

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843



July 26, 2013

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Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control
Department of Health
State of Hawaii
235 South Beretania Street, Room 702
Honolulu, Hawaii 96813

Dear Ms. Salmonson:

Subject: Draft Environmental Assessment - Anticipated Finding of No Significant Impact for the Maakua Well Unit No. 2, Hauula, Koolauloa District, Oahu, Hawaii, TMK: 5-4-005: Portion of 001

With this letter, the City and County of Honolulu Board of Water Supply (BWS), hereby transmits the Draft Environmental Assessment - Anticipated Finding of No Significant Impact (DEA-AFNSI) for the Maakua Well Unit No. 2 project for publication in the next available edition of the Office of Environmental Quality Control (OEQC) Environmental Notice.

Enclosed is a completed OEQC Publication Form including the summary, one (1) hard copy of the DEA-AFNSI and one (1) CD containing the DEA-AFNSI, the BWS Transmittal Letter and the Distribution List in pdf format and the OEQC Publication Form including the summary in Word format.

If you have any questions, please contact Rian Adachi at 748-5943 or our consultant, Chester Koga of R.M. Towill Corporation at 842-1133.

Very truly yours,

ERNEST Y. W. LAU, P.E.
Manager and Chief Engineer

Enclosures

cc: Chester Koga, R.M. Towill Corporation

OFFICE OF ENVIRONMENTAL
QUALITY CONTROL

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Ma'akua Well Unit No. 2

(1) 5-4-005: por. 001

Hau'ula, O'ahu, Hawai'i

July 2013

**Board of Water Supply
630 South Beretania Street
Honolulu, HI 96843**

Draft Environmental Assessment
Ma'akua Well Unit No. 2
Tax Map Key: (1) 5-4-005: por. 001
Hau'ula, O'ahu, Hawai'i

July 2013

Prepared for:
Board of Water Supply
630 South Beretania Street
Honolulu, Hawai'i 96843

Prepared by:
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RMTC Reference No.1-21715-0P

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Section 1
Project Summary

Project	Ma'akua Well Unit No. 2
Applicant	Board of Water Supply City & County of Honolulu
Accepting Agency	Board of Water Supply City & County of Honolulu
Agent	R. M. Towill Corporation
Location	Hau'ula, O'ahu, Hawai'i
Proposed Action	Construction of a second well unit(1 million gallons per day (mgd) capacity)
Present Use	Well Site for Ma'akua Well Unit No. 1
Tax Map Key (TMK)	(1) 5-4-005: por. 001
Total Parcel Area/Project Site	152 acres/< approximately 1 acre
Flood Insurance Rate Map (FIRM)	Flood Zone D
State Land Use District	Conservation, Resource (R) Subzone
State Water Management Area	Ko'olau Loa
City & County of Honolulu Development Plan Public Facilities Map	Site Determined
Special Management Area	No
City & County of Honolulu Zoning	Preservation (P-1)
Land Owner	State of Hawai'i with Executive Order to BWS for water production purposes
Permits That May be Required	<ul style="list-style-type: none"> ▪ Conservation District Use Permit ▪ Permit for Use of State Lands ▪ Water Use Permit ▪ Well Construction Permit ▪ Pump Installation Permit ▪ National Pollutant Discharge Elimination System (NPDES) Permit ▪ Noise Permit
Anticipated Determination	Finding of No Significant Impact (FONSI)

Section 2 Project Purpose and Location

2.1 Purpose of Project

The Honolulu Board of Water Supply (BWS) proposes to develop the Ma'akua Well Unit No. 2 to act as a second well when peak demand is exceeded for Unit No. 1 and to improve reliability of the station. The Ma'akua Well Station is a BWS facility serving the Hau'ula and Ma'akua area. There is currently only one well at the existing Ma'akua Well Station which produces on average 0.8 million gallons per day (mgd) (2007-2011). The station is situated on approximately 1.0 acre identified as Tax Map Key: (1) 5-4-005: portion of parcel 001. The station was constructed in 1996 as a BWS water supply facility designed to serve the Hau'ula area in the Ko'olau Loa District in Windward O'ahu.

The site includes the following facilities:

- A 10,000 gallon holding tank (reservoir);
- Ma'akua Well Unit No. 1, a production well approximately 350 feet deep with an installed pump capacity of 1 mgd;
- A pump mute building serving as an acoustic enclosure and weatherproof structure protecting Ma'akua Well Unit No. 1;
- A single-story control building;
- A hydropneumatic pressure tank;
- An access road extending from the end of Ma'akua Road and into the Ma'akua Well site providing access to its facilities; and
- A 12-inch distribution main that conveys potable water to the Hau'ula and Ma'akua area.

The Ma'akua Well Site is a component of the BWS, Windward O'ahu Regional Water System Improvements (Board of Water Supply, 1988) development plan, and is part of the BWS' Hau'ula 180 System that also feeds into the Kahana 315 System (see **Figure 1, BWS Hau'ula 180 System**).

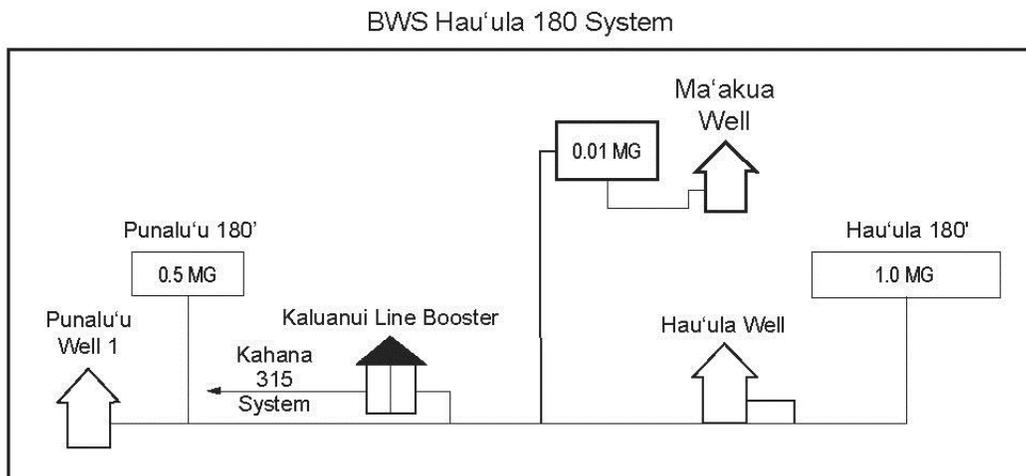


Figure 1: BWS Hau'ula 180 System

Ma'akua Well Unit No. 1 was originally constructed to meet the growing demand for residential water use in Windward O'ahu. The purpose of the proposed Ma'akua Well Unit No. 2 is to primarily serve as a second well unit to improve the efficient use of the BWS facility by allowing for the distribution of workload between two well pumping units thereby prolonging lifecycle costs for maintenance, repair, and/or replacement of machinery. Well Unit No. 2 will be operated when it is necessary for BWS to shut down Well Unit No. 1 for repair or regularly scheduled maintenance. Major repairs or maintenance that may be required in the future for Well Unit No. 1 will not require the shutdown of the station. In addition, the second well would be operated during peak demand periods when the demand exceeds the Well Unit No. 1 output. The existing permitted use of 1.12 mgd from CWRM will remain unchanged.

2.2 Purpose of Environmental Assessment

The purpose of this Environmental Assessment (EA) is to address the requirements of Hawai'i Revised Statutes (HRS), Chapter 343, and Hawai'i Administrative Rules (HAR), Chapter 11-200. The specific action that requires the preparation of this EA includes the use of state or county lands and/or funds for development.

This EA provides information and evaluation of the potential for adverse environmental impacts on the natural and built environment associated with the planned construction of the Ma'akua Well Unit No. 2. This EA will also inform interested parties of the proposed project and seek public comment on relevant environmental issues that should be addressed during preparation of the Final EA.

2.3 Project Location

The Ma'akua Well site is located at the end of Ma'akua Road, approximately 0.6 miles inland or mauka (west) from Kamehameha Highway in Hau'ula Town, Ko'olau Loa District, O'ahu (see **Figure 2, Project Location and Figure 3, Site Map**). The site is identified as TMK: (1)-5-4-005: por. 001 (see **Figure 4, Tax Map Key**). The Ma'akua Well Unit No. 2 will be constructed within the existing Ma'akua well facility in a location that is approximately 150 - 200 linear feet from Well Unit No. 1.

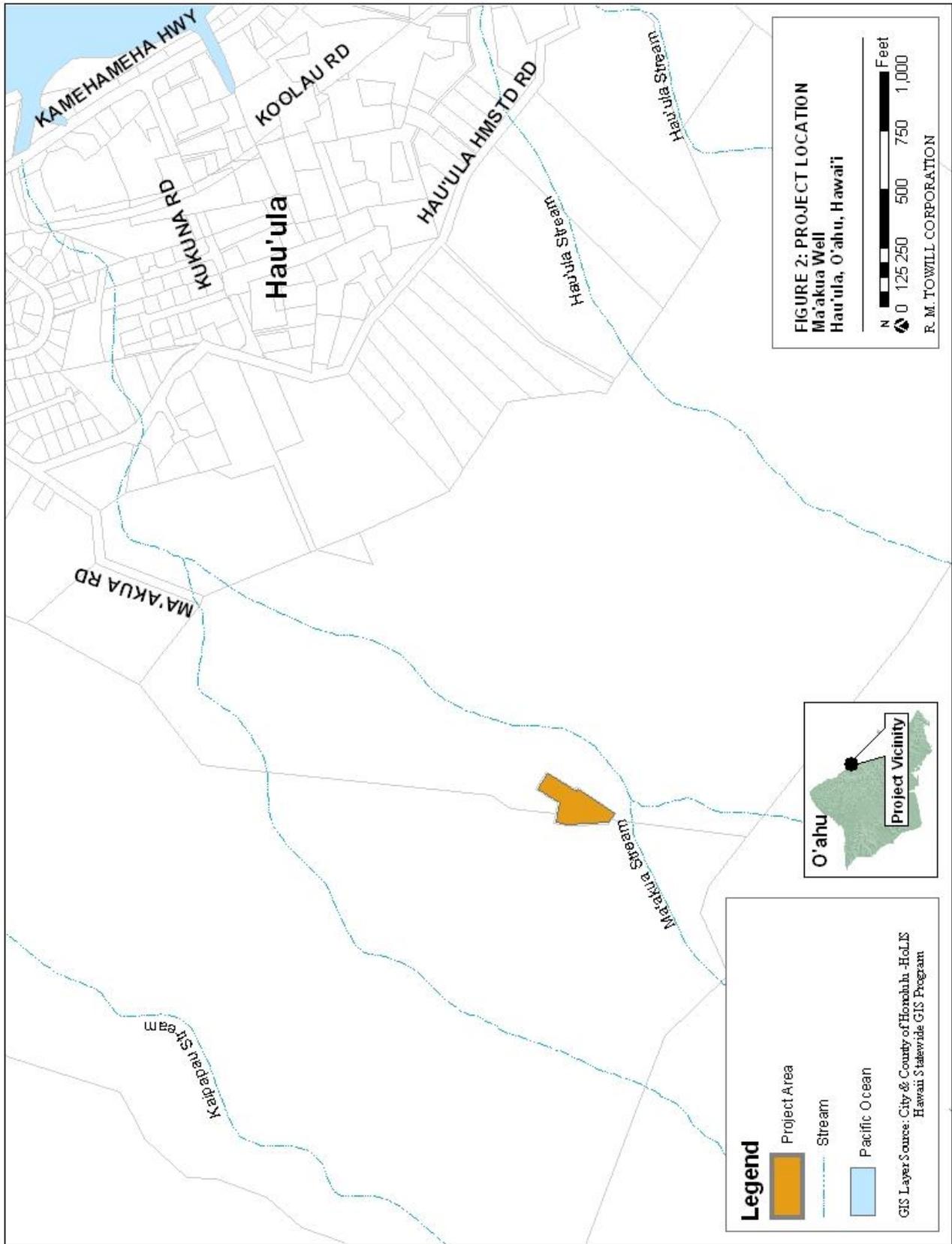


Figure 2: Project Location

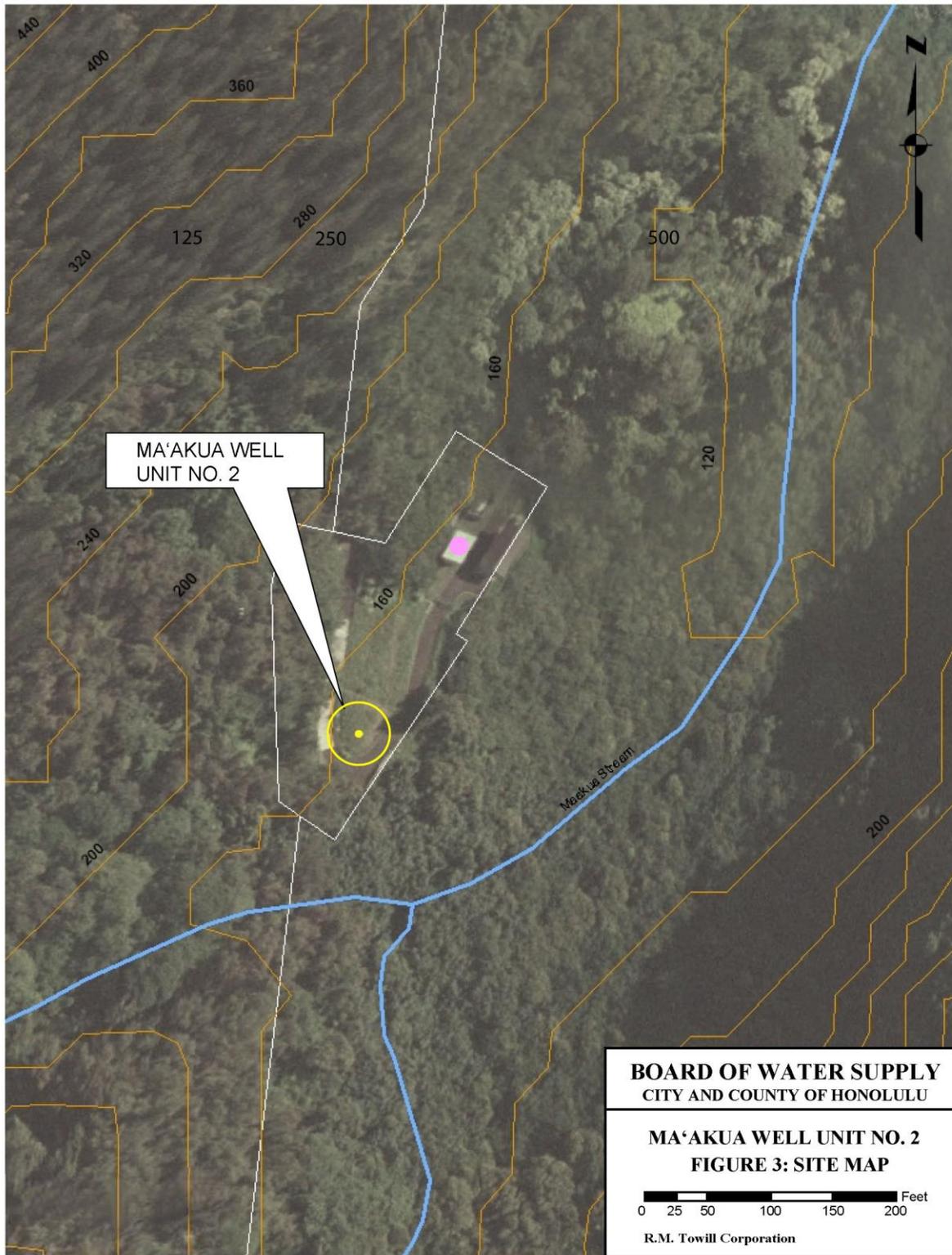


Figure 3: Site Map

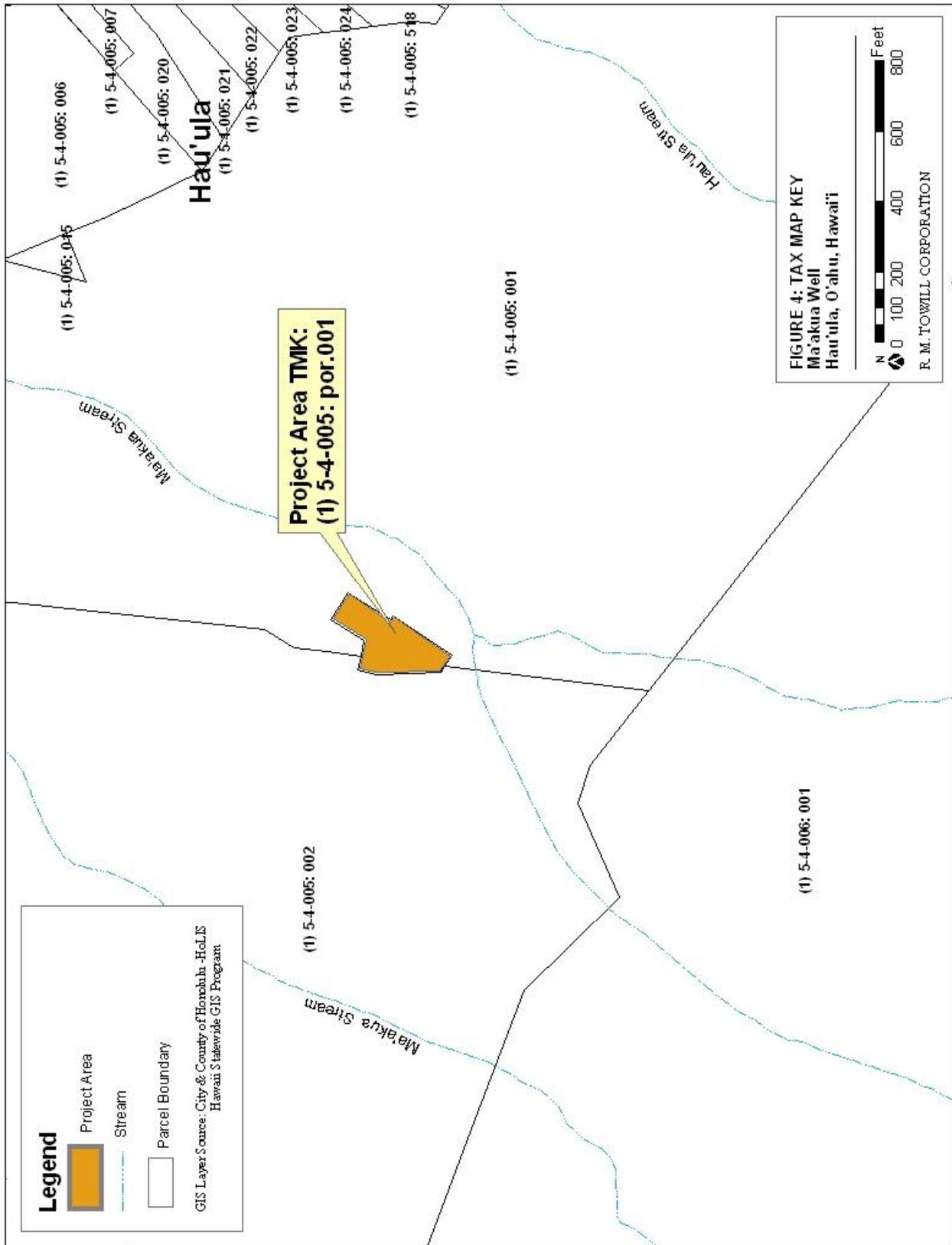


Figure 4: Tax Map Key

Section 3

Project Description and Alternatives Considered

3.1 Description of Proposed Plan

3.1.1 Overview

The proposed project involves the construction of the Ma'akua Well Unit No. 2 to act as a second well when peak demand is exceeded for Unit No. 1 and to improve reliability of the station. The Ma'akua Well Station was originally constructed as part of a groundwater development program to meet BWS consumer demand for potable water in Windward O'ahu¹. The BWS plans to meet user demand by investigating, planning, and developing water supply within the limits of available resources. The proposed project is intended to ensure the long term maintenance, reliability and stability of the Ma'akua Well Station by providing a secondary well unit.

Two project phases are planned: Phase 1 will drill and test an exploratory well. The well will be drilled, cased, and tested for yield, water quality, and drawdown capability. Once the capabilities of the well are confirmed for adequacy, the second phase will be implemented. Phase 2 will develop the exploratory well into a production well. Construction activities include the installation of the Unit No. 2 production well pump, pad and foundation, mute building if necessary, retaining wall, and connection to the existing distribution infrastructure at the site. The mute building will be necessary only if a line-shaft type of pump is installed. If a submersible type of pump is installed, the mute building will not be needed. The determination will be made prior to construction.

Water developed from the new well will utilize the existing site facilities that include a holding tank (reservoir), water mains, control building, hydropneumatic pressure tank, electrical transformer, and access road.

The project will support the existing distribution of water as part of the BWS Hau'ula 180 System. The Ma'akua Well Station will also continue to supply water to the existing Kaluanui Line Booster Station for distribution toward Kahana and Kāne'ohe. That is, flows that are in excess of requirements will be diverted to the Kailua/Kāne'ohe area as needed to maintain BWS capacity requirements (**refer back to Figure 1, BWS Hau'ula 180 System**). No increase in potable water yield from the site will be required.

Well Unit No. 2 Site

The proposed project site will utilize an area of approximately 100 square feet and will contain the Well Unit No. 2 and possibly a mute building enclosure similar to that used for Well Unit No. 1 during Phase 2 (**see Photo 1 and 2**). The technical specifications for the mute building, if necessary, will consist of a concrete foundation of approximately 10 x 8 feet, and construction materials that include concrete masonry units (cmu) and a concrete roof. The mute building will serve to reduce noise during operation of the well and provide protection against tampering and vandalism. A retaining wall will be constructed to maintain stability of the site based on the need

¹ Windward O'ahu Regional Water System Improvements [Plan], Board of Water Supply, 1988

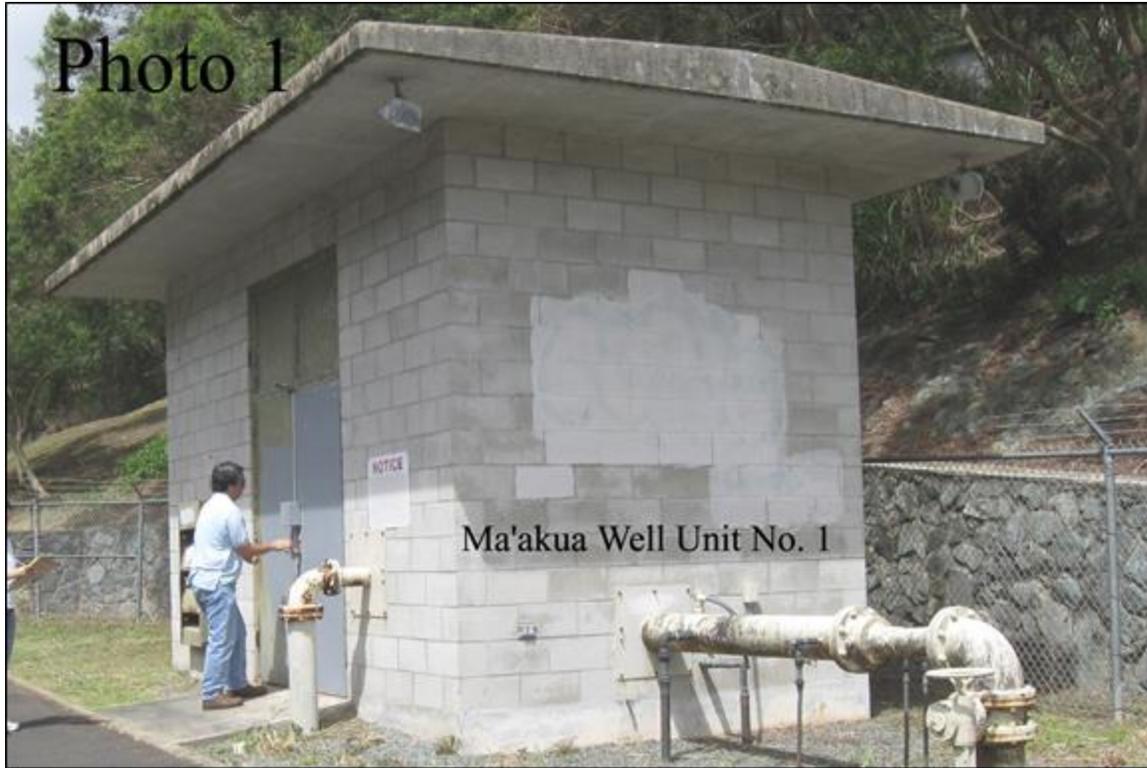


Photo 1 – View of mute building enclosure protecting the Ma'akua Well Unit No. 1.



Photo 2 – View of Proposed Site for Ma'akua Well Unit No. 2. The site is located along the access road and upgradient of Ma'akua Stream which was dry at the time of the photograph (July 2010).

for grading to prepare the site to accept the new well and mute building. A water line will connect the new well to an existing distribution system line.

According to BWS, the yield-drawdown and long-term pumping tests performed for an exploratory well in June 1990 (for Well Unit No. 1) indicate that the new well is capable of sustaining an installed pumping capacity of 1.0 mgd, the equivalent of approximately 700 (694.44) gallons per minute (gpm). In accordance with CWRM requirements, the permitted use of the Ma'akua Well Station for both wells is 1.12 mgd. The static head of the well will be approximately 17.8 feet above msl and drawdown at this capacity is estimated to be 5.5 feet.

The proposed Well Unit No. 2 will have a wellhead ground elevation of about 162 feet above mean sea level (msl) and be drilled as a single bore well. The upper or cased portion of the well will have an outside diameter of approximately 18-20 inches and be drilled to a depth of 215 feet or -53 feet msl. A 14-inch diameter steel casing will be centered within the upper portion and grouted in place. The steel casing and grouting will follow State well construction standards that provide for protection of the aquifer from contamination. The developmental portion of the well below the casing will have a diameter of about 12-inches and be drilled approximately 135 feet deep to a depth of -188 feet msl for a total depth of 350 feet. The final dimensions and depth of the well may be adjusted depending on the site conditions and the results of the pumping tests that will determine yield and quality (**See Figure 5, Preliminary Cross-Section**).

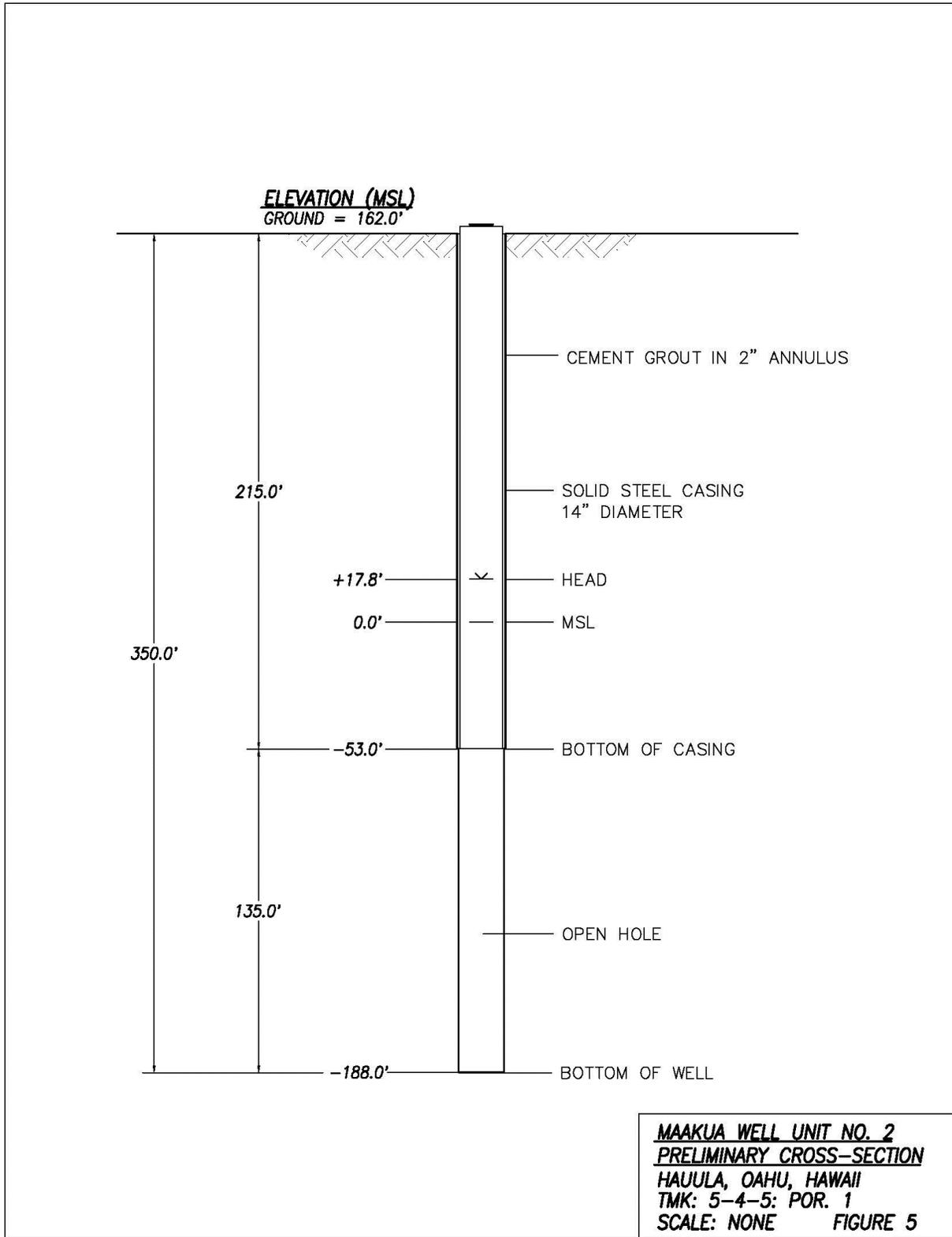


Figure 5: Preliminary Cross-Section

3.1.2 Construction Activities

The area of the proposed well site will be cleared and graded to prepare the site for the drilling rig and equipment. Grading will be required to establish a level working surface for the drilling rig and equipment, temporary storage of the well pump, valves and fittings, and discharge pipes necessary for cleaning and testing of the well, and possibly construction of the mute building that will enclose the well during Phase 2. All materials removed from clearing and grading will be either stored on-site for reuse, or disposed of at a county-authorized facility that accepts construction and demolition debris.

The drilling process will use the cable tool method due to the available space at the site, and the ability of the cable tool method to work in relatively limited spaces while providing a clean drilling process. The anticipated drilling depths required will be approximately 350 feet and easily within the capabilities of the drilling method.

The well will be drilled to the design depth where groundwater is expected to be encountered. Development of the well will be by surge pumping which will also be used to determining preliminary drawdown capacity and turbidity levels. Following the developmental phase, pumping tests will be conducted to determine final yield and quality. In addition, water samples will be taken and tested to verify that contaminants from the new well construction are not reaching the capture zone of the existing well.

Well associated discharges that flow off-site from the on-site storm drainage system may enter the Ma'akua Stream located downgradient of the site. Based on site conditions the contractor will assess if the discharges can be disposed of through a retention basin constructed at the site, through the use of tanker trucks, or through the use of the existing on-site storm drainage system. A National Pollution Discharge Elimination System Permit (NPDES) Notice of Intent, Form I (NPDES General Permit Authorizing Discharges of Treated Process Wastewater Associated with Well Drilling Activities) and Form F (NPDES General Permit Authorizing Discharges of Hydrotesting Waters) will be prepared and filed by BWS and/or its contractor to address discharges of treated well associated effluent into State Waters.

Should the exploratory phase prove successful the well will be developed to production (standby) status and all necessary connections from the well to the existing on-site facilities will be made. During operation of the well, the distribution of water will be through the existing on-site facilities to the BWS municipal system, similar to the use of site facilities that handle the production of water from Well Unit No. 1.

Minor construction related traffic, noise, and air quality (dust) disturbances are anticipated during construction. The contractor will be required to observe and comply with all federal, state, and local laws required for the protection of public health, safety, and the environment. Construction equipment used for this project may include, but are not limited to: wheel-type loaders, track-type bulldozers, dump trucks, loader-backhoe, trencher, pump installation rig, motor grader, smooth-wheel rollers, water trucks, concrete hauler pumper, flatbed trucks, and a small- to medium-capacity crane.

The contractor will prepare a Best Management Practices (BMPs) Plan for this project. The BMPs Plan will consist of erosion control measures such as planting or hydromulching grass seedling, erecting silt fencing/curtains, berms, and/or other applicable erosion control devices to prevent construction related soils and silt from mixing with storm water runoff.

Shoring (sheetpiles or other related method) will be used in accordance with OSHA requirements (part 3, Chapter 132). No blasting will be required or allowed.

Upon the completion of work, the site will be restored as much as practicable to pre-existing conditions:

- All construction-related debris, including excavated material, fill material, and refuse shall be removed from the project site and disposed of properly by the contractor.
- All construction equipment shall be removed from the project site promptly after construction is complete.
- Any temporary modification to existing utilities, such as power or communications lines, shall be repaired to their pre-existing condition.
- Roadways providing access to the site shall be cleared of construction debris and any damage from construction traffic repaired. Gates and/or fencing removed to provide access to the site shall be replaced.
- All areas damaged by construction staging shall be restored. Any trees removed, damaged, or destroyed shall be replaced. Exposed ground areas shall be seeded or hydromulched as appropriate.
- Temporary pumps, pipelines, and electrical lines will be removed from the site and all surplus excavation material and construction debris will be removed and disposed of off-site in compliance with applicable State, and City and County regulations.

Water Line Connection

The Well Unit No. 2 will be connected to the existing water line used for Well Unit No. 1. Trenching will be required to install the line from the Well Unit No. 2 to the water line. The length of the connection is anticipated to be minimal (approximately +/-100 to 200 linear feet or less). Distribution of water from the well site to the water main along the Hau'ula Homestead Road and Kamehameha Highway will continue to be provided by these existing facilities.

Access Road

A portion of the access road adjacent to the proposed Well Unit No. 2 site may require minor modification during construction to allow access by construction vehicles and equipment. However, these modifications are anticipated to be minimal and the access road will be restored following the completion of work to drill, construct, and install the well and possible well mute building during both phases of work.

Utilities

No relocation of existing utilities is anticipated for the construction of Well Unit No. 2. During the construction of the Ma'akua Well Station and Well Unit No.1, a three-phase power distribution line along the Hau'ula Homestead Road was extended to the Ma'akua Road along the same routing as the pre-existing overhead single-phase distribution line. Underground

electric and telephone ductline handholes were also installed and the proposed Well Unit No. 2 will require access to these underground power lines. Currently there are two 4-inch electric ductlines and one 2-inch telephone ductline installed along the Ma'akua Well Station access road within land that is designated in the State Conservation District. The ductline cross-section is 24 inches wide and 30 inches deep, and on-site, there is an above ground, pad-mounted transformer. As required, all work within the State Conservation District will be coordinated with the Department of Land and Natural Resources (DLNR), Office of Conservation and Coastal Lands (OCCL).

3.2 Estimated Construction Cost and Schedule

Construction and design costs for both phases are estimated at \$1.5 million and will require approximately three years to complete. The proposed schedule by fiscal year (FY) and costs in thousands of dollars (\$000) is as follows:

Activity	Type	Totals	2013	2014	2015	2016	2017
Drill and case new well	Well Development	\$210	--	\$210	--	--	--
Prepare plans and specifications	Planning & Engineering	\$120	--	--	\$120	--	--
Install 1 - 1.0 mgd pump, connections and pump mute building (to be determined)	Construction	\$1,200	--	--	--	--	\$1,200

The drilling and casing of Well Unit No. 2 is planned for FY 2014 (July 1, 2013 to June 30, 2014). Construction is estimated to finish approximately within 6 months for the exploratory well phase. Once water quality and yield tests are complete and satisfactory, the production well (and possible well mute building) will be incorporated into the Ma'akua Well Station with pump, connections, and electrical improvements.

3.3 Project Alternatives

3.3.1 No Action

The “no action” alternative involves taking no further action to develop the proposed project to improve the stability and reliability of the existing Ma'akua Well Station. Taking “no action” would avert the potential for negative adverse environmental impacts associated with well installation activities and would eliminate the need for the expenditure of approximately \$1.5 M in design, engineering, well development, and construction costs.

The “no action” alternative, however, is contrary to the objective of the BWS to provide for the potable water needs of the Hau'ula community and Windward O'ahu. The BWS is mandated by law in Revised Ordinances of Honolulu (ROH), Chapter 30, Water Management, Article 2, O'ahu Water Management Plan, 1990, Amended 2010, and the Ko'olau Loa Watershed Management Plan, 2009, to provide for the water needs of the people of the City & County of

Honolulu. The objective of the project is to increase the stability and reliability of the Ma‘akua Well Station to provide for the municipal water supply needs of the Hau‘ula and Windward O‘ahu region and would thereby improve the ability of the BWS to meet the mandate of ROH, Chapter 30, Article 2.

Because the proposed project is an important element in maintaining capacity requirements and meeting peak demands to promote a stable and reliable source of water from the Ma‘akua Well Station, the “no action” alternative would fail to allow the BWS to meet its obligation to provide for the water needs of the Hau‘ula community and Windward O‘ahu. If the proposed Well Unit No. 2 is not constructed and a shutdown of the existing Well Unit No. 1 is required because of maintenance or emergency repair, there would be a corresponding loss of water capacity and the ability of the BWS to meet the demand for water supply.

Because the “no action” alternative would fail to accomplish the objective of the proposed project, it was rejected from further consideration.

3.3.2 Delayed Action

The “delayed action” alternative involves the construction of the project, but at a later date. Delaying the proposed project would temporarily avoid the potential for adverse environmental effects, and the need for the expenditure of funds for planning, design, well development, and construction activities. However, because the potential for environmental impacts and project costs would only be delayed, impacts and costs associated with the project would eventually be borne when the project is implemented.

Delaying the project to a later time is expected to have the same virtually the same effect as the “no action” alternative:

- The provision of potable water from the Ma‘akua Well Station would fail to maintain capacity requirements should the peak demand reach more than 1 mgd and continue to be compromised in the event that Well Unit No. 1 requires maintenance or repair.
- The costs for well development would be averted in the short-term, but could ultimately incur higher costs due to inflation while generating environmental outcomes similar to the preferred alternative of proceeding with the proposed project.
- Delayed action would delay the BWS implementation schedule and result in little to no change in the potential environmental impacts and mitigation measures that would be applied to the project.

Because the “delayed action” alternative would also fail to accomplish the objective of the BWS to provide for the safe, efficient, and reliable supply of water in Hau‘ula and Windward O‘ahu, it was also rejected from further consideration.

3.3.3 Alternative Water Sources

The BWS considered a number of alternatives to the use of potable groundwater from development of a second well at the Ma‘akua Well Station. These alternatives included

desalination, the development of surface and brackish water sources, and the recycling of treated wastewater. The use of these alternatives may offer opportunities for potable water development in the future, however, until such alternatives become acceptable from a technical, health and/or cost standpoint, the BWS will continue to emphasize the development of ground water resources. In this regard, the BWS considers that alternative water sources represent potential additional projects rather than actual alternatives to the proposed Ma'akua Well Unit No. 2 project.

The BWS has rejected the use of alternative water sources based on technical, health, and/or cost considerations and because development of the proposed project within the existing Ma'akua Well Station represents the most efficient and effective means to provide for the safe, dependable, and reliable source of potable water to address the needs of Hau'ula and Windward O'ahu users.

3.3.4 Alternative Sites and Preferred Alternative

According to the Final Amended Environmental Assessment, Ma'akua Well Project, BWS, May 1996, two alternative well sites were considered when the BWS developed the Ma'akua Well Station and Well Unit No. 1. The alternative well sites are identified as: (1) BWS Alternate – located at a ground elevation of approximately 160 feet; and (2) Department of Land and Natural Resources formerly known as the Division on Water and Land Development (DOWALD) Alternate – located at a ground elevation of approximately 200 feet (see **Figure 6, Alternative Sites for Ma'akua Well Unit No. 1**).



Figure 6: Alternative Sites for Ma'akua Well Unit No. 1

The Ma'akua Well Station is located within Ma'akua Gulch, approximately 0.5 miles through the access gate. The gate and access road is to the southwest of Kamehameha Highway, near mile marker 22, at the end of Hau'ula Homestead Road and Ma'akua Road. The BWS Alternative Well Site was to be located northwest off the access road closer to the residential areas. The DOWALD Alternative Well Site was to be located near the ridgeline to the south of

the access road along the Ma'akua Ridge. Neither the BWS Alternative nor the DOWALD Alternative Well Sites were developed. The existing well site marks the trailhead for the closed Ma'akua Gulch Hike. Hau'ula Loop Trail and Ma'akua Ridge Trail, two trails still open, are the other two hikes that comprise the Hau'ula Trail System. All three trails begin at the gate with trailheads emanating from along the access road.

Since development of the Ma'akua Well Station and Well Unit No. 1, the BWS considers the BWS and DLNR / DOWALD Alternate sites as having the potential for future groundwater development in the event that new water development is required. However, both sites are infeasible for the proposed project based on their distant locations from the existing Ma'akua Well Station, and because new development of a well, supporting well infrastructure, and water mains would be required. This in turn would create the potential for environmental impacts that are not currently associated with the proposed site.

The Ma'akua Well site was selected as the preferred alternative site by the BWS based on the following factors:

- There is adequate space
- The space is already developed with a single well, holding tank, and control building with a permitted use of 1.12 mgd.
- It is remote from homes and public facilities.
- There are no threatened or endangered fauna or flora that are known to inhabit the site.
- The proposed access road improvements could be constructed to minimize impacts on archaeological sites.
- The land is owned by the State of Hawai'i and available to the BWS for use as a well station site.
- The site has been previously disturbed (developed during construction of Well No. 1), hence the unlikelihood of environmental impacts that cannot be easily mitigated

The Ma'akua Well site is the preferred location for Well Unit No. 2 because of the presence of the existing Well Unit No. 1 and the inherent efficiencies that are realized from the co-location of two well sites within proximity to each other that utilize existing BWS distribution infrastructure.

Section 4

Description of Existing Site Conditions, Potential Impacts, and Proposed Mitigation

4.1 Existing Site Conditions

The Ma'akua Well facility comprises a total of approximately 1.0 acre and is situated at an elevation of approximately 160 feet above msl. The well facility is comprised of the existing Ma'akua Well Unit No. 1, holding tank, control building, hydropneumatic tank, transformer, access road, retaining walls located along the hillsides, and a 6 foot high chain link security fence (see **Figure 7, Site Map**). The landscaping within the well facility is regularly maintained with grass cutting and trimming. Surrounding the facility the area is heavily vegetated with mostly introduced plant species that include gunpowder tree, Christmas berry tree and strawberry guava (Whistler, 1992). Ma'akua Stream flows year-round (perennial) in its upper portions, and intermittently at lower elevations (i.e., near the project site as water was not flowing at the time of a recent site visit in June 2010), and is located approximately 50 to 100 feet from the East boundary of the facility and within heavily wooded and vegetated surroundings. The closest residences are located approximately 0.6 miles north of the site. No other uses are located nearby (see **Photo 3 and Photo 4**).

4.2 Climate

4.2.1 Description

Temperatures along the windward coast of O'ahu vary little throughout the year. Average monthly temperature in the Kahuku area, about eight miles northwest of the project site, ranges from about 69 to 80° F (The State of Hawai'i Data Book 2008).

Rainfall occurs sporadically throughout the year, with most precipitation occurring during the months from November to March. Average annual rainfall at Ma'akua is approximately 41 inches (The State of Hawai'i Data Book 2008). Northeast trade wind conditions are prevalent.

4.2.2 Potential Impacts and Proposed Mitigation

The climate will not be impacted by this project, and therefore no mitigation is necessary.

4.3 Geology and Topography

4.3.1 Description

The site for the proposed well is located at the northern end of the Ko'olau Volcano, which runs along the windward (northeastern) shoreline of O'ahu. The volcano is deeply eroded and includes an extensive dike complex formed in the rift zone. These well-defined dikes formed when molten lava flowed through fissures in the volcano, then cooled and solidified. Excess rainwater filters through the highly porous basalt rock and is stored as ground water between the relatively impermeable dikes.

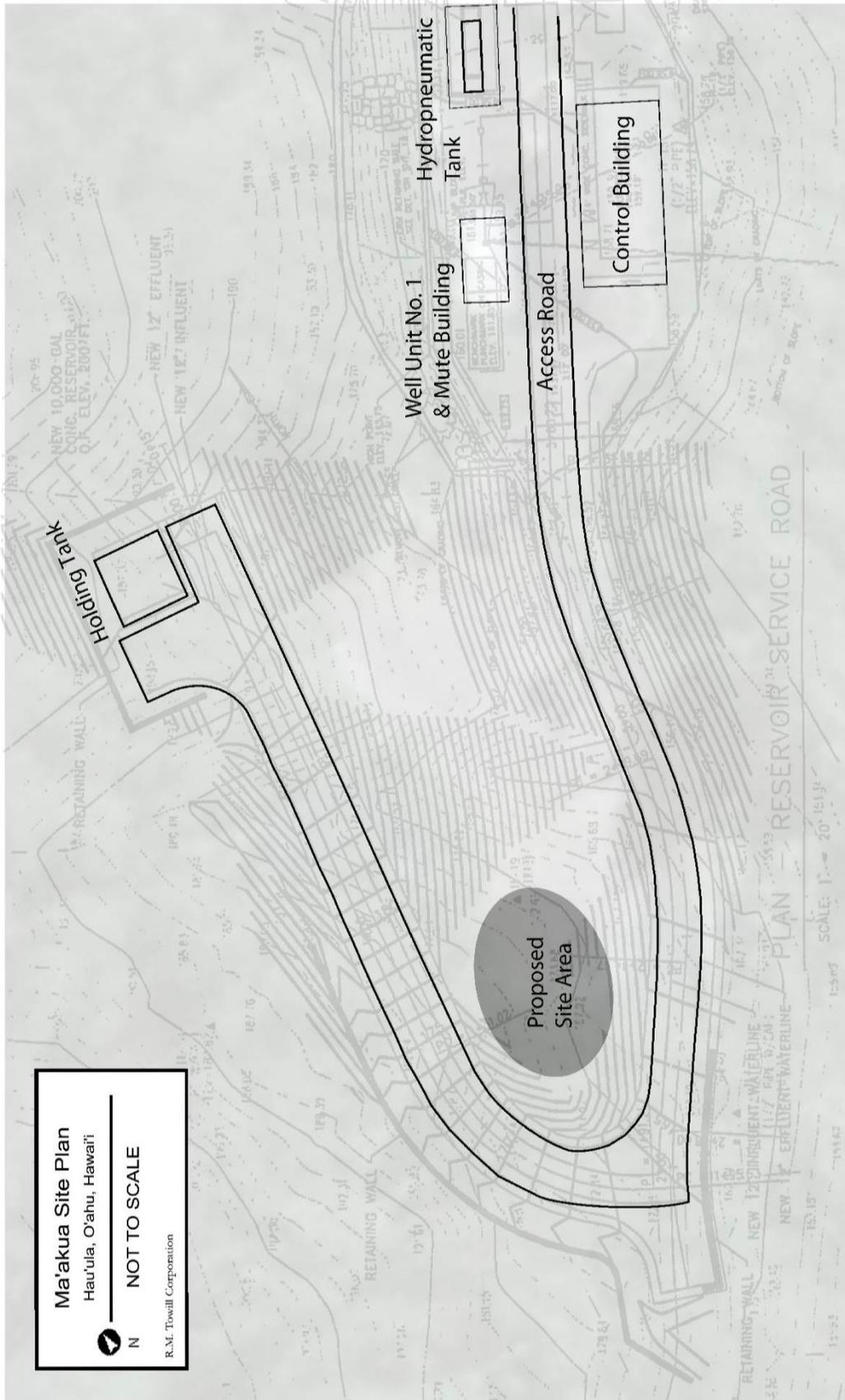


Figure 7: Site Map

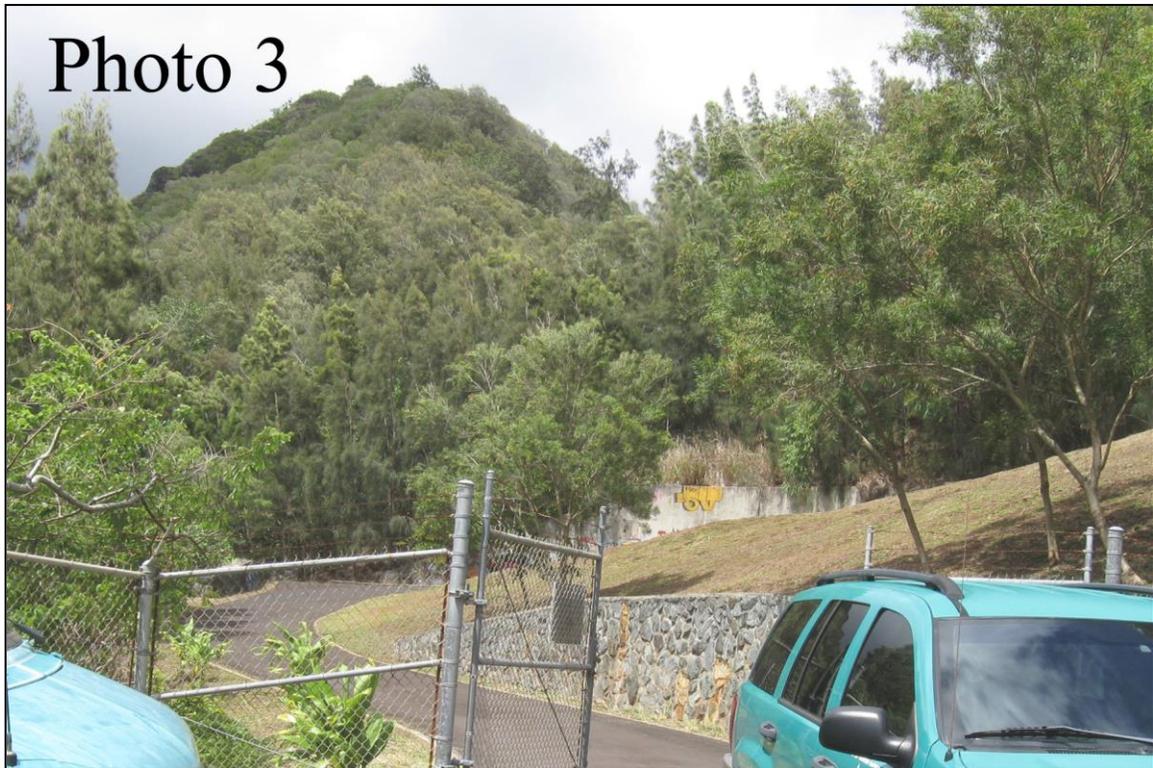


Photo 3

Photo 3 – View of access road and gated entry into the Ma'akua Well Station



Photo 4

Holding Tank

Proposed Site Area

Access Road

Photo 4 – View of access road leading to the holding tank at the Ma'akua Well Station. Note the retaining wall located on the left of the photo.

Stream erosion and weathering are the primary geological processes that carved out Ma'akua Gulch along the flanks of the Ko'olau Volcano when the main shield-building volcanic activity ceased. The valley is relatively straight from its mouth at sea level until it reaches its 800 foot elevation, where it starts to meander to its headwaters. Ma'akua Gulch lies between the valleys of Kaluanui and Kaipapāu. These two major valleys have diverted Ma'akua Gulch headwaters, so that the Ko'olau crest is separated from the entire valley by a broad ridge which drains into the aforementioned valleys. Ma'akua Gulch is narrow, but gravity deposited talus forms a thin coating along the valley walls and alluvium can be found in the stream bed.

The proposed well site is located on the northern bank of the project site about +50 feet above the stream, at an elevation of 160 feet msl. (see **Figure 8, Topography**). The site lies near the convergence of the older alluvium and the Ko'olau Volcanics, and seaward of the dike complex and marginal dike zone (Stearns 1939). The exploratory well for Well Unit No. 1 was drilled into lavas that are essentially dike-free, and that were erupted from the northwest rift zone. Several thin, north-south trending dikes are mapped in the ridge between Ma'akua Gulch and Kaipapāu Valley. These dikes do not seem to affect hydrological conditions in the well (DOH unpublished report). Relief at the site varies from a shallow gulch near the stream's headwaters to over a thousand feet along the mid-reach of the stream. At the well site, valley walls rise about 500 feet above the valley floor, with a slope of approximately 30 percent. The existing well site was previously graded to provide a level area for well installation that is approximately 50 by 75 feet in area. This area was cut into an older, consolidated talus bank. A steeply graded cut slope, approximately 18 to 20 feet in height, was excavated along the west side of the site.

4.3.2 Potential Impacts and Proposed Mitigation

There will be no significant impact to the geology of the project area. The well site will be cleared of excess material (mostly a grassed area and soils) and graded. The extent of grading will cause no major changes in topography. Slopes will be planted as soon as possible upon completion of grading to reduce the effects of erosion and weathering. Installation of the new pipeline (from the new well to the existing well) will have negligible impacts on geology and topography as they will connect to an existing distribution line.

4.4 Water Resources and Hydrology

4.4.1 Surface Water Description

Ma'akua Stream is located downslope from the project site and drains into the Ma'akua Gulch. The stream is listed in the Hawai'i Stream Assessment (Smith 1990) as a *perennial* stream, but is classified as *intermittent*, because it flows year-round in its upper portions and intermittently at lower elevations (i.e., near the project site the stream was observed to be dry during a site visit in June 2010). The base discharge of Ma'akua Stream is less than 0.1 mgd (BWS 1988).

Two intermittent streams flow into Ma'akua Stream near the project vicinity. One of these, from Kawaipapa Gulch, flows into the main stream just south of the well site. The other stream, from Hanaimoa Gulch, crosses the access road alignment approximately 1,800 feet north of the site².

² Final Amended Environmental Assessment for the Ma'akua Well Project, Ogden Environmental and Energy Services Co., Inc., May 1996.

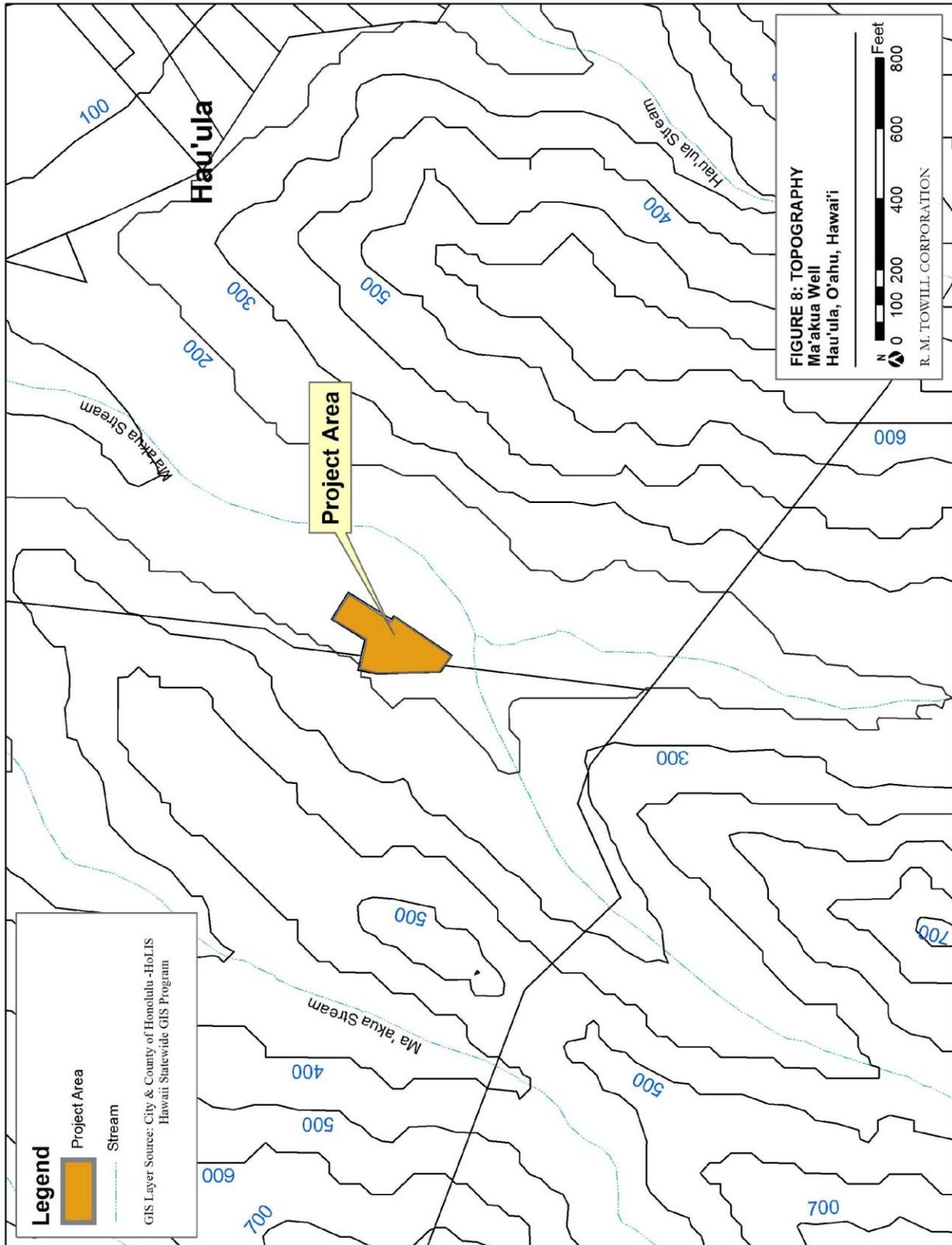


Figure 8: Topography

4.4.2 Potential Impacts and Proposed Mitigation

Erosion control measures such as the placement of sandbags, berms or silt curtains along construction perimeters, will be implemented to minimize the potential for impacts from runoff. With the use of these measures the project is anticipated to have a negligible impact on surface runoff within the Ma'akua Stream watershed. The entirety of the Ma'akua Well Station site contributes less than approximately one acre of impermeable surface area due to the maintenance of extensive grassing and vegetation on the site. The proposed Ma'akua Well Unit No. 2 is expected to add less than approximately 100 square feet of impermeable surface area and the existing pattern of runoff from the site will not be altered.

The BWS will coordinate with the Department of Land and Natural Resources and the CWRM to address the development of groundwater resources on State lands. Water rights and water allocation issues are not expected to be adversely affected as the proposed use of the site will not involve the withdrawal of groundwater beyond existing permitted levels.

Stormwater and Point Source Discharges

Stormwater discharges from construction activities have the potential to affect the quality of receiving waters because the project area (less than 100 square feet) will be subject to disturbance. An Erosion Control Plan (ECP) will provide measures to control storm-water runoff on the project site using sandbags, silt screens, earthen dikes, drainage swales, or other controls as selected by the civil engineer preparing the ECP. As required, the construction contractor may modify the use of these controls to optimize performance based on site specific conditions. A stabilized construction entrance will also be specified. The ECP will be submitted to the Department of Planning and Permitting, City & County of Honolulu, for review and approval prior to construction.

Permit applications including NPDES permits for the discharge of effluent will be filed, as required, for specific discharges that may include hydrotesting and well test water. A Best Management Practices (BMPs) Plan will be submitted to the State Department of Health (DOH) to control and treat the discharge of pollutants into receiving waters.

4.4.3 Groundwater Description

The source of water for the Ma'akua Well site is basal ground water derived from rainfall. The coastal plain sediments which join the stream alluvium create the basal lens and aquifer head conditions at the site. At the headwaters of Ma'akua Stream, rainfall is absorbed into the ground and is impeded by a series of volcanic dikes. These dikes supply the basal lens from which the well receives its water. The static water level of basal groundwater at the existing well site is 17.8 feet \pm msl. Seasonal fluctuations of several feet may occur (R. M. Towill Corporation, 1996).

The results of yield-drawdown and long-term pumping tests for the primary well (Well Unit No. 1) indicate that the well taps a very permeable aquifer. Water quality data obtained during pump testing indicates low chloride levels of approximately 27 to 32 ppm (Okahara and Associates 1993).

4.4.4 Potential Impacts and Proposed Mitigation

Groundwater Contamination

Over pumping may introduce salt water into the aquifer, as continuous overdraft of a basal lens will cause shrinkage of the lens. However, the amount of water that is being pumped from Well Unit No. 1 is much less than the amount of water available in maintaining the viability of the aquifer (BWS 1988, DOH unpublished report). The total amount of pumpage from both wells will not exceed the capacity of the aquifer or the permitted use.

It is possible that the contamination of basal ground water pumped by the Ma'akua Wells could originate from the deep percolation of cesspools overlying the basaltic aquifer on the mauka (mountain) side of the Hau'ula Homestead Road. According to the BWS, contamination from this source seems unlikely since the wells are almost a quarter mile up-gradient from the nearest house. The current well casing extends to a depth of 215 feet from ground and is grouted to the surface, thereby protecting the aquifer from contamination by a surface source. Prior to pump installation, the well will be disinfected. A chlorinator is currently in the control building and will be employed should contamination occur.

The BWS will monitor the quality of groundwater that is withdrawn from the well to meet applicable state and federal drinking water regulations. Measurements of salinity will also be performed to test for seawater intrusion into the basal aquifer. If there is a risk of intrusion, the BWS will decrease or otherwise modify the well pumpage.

The well will also be monitored for pesticide contamination. Under current law, the State can ultimately control the production and use of ground water by designating water management areas. The CWRM has recently designated Windward O'ahu under the State Water Code, signaling that the commission intends to more closely regulate water pumping in the area. A Water Use Permit will therefore be obtained by BWS as required.

4.5 Soils

4.5.1 Description

A soils investigation of the well site and access road was conducted in March 1992 by Ernest K. Hirata and Associates. Test borings indicated that surficial soils at the site generally consisted of mottled brown and orange-brown silty clay with highly weathered rock fragments. The soils have a moderate to high expansion potential. Overlying the stiff silty clay along the southeast portion of the site is a layer of fill consisting of similar mottled brown silty clay with highly weathered rock fragments. The fill material was probably generated from the cut slope excavations along the uphill side of the well site. The fill ranges from 2.5 to 11 feet thick and is relatively loose and uncompacted. Underlying the undisturbed silty clay at depths from 1.5 to 17 feet is mottled orange and grayish-brown highly weathered rock (see **Figure 9, Soils**).

4.5.2 Potential Impacts and Proposed Mitigation

No significant negative impact is expected to the soils in the project's vicinity. Ground disturbance will only be undertaken during construction, and any waste material that cannot be reused will be removed from the project site. Due to the presence of expansive soils, the soil

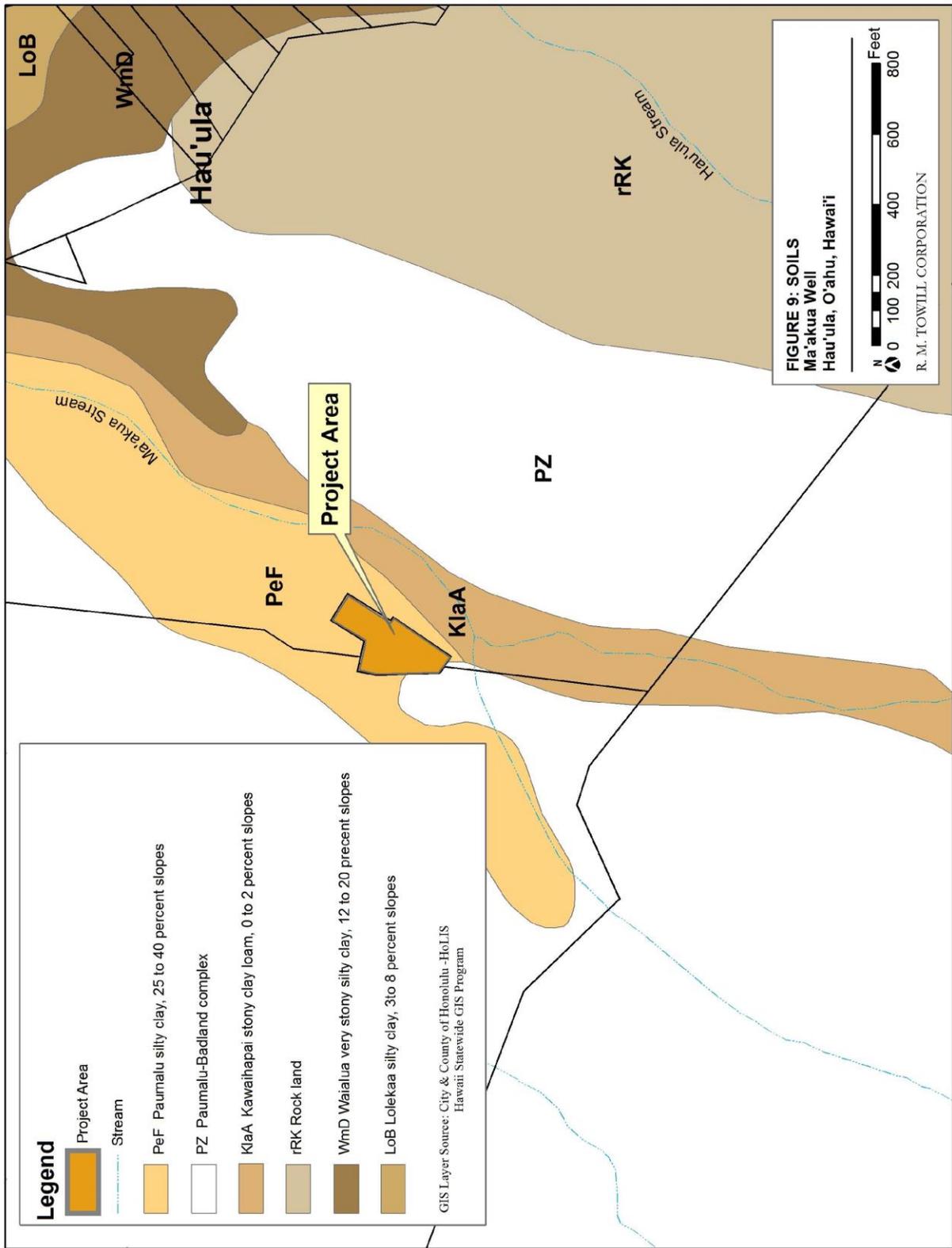


Figure 9: Soils

directly under the concrete foundation will be completely removed and replaced with select fill. Soil excavation necessary to install the piping to connect the water distribution pipeline will be replaced with structural fill and pipe cushion material to BWS standards.

The project site is not classified as important or productive agricultural land, and thus the potential for negative adverse effects to agricultural lands is not anticipated.

4.6 Wetlands

4.6.1 Description

There are no wetlands located on or near the project site.

4.6.2 Potential Impacts and Proposed Mitigation

No adverse impacts to wetlands are anticipated as no wetlands exist near the site. Therefore, no mitigation measures are proposed.

4.7 Natural Hazards

4.7.1 Description

Earthquakes

The Island of O'ahu is an emergent portion of several basaltic shield volcanoes that rise from the ocean floor. Some the earthquakes that strike O'ahu are related to the injection of magma into the volcanic edifice (shape of the volcano), whereas others may be due to gravitational collapse of the flanks of the volcano (Yeats et al., 1997). In general, the earthquakes that impact O'ahu are relatively shallow crustal (shallow, in the earth's crust) events (FEIS, Waimānalo Gulch Sanitary Landfill Expansion, 2002).

The Uniform Building Code (UBC) provides minimum design criteria to address the potential for damage due to seismic disturbances. The range of seismic risk varies from Zone 0, indicating no damage, to Zone 4, indicating major damage. The island of O'ahu is in Seismic Zone 2, as established by the UBC, indicating a moderate risk of damage from earthquake.

Tsunami

A tsunami involves the generation of a series of destructive ocean waves that can affect all shorelines. These waves can occur at any time with limited or no warning. Persons in low lying shoreline or beach areas are advised to immediately go to higher ground.

According to the O'ahu Civil Defense Agency, the evacuation boundary for the project area runs along the Kamehameha Highway. The location of the proposed project site is located approximately 0.70 miles mauka of the highway and is considered to be safe from wave action and is not a location that would be subject to inundation by a tsunami.

Hurricanes

Heavy rains and strong winds associated with tropical storms occasionally impact the Hawaiian Islands and can cause flooding and major erosion. Hurricanes occasionally approach the Hawaiian Islands, but rarely reach the islands with hurricane force wind speeds.

Hawai'i's annual "hurricane season" is from June through November. Hawai'i has experienced the full effects of five hurricanes since 1949. The first (Hiki, 1950) moved from east to west, north of the islands. The other four, Nina, (1957), Dot (1959), Iwa (1982) and Iniki (1992), all traveled on more-or-less northerly headings and affected the Wai'anae Coast with high winds and storm surge. Except for Hiki, the storms moved across, or very close to, Kaua'i, about 90 nautical miles west-northwest of O'ahu. Nina remained southwest and west of the islands (U.S. Navy, 2002).

Flood Hazard

The project site is located within in Zone D (see **Figure 10, Flood Zones**) as depicted in the National Flood Insurance Rate Map (FIRM). Zone D is defined as an area of undetermined but possible flood hazard (Federal Emergency Management Agency 1987).

4.7.2 Potential Impacts and Proposed Mitigation

Earthquakes pose a threat throughout Hawai'i, but disruptive seismic events are relatively uncommon in this region. In the interest of public health and safety the BWS has adopted the UBC and Seismic Zone 3 design standards for the Ma'akua Well Station, which will include the mute building that will serve to protect the proposed Well Unit No. 2, if one is required.

Tsunami and tsunami related flooding in the project area are unlikely due to the elevation and inland location of the site. The project is not expected to be adversely affected and no adverse impacts are expected. No further mitigation measures related to the potential threat of a tsunami are proposed.

The potential for hurricanes, while relatively rare, are present. BWS site facilities such as the Ma'akua Well Station are designed to withstand hurricane force winds principally through the use of high wind resistant enclosures. The mute building, if required, which will house the proposed Well Unit No. 2 will be designed to this requirement which is expected to be sufficient for the protection of the well.

The site's elevation at approximately 162 feet msl will facilitate the protection of the site from an unlikely flooding event. The Ma'akua Well Station and proposed Well Unit No. 2 are designed to serve as unmanned facilities. Consequently, the potential for adverse effects will be limited to the physical facilities. No adverse effects to human health or safety associated with flooding are anticipated.

4.8 Flora and Fauna

4.8.1 Flora Description

A botanical survey of the Ma'akua Well Station was undertaken for the previous EA in April 1992 by Dr. Arthur Whistler. The survey at that time indicated that the principal botanical species were dominated by alien plant species, most notably by the gunpowder tree (Trema orientalis), Christmas berry tree (Schinus terebinthifolius), Java plum (Syzygium cumini), and strawberry guava (Psidium cattleianum). Most of the plants in the vicinity were herbaceous weeds, but vines such as yellow granadilla (Passiflora laurifolia) and Psidium cattleianum were also common climbing over trees and shrubs.

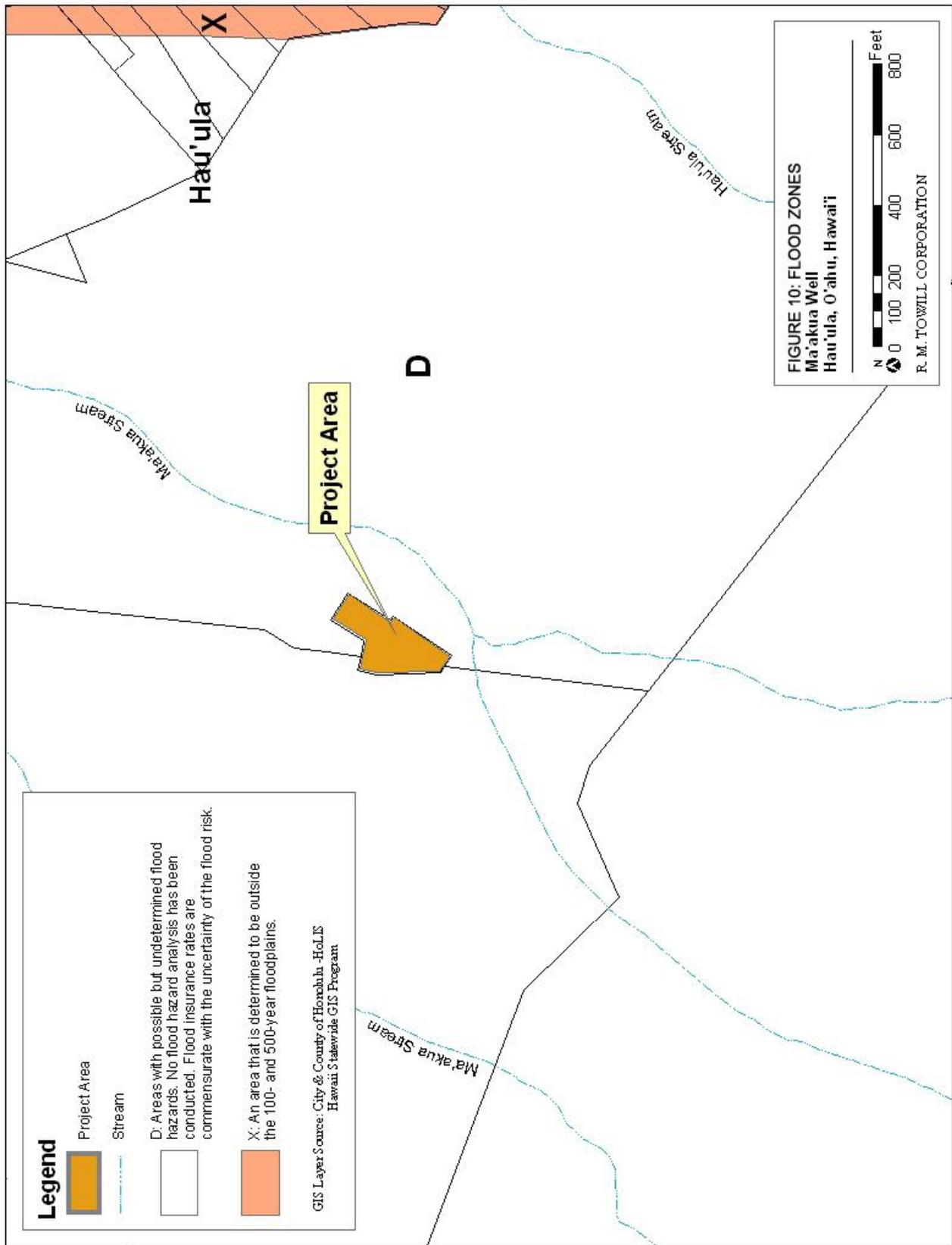


Figure 10: Flood Zones

The proposed project will involve work within the existing developed Ma'akua Well Station. Vegetation primarily consists of introduced grass used for the areas between facilities that include the mute building (housing Well Unit No. 1), pneumatic tank, control building, and holding reservoir. There are a few other introduced plant species that included tī. Outside of the fenced enclosure many of the introduced species previously described by Dr. Whistler continue to be present and were observed to include Java plum and Christmas berry, and some isolated koa haole.

4.8.2 Potential Impacts and Proposed Mitigation

No adverse effects to rare, threatened or endangered flora are anticipated as all work will be within the fenced enclosure of the existing Ma'akua Well Station.

The specific location of the proposed Well Unit No. 2 and possible mute building will be limited to the use of a small portion (approximately +/-100 square feet) of area that has been grassed by the BWS. Appurtenant work to connect distribution lines to Well Unit No. 2, from the existing facilities of the site will similarly be located within the premises of the fenced enclosure.

Upon the completion of work, all areas of exposed soils will be replanted to maintain erosion and sediment control.

4.8.3 Fauna Description

Terrestrial Wildlife

There are introduced species consisting of small mammals and non-native birds that may be present at the site. These species may include rats or mice, feral cats, dogs, the Indian Mongoose (*Herpestes auropunctatus*), and feral pigs. None of these species are listed as candidate threatened or endangered species. Pigs that may be present in the vicinity are considered detrimental to existing vegetation and stream quality and would be prevented from entering the Well Station and the proposed area of the well by perimeter fencing.

It is unlikely that the project site provides important habitat for any endangered native bird species. A prior botanical survey conducted for the Ma'akua Well Station confirmed that introduced vegetation dominates the Ma'akua area, and apart from waterbirds, most endemic birds on the island are limited to native forests (Whistler, 1992). Exceptions include the elepaio (*Chasiempis sandwichensis*), which has been found in some areas where nearly all of the vegetation is composed of introduced plants, and the pueo or Hawaiian short-eared owl (*Asio flammeus sandwichensis*), which is found in open grasslands, pastures, forests, lava flows, and residential areas. It is possible that these birds frequent the Ma'akua project area, but the more common species found in a guava mixed-forest habitat include the Northern Cardinal (*Cardinalis cardinalis*), Red Crested Cardinal (*Paroaria coronata*), doves (Mourning Dove- *Zenaida macroura*; and Zebra Dove- *Geopelia striata*), Japanese white-eye (*Zosterops japonicus*), all of which are introduced (University of Hawai'i 1983 and site observation, June 2010).

Stream Fauna

Ma'akua Stream has been determined to be of limited quality by the Hawai'i Stream Assessment Aquatic Resources Committee (Smith 1990), based on the presence of only one species from the

Native Species Group 2 (NG2) category. In fact, the species was incorrectly classified. The species collected was the Tahitian prawn (Macrobrachium lar); an introduced species which is present in nearly all Hawaiian streams (Whistler, 1992).

Whistler was unable to provide a rating for the biological quality of Ma'akua Stream because of the lack of suitable information. However, he cited evidence that up to three native species Awaous stamineus (endemic goby), Atyoida bisulcata (endemic shrimp); and Neritina granosa (endemic mollusc) may be present in abundance. In this event, the stream would likely deserve a high quality ranking.

4.8.4 Potential Impacts and Proposed Mitigation

Terrestrial Wildlife

Some wildlife species (none of which are listed or candidate threatened or endangered species) may be displaced into surrounding areas during construction as a result of increased activity and noise in the project site, but are expected to return to the area upon completion of construction. Thus, the project is not expected to have a long-term adverse effect to the area fauna.

Stream Fauna

Although the nearby Ma'akua Stream was dry and without flows during the time of a recent site visit in June 2010, the potential for adverse impacts to stream biota the site will employ erosion control measures that include one or more of the following: silt fencing/curtains; berms; hydromulching/grassing; and/or other applicable erosion control measures to prevent construction related soils and silt from leaving active areas of work. No waste materials from construction activities will be discarded in the stream bed or open areas that could mix with storm water runoff.

Chlorinated water used for pipeline disinfection will not be directly discharged into the stream. A chlorination discharge plan will be submitted prior to construction, and NPDES permit applications to maintain State water quality standards will be filed, if required.

Erosion sedimentation and discharge reduction impacts for surface water may also occur to stream fauna. Mitigative measures proposed for potential construction-related stream impacts will also facilitate the protection of stream fauna that may be present.

4.9 Archaeological and Cultural Resources

4.9.1 Description

There are no archaeological sites within the area of planned construction. The proposed project site consists of a previously disturbed area that has been graded and grassed for erosion control.

A review of the proposed project site in accordance with the requirements of Session Laws of Hawai'i (SLH), Act 50, was undertaken to identify a correlation between the law and the proposed project. A relationship is unlikely as the use of the site for traditional or cultural practices is not expected based on the location of the project site within the fenced enclosure of the Ma'akua Well Station. The modified condition of the site includes the presence of introduced

plant species (grass located on a lawn-like area) not normally associated with cultural gathering or use activities.

The developed and fenced condition of the site is also not conducive to the presence of wahi pana (storied place) or other sites associated with the gathering of important native species that may include tī, flowering plants, or other species bearing fruit.

4.9.2 Potential Impacts and Proposed Mitigation

As there are no archaeological sites in the construction area, no impacts to archaeological or cultural resources are anticipated. However, because there is always the potential for the discovery of 'iwi or other cultural remains any inadvertent finds will immediately result in the cessation of work and the immediate reporting of the find to the State Historic Preservation Division (SHPD) at (808) 692-8015, for further instructions regarding handling and treatment of the find. Work may only resume upon concurrence from the SHPD to do so.

There is no mention in previous documents that construction of the first well station caused disruption to any cultural practices in the area. Since the second well will be built on a portion of the existing site, it will not affect any cultural practices that may have developed in surrounding areas after the station was constructed.

The potential for adverse impacts associated with traditional and/or cultural practices is not anticipated. As noted in this document, should archaeological or cultural remains be inadvertently be uncovered during work practices, all work will be temporarily halted and the SHPD immediately notified at 692-8015 for further instructions. Work will only be allowed to be resumed upon appropriate notification to do so by the SHPD.

4.10 Noise Conditions

4.10.1 Description

Regulation of noise in residential areas of O'ahu are governed by the State Department of Health, HAR, Title 11, Chapter 46, Community Noise Control. Allowable day and nighttime noise standards for sensitive receptors have been established for residential, preservation, hotel, apartment, and business districts. Existing noise levels at the site are relatively low due to the existing preservation zoning of the site and the nearby residential areas. The maximum allowable day and night noise levels in the preservation and residential zoning districts are as follows:

Time:	Allowable Levels:
7:00 am to 10:00 pm	55 dBA
10:00 pm to 7:00 am	45 dBA

The principal source of noise at the site will be during construction activities and during operation of the proposed Well Unit No. 2 pump. Noise that is generated during construction is expected to come from the drilling rig, use of construction equipment during clearing and grading operations, and during pumping tests of the well. Construction vehicles and workers will also pass through residential and agricultural areas as they traverse along the Ma'akua Road and Ma'akua Well Station Access Road.

Noise that is generated from the existing Well Unit No. 1 pump is extremely limited based on the use of a mute building to control noise levels. The whirring of the pump can only be heard when standing within close proximity about 1-10 feet from the mute building. At the location of the planned Well Unit No. 2 site, the sound generated from the first well cannot be heard. As with Well Unit No. 1, a mute house as indicated in the project description may be constructed for the second well depending on the type of pump that is installed.

4.10.2 Potential Impacts and Proposed Mitigation

The noise from the construction crew will be mitigated through use of construction equipment appropriate to the preservation and residential surroundings of the area, e.g., no heavy field equipment larger than necessary; use of mufflers on construction vehicles; and maintaining all equipment in good working order. Since the site is isolated, noise levels from actual construction at the site are not expected to adversely affect the closest residential area approximately two-thirds of a mile away at the beginning of the access road which would be the primary concern.

As previously indicated, a mute building will be constructed for the proposed Well Unit No. 2 should a line shaft pump be installed. This will significantly reduce the generation of noise associated with this type of pump. However, if a submersible type of pump is installed, no mute building will be constructed due to the submersible's quiet operational characteristics. The nearest residential area is approximately 0.6 miles away and will not be affected by any noise from this pump regardless of type given the aforementioned mitigative measures.

The contractor will obtain a noise permit if noise levels from construction activities are expected to exceed allowable levels as set forth in the provisions of DOH Administrative Rules Title II, Chapter 46, Community Noise Control.

4.11 Air Quality

4.11.1 Description

Air quality in most areas of O'ahu are generally affected by vehicular traffic and stationary sources. The general lack of high volumes of both sources, combined with the normal northeast trade wind conditions, provide for good air quality in the vicinity of the project.

4.11.2 Potential Impacts and Proposed Mitigation

Some temporary deterioration of air quality associated with grading and construction activities may be anticipated while the well is being built. These actions may create increased fugitive dust and pollutant emissions from the operation of vehicles and equipment. However, these effects are short-term and normal trade wind patterns in the area are expected to disperse pollutants generated by activities at the project site. Mitigative measures will be implemented to limit the potential effects from dust generation should this become a nuisance during project construction.

The contractor will be required to maintain internal combustion equipment in excellent working condition to minimize the emission of exhaust fumes. Additionally, the contractor will be required to comply with DOH Administrative Rules Title 11, Chapters 59 and 60 (Air Pollution Control). There will be no long-term effects to air quality once construction is completed.

4.12 Visual Resources

4.12.1 Description

The Ma'akua Well Station, which encompasses the area of the proposed Well Unit No. 2 site is not readily visible to nearby residents. However, hikers and hunters traveling along the trail that begins at the end of Ma'akua Road are able to view the site over a distance of approximately 50 feet.

Three trails branch off from the main trail at the end of the road: Ma'akua Gulch Trail, Ma'akua Trail, and Hau'ula Trail. All three trails are located on State land within the forest reserve and offer hiking opportunities. The three-mile Ma'akua Gulch Trail, which follows the stream bed, is a difficult trail that provides hikers with views of a waterfall and two pools deep enough for swimming at the end of the gulch. Ma'akua Trail, a 2.5-mile loop, is the least traveled of the three but provides the best views of the Ko'olau Range. Hau'ula Trail, also a 2.5-mile loop, is an easy hike for families with children.

4.12.2 Potential Impacts and Proposed Mitigation

During construction activities the well drilling rig will be erected and construction vehicles, equipment, and personnel may be visible to those passing by the site. This is expected to have a limited but not offensive visual effect as all work will be within the fenced enclosure of the site and temporary in duration. Public access during this period is not anticipated to be adversely affected.

Following development of the proposed Well Unit No. 2, an acoustical enclosure or mute building may be constructed to enclose and protect the well depending upon the type of pump installed. The one-story structure if constructed will be painted in natural hues and the area within the fenced enclosure of the well station will continue to be landscaped.

Other possible effects that are more likely to affect hikers and hunters, the principal recreational users of the area, may include equipment noise, dust, and construction related traffic. These activities will be limited to a very small portion of the trail and for only a temporary period of time. The walk from the trailhead to the well site takes approximately 10 to 15 minutes; beyond that point, hikers could continue on the Ma'akua Gulch Trail with no further visual or project-related disruptions. Appropriate signs will be posted during the construction period to inform trail users of project activities.

The overall potential visual impact is anticipated to be minimal. Following construction, the well site will remain fenced to maintain the safety and security of the site.

4.13 Socio-Economic Environment and Demographics

4.13.1 Description

The town of Hau'ula is a residential beach community composed largely of single-family homes. In 2010, Hau'ula has a resident population in the range of 4,000 to 6,000 (Department of Business, Economic Development and Tourism, 2010). The area is characterized as rural. Surrounding land use includes low-density residential and light commercial areas with varying setbacks from the coastline, interspersed with small-scale agricultural uses. In addition, Hau'ula hosts a shopping center, county beach park, fire station, and elementary school.

4.13.2 Potential Impacts and Proposed Mitigation

Construction crew members may come from all areas of O'ahu, possibly including some workers from the Windward area. Regardless, the small crew size would have no significant effect relative to the local or regional population.

Furthermore, the project will neither promote nor discourage population growth as the amount of pumpage will remain the same.

4.14 Public Facilities and Services

4.14.1 Description

Roads and Transportation

Kamehameha Highway, the nearest highway to the project vicinity, is a two-lane, asphaltic concrete roadway under the jurisdiction of the State Department of Transportation (DOT). The right-of-way width is about 50 feet, with 30 feet of paved roadway. Various improvements by abutting landowners have moved toward the highway right-of-way. The speed limit is 35 miles per hour. Traffic on Kamehameha Highway is a mixture of automobiles, trucks, and buses. The Bus, O'ahu's public transportation system, operates a regular schedule along this route. Private tour companies also use this route to transport tourists to and from the Polynesian Cultural Center in La'ie, and other scenic attractions along the North Shore area.

Hau'ula Homestead Road runs perpendicular to Kamehameha Highway. It is a narrow 2-lane stretch of road and the speed limit on this road is 25 miles per hour. Hau'ula Homestead Road forks at approximately a quarter of a mile from its start at Kamehameha Highway and this is where Ma'akua Road starts. Ma'akua Road is narrower than Hau'ula Homestead Road and continues only 0.10 of a mile before it turns into the Ma'akua Well Station access road. This gated road is less than half a mile long and is a single lane of pavement. It winds up through the surrounding vegetation to the site, and continues into the site itself. At the site it circles around the proposed site area for the second well and continues until its end at the holding tank.

Utilities

Ma'akua Well Station has electricity provided through HECO overhead utility lines to power the existing pump and equipment. In addition, a telephone line provides communication to the site.

4.14.2 Potential Impacts and Proposed Mitigation

Roads and Transportation

Minimal impacts to traffic are anticipated as a result of construction activities. The site is isolated from residential roads and is not expected to adversely affect normal traffic enough to warrant mitigation.

Utilities

No utilities to the surrounding area are expected to be impacted during the proposed improvements. No upgrades to the existing electrical system are required. No mitigation measures are anticipated and none are proposed.

4.15 Solid Waste

The construction of the proposed project is not expected to have long term impacts to solid waste facilities based on the limited scope and scale of work. Short-term impacts are anticipated in the form of construction debris that will be generated requiring disposal. The construction contractor shall be responsible for the disposal of construction debris at a county-approved landfill site.

4.16 Hazardous Waste and Materials

The proposed project is not anticipated to result in the generation of hazardous waste or materials requiring disposal. Chlorine will be used as a disinfecting agent, but only in quantities sufficient to maintain sanitary conditions sufficient for the distribution of potable water. All use of chlorine will be in accordance with BWS specifications and in accordance with safe water supply industry practices. No adverse effects are anticipated.

4.17 Recreational Facilities

There are no recreation facilities within the vicinity of the project. Because the majority of the land in the area is owned by the state, public access is limited. On occasion it has been observed that residents enjoy hiking the three trails available in the surrounding area. However, these trails will not be impacted as they will remain open and fully accessible during and after construction.

Section 5

Relationship to Land Use Policies, Plans, and Controls

5.1 Overview

Federal, State, and City & County of Honolulu policies, policies, plans, and land use controls are established to guide development in a manner that enhances the environment and quality of life. The establishment of policies, plans, and land use controls at all levels of government are further promulgated to help ensure that the long-term social, economic, environmental, and land use needs of the community and region can be met. The proposed project's relationship to regulations, controls and policies are as follows.

5.2 Federal

5.2.1 Safe Drinking Water Act (SDWA)

The Safe Drinking Water Act, Chapter 42 U.S.C. 300(f) et seq., mandates the National Primary Drinking Water Regulations, which establishes federal standards for maximum containment levels (MCLs) in public supplies of drinking water. This Act is crucial to the safety of citizens, because there are a number of threats that can contaminate drinking water: improperly disposed of chemicals; animal wastes; pesticides; human wastes; wastes injected deep underground; and naturally-occurring substances. Accordingly, drinking water that is not properly treated or disinfected may pose a health risk.

The Environmental Protection Agency (EPA) sets legal limits on the levels of certain contaminants in drinking water. The legal limits reflect both the level that protects human health and the level that water systems can achieve using the best available technology. In addition to prescribing these legal limits, EPA rules set water-testing schedules and methods that water systems and municipalities such as the Honolulu BWS, must follow. The rules list acceptable techniques for treating contaminated water. The standards set by State Regulations may not be any less stringent than the Federal standards in effect at the time. Specific contaminant level ceilings and contaminant level monitoring requirements regarding organic and inorganic chemicals, radionuclides, microbiological contaminants and turbidity are established in the State Regulations.

All work performed by the BWS for the subject project will be in compliance with the SDWA.

5.2.2 Clean Water Act (CWA)

The Clean Water Act regulates pollutant discharges that could affect aquatic life forms or human health and safety. The major sections of the CWA applicable to the proposed action are:

Section 401 of the CWA requires a Water Quality Certification (WQC) for actions that require certain Federal permits (such as the Section 404, Department of the Army Permit) to conduct an activity, construction or operation that may result in discharge to waters of the United States. The State of Hawai'i, Department of Health, Clean Water Branch (DOH-CWB) issues the WQC for Hawai'i waters.

Section 402 of the CWA requires NPDES permits for point source discharges including storm water discharges associated with construction activities that disturb a land area of 1 acre or more and discharge storm water from construction sites to waters of the U. S. The DOH-CWB issues the NPDES for Hawai'i waters.

The proposed project is not expected to trigger Section 401 permitting requirements based on no associated Section 404, Department of the Army Permit.

An NPDES permit³ for discharges of construction stormwater from the disturbance of a land area equal to or greater than 1 acre will also not be required. However, discharges of hydrotesting water and well effluent water during the exploratory and development phases are expected to trigger the requirement for a NPDES NOI Form F, Hydrotesting Permit and a NPDES NOI Form I, Discharges of Well Effluent Permit should the contractor decide to discharge to State waters. In this situation, the procedures listed below will be followed. However, should the contractor decide to keep all discharges on site, no permits would be required.

In order to maintain compliance with NPDES permitting requirements, methods, measures, and practices that will be included for the NPDES NOI Forms F and I permit applications will involve the provision of Best Management Practices (BMPs) Plans to treat well effluent and hydrotesting water discharges from the area of work. The BMPs will provide, but not be limited to the following:

- A Site-Specific BMPs plan will be prepared to minimize and prevent runoff and discharges of pollutants into State waters. The BMPs Plans will be prepared by the construction contractor as part of the project construction plan and will be submitted to the DOH-CWB for review and approval.
- Discharge pollution prevention measures will be employed in all phases of the project.
- Control measures to prevent discharges of untreated effluent will be in place and functional before construction activities begin, and will be maintained throughout the construction period.
- The BMPs will include guidelines and mitigation measures to minimize and prevent runoff, discharge pollution, and other detrimental effects related to construction activities. In addition, contingency plans will be included as part of the BMPs to address the potential for heavy rain conditions.

The NPDES NOI Form F and I permit applications will be prepared in compliance with Hawai'i Administrative Rules (HAR), Title 11, Chapter 54 – Water Quality Standards, and Chapter 55 – Water Pollution Control.

5.3 State of Hawai'i

5.3.1 Hawai'i State Plan

The Hawai'i State Plan, adopted in 1978, and promulgated in Hawai'i Revised Statutes (HRS), Chapter 226, consists of three major parts:

³ NPDES Notice of Intent (NOI) Form C, Construction Stormwater Permit Application.

1. An overall theme describing Hawai'i's desired future and quality of life expressed in goals, objectives, policies, and implementing actions;
2. A system designed to coordinate public planning to implement the goals, objectives, and policies of the Hawai'i State Plan; and
3. Priority Guidelines which are statements of statewide interrelated problems deserving immediate attention.

The proposed project would be in conformance to the Hawai'i State Plan's objectives and policies for Facility Systems as identified in the plan as:

"(a) Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives."

"(b) To achieve the general facility systems objective, it shall be the policy of this State to:"

"(1) Accommodate the needs of Hawai'i's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans." and "(3) Ensure that required facility systems can be supported within resource capacities and at reasonable cost to the user" (HRS, Section 226-14)."

And,

"(a) Planning for the State's facility systems with regard to water shall be directed towards achievement of the objective of the provision of water to adequately accommodate domestic, agricultural, commercial, industrial, recreational, and other needs within resource capacities" (HRS, Section 226-16).

The proposed project can be considered an important facility system providing water, an important and necessary item for human subsistence. The construction of this project will maintain this provision of water by the BWS, within its resource capacity as a planned project and at a cost that can be financed within its capital resources for public benefit.

5.3.2 State Land Use Law

The State Land Use Commission classifies all lands in the State of Hawai'i into one of four land use designations: Urban, Rural, Agricultural and Conservation. According to HRS, Chapter 205, an explanation of land use districts is provided:

"Chapter 205, HRS, Districting and classification of lands:"

"(a) There shall be four major land use districts in which all lands in the State shall be placed: urban rural agricultural and conservation. The land use commission shall group contiguous land areas suitable for inclusion in one of these four major districts. The commission shall set standards for determining the boundaries of each district provided that:"

"(1) In the establishment of boundaries of urban districts those lands that are now in urban use and a sufficient reserve area for foreseeable urban growth shall be included;"

"(2) In the establishment of boundaries for rural districts, areas of land composed primarily of small farms mixed with very low density residential lots, which may be shown by a minimum density of not more than one house per one-half acre and a minimum lot size of not less than one-half acre shall be included except as herein provided;"

"(3) In the establishment of the boundaries of agricultural districts the greatest possible protection shall be given to those lands with a high capacity for intensive cultivation; and"

“(4) In the establishment of the boundaries of conservation districts, the "forest and water reserve zones" provided in Act 234, section 2, Session Laws of Hawai'i 195, are renamed "conservation districts" and, effective as of July 11, 1961, the boundaries of the forest and water reserve zones theretofore established pursuant to Act 234, section 2, Session Laws of Hawai'i 195, shall constitute the boundaries of the conservation districts; provided that thereafter the power to determine the boundaries of the conservation districts shall be in the commission.”

In establishing the boundaries of the districts in each count, the commission shall give consideration to the master plan or general plan of the county.

(b) Urban districts shall include activities or uses as provided by ordinances or regulations of the county within which the urban district is situated.

(c) Rural districts shall include activities or uses as characterized by low density residential lots of not more than one dwelling house per one-half acre, except as provided by county ordinance pursuant to section 46-4(c) in areas where "city-like" concentration of people, structures, streets, and urban level of services are absent- and where small farms are intermixed with low density residential lots except that within a subdivision as defined in section 484-1, the commission for good cause may allow one lot of less than one-half acre, but not less than 1,500 square feet- or an equivalent residential density, within a rural subdivision and permit the construction of one dwelling on such lot- provided that all other dwellings in the subdivision shall have a minimum lot size of one-half acre or 21,780 square feet. Such petition for variance may be processed under the special permit procedure. These districts may include contiguous areas which are not suited to low density residential lots or small farms by reason of topography, soils, and other related characteristics.

(d) Agricultural districts shall include activities or uses as characterized by the cultivation of crops, orchards, forage, and forestry; farming activities or uses related to animal husbandry, aquaculture, and game and fish propagation; aquaculture, which means the production of aquatic plant and animal life for food and fiber within ponds and other bodies of water; wind generated energy production for public, private, and commercial use; bona fide agricultural services and uses which support the agricultural activities of the fee or leasehold owner of the property and accessory to any of the above activities, whether or not conducted on the same premises as the agricultural activities to which they are accessory including but not limited to farm dwellings as defined in section 205-4.5(a)(4) employee housing farm buildings, mills, storage facilities, processing facilities, vehicle and equipment storage areas, and roadside stands for the sale of products grown on the premises; wind machines and wind farms; small-scale meteorological, air quality noise, and other scientific and environmental data collection and monitoring facilities occupying less than one-half acre of land" provided that such facilities shall not be used as or equipped for use as living quarters or dwellings; agricultural parks; and open area recreational facilities, including golf courses and golf driving ranges; provided that they are not located within agricultural district lands with soil classified by the land study bureau s detailed land classification as overall (master) productivity rating class A or B.

These districts may include areas which are not used for or which are not suited to, agricultural and ancillary activities by reason of topography soils, and other related characteristics.

The State land-use designation for the proposed project site is within the Conservation District, Resource Subzone (R) (see **Figure 11, State Land Use Development**). According to HAR, Chapter 13-5-24:

Identified land uses in the resource subzone. (a) In addition to the land uses identified herein, all identified land uses and their associated permit or site plan approval requirements listed for the protective and limited subzones also apply to the resource subzone, unless otherwise noted.

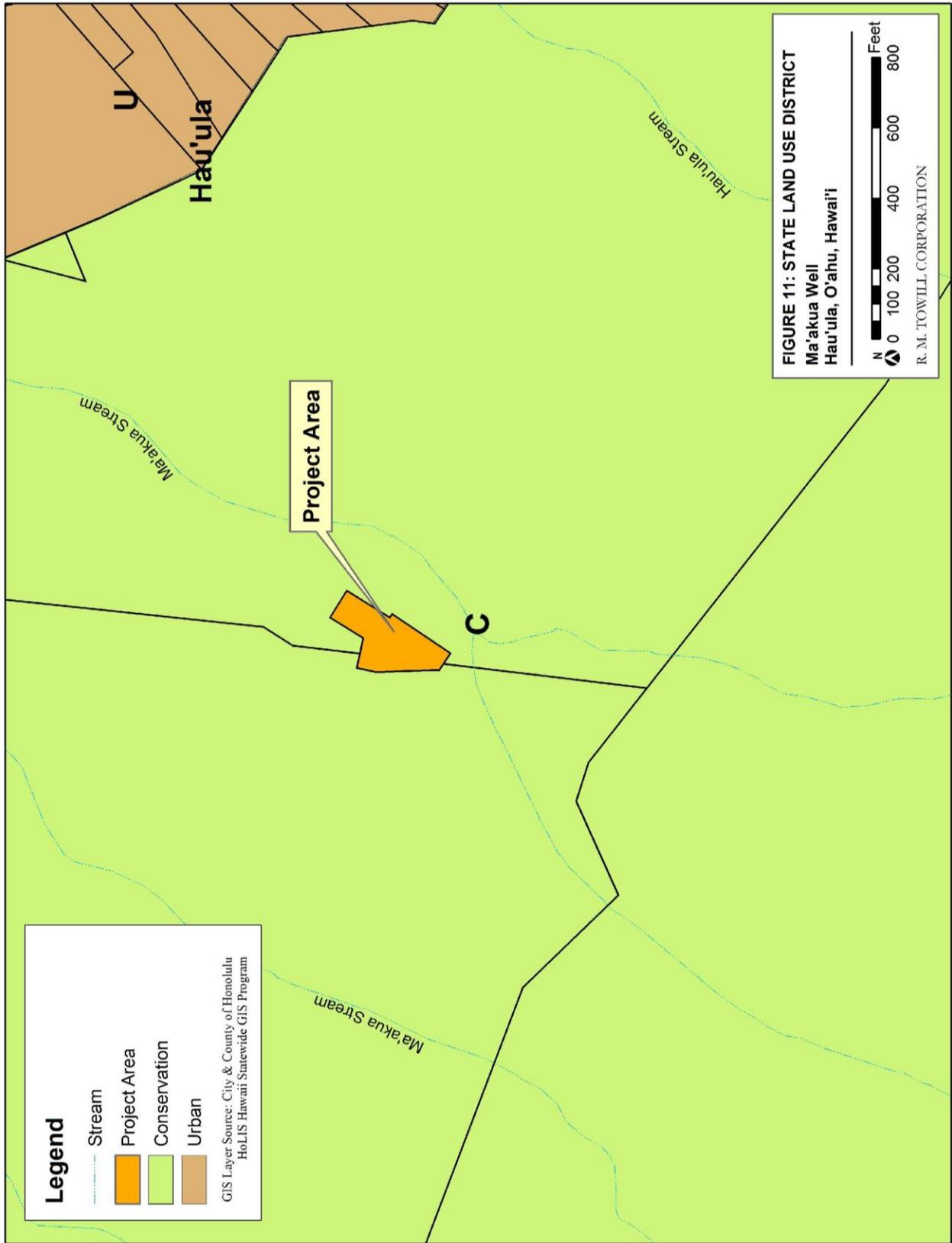


Figure 11: State Land Use District

According to HAR, Chapter 13-5-22, the identified land use for the Protective (and Resource) Subzone is identified as:

P-6 PUBLIC PURPOSE USES

(D-1) Land uses undertaken by the State of Hawai'i or the counties to fulfill a mandated governmental function, activity, or service for public benefit and in accordance with public policy and the purpose of the conservation district. Such land uses may include transportation systems, water systems, communications systems, and recreational facilities.

Based on the delineation of the subject site within the Resource Subzone a Conservation District Use Permit (CDUP) application requiring action by the Board of Land and Natural Resources will be required. If applicable a Management Plan may also be required (HAR, Chapter 13-5-24(c)(4)).

5.3.3 Coastal Zone Management Act (CZMA)

All land and water use activities in the state must comply with Hawai'i's Coastal Zone law, HRS, Chapter 205A. The State of Hawai'i designates the Coastal Zone Management Program (CZMP) to manage the intent, purpose and provisions of HRS, Chapter 205(A)-2, as amended, for the areas from the shoreline to the seaward limit of the State's jurisdiction, and any other area which a lead agency may designate for the purpose of administering the CZMP.

The following is an assessment of the project with respect to the CZMP objectives and policies set forth in Section 205(A)-2.

1. Recreational resources

Objective: Provide coastal recreational opportunities accessible to the public.

Policies:

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

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

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

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

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

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

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

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

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

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

Discussion:

As the project is outside the Special Management Area (SMA), recreational resources, historic resources, scenic and open space resources, coastal ecosystems, economic uses associated with coastal dependent development, coastal hazards, coastal zone development, beach protection, and marine resources are not anticipated to be affected by the project. The project site is within a relatively isolated location and access is limited through any one of three hiking trails (see Section 4.12.2 Potential Impacts and Proposed Mitigation). Access for hiking and possible hunting purposes will not be adversely affected but may be temporarily limited by equipment noise, dust, and construction related traffic. Appropriate signs will be posted during the construction period to inform trail users of the project.

There are no archaeological or cultural resources that are known to be present within the small area planned for construction of the well site and possible mute building as much of the project vicinity had been previously disturbed during the construction of the Ma'akua Well Station. However, in accordance with HRS, Chapter 6E and the requirements of the SHPD, Department of Land and Natural Resources, should any historic resources, including human skeletal and significant cultural remains, be identified during the construction of the proposed project: (1) work will cease in the immediate vicinity of the find; (2) the find will be protected from any additional disturbance by the contractor; and (3) the SHPD, will be contacted immediately at (808) 692-8015 for further instructions including the conditions under which work activities may resume.

5.3.4 Hawai'i Groundwater Laws and Regulations

Hawai'i addresses groundwater pollution through HRS, Chapter 340E, Hawai'i Safe Drinking Water Law (SDWL). The EPA has also granted the DOH primary enforcement authority to administer the Federal Safe Drinking Water Act (SDWA) in Hawai'i. Under the two drinking water laws, the DOH administers three programs:

1. Drinking water standards;
2. Underground injection control; and
3. Wellhead protection.

Under the first program, the DOH sets state primary drinking water standards. These standards establish specific contaminant level ceilings for pollutants and the required monitoring in public drinking water supplies. The BWS coordinates with the DOH to adhere to the maintenance of safe drinking water standards that will apply to the subject project.

The second program called the Underground Injection Control (UIC) Program authorizes the DOH to regulate discharges into underground wells to prevent groundwater contamination of drinking water supplies. Operations that discharge groundwater must apply to the DOH for a discharge permit. Examples of injection activities that require a discharge permit include the direct injection of fluids into wells and the leaching of fluids into aquifers from containment facilities. Discharge permits impose standards that govern the location, construction, and operation of injection wells. Only Class V well injections are permitted in Hawai'i. Class I, II, III, and IV injection wells are prohibited completely.

The proposed project will not require the use of underground injection wells.

The third program is the wellhead protection program. This is a voluntary program through which the DOH along with county agencies delineate certain areas near potable underground drinking water supplies in order to develop plans for preventing groundwater contamination. These drinking water protection plans may include the restriction of certain type of land uses within the wellhead protection area.

The BWS coordinates with the DOH to maintain the protection of wellheads in general. Inasmuch as there are no plans for development surrounding the Ma'akua Well Station, no further protection for the proposed project's Well Unit No. 2 wellhead is presently required or planned.

5.4 City and County of Honolulu

5.4.1 General Plan

The General Plan of the City & County of Honolulu is a comprehensive statement of objectives and policies which sets forth the long-range aspirations of O'ahu's residents and the strategies or actions to achieve them. It is the focal point of a comprehensive planning process that addresses physical, social, economic, and environmental concerns affecting the City & County of Honolulu. The proposed project plan conforms to the following objectives and policies of the General Plan:

Objective A: To protect and preserve the natural environment.

- *Policy 1: Protect O'ahu's natural environment, especially the shoreline, valleys, and ridges, from incompatible development.*
- *Policy 2: Seek the restoration of environmentally damaged areas and natural resources.*
- *Policy 3: Retain the Island's streams as scenic, aquatic, and recreation resources.*
- *Policy 4: Require development projects to give due consideration to natural features such as slope, flood and erosion hazards, water-recharge areas, distinctive land forms, and existing vegetation.*
- *Policy 6: Design surface drainage and flood-control systems in a manner which will help preserve their natural settings.*
- *Policy 7: Protect the natural environment from damaging levels of air, water, and noise pollution.*

The proposed project is considered to be consistent with the protection and preservation of O'ahu's natural environment through the following:

- The use of existing groundwater resources will be within the limits of sustainability of the Ma'akua aquifer. All groundwater withdrawn from the existing Well Unit No. 1 and the proposed Well Unit No. 2 will be in compliance with the CWRM.
- The existing Ma'akua Stream will not be adversely affected as the potential for discharges associated with well development and discharges of well and hydrotesting effluent will be properly addressed through methods, measures, and BMPs associated with NPDES permit applications that will be field for the project.
- As noted in this document the proposed project involves the development of a second well within an existing BWS facility (Ma'akua Well Station) that was constructed for the purpose of supplying water to the area community. In as much as the Ma'akua Well Station was constructed in a manner consistent with

considering the natural features of the site, no adverse impacts are anticipated for the proposed project with regard to slope, flood and erosion hazards, water-recharge areas, distinctive land forms, and existing vegetation.

- Construction and operation of the project will maintain the environmental quality of the site and surrounding area from damaging levels of air, water, and noise pollution. The expectation for this condition is based on the existing use and operation of the site since 1997 by the BWS. The proposed use as identified in this document will be substantively similar, but of a smaller scope and scale involving the addition of the second Well Unit No. 2.

5.4.2 State Water Code and O'ahu Water Management Plan

The Revised Ordinances of Honolulu (ROH), Chapter 30, Article 2, O'ahu Water Management Plan, 1990, Amended 2010, serves to identify the water management plan for the Island of O'ahu and is intended to ensure the following:

- (a) The optimum utilization of the existing water supply in order to minimize the need for the development of additional potable groundwater sources;*
- (b) The preservation of the aquifers for the benefit of future generations, in perpetuity, by proper management of O'ahu's groundwater sources;*
- (c) The timely development of additional potable groundwater sources and alternative sources to provide for additional consumer demand; [and]*
- (d) That growth in consumer demand will be compatible with available water supply. (Added by Ord. 90 62)*

The proposed project will aid these objectives for the Island of O'ahu because it will optimize the reliability of an existing BWS facility and improve the stability of the system. The preservation of the existing aquifer system will be also be promoted by ensuring that pumpage will be limited to the existing sustainability of the aquifer system and to no more than the existing permitted use of 1.12 mgd for the Ma'akua Well Station.

5.4.3 Development/Sustainable Communities Plan for Ko'olauloa

The Ko'olauloa Sustainable Communities Plan is incorporated into City Ordinance 99-72, Bill No. 67 (1999), CD1. The following chapters relate to the proposed project:

(Note: The Ko'olauloa Sustainable Communities Plan is presently under revision by the City & County of Honolulu. The following reference is to the existing plan which was last completed in 1999. It is anticipated that the proposed project will continue to be consistent as the plan is revised.)

Chapter 1: Ko'olauloa's Role in O'ahu's Development Pattern

- *Consistent with the provisions of the General Plan, Ko'olau Loa is projected to maintain its country character and to experience very little growth over the plan's 20-year planning horizon. The plan supports this and includes policies to limit the growth of the region's housing and commercial development, protect cultural and natural resources, and retain the patterns of development characteristic of the region.*

The proposed project supports this chapter of the plan, as it will not increase the region's housing or commercial development. The second well unit will improve the efficient use of the BWS facility by allowing for the distribution of workload between two well pumping units thereby prolonging lifecycle costs for maintenance, repair, and/or replacement of machinery. Well Unit No. 2 will be operated when necessary to provide for peak water demand and maintain capacity requirements for the residents in the Hau'ula area

Chapter 4: Public Facilities and Infrastructure Policies and Principles

- *This chapter presents the general policies and planning principles for the major issues relating to public facilities and infrastructure in Ko'olau Loa. General policies related to each facility type are summarized in this chapter.*

Water Allocation and System Development

Integrate management of all potable and nonpotable water sources, including groundwater, stream water, storm water and effluent, following State and City legislative mandates.

Adopt and implement water conservation practices in the design of new developments and the modification of existing uses, including landscaped areas.

The proposed project is consistent with this chapter because it represents BWS policy to improve the integration of water supply facilities through upgrades in system reliability. While the proposed project does not itself involve water conservation practices, it does represent the results of BWS water conservation practices through the provision of a facility that does not presently require an increase in water use allocation.

5.4.4 Zoning

The project site is zoned by the City & County of Honolulu as within the P-1 (Restricted Preservation) zoning district (see **Figure 12, Zoning**). According to City Ordinance, Chapter 21, Land Use Ordinance:

Sec. 21-3.40-1 Preservation uses and development standards.

(a) Within the P-1 restricted preservation district, all uses, structures and development standards shall be governed by the appropriate state agencies.

Based on the P-1 zoning designation of the site, the City has delegated the authorization for development of the site to the appropriate state agency, the Department of Land and Natural Resources, through the CDUP permitting process (see Section 5.3.2. State Land Use Law).

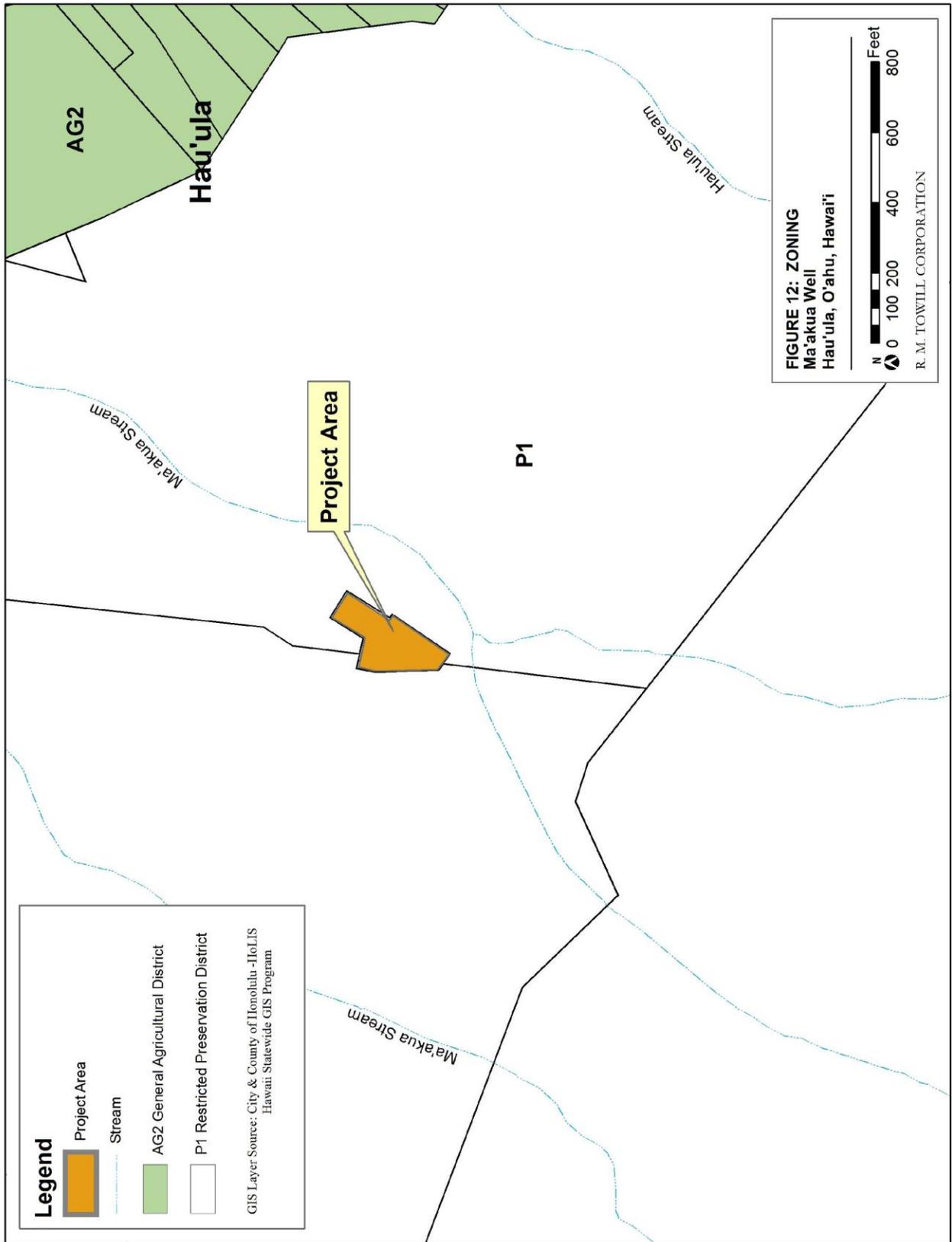


Figure 12: Zoning

Section 6
Permits and Approvals That May Be Required

6.1 City & County Of Honolulu

Construction Plan Approvals
Building and Grading Permits
Department of Planning and Permitting (DPP)

6.2 State of Hawai'i

Conservation District Use Permit⁴
Office of Conservation and Coastal Lands,
Board of Land and Natural Resources (BLNR)

Well Construction Permit and Pump Installation Permits
Commission on Water Resource Management (CWRM)

Water Use Permit⁵
CWRM

National Pollutant Discharge Elimination System (NPDES) Permits:
Notice of Intent (NOI), Form I - Treated Process Wastewater Associated with Well
Drilling Activities; and NOI Form F – Discharges of Treated Hydrotesting Effluent
Clean Water Branch, State Department of Health (DOH)

Source Approval and Well Connection Authorizations
Safe Drinking Water Branch, DOH
(HAR 11-20-30, Rules Relating to Potable Water Systems, New and Modified Public
Water Systems)

Community Noise Permit
Indoor and Radiological Health Branch, DOH

⁴ The use of the project site within the Conservation District is expected to be granted as part of the existing Executive Order granting use of the site for the Ma'akua Well Station.

⁵ There is an existing Water Use Permit for the Ma'akua Well Unit No. 1. The existing Water Use Permit will be reviewed for the proposed Well Unit No. 2, to demonstrate there is sufficient available capacity within the Ma'akua Aquifer to support the new well.

Section 7
Agencies and Organizations Consulted
for the Environmental Assessment

7.1 City & County Of Honolulu

Department of Planning and Permitting (DPP)
Department of Design and Construction
City Council – District 2
Municipal Library

7.2 State of Hawai'i

Department of Health (DOH):
• Safe Drinking Water Branch
• Underground Injection Control Branch
• Environmental Health

Department of Land and Natural Resources (DLNR):
• Office of Conservation and Coastal Lands
• Commission on Water Resource Management
• State Historic Preservation Division
• Engineering Division
• Land Division

Department of Transportation
Department of Agriculture
Kāne'ohe Library
Hawai'i State Library
Office of Hawaiian Affairs

7.3 Federal

U. S. Department of Army, Corps of Engineers

7.4 Organizations and Individuals

Ko'olauloa Neighborhood Board No. 28
Kahalu'u Neighborhood Board

Section 8 Summary of Effects

8.1 Short Term Effects

Short term effects associated with the proposed project will be principally during the construction phase. The City & County of Honolulu and its designated contractor will require access to the project site via the Ma'akua Access Road which parallels the Ma'akua Stream. Noise will be temporarily generated from construction and related mobilization of equipment for the temporary duration of work. Construction equipment is expected to include, but not be limited to, backhoe(s), front-end loader(s), or excavator(s), dump trucks and powered hand tools. All equipment will be muffled in accordance with standard engine operating practices. Upon construction completion, noise levels will return to ambient levels.

The generation of fugitive dust during construction activities is expected to be slight to insignificant due to the limited scope and scale of the project. The contractor will be required to control fugitive through the regular wetting of soils that may be disturbed during work activities.

Protection of water quality will be through the use of mitigative measures including silt fencing/curtains, berms, and other applicable erosion controls to prevent construction stormwater related soils and silt from leaving active areas of work. Specifications for the use of these measures will be through the construction plan approval process and the possibly required NPDES permit applications that will be filed prior to the start of work.

Upon completion of work all construction equipment, machinery, and personnel will be demobilized from the job site with no further disturbance to the area. As required, all debris and waste materials will be disposed of at an approved refuse facility, and active areas of work will be replanted with vegetation similar to that found at the existing site.

8.2 Long Term Effects

Long term effects are expected to principally result from use and operation of the proposed Well Unit No. 2 and its possible mute building enclosure. No long term adverse effects are anticipated based on the use of the Well Unit No. 2 within an enclosed structure which, if constructed, will be designed to provide: acoustic dampening of noise that may be generated by the well; protection of the well head against vandalism or damage; and, the ability to withstand hurricane force winds and inclement weather conditions. The Well Unit No. 2 will be substantively the same as the well unit and mute building enclosure that is used for Well Unit No. 1. Furthermore, the mute building enclosure, if necessary, will be designed to be small and painted in an earth toned color to reduce the potential for any visual impact.

Less than approximately 100 square feet of impermeable surface area will be added to the site. The existing Well Unit No. 1, and the entire area of the Ma'akua Well Station comprises an acre of less than approximately one-acre and general runoff patterns will not require alteration to accommodate the new facility. The site will continue to meet up to a 50-year storm event in order to withstand flooding.

8.3 Significance Criteria

In accordance with the provisions set forth in HRS, Chapter 343, and the significance criteria in HAR, Chapter 11-200-12, this Environmental Assessment has preliminarily determined that the project will have no significant adverse impact to air and water quality, existing utilities, noise, archaeological or cultural sites, or wildlife habitat. All anticipated impacts will be temporary and will not adversely impact the environmental quality of the area.

According to the Significance Criteria:

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

The proposed project is not anticipated to adversely impact any natural or cultural resources. The proposed well site is located on an existing BWS well site. The site has been previously disturbed by clearing and grading to accommodate paving and building construction. If any potential remains (natural or cultural) exist at the site, such remains are expected to have been recovered or destroyed during prior development activities.

No significant archaeological or cultural sites are anticipated to be discovered. However, in the unlikely event that any remains or artifacts are encountered, work is to immediately cease and the State Historic Preservation Division notified at (808) 692-8015, for further instructions and to determine significance and treatment of any remains or artifacts.

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

The location of the proposed project is on land owned by the State of Hawai'i with the grant of an Executive Order allowing BWS the use of the site for the development and distribution of potable water for public purposes. The proposed use of the site will facilitate development of a second well and will not curtail existing surrounding land uses.

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

The proposed project is consistent with the environmental policies, goals and guidelines as delineated in HRS, Chapter 343, and as documented in this Environmental Assessment.

- 4. Substantially affects the economic welfare, social welfare, and cultural practices of the community or State;*

The proposed project is intended to maintain the long-term provision of clean, potable water necessary for the future health, welfare, and growth of the community.

- 5. Substantially affects public health;*

The proposed project will be developed in accordance with Federal, State, and City & County of Honolulu, rules and regulations governing public safety and health. Potential sources of adverse

impacts have been identified and appropriate mitigative measures developed. The primary public health concerns are anticipated to involve air, water, noise, and traffic impacts. However, it is expected that these impacts will be either minimized or brought to negligible levels by the appropriate use of the mitigation measures described in this document.

6. *Involves substantial secondary impacts, such as population changes or effects on public facilities;*

The proposed project is part of the BWS program for development of water resources to serve the present and future population of the surrounding Hau'ula neighborhood and region. The project itself, however, will not generate new population growth as the planned use of the Well Unit No. 2, will be for improved reliability, to maintain capacity requirements and meet peak demands.

7. *Involves a substantial degradation of environmental quality;*

The proposed project will be developed in accordance with the environmental policies of HRS, Chapter 343. The analysis provided in this Environmental Assessment indicates that no environmental degradation is anticipated or expected.

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

The proposed project addresses the need for the provision of a reliable source of potable water for existing and future area residents, businesses, and institutional users. The CWRM, which regulates Hawai'i's water resources, is delegated the responsibility to regulate permitted withdrawals from resources such as the Ko'olauloa Basal Aquifer System. The available sustainable yield of this resource is not planned to be exceeded by this project.

9. *Substantially affects a rare, threatened, or endangered species, or its habitat;*

There are no threatened or endangered flora or fauna species within or immediately surrounding the project site.

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

Any potential for adverse impacts to air, water quality, or noise levels will be addressed by use of appropriate mitigative measures as described in this Environmental Assessment.

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

The proposed project is located in an area that is already in use for the BWS Ma'akua Well Station. The project itself does not possess any sensitive characteristics that would detract from or adversely impact the surrounding environment.

12. *Substantially affects scenic vistas and view planes identified in county or state plans or studies;*

No adverse impacts to scenic vistas or view planes are expected. Although the area surrounding the existing BWS property provides hiking trails, construction activity will be limited and of short duration. Upon completion of work all equipment, machinery, and personnel mobilized to the site will be removed. Any views of the possible mute building that will be used to protect the planned Well Unit No. 2 will be designed to be small and will be painted in earth toned colors to reduce its visual impact.

13. *Requires substantial energy consumption.*

Energy that is used for the proposed project will be in the form of fossil fueled internal combustion equipment, machinery, and vehicles, and electricity supplied to the site by an existing HECO power connection. The use of these forms of energy is not expected to be greater or significantly greater than that used for the development of similar exploratory and production well projects.

Section 9 Summary of Findings and Determination

Based on the review and analysis of the above factors, it has been preliminarily determined that a HRS, Chapter 343, Environmental Impact Statement (EIS) will not be required, and that an anticipated Finding of No Significant Impact (FONSI) should be issued for this project.

In accordance with the provisions set forth in HRS, Chapter 343, and the significance criteria in HAR, Chapter 11-200-12, this Environmental Assessment has evaluated and assessed the potential for environmental impacts associated with the proposed project and it is preliminarily determined that a HRS, Chapter 343, EIS will not be required.

The proposed well development is not expected to result in significant adverse impacts to geology, soils, hydrology, stream flow, biological resources, air quality, natural hazards, cultural resources, socioeconomics, or land uses. Minimal impacts may consist of minor traffic, noise and air quality disturbances to occasional hikers and hunters that may traverse the immediate surrounding area of the site. Local residents, however, are not anticipated to be adversely affected.

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