate sight distance is provided for all vehicle types at all project driveways. All driveways that are gated for security purposes should have adequate storage for vehicle queuing and a turnaround area. A signal is being provided for the main driveway as part of a neighboring project.

Any damage to the existing roadway and sidewalk area caused by the project should be restored to its original or better condition. Also, the area Neighborhood Board, as well as the area residents, businesses, emergency personnel, Oahu Transit Services, Inc. (TheBus), etc., should continue to be kept apprised of the details of the proposed project and the impacts that the project may have on the adjoining local street area network.

5.10.3 Operational Impacts and Mitigation Measures

The trip generation for the Future Year 2030 scenario was based on the full build-out of the project. The current staffing level at the Honouliuli WWTP is at 39 full time equivalent (FTE) positions, while the build-out of the project will increase the staffing to an estimated 320 FTE positions. This results in an eight-fold increase to the number of employees at the Honouliuli WWTP. In order to determine the growth in traffic generated by this increase to 320 FTE, all existing traffic turning movements were increased linearly by a factor of 8. Trips were also increased to address trips for solids and solids product handling.

Future Year 2030 Project trips were assigned to all existing driveways, in addition to the three proposed new access points. Trip distribution is based on existing traffic flow patterns throughout the study area. Figure 5-8 illustrates the Project Generated Traffic volumes for Year 2030. See Appendix F for illustration of the forecast traffic volumes, lane configuration, and LOS for Future Year 2030 conditions. Table 7 (in Appendix F) summarizes the delay, v/c, and LOS at the study intersections for Base Year 2030 and Future Year 2030 conditions.

Based on a LOS comparison between Future Year 2030 and Base Year 2030/Future Year 2021, the majority of individual movements projected to operate at LOS E/F for Base Year 2030/Future Year 2021 conditions will continue operating at similar levels of service for Future Year 2030 conditions during the AM and PM peak hours of traffic, except for the following:

- Geiger Road/DW1 (intersection #7 on Figure 5-8):

  This intersection is forecast to operate similar to Base Year 2030 conditions with the exception of the southbound shared left/through/right movement which is projected to operate at LOS E during the PM peak hours of traffic. The southbound left-turn movement currently operates with only 10 vehicles and queues were not observed to extend beyond one vehicle long. An additional 35 left-turn vehicles anticipated to be generated by the proposed project should have minimal impacts to the queues along the southbound approach.

- Geiger Road/DW2 (intersection #8 on Figure 5-8):

  The southbound shared left/through/right movement is projected to operate at LOS E(F) during the AM(PM) peak hours of traffic, respectively. The southbound approach will continue to operate at a low 20 vehicle right-turn movement and 70 vehicle left-turn movement during the more critical PM peak hour. With an anticipated average of only 1 southbound left-turn vehicle arriving every minute, the increase in southbound traffic should have minimal impacts on southbound queues.

– Geiger Road/DW3 (intersection #12 on Figure 5-8):

  This new proposed access is forecast to operate at LOS D or better during the AM and PM peak hours of traffic with the exception of the southbound shared left/right-turn movement which is projected to operate at LOS F during the PM peak hour of traffic. The southbound left-turn movement will operate at a low 50 vehicles during the PM peak hour. With an anticipated average of less than 1 southbound left-turn vehicle arriving every minute, the movement should not experience heavy southbound queues.

– Fort Weaver Road/Geiger Road/Iroquois Road & Renton Road/Fort Weaver Road (intersections #10 and #11 on Figure 5-8):

  As previously discussed, intersections along Fort Weaver Road through the Ewa region will continue to experience LOS F and over-capacity conditions at some movements. However, this is generally ascribed to requisite long traffic signal cycle lengths, split phase operation, and generally long crosswalk lengths across Fort Weaver Road.

In conclusion, based on an anticipated increase in regional growth along the major thoroughfares (without the project), slight increase anticipated in entering/exiting project traffic during peak hours as a result of the proposed project, and proposed improvements to accommodate the slight increase, impacts to traffic in the region due to operation of the proposed project are not anticipated.

Figure 5-6. Existing Lane Configuration, Volume, and LOS

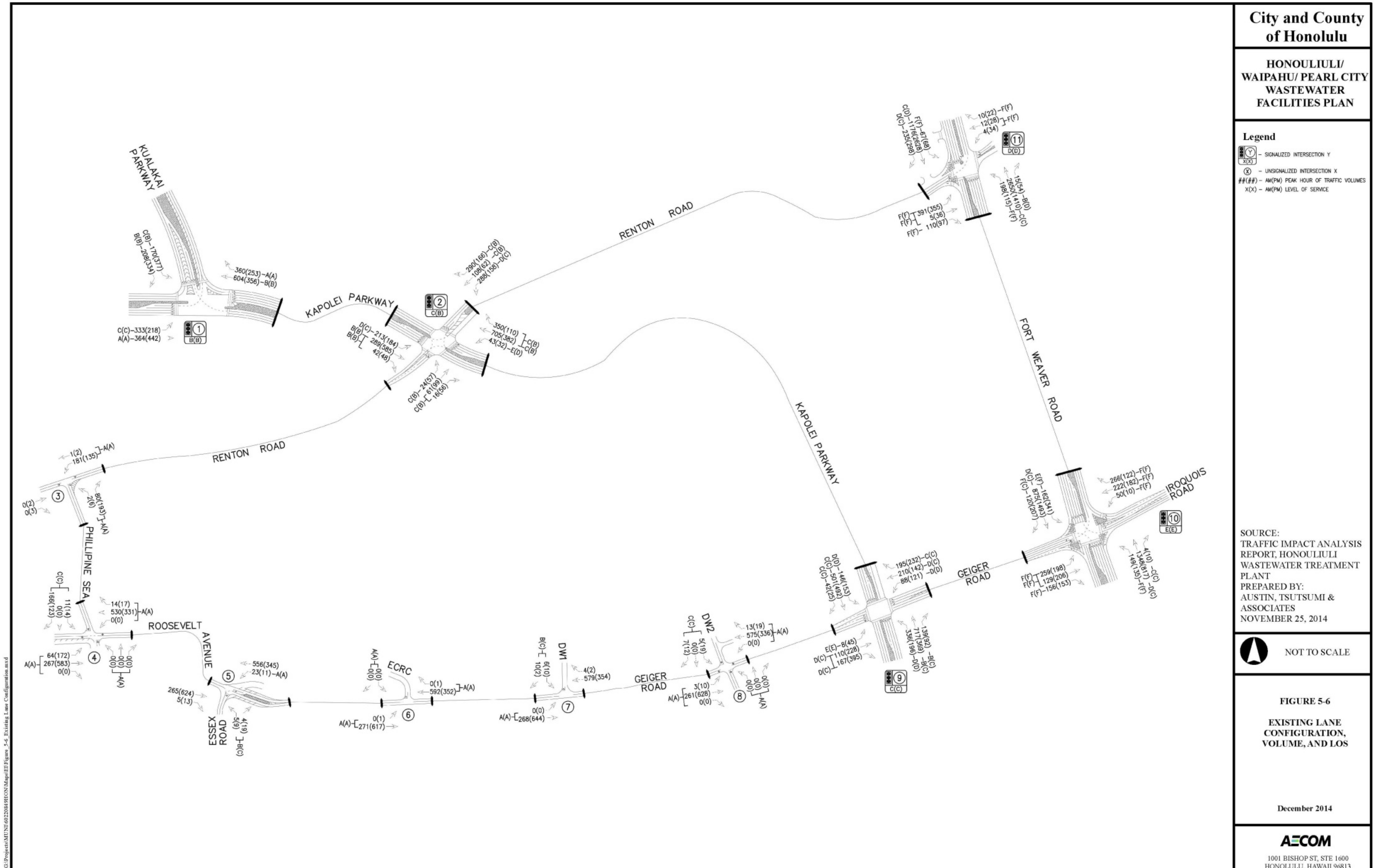


Figure 5-7. Year 2021 Project Only Volumes

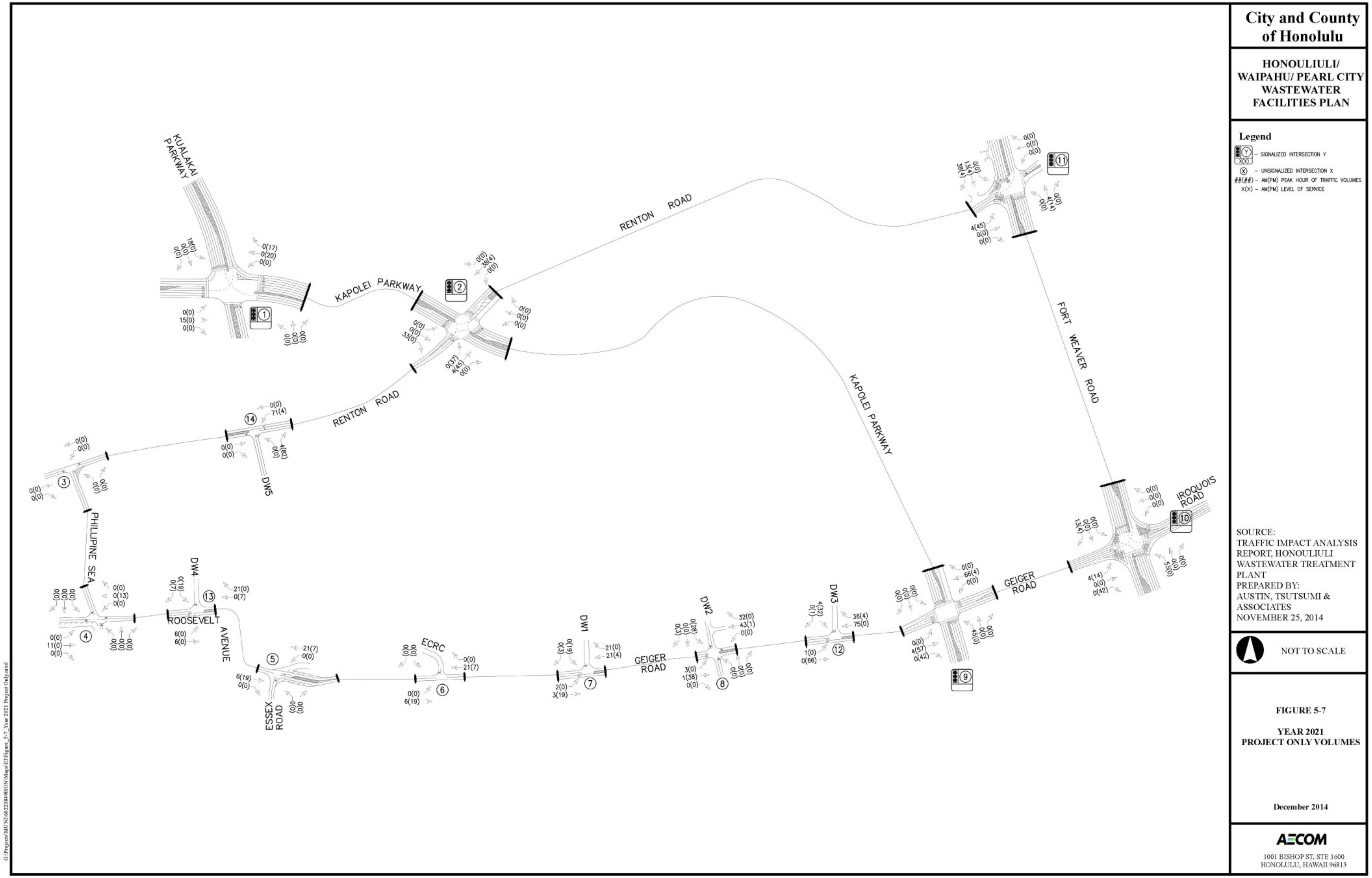
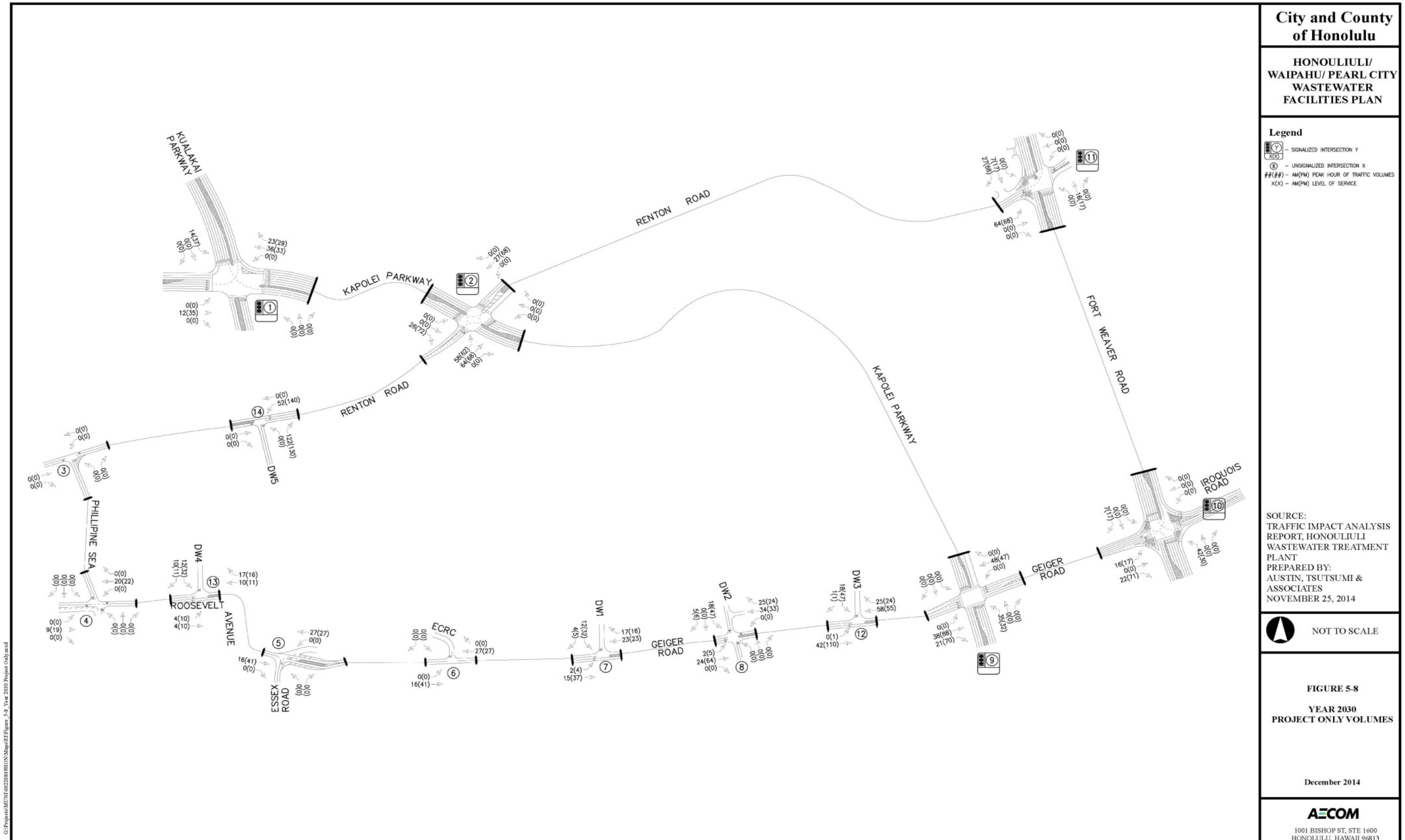


Figure 5-8. Year 2030 Project Only Volumes



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5.11 Visual and Aesthetic Resources

5.11.1 Existing Setting

The visual character of the project site is primarily an industrial setting due to the existing treatment facilities. The WWTP site is visible from nearby golf courses, including Coral Creek Golf Course to the east of the site and Barbers Point Golf Course located to the south of the project site, and residential neighborhoods located along the western and northwestern expansion property boundary. Views of the WWTP from the golf courses are partially screened by the existing tree canopy located between the WWTP site and the golf courses on each golf course property. The WWTP project site is also visible from a rail trail/bike path within the old OR&L railway, located immediately north of the expansion property. Trees within the expansion property currently provide a visual screen between the existing WWTP and the Coral Creek Golf Course, residential areas, and the rail trail. Other nearby properties within viewing distance of the project site includes industrial land uses.

5.11.2 Construction Impacts and Mitigation Measures

Construction of the proposed improvements, regardless of the alternative, would result in temporary impacts to the viewshed from Coral Creek Golf Course, residential areas, and the rail trail/bike path due to the clearing of trees within the expansion property and subsequent construction activities following tree clearing. Visual impacts during construction as viewed from Barbers Point Golf Course are anticipated to be minimal as a result of an existing tree canopy between the site and the golf course.

During construction, fencing surrounding the construction site may be provided as needed to provide a visual screen from construction equipment. Any construction impacts regarding visual aesthetics are expected to be short-term and would cease after construction.

The existing perimeter chain link fence would be removed and replaced with a new combination of walls, ornamental fence, and chain link fence. The selection of fence type would be determined based on location on the property. Fence lines/walls along roadways/property boundaries would be improved to provide an aesthetically pleasing view to replace the industrial look that currently exists, with linear landscape elements along the fences/walls.

5.11.3 Operational Impacts and Mitigation Measures

The proposed project, regardless of the alternative, would include new structures that would be consistent with the industrial character of the existing facility. The facilities would be designed to blend in the new structures with the existing structures and would be designed in accordance with CCH rules and regulations. The viewshed from Coral Creek Golf Course, residential areas, and the rail trail/bike path would be impacted by the change in character from forest to industrial uses. However, as previously noted, the expansion property is an area that has been disturbed by past and current land uses.

The area around the facilities would be fenced and landscaped. The landscaping elements would be irrigated with reclaimed water or drought-tolerant plants, and grasses and native species would be planted whenever feasible. The height and setback of the walls would be considered to minimize impacts to the surrounding neighborhoods. At least 10 ft of clear space would be provided on both sides of fence lines for vehicle access, which would support fence line maintenance. A perimeter walking/biking path around the entire site would provide the public with a source of recreational activity. The path would be located outside the fenced areas. A separate entrance and parking area would be provided for users of the walking/biking path. This path would be designed to include provisions for safe pedestrian, bicycle, and vehicle crossings at all project driveways.

Regardless of the alternative implemented, anticipated indirect impacts to visual aesthetics are associated with upgrades and improvements to the treatment system to allow future developments (residential, commercial and industrial) in the sewer basin to connect to the existing wastewater system, as envisioned in the PUC and Ewa

Development Plans. These future developments are expected to result in a more urbanized look in the sewer basin.

5.12 Socioeconomics

The socioeconomic region of influence (ROI) is the geographic area that would be most affected by the proposed expansion and upgrading of the Honouliuli WWTP, and relocating of non-process related functions and facilities from the Sand Island WWTP and other locations to the Honouliuli WWTP. The ROI is selected as the basis on which social and economic impacts of the proposed project are analyzed, as it encompasses the expected residency distribution of Honouliuli WWTP and Sand Island WWTP employees, their commuting patterns, and the location of businesses providing goods and services to the WWTPs, its personnel, and their families. The ROI for the socioeconomic environment comprises the following census county divisions (CCDs), which are subdivisions of Honolulu County recognized by the USCB:

- Ewa CCD, in which the Honouliuli WWTP is located, as the primary component of the ROI (defined as primary since the project is located in this area)
- Honolulu CCD, in which the Sand Island WWTP is located, as a secondary component of the ROI (defined as secondary as it the actual project site is located outside of this area)

There is a potential for a greater magnitude of socioeconomic effects within the primary component of the ROI, as the project would result in very large construction and operation expenditures at the Honouliuli WWTP, but no or minimal expenditures at the Sand Island WWTP. However, there is greater certainty of socioeconomic effects within the primary component, as the project entails the expansion and upgrading of the Honouliuli WWTP, but addresses the relocation of non-process facilities from the Sand Island WWTP as a potential action.

The ROI, depicted in Figure 5-9, encompasses a land area of approximately 254 square miles (USCB 2014a), representing about 42.3 percent of the county land area (USCB 2014b). Data for Honolulu County are provided as needed in lieu of data available for the CCDs and for context and comparison, and data for the State of Hawaii are provided as relevant for context and general comparison.

5.12.1 Demographics and Economics

Population and Housing

The USCB conducts a census of the United States every 10 years, in years ending in zero, to count the population and housing units for the entire United States. The most recent decennial census was conducted in 2010. Table 5-6 presents population statistics for the ROI. Population data were derived based on the 2000 Census and the 2010 Census.

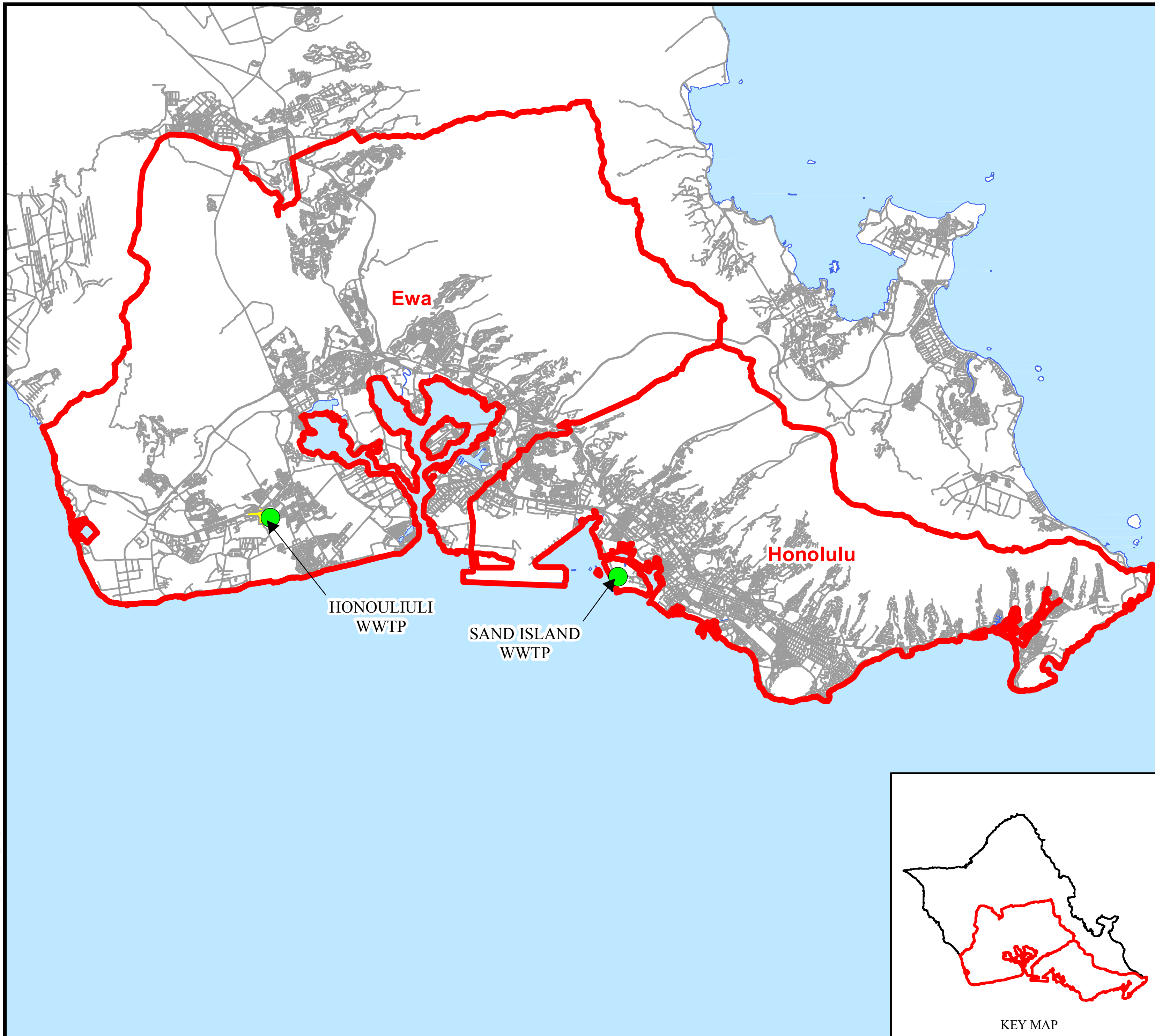
Table 5-6. Population, 2000 and 2010, and Population Density, 2010

Geographic Area	Land area (sq. miles)	Population			2010 Density (persons per square mile)
		2000	2010	Percent Change 2000-2010[1]	
Ewa CCD	165	272,328	323,118	19%	1,958[1]
Honolulu CCD	89	372,279	390,738	5%	4,390[1]
ROI	**254**	**644,607[1]**	**713,856[1]**	**11%**	**2,810[1]**
Honolulu County	601	876,156	953,207	9%	1,586
Hawaii	6,422	1,211,537	1,360,301	12%	212

Sources: USCB 2014b; USCB 2014c, DP-1, Profile of General Demographic Characteristics, 2000 Census and 2010 Census.
[1]Values were calculated based on USCB estimates.

The Honouliuli WWTP and Sand Island WWTP are located in a densely-populated and robust region. ROI population density is about 2,810 persons per square mile; substantially higher than the approximately 1,590 persons per square mile population density of Honolulu County and the 210 persons per square mile density of the State of Hawaii (USCB 2014b). Ewa CCD encompasses a land area of approximately 165 square miles and a water area of about 77 square miles, and Honolulu CCD encompasses a land area of approximately 89 square miles and a water area of about 1,127 square miles (USCB 2014a).

The population within the ROI increased 11 percent from 2000 to 2010; similar to the 12 percent increase in population of the State of Hawaii during that time period. Ewa CCD was the fastest growing area among the geographic areas of comparison, growing approximately 19 percent between 2000 and 2010.



City and County of Honolulu

HONOULIULI/ WAIPAHU/ PEARL CITY WASTEWATER FACILITIES PLAN

Legend

- WWTPs
- Census County Divisions
- Street

0 — 20,000
Feet
1 inch = 20,000 feet

FIGURE 5-9

SOCIOECONOMIC REGION OF INFLUENCE

December 2014

AECOM
1001 BISHOP ST, STE 1600
HONOLULU, HAWAII 96813

G:\Projects\MUN\60220849HON\Maps\EI\Figure_5-9_Socioeconomic ROI.mxd

Table 5-7 provides population projections for Honolulu County and the State of Hawaii prepared by the DBEDT (DBEDT 2012). Based on DBEDT population projections, the population of Honolulu County will be about 1,003,700 in 2020 and 1,052,100 in 2030, an approximately 5 percent increase per decade. For the State of Hawaii, DBEDT estimates an approximately 8 percent increase between 2010 and 2020, as well as between 2020 and 2030. This rate of increase for the state is higher than the anticipated increase in Honolulu County.

Table 5-7. Population Projections, 2010-2035

Geographic Area	2010	2015	2020	2025	2030	2035
Honolulu County	953,207	976,192	1,003,706	1,029,414	1,052,134	1,071,225
Hawaii	1,360,301	1,418,252	1,481,236	1,543,244	1,602,338	1,657,500

Sources: USCB 2014c, DP-1, Profile of General Demographic Characteristics, 2010 Census; DBEDT 2012.

Based on USCB American Community Survey five-year estimates for 2008-2012, the number of housing units in the ROI totaled about 263,660, as shown in Table 5-8. Approximately 5.7 percent of the housing units in the Ewa CCD were vacant and 10.5 percent of the units in the Honolulu CCD were vacant. The comparable vacancy rate for Hawaii was substantially higher, at 13.9 percent. However, according to the DBEDT, residential housing units currently are in short supply in the state (DBEDT 2014). Although not explicitly stated by the DBEDT (2014), this characterization may be due in part to the large proportion of housing units in Hawaii that are vacant for seasonal, recreational, or occasional use. In 2010, approximately 46.9 percent of the State's total vacant housing units were vacant for seasonal, recreational, or occasional use, and about 16.2 percent of the vacant units in the Ewa CCD and 39.9 percent of the vacant units in the Honolulu CCD were vacant for this reason (USCB 2014c, DP-1, Profile of General Demographic Characteristics, 2010 Census). In recent years, housing demand in Hawaii has increased due to population growth, the conversion of homes to visitor use due a limited supply of hotel rooms (especially on Oahu), and the shifting of military forces to Hawaii (DBEDT 2014).

Table 5-8. Housing Units, 2008-2012

Geographic Area	Total Housing Units	Occupied Housing Units	Vacant Housing Units	Percent Vacant[1]
Ewa CCD	100,797	95,056	5,741	5.7
Honolulu CCD	162,862	145,723	17,139	10.5
ROI	263,659	240,779	22,880	8.7
Honolulu County	337,389	308,490	28,899	8.6
Hawaii	519,811	447,453	72,358	13.9

Source: USCB 2014c, DP04, Selected Housing Characteristics, 2008-2012 American Community Survey.
[1]Values were calculated based on USCB estimates.

Employment and Income

Total employment in Honolulu County was approximately 562,820 jobs in 2010, as shown in Table 5-9. The industries that employed the most people in the county were government (19.7 percent), retail trade (10.0 percent), and health services (9.8 percent). Based on DBEDT projections, between 2010 and 2035, employment in Honolulu County is expected to grow most rapidly in education, health, and business services, with estimated cumulative expansions over 25 years of 41.2, 40.0, and 38.4 percent, respectively.

Table 5-9. Honolulu County Civilian Jobs by Sector, 2010-2035

Geographic Area	2010	2015	2020	2025	2030	2035
Agriculture	3,460	3,450	3,420	3,370	3,310	3,250
Mining and construction	28,160	30,130	31,930	32,720	33,420	34,200
Food processing	4,410	4,470	4,530	4,570	4,610	4,640
Other manufacturing	8,330	8,400	8,440	8,450	8,450	8,430
Transportation	20,200	20,950	21,580	22,060	22,530	22,970
Information	9,380	9,490	9,960	10,320	10,730	11,090
Utilities	2,180	2,260	2,350	2,420	2,490	2,550
Wholesale trade	16,850	17,240	17,600	17,900	18,180	18,420
Retail trade	56,070	57,220	58,200	59,000	59,680	60,200
Finance and insurance	24,960	25,950	26,900	27,750	28,460	29,030
Real estate and rentals	24,330	24,630	24,820	24,910	24,940	24,890
Professional services	34,090	36,510	38,870	41,090	43,210	45,230
Business services	45,440	49,090	52,720	56,240	59,610	62,870
Educational services	15,230	16,530	17,810	19,060	20,300	21,500
Health services	54,990	59,600	64,140	68,570	72,890	76,970
Arts and entertainment	11,940	12,460	12,910	13,290	13,650	13,990
Hotels	15,110	15,450	15,710	15,890	16,080	16,270
Eating and drinking	41,540	43,540	45,330	46,920	48,480	49,990
Other services	35,360	36,800	38,090	39,210	40,210	41,040
Government	110,800	113,570	116,450	119,340	122,220	124,870
Total Civilian Jobs	**562,820**	**587,750**	**611,770**	**633,060**	**653,450**	**672,390**

Sources: DBEDT 2012.

Unemployment rates in Honolulu County decreased at an increasing pace over the last five years, as shown in, Table 5-10, decreasing by more than a quarter from 2009 to 2013. The unemployment rates for the State of Hawaii also decreased over the five-year period, although the rates for the state consistently were higher than the rates for Honolulu County.

Table 5-10. Annual Average Labor Force, 2009-2013

Geographic Area	2009	2010	2011	2012	2013
Honolulu County					
Labor Force	443,556	453,991	458,737	455,937	456,804
Employed	417,987	428,111	433,409	432,869	437,230
Unemployed	25,569	25,880	25,328	23,068	19,574
Unemployment Rate (%)	5.8	5.7	5.5	5.1	4.3
Hawaii					
Unemployment Rate (%)	6.8	6.7	6.5	5.7	4.8

Source: United States Bureau of Labor Statistics, 2014.

Table 5-11 summarizes total personal income data for Honolulu County for the last four years. The United States Bureau of Economic Analysis calculates total personal income as the sum of labor income plus dividends, interest, and rent, plus transfer payments, minus contributions for government insurance, and minus the adjustment for residence. Total personal income in the county increased by approximately 11.8 percent from 2009 to 2012.

Table 5-11. Honolulu County Total Personal Income, 2009-2012

Geographic Area	2009	2010	2011	2012
Total Personal Income ($)	42,363,319	43,243,596	45,662,776	47,382,065
Earnings by Place of Work	30,799,392	31,642,263	33,210,211	34,451,141
Dividends, Interest, and Rent	9,435,291	9,153,105	9,576,812	10,157,594
Transfer Payments	5,600,753	6,115,629	6,375,677	6,402,104
Contributions for Government Insurance	3,456,972	3,648,965	3,475,965	3,605,003
Adjustments for Residence	15,145	18,436	23,959	23,771

Source: United States Bureau of Economic Analysis, 2014.

Construction Impacts and Mitigation Measures

The proposed project would construct (at the Honouliuli WWTP) process facilities and non-process facilities relocated from the Sand Island WWTP, and would cost an estimated $760 million to complete. This total construction cost is inclusive of the costs of upgrading the Honouliuli WWTP and the costs of constructing facilities at the Honouliuli WWTP required to relocate non-process related functions to the plant. As detailed in Appendix G, Economic and Fiscal Impacts, the construction expenditures would result in one-time increases in economic output, employment, and earnings, and one-time increases in fiscal revenues of the state. The economic impacts of project construction would include the impact of expenditures on construction materials, and on earnings of construction workers and professional service providers during the construction period, as well as the impacts of those changes on the overall economy of the CCH.

On a one-time basis, project construction would have an estimated total economic impact of $1.6 billion in output, supporting a total of approximately 13,430 jobs, earnings of $520 million, and fiscal revenues of $70 million (Table 5-12). The estimated construction period is 9 years (AECOM 2014d). Although construction expenditures and therefore the resulting effects actually would vary from year to year, the estimated total economic impact translates to an average annual economic impact of about $180 million, which would support approximately 1,490 jobs, earnings of $60 million, and fiscal revenues of $7.6 million per year. Providing each job or employee represents one household and assuming the current average household size of 2.98 people in Honolulu County

(USCB 2014b), jobs resulting directly or indirectly from project construction would support approximately 4,450 residents on average during project construction.

Table 5-12. One-Time Economic and Fiscal Impacts of Construction

	Output	**Earnings**	Employment	State Tax
	Million $	Million $	Jobs	Million $
Direct/Indirect Impact	1,126	380	9,462	43
Induced Impact	493	137	3,965	25
Total Impact	1,619	517	13,427	68

The current ROI construction labor force might not be sufficient to fill the jobs, although the construction industry in Hawaii is projected to grow, both on the short term (DBEDT 2014) and on the long term (Table 5-9), with the mining and construction sector expected to expand approximately 13.4 percent between 2010 and 2020 (DBEDT 2012). Employment growth is beneficial to an economy, and expansion of the industry base results in economic benefits on the region. Socioeconomic concerns would materialize if expansion occurs in a short time frame or if other aspects of the economy also undergo a rapid expansion during the same time period. Possible labor shortages could occur, resulting in a rise in labor costs and ultimately a rise in overall construction costs. However, the market would respond to a shortage with new workers entering the construction industry from other industries or new workers coming from outside the region to fill available jobs. If new workers were to enter the region in response to a construction labor shortage, the households that relocate to the ROI would need a supply of housing, to which the local economies likely would respond by increasing the supply.

Operational Impacts and Mitigation Measures

With operation of the proposed project, the number of personnel at the Honouliuli WWTP is projected to increase from the existing 39 employees to a projected ultimate 320 employees. However, in addition to upgrading the Honouliuli WWTP, the project also would entail the relocating of non-process related functions and facilities from the Sand Island WWTP and other locations to the Honouliuli WWTP. Approximately 120 jobs and personnel currently at the Sand Island WWTP would be relocated to the Honouliuli WWTP. Additional jobs and personnel potentially would be relocated to the Honouliuli WWTP from other locations. The likely effect of these jobs would be a shift of expenditures from areas near the Sand Island WWTP and other locations to areas closer to the Honouliuli WWTP, and from the employees' original places of residence to their new places of residence, were some employees to choose to move to be closer to their relocated jobs. Of the projected 320 future employees at Honouliuli, fewer than 161 would be newly employed in new jobs that would result from the project. These new jobs and the operation of new or expanded functions and facilities at the Honouliuli WWTP would be new to the City and County, and would have a continuing economic impact from the WWTP's ongoing operating expenditures.

Annual expenditures from operations of the proposed project would result in ongoing increases in economic output, employment, and earnings, and ongoing increases in fiscal revenues. Projected operations costs were used to estimate economic and fiscal impacts during the operation of the upgraded Honouliuli WWTP, exclusive of the non-process related functions and facilities relocated from the Sand Island WWTP and other locations to the Honouliuli WWTP (Appendix G). Whereas the economic and fiscal impacts of construction evaluated above cover both upgrading the Honouliuli WWTP and constructing non-process related facilities at the plant, the ongoing impacts of operating the non-process related facilities are not evaluated here, as those operating costs are undetermined at the time of writing.

The annual operating expenditures for the proposed project are estimated to be approximately $19.8 million (AECOM 2014e). On an ongoing basis, plant operation related to the upgrading of the Honouliuli WWTP would result in an estimated annual impact of $28.5 million in output, supporting about 90 jobs, earnings of $3.8 million, and fiscal revenues of $990,000 (Table 5-13). Providing each job represents one household and assuming the current average household size of 2.98 people in Honolulu County (USCB 2014b), jobs resulting directly or indirectly from these operations would support approximately 270 residents on average.

Table 5-13. Ongoing Economic and Fiscal Impacts of Operations

	Output	**Earnings**	Employment	State Tax
	Million $	Million $	Jobs	$
Direct/Indirect Impact	24.9	2.8	59	792,000
Induced Impact	3.6	1.0	30	198,000
Total Annual Impact	28.5	3.8	89	990,000

Both construction and operation effects from the proposed project would be beneficial, providing regional economic benefits from construction spending and labor, as well as long-term positive effects on employment and income in the region. As noted above, approximately 120 jobs and personnel would be relocated from the Sand Island WWTP, likely resulting in a shifting of expenditures to areas closer to the Honouliuli WWTP. Nonetheless, implementation of the project would have overall, beneficial impacts on employment and income.

5.12.2 Environmental Justice and Protection of Children

Environmental Justice

In the United States, environmental justice (EJ) minority populations are comprised of any races that are not white. However, the racial composition of Hawaii is different than that of the United States as a whole, with whites comprising the majority of the population (approximately 74 percent) in the United States, but no group comprising a majority in Hawaii. In Hawaii, the largest racial group is Asian, accounting for approximately 40 percent of the population (Kahihikolo 2008). Because the populations on Hawaii and Oahu are so racially diverse, EJ minority populations in the vicinity of the Honouliuli WWTP were identified using an approach based on the methodology developed by the OMPO (OMPO 2004), as recommended in the *Hawaii Environmental Justice Initiative Report* (Kahihikolo 2008). The objective of the OMPO methodology is to determine where EJ is a concern by taking into account the unique Asian population and the racially diverse areas on Oahu (OMPO 2004).

To identify areas where EJ could be a concern in the immediate vicinity of the Honouliuli WWTP — hereafter referred to as the affected area — racial population data for 2010 Census block groups were analyzed. Minority populations in block groups located adjacent to and including the Honouliuli WWTP (located in Block Group 1 of Census Tract 84.11) were compared to minority populations in all block groups throughout Honolulu County. Each minority group was evaluated separately to identify those areas in the county where each minority population is concentrated in a disproportionate way. Consistent with the OMPO methodology, disproportionality was defined as exceeding one standard deviation above the mean relative concentration of a minority group, with the relative concentration for each block group normalized for the areal size of the block group. If this threshold was exceeded for any of the race categories evaluated, an EJ population was determined to be present.

Based on this analysis, six of the eight block groups in the affected area are minority populations (Figure 5-10, Table 5-14). EJ minority populations within the six block groups with minority populations are associated with disproportionately large Hispanic and Latino populations relative to the average for block groups in Honolulu County, which may be attributed to the military-related population in those block groups (OMPO 2004).

Table 5-14. Adjusted Percentage Minority, 2010

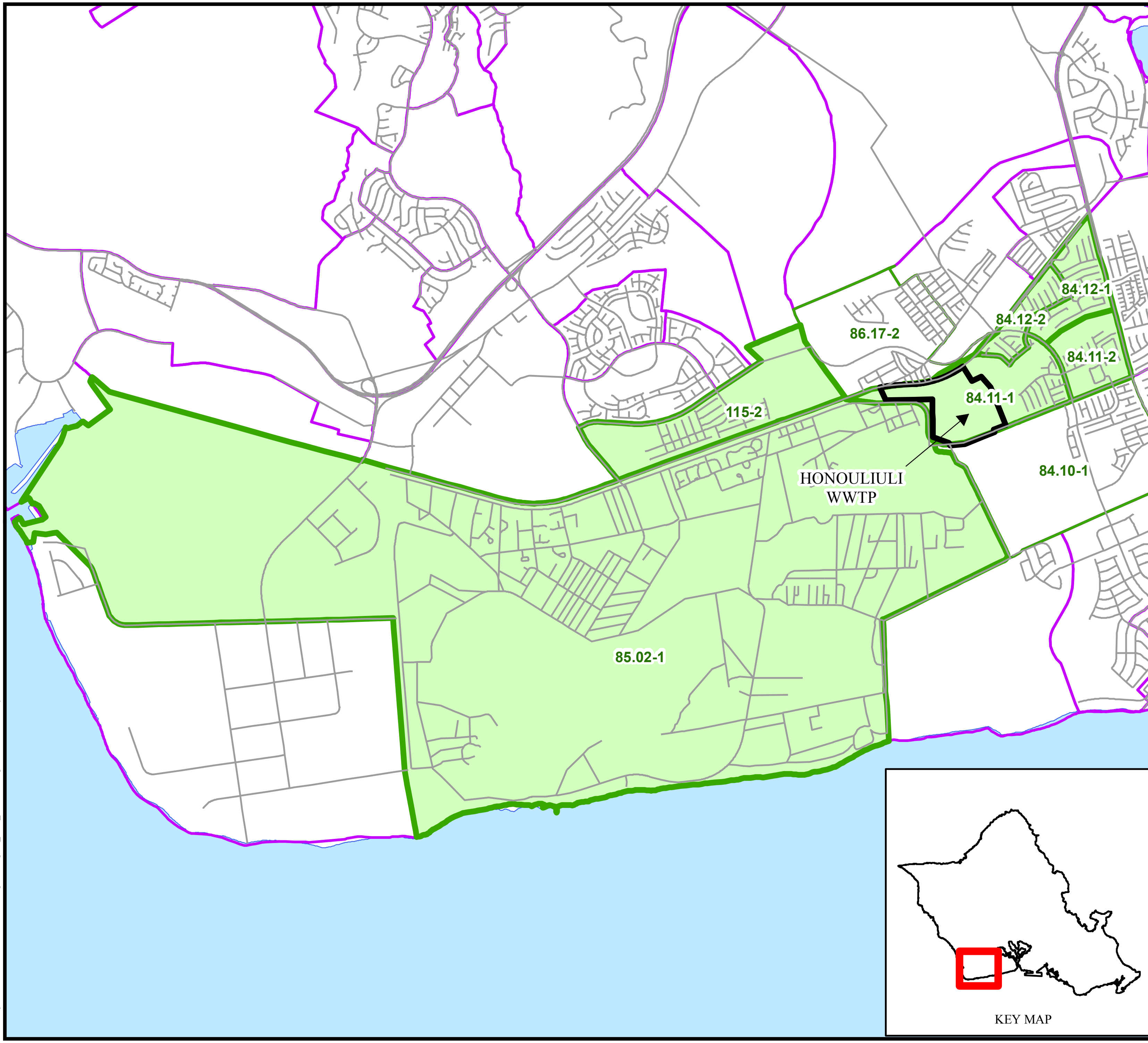
Geographic Area	White	Black	American Indian and Alaskan Native	Asian	Native Hawaiian and Other Pacific Islander	Other	Hispanic
Calculated Honolulu County Threshold (percent)	42.7	5.6	1.0	70.7	25.8	1.4	12.2
Block Group 1, Census Tract 84.11	17.4	2.8	0.2	53.0	12.2	0.4	**14.1**
Block Group 1, Census Tract 84.10	19.7	3.4	0.2	57.2	9.6	0.3	9.7
Block Group 2, Census Tract 84.11	19.4	4.0	0.6	50.3	12.1	0.6	**13.2**
Block Group 1, Census Tract 84.12	20.0	4.4	0.9	47.5	14.1	0.5	**12.8**
Block Group 2, Census Tract 84.12	19.2	3.5	0.3	47.1	15.1	0.1	**14.7**
Block Group 1, Census Tract 85.02	35.1	**8.2**	**1.2**	14.2	25.8	0.3	**15.1**
Block Group 2, Census Tract 86.17	8.8	1.4	0.2	61.5	14.9	1.2	11.9
Block Group 2, Census Tract 115	14.0	1.8	0.5	29.6	**39.9**	0.0	**14.1**

Sources: USCB 2014c, QT-P4, Race, Combinations of Two Races, and Not Hispanic or Latino, 2010 Census; OMPO 2004.

Notes:

The Honouliuli WWTP is located in Block Group 1, Census Tract 84.11.

Bold values indicate population percentages of minority populations.



City and County of Honolulu

HONOULIULI/ WAIPAHU/ PEARL CITY WASTEWATER FACILITIES PLAN

Legend
- Honouliuli WWTP
- Minority Block Group
- Other Adjacent Block Group
- Other Block Group
- Street

0 4,000
Feet
1 inch = 4,000 feet

FIGURE 5-10

BLOCK GROUPS WITH ENVIRONMENTAL JUSTICE MINORITY POPULATIONS

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The USCB determines poverty status by using a set of dollar-value thresholds that vary by family size and composition (USCB 2014c, Glossary). If a family's total income is less than the dollar value of the appropriate threshold, then that family and every individual in it are considered to be in poverty. Similarly, if an unrelated individual's total income is less than the appropriate threshold, then that individual is considered to be in poverty. The poverty thresholds do not vary geographically. They are updated annually to allow for changes in the cost of living (inflation factor) using the Consumer Price Index.

As recent, applicable data at the block group level were not available, census tract-level data were used to identify low-income populations. Table 5-15 presents the 2008-2012 American Community Survey five-year estimates for families and individuals in the affected area whose annual income was below the poverty level. The percentage of low-income families in Census Tract 85.02 is by far the highest in the affected area. With the exception of this census tract, the tracts in the affected area have percentages of low-income families lower than in Honolulu County overall, as well as lower than in Honolulu CCD. Therefore, environmental justice will be assessed for low-income populations in Census Tract 85.02 (Figure 5-11).

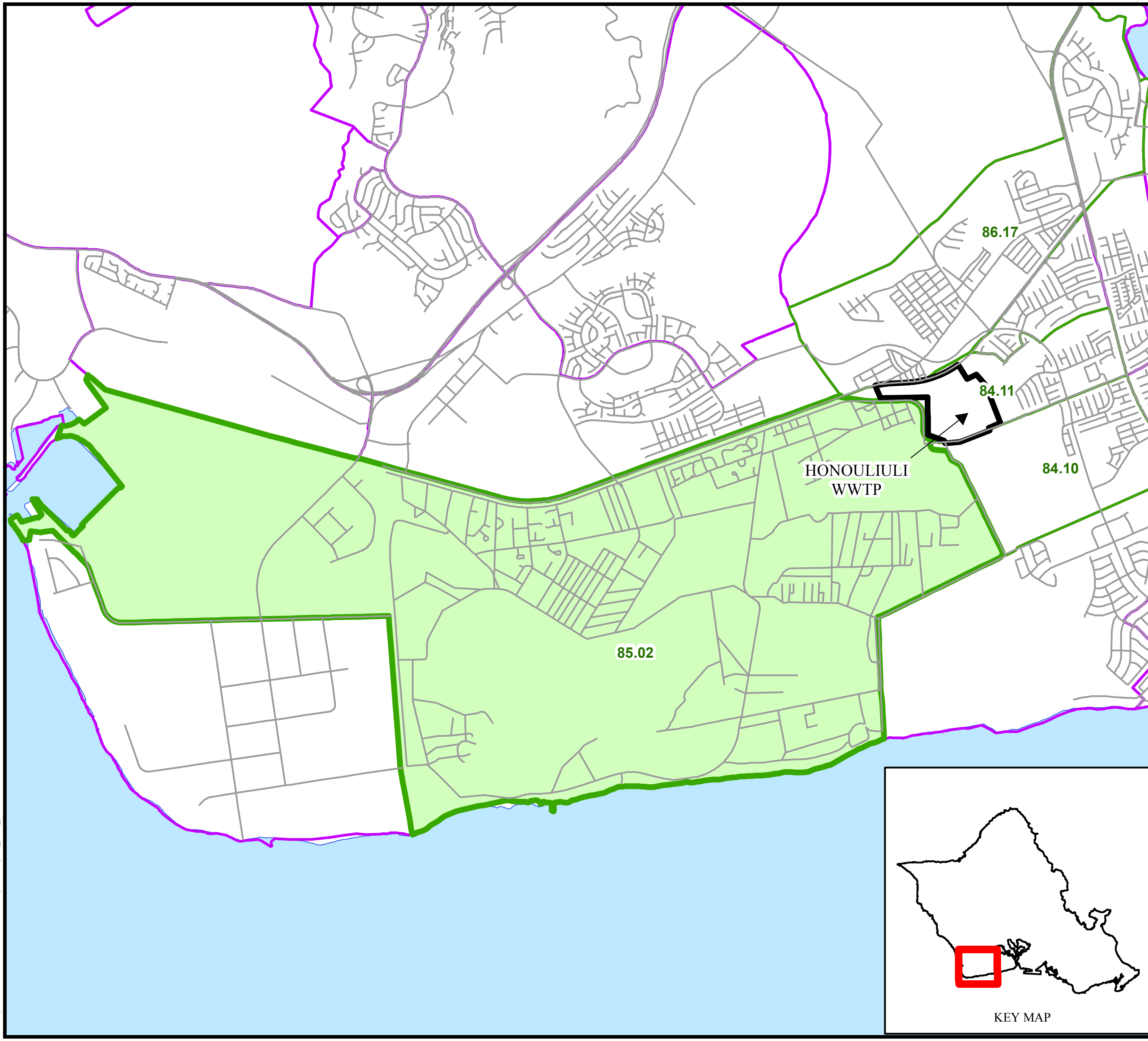
Table 5-15. Percentage Low Income, 2008-2012

Geographic Area		Low-Income Population (percent)
Area of Comparison	Honolulu County	9.6
Socioeconomic ROI	Honolulu CCD	10.9
	Ewa CCD	6.5
Affected Area	Census Tract 84.11	4.0
	Census Tract 84.05	2.4
	Census Tract 84.06	3.4
	Census Tract 84.10	1.4
	Census Tract 84.12	3.3
	Census Tract 85.02	**21.3**
	Census Tract 86.17	7.6
	Census Tract 115	3.7

Source: USCB 2014c, DP03, Selected Economic Characteristics, 2008-2012 American Community Survey.
Notes:
The Honouliuli WWTP is located in Census Tract 84.11.
Bold values indicate population percentages of low-income populations.

City and County of Honolulu

HONOULIULI/ WAIPAHU/ PEARL CITY WASTEWATER FACILITIES PLAN



Legend

- Honouliuli WWTP
- Low Income Tract
- Other Adjacent Tract
- Other Tract
- Street

0 4,000
Feet
1 inch = 4,000 feet

FIGURE 5-11

CENSUS TRACTS WITH ENVIRONMENTAL JUSTICE LOW-INCOME POPULATIONS

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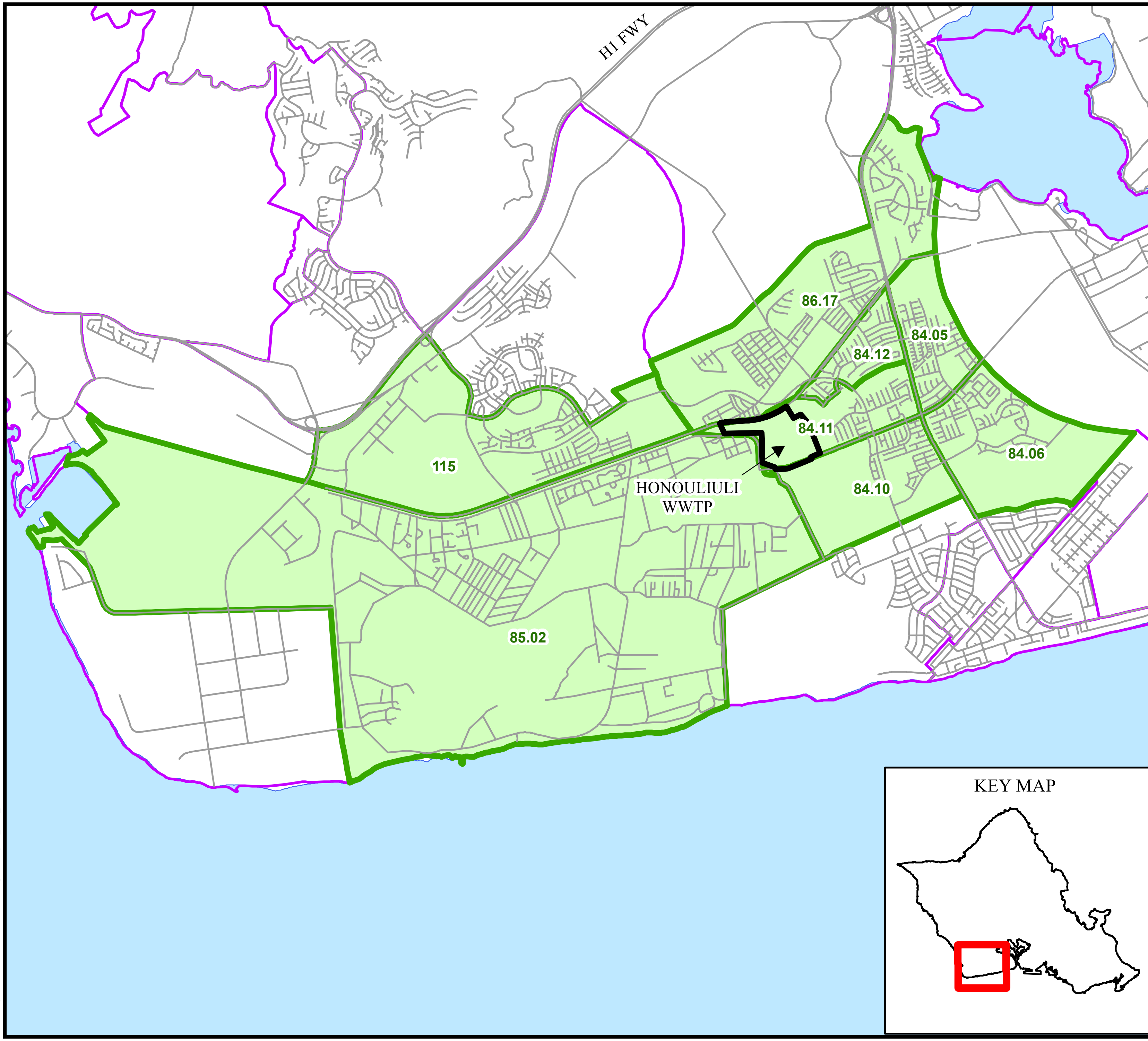
Protection of Children

For the purposes of this analysis, census tracts located adjacent to and including the Honouliuli WWTP were considered the areas potentially most affected by the proposed upgrading of the Honouliuli WWTP. The number and percentage of children under 18 within census tracts, the CCDs within the ROI, and Honolulu County were determined based on 2010 Census data (Table 5-16). The percentage of children under 18 in each of the census tracts in the vicinity of the Honouliuli WWTP was higher than the percentages of children under 18 in all other areas considered for comparison. Therefore, a concentration of children is present in all census tracts in the affected area, including the census tract in which the Honouliuli WWTP is located, Census Tract 84.11 (Figure 5-12).

Table 5-16. Number and Percentage Children, 2010

Geographic Area		Children Under 18	
		Number	Percent
Area of Comparison	Honolulu County	210,500	22.1
Socioeconomic ROI	Honolulu CCD	69,807	17.9
	Ewa CCD	80,225	24.8
Affected Area	Census Tract 84.11	**1,000**	**29**
	Census Tract 84.05	**1,476**	**31.6**
	Census Tract 84.06	**2,078**	**34.7**
	Census Tract 84.10	**668**	**28.5**
	Census Tract 84.12	**1,739**	**26.6**
	Census Tract 85.02	**595**	**27.9**
	Census Tract 86.17	**2,512**	**26.8**
	Census Tract 115	**1,885**	**34.3**

Source: USCB 2014c, P12 Sex by Age, 2010 Census.
Notes:
The Honouliuli WWTP is located in Census Tract 84.11.
Bold values indicate population numbers and percentages of concentrations of children.



City and County of Honolulu

HONOULIULI/ WAIPAHU/ PEARL CITY WASTEWATER FACILITIES PLAN

Legend

- Honouliuli WWTP
- Tract with Concentration of Children
- Other Tract
- Street

0 4,000
Feet
1 inch = 5,000 feet

FIGURE 5-12

CENSUS TRACTS WITH CONCENTRATIONS OF CHILDREN

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Impacts and Mitigation Measures

Although EJ populations and concentrations of children are present in the affected area, based on the analyses presented in this EIS, the proposed project would have less than significant adverse human health or environmental impacts. Negative impacts on the population in the project vicinity are not anticipated, and the project would provide improved wastewater treatment for the surrounding population. The proposed project would allow the wastewater system to safely and efficiently accommodate projected flows up to the year 2035 and provide an adequate wastewater system to support the needs of the population and economy in the service area. With respect specifically to children, as described in Section 5.14.2 Public Schools, the nearest public school to the project site is located approximately 0.6 miles from the Honouliuli WWTP and there are no known childcare facilities within a one-mile radius of the project. However, there are several childcare facilities within a 2 mile radius as well as several DHS registered family care homes within several miles of the treatment plant.

The effects of implementing the project would not be appreciably more severe or greater in magnitude in minority or low-income communities, or in communities with high concentrations of children. Therefore, no disproportionately high and adverse human health or environmental effects on minority populations and low-income populations would occur. Likewise, implementation of the project would not pose disproportionate environmental health or safety risks to children. The proposed project would not negatively impact EJ populations, and would not negatively impact children. There could possibly be direct and indirect benefits to these population groups as a result of additional job opportunities.

5.13 Infrastructure and Utilities

The following section provides a brief overview of the existing water, wastewater, solid waste disposal, electrical, and communications systems, and public services and the direct impacts that the proposed wastewater system improvements would have on each.

Increased capacity in the wastewater treatment system serves the projected increase in development and urban expansion along the Honolulu High-Capacity Transit Corridor Project (HHCTCP) within the sewershed, as planned by the CCH. Information regarding this projected expansion, which may result in increased demands on the CCH's overall public infrastructure services, was addressed in HHCTCP Final Environmental Impact Statement published on June 25, 2010 in the Federal Register.

5.13.1 Water

5.13.1.1 Existing Setting

The emergency fire and potable water supply for the island of Oahu is provided by the CCH BWS, which is a semi-autonomous agency that constructs, operates, and maintains the pumping stations and associated distribution network. The BWS relies solely on groundwater for potable water supply. The Honouliuli WWTP site is located within the Waipahu-Waiawa system, which is the primary source of drinking water for the study area. The closest well to the WWTP site is approximately 3.1 miles to the north. For industrial and irrigation purposes, the BWS utilizes the HWRF, operated by Veolia Water North America and located on the western side of the Honouliuli WWTP, which recycles wastewater for non-potable uses. Access to the HWRF is through the main access gate of the Honouliuli WWTP along Geiger Road. The HWRF provides tertiary treatment to approximately 13 mgd of secondary effluent from the WWTP.

5.13.1.2 Construction Impacts and Mitigation Measures

The BWS has requested consideration of a dedicated entrance and that 3 to 5 acres of land be set aside and reserved for HWRF upgrades, improvements, and/or expansion. The final determination of land area, location, and timing of expansion would need to be defined with BWS during detailed design.

Water system improvements near the Honouliuli WWTP may be required to improve the reliability of the existing potable water system and for the potential expansion of the Honouliuli WWTP. Coordination with the BWS would be necessary during design to avoid or minimize the potential for conflicts regarding the reclamation and reuse of wastewater. Requests for additional potable water or recycled water by consumers must be submitted to BWS for review. Construction drawings would be submitted to BWS review as part of the building permit application process and the estimate of water required during construction and availability of the water would be confirmed during the review and approval of the building permit application.

5.13.1.3 Operational Impacts and Mitigation Measures

The treatment alternatives include the upgrade/construction of wastewater facilities, and may require additional potable and/or emergency water service during operation. BWS recommends the use of drought tolerant/low water use facilities and xeriscaping principles for all landscaping and installation of an efficient irrigation system, such as drip irrigation, incorporating moisture sensors to avoid the operation of the system in the rain and if the ground has adequate moisture. These recommendations would be implemented for the proposed project, regardless of the alternative selected.

5.13.2 Wastewater

5.13.2.1 Existing Setting

The existing wastewater infrastructure in the project area is described in Section 3. Improvement of the existing wastewater treatment system is the focus of the ongoing evaluation and the subject of this FEIS. Wastewater is collected primarily by gravity to 16 pump stations distributed throughout the Honouliuli Sewershed. Wastewater is then pumped through force mains to the interceptor sewers leading to the Honouliuli WWTP, where it is treated and discharged through the Barbers Point Deep Ocean Outfall, located approximately 1.7 miles offshore at a depth of 200 feet.

5.13.2.2 Construction Impacts and Mitigation Measures

Construction is proposed to occur at the existing WWTP site. The plant would continue to operate during construction activities, which are anticipated to continue for several years. Effluent discharged will remain in compliance with the 2010 Consent Decree. It is possible that processes may be temporarily interrupted on occasion to connect new structures and facilities to the existing system, and temporary pumping and piping may be required. Staging areas at the Honouliuli WWTP would be designed to avoid impacting any existing sewer pipes in the vicinity of the project site.

5.13.2.3 Operational Impacts and Mitigation Measures

As mandated by the EPA, the long-term goal of this project is to upgrade the WWTP to secondary treatment. The project may also improve some water quality parameters as it would provide additional treatment capacity to meet future population growth and development and better manage peak wastewater flows, as described in Section 5.7 Water Quality.

5.13.3 Solid Waste Disposal

5.13.3.1 Existing Setting

The Ewa Convenience Center, located at 91-1000 Geiger Road at the southwest corner of the Honouliuli WWTP, accepts residential municipal solid waste only. Multiple roll-off dumpsters are used onsite for the separate collection of different types of materials: combustibles are processed at the Honolulu Program of Waste Energy Recovery (H-POWER), a waste-to-energy facility located at the Campbell Industrial Park in Kapolei; non-combustibles are taken to the Waimanalo Gulch Landfill in Kahe Valley; yard waste is hauled to mulching and composting sites; and large appliances, tires and auto batteries are taken to recycling facilities. There are plans to close the Waimanalo Gulch Landfill and/or limit the amount of solids disposed of. The solids loading to the WWTP comes from the Honouliuli WWTP system in addition to the solids from the Wahiawa and Paalaa Kai WWTPs, which are trucked to the Honouliuli WWTP for further processing and disposal. Construction debris is transported to the PVT Land Company located in Nanakuli by private haulers.

5.13.3.2 Construction Impacts and Mitigation Measures

The construction of the proposed project may have some impact on the solid waste disposal operations within the project area. Approximately 673,250 cubic yards would be excavated for new structures, most of which (approximately 573,000 cubic yards) would be used as backfill onsite. Excess excavated material would be approximately 100,000 cubic yards (equivalent to the estimated volume of the buried foundation of each new structure). If this material could not be kept on site, coordination with local landfills and recycling centers for the disposal of construction debris and/or hazardous materials may be required and the ultimate disposal location will depend on space availability at local landfills. Disposal would be in accordance with appropriate regulations and standards.

5.13.3.3 Operational Impacts and Mitigation Measures

The proposed project is expected to have minimal impact on the solid waste disposal operations within the project area. Solid waste generated at the WWTP would continue to be disposed of in accordance with local requirements.

The upgrade of the existing WWTP to full secondary treatment would increase the solids production. The CCH has evaluated options for biosolids processing and disposal in an effort to reduce solids disposal to the landfill. The CCH ENV developed an *Island-wide Sludge Management Plan (2015)*, which recommended sludge processing technologies for implementation at Honouliuli WWTP. Potential options include building two new conventional mesophilic anaerobic digesters to accommodate the proposed secondary treatment upgrade and population growth, as recommended in TM 11.D.4. The quantity and quality of sludge being processed, and biogas available for beneficial use, will depend to an extent on the outcome of the island-wide sludge planning effort and factors such as on-site processing methods and importation of sludge.

Waste minimization options include composting or further solids handling to reduce the volume of solids such as drying. Drying is the recommended process to provide for sludge reuse by land application as a sludge disposal method. In addition, other solid residuals from the wastewater treatment process, including screenings and grit would be washed and compacted. These measures are consistent with current best practices for handling residuals and are consistent with waste minimization goals.

Another sustainable opportunity is the conversion of solids to energy. There are both off-site and on-site opportunities for the conversion of solids to energy. One off-site alternative is to haul the solids from Honouliuli WWTP to H-POWER. H-POWER is currently accepting sludge and is a viable outlet in the near future. On-site waste-to-energy alternatives include incineration and closed-coupled processes. Section 4.1.5 describes the alternatives considered for the solids handling systems. Further refinement of the processing and disposal options is expected during design.

5.13.4 Electrical and Communication Services

5.13.4.1 Existing Setting

Hawaii Electric Company (HECO) supplies electricity to the majority of Oahu. Two of HECO's major facilities, the Kahe and Waiau Power Plants, are located within approximately 5 miles of the WWTP site. Overall facility electrical demand currently ranges from 1,536 to 1,757 kW (AECOM 2014a). Telephone and internet services within the project area are provided by Hawaiian Telcom and Oceanic Time Warner Cable. Oceanic Time Warner Cable also provides cable services within the project area. These services are transmitted through underground and aerial lines located in the project area. HECO substation upgrades may be required to handle the new secondary power requirements.

There are two cell phone towers located on the WWTP property, one in the southeast corner and the other in the northwest corner.

5.13.4.2 Construction Impacts and Mitigation Measures

Construction of the project would require electricity mostly generated by the burning of fossil fuels and imported fuels for powering equipment and vehicles during construction.

The existing overhead power lines are recommended to be replaced with underground utilities, and the backbone of the electrical distribution would be expanded to areas with new facilities. Regardless of the alternative selected, coordination with HECO, Hawaiian Telcom, and Oceanic Time Warner Cable, would be conducted to minimize and/or avoid potential conflicts with any underground and overhead utility lines in the project area. Proposed improvements, including staging areas, would be designed to avoid impacting any existing electrical and communication lines.

No impacts to the two cell phone towers and their current vehicular access ways are anticipated.

More Information on the electrical component of the proposed secondary treatment upgrade is located in Section *4.1.7*

5.13.4.3 Operational Impacts and Mitigation Measures

An increase in energy consumption would be necessary at the existing Honouliuli WWTP for the proposed project. The increase in energy usage to upgrade the WWTP from primary treatment to secondary treatment and additional solid treatment could be substantial in the WWTP's overall energy consumption. Secondary treatment under aerobic conditions is typically done at the expense of increasing energy consumption while also increasing the solids from microbial synthesis that adds to disposal burden. Electrical demand is anticipated to be 6,943 kW following upgrades to the Honouliuli WWTP, which is higher than the current estimated peak electrical demand (1,757 kW) (AECOM 2014a). Comparing alternatives, it is anticipated that Sub-options 1B and 1A would consume the smallest amount of electricity and Option 2 and Sub-option 3A would consume the most electricity (AECOM 2014e). Energy savings measures may be employed, regardless of the alternative selected, to offset this anticipated increase, such as new light fixtures and skylights, new more efficient blowers and pumps, and new solar panels (AECOM 2014a).

There is a potential for energy recovery from digester gas or by utilizing new emerging technology for gasification of sewage sludge. However, at this time, it is not known if the net energy consumption could be feasibly reduced to favorable levels through the implementation of new technologies that are emerging on the market. CCH is currently evaluating alternatives to use the digester gas for energy recovery.

If a CHP facility is incorporated at the Honouliuli WWTP, it would need to be permitted according to local, State and Federal air regulations, including air permitting in conjunction with the biosolids disposal.

5.13.5 Gas

5.13.5.1 Existing Setting

The Gas Company, LLC maintains underground utility gas mains which serve commercial and residential customers throughout the project area. There are no known major gas lines within the proposed project site.

5.13.5.2 Impacts and Mitigation Measures

Regardless of the alternative selected, coordination with the Gas Company, LLC would be necessary to minimize and/or avoid potential conflicts with the existing gas utilities. Although there are no known major gas lines in the vicinity of proposed construction activities, gas handling systems would be necessary, including piping for the anaerobic digesters. None of the proposed processes are anticipated to require natural gas as a fuel source. The proposed standby generators would use diesel fuel. The thermal dryer would use digester gas as a fuel source. Any leftover digester gas would be:

1. Used to generate electricity (cogeneration)
2. Cleaned and sold as a commercial fuel, or
3. Burned with the existing waste gas flare that is presently used at the site.

Based on the initial coordination, impacts would not be anticipated during construction or operation of the proposed project, regardless of the alternative selected.

5.14 Public Services and Facilities

5.14.1 Police and Fire Protection Services

5.14.1.1 Existing Setting

The Honolulu Police Department (HPD) and Honolulu Fire Department (HFD) provide emergency services to the island of Oahu. The HPD has divided the island into eight patrol districts with five district stations. The Kapolei district station is located within the project area (District 8).

5.14.1.2 Construction Impacts and Mitigation Measures

Coordination with the HPD during construction would be necessary to mitigate traffic congestion and ensure public safety, in those instances when traffic control cannot be provided by the contractor(s) employees alone. When necessary, off-duty police officers would be scheduled and hired.

Coordination with the HFD for the safe design of new or upgraded structures would also be necessary; plans would be submitted to the HFD for review and approval during the design phase. Based on their recommendations and the National Fire Protection Association [NFPA]1; Uniform Fire Code [UFC]™, 2012 Edition, a fire apparatus access road for every facility, building or portion of building within their jurisdiction would be provided when the structure is more than 150 ft from a fire apparatus access road (UFC Section 18.2.3.2.2.~~Section 902.2.1~~). A fire department access road shall extend to within 50 feet (15m) of at least one exterior door that can be opened from the outside and that provides access to the interior of the building. (NFPA 1; UFC™, 2012 Edition, Section 18.2.3.2.1.) In accordance with the NFPA 1; UFC™, 2012 Edition, Section 18.3.1, as amended ,~~UFC Section 903.2~~, on-site fire hydrants and mains capable of supplying the required fire flow would also be provided when any portion of a facility or building is in excess of 150 ft from a water supply. The water supply would also be provided as approved by the county in terms of supplying the required fire flow for fire protection.

5.14.1.3 Operational Impacts and Mitigation Measures

The operation of the proposed wastewater system improvements is expected to have minimal impact on the HPD and HFD. Design drawings should be submitted to HFD for review prior to bid.

5.14.2 Public Schools

5.14.2.1 Existing Setting

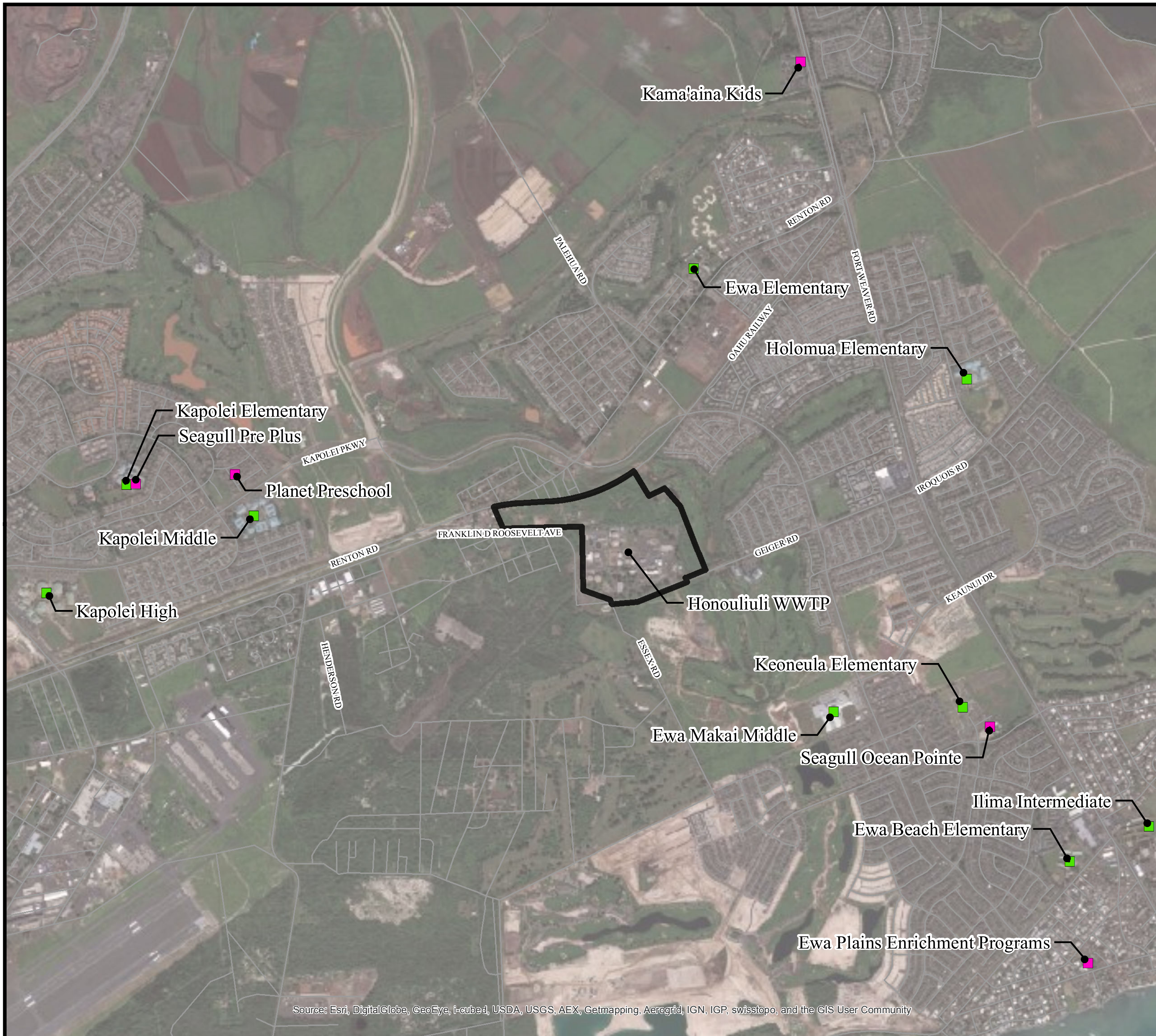
There are several public schools located in the vicinity of the project area (within approximately 1 mile [mi.]) including:

- Ewa Makai Middle School (approx. 0.6 mi.)
- Ewa Elementary School (approx. 0.7 mi.)
- Kapolei Middle School (approx. 0.8 mi.)
- Keoneula Elementary School (approx. 1.0 mi.)
- Holomua Elementary School (approx. 1.0 mi.)

There are no childcare facilities within a 1 mi. radius of the project site. The nearest childcare facilities include:

- Seagull schools (two locations, approx. 1.3 mi. and 1.7 mi.)
- Planet Preschool (approx. 1.4 mi.)
- Kamaʻaina Kids (approx. 1.9 mi.)
- Ewa Plains Enrichment Programs approx. 2 mi.)

Figure 5-13 shows the public schools and childcare facilities in the project area.



City and County of Honolulu

HONOULIULI/ WAIPAHU/ PEARL CITY WASTEWATER FACILITIES PLAN

Legend

- Honouliuli WWTP
- Public School
- Childcare Facility
- Street

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Feet
1 inch = 2,400 feet

FIGURE 5-13

PUBLIC SCHOOLS AND CHILDCARE FACILITIES

December 2014

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G:\Projects\MUNI\60220849HON\Maps\EI\Figure_5-13 Public Schools and Childcare Facilities.mxd

5.14.2.2 Construction Impacts and Mitigation Measures

Public schools and childcare facilities in the vicinity of the project area are not anticipated to be impacted by construction activities (including any increases in noise or traffic) at the Honouliuli WWTP site, due to the distance between the project site and public schools/childcare facilities in the area. The nearest public school to the project site is the Ewa Makai Middle School located approximately 0.6 mi. to the southeast, and there are no childcare facilities within a 1 mi. radius of the project. As previously mentioned, there may be a slight increase in traffic during construction activities at the Fort Weaver Road/Geiger Road/Iroquois Road & Renton Road/Fort Weaver Road intersections (intersections #10 and #11 on Figure 5-7), which are located in the vicinity of Ewa and Holomua Elementary Schools (Figure 5-13).

5.14.2.3 Operational Impacts and Mitigation Measures

Operational effects to schools or childcare facilities are not anticipated as a result of any of the project alternatives, with the exception of the potential for a slight increase in traffic at the Fort Weaver Road/Geiger Road/Iroquois Road & Renton Road/Fort Weaver Road intersections (intersections #10 and #11 on Figure 5-7), located in the vicinity of Ewa and Holomua Elementary Schools.

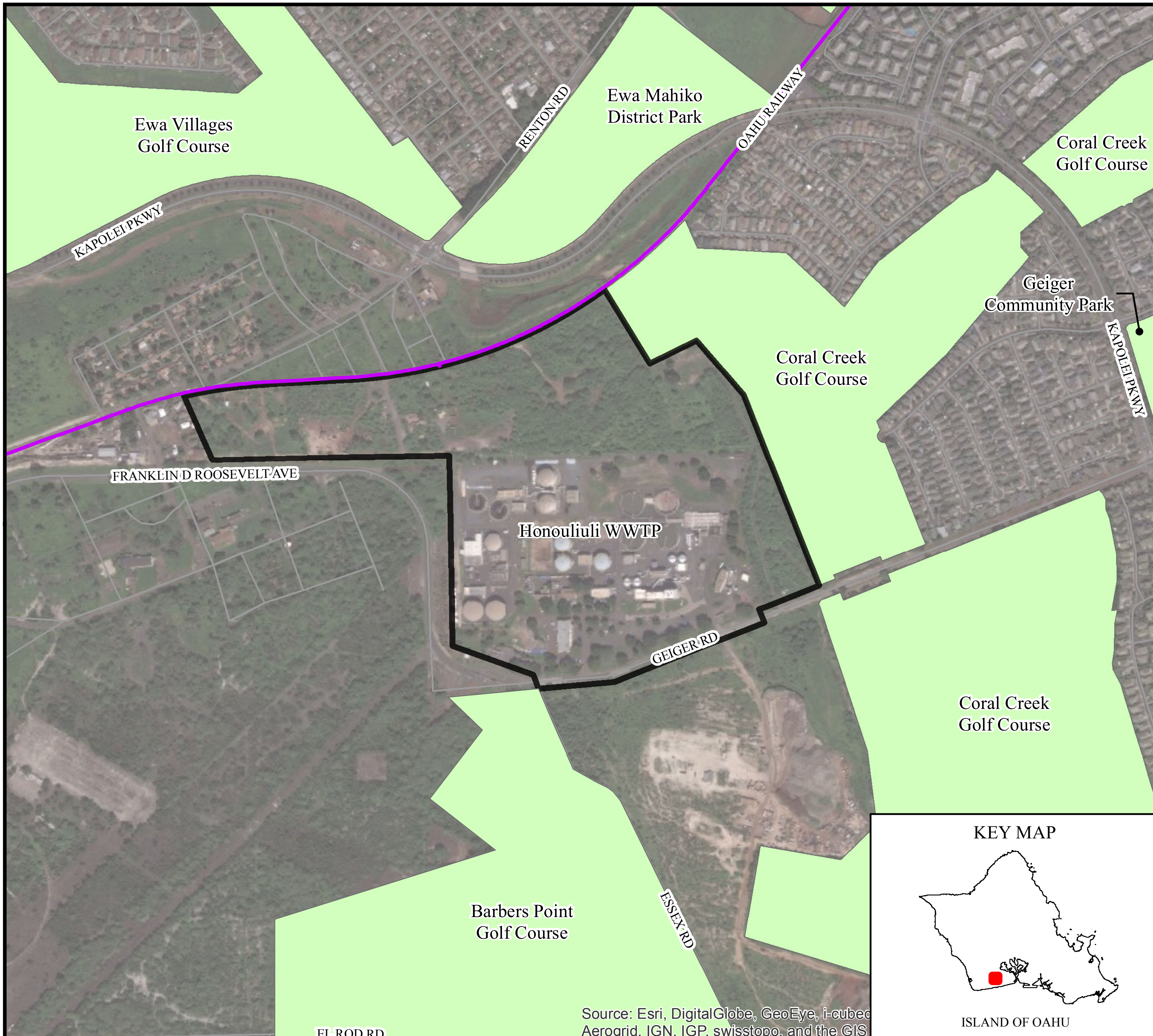
5.14.3 Parks and Recreational Areas

5.14.3.1 Existing Setting

Several recreational areas including golf courses, parks, and a bike trail are located near the project area (within 1 mi.) including:

- Coral Creek Golf Course
- Barbers Point Golf Course
- Ewa Villages Golf Course
- Geiger Community Park
- Ewa Mahiko District Park
- Rail trail/bike path within the old OR&L railway

Figure 5-14. Parks and Recreational Areas shows the parks and recreational areas in the project area. Of the recreational areas listed above, Coral Creek Golf Course and rail trail/bike path are located closest to project activities; the golf course lies directly adjacent to the eastern boundary of the project parcel and the bike path is located to the north.



City and County of Honolulu

HONOULIULI/ WAIPAHU/ PEARL CITY WASTEWATER FACILITIES PLAN

Legend

- Honouliuli WWTP
- Parks and Recreational Areas
- Street
- Rail Trail

0 800
Feet
1 inch = 800 feet

FIGURE 5-14

PARKS AND RECREATIONAL AREAS

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5.14.3.2 Construction Impacts and Mitigation Measures

The WWTP alternatives are not anticipated to directly impact park or golf course facilities as a result of construction activities. However, some secondary minor impacts as a result of construction, such as noise, slight increase in traffic, or temporary aesthetic impacts (as discussed in this document) may occur near the closest recreation areas (Coral Creek Golf Course and possibly the bike path). However, these secondary impacts are anticipated to be minor in nature.

In general, if the alternative implemented potentially impacts any park or recreational use, owners of these recreational areas, as well as the CCH Department of Parks and Recreation, would be consulted for acceptability before proceeding further and to coordinate work to avoid any impairment to public use of these facilities.

5.14.3.3 Operational Impacts and Mitigation Measures

Regardless of the alternative implemented, no operational effects to parks and recreational facilities are anticipated, other than periodic inspection and/or maintenance of proposed wastewater management facilities located near park/golf course property. Mitigation measures include the proper design and construction of wastewater facilities.