Draft Environmental Assessment

‘ŌLA‘A #6 PRODUCTION WELL AND RESERVOIR

PREPARED FOR:
Department of Water Supply
County of Hawai‘i

PREPARED BY:
PLANNING SOLUTIONS

APRIL 2009

PROJECT SUMMARY

Project:	**‘Ōla‘a Production Well & Reservoir**
Applicant/Approving Agency	Department of Water Supply (DWS) County of Hawai‘i Contact: Kawika Uyehara (808-961-7251) 345 Kekūanaō‘a Street., Suite 20, Hilo, HI 96720
Location	Puna District; Island of Hawai‘i
Tax Map Keys	1-8-001:0045 & 50, 1-6-003:087, 1-7-006:033, and 1-8-008:018
Parcel Areas	Respectively: 0.146, 1.141, 2.002, 0.572, and 1.175 acres
Project Site Area	1.1 acres
State Land Use District	Urban
County Zoning	RS-20 Single Family Residential
Proposed Action	DWS proposes to convert an existing exploratory well on its ‘Ōla‘a #6 site to a 1,400-gallon per minute capacity production well and construct a new 1.0 million gallon (MG) reservoir. The nearby 0.05 MG ‘Ōla‘a #6 tank and booster pump system will be demolished. The project also includes a control building, SCADA communications equipment, and associated control valves. SCADA controls and control valves will be added at ‘Ōla‘a Site #3, #4, and #5 and at Mountain View Site #1 to facilitate remote operations. The project will augment water sources in the ‘Ōla‘a Water System and allow DWS facilities there to be remotely monitored from their Hilo base yard.
Associated Actions Requiring Environmental Assessment	Proposed use of County & Federal funds & County land.
Consultation	The parties listed in Table 7.1 are being sent copies of this *Draft EA* for review and comment.
Required Permits and Approvals	• Plan Approval, Hawai‘i County Planning Department • Construction Noise Variance, State Department of Health (possible) • Building Permit, Hawai‘i County Department of Public Works • State Department of Transportation Highway Construction Permit • Pump Installation Permit, State Commission on Water Resource Management • Certification of Well for Drinking Water Use, State Department of Health • General NPDES Construction Permit Coverage
Anticipated Determination	Finding of No Significant Impact
Consultant	Planning Solutions, Inc. 210 Ward Avenue, Suite 330 Honolulu, HI 96814 Contact: Perry White (808)-550-4483

TABLE OF CONTENTS

1.0 PURPOSE & NEED 1-1
1.1 INTRODUCTION 1-1
1.2 PURPOSE AND NEED FOR THE PROJECT 1-1
1.2.1 Existing 'Ōla'a-Mountain View Water System 1-1
1.2.2 Water Use/Demand in 'Ōla'a-Mountain View Water System 1-5
1.2.3 Need for Additional Source Capacity and Storage 1-5
1.2.3.1 Need for Additional Well Source 1-5
1.2.3.2 Need for Additional Storage 1-5
1.3 ORGANIZATION OF THE ENVIRONMENTAL ASSESSMENT 1-6

2.0 PROPOSED ACTION & ALTERNATIVES CONSIDERED 2-1
2.1 DESCRIPTION OF THE PROPOSED ACTION 2-1
2.1.1 Overview 2-1
2.1.2 Demolition and Site Preparation 2-1
2.1.3 Design of the Proposed Facilities 2-1
2.1.3.1 Well Pump & Equipment 2-2
2.1.3.2 Control Building 2-2
2.1.3.3 1.0 MG Reservoir 2-13
2.1.3.4 SCADA System 2-13
2.1.3.5 Seepage pits 2-13
2.1.3.6 Electricity and Communications 2-13
2.1.3.7 Site Access & Security 2-13
2.1.4 Water Testing 2-13
2.1.5 Construction Schedule 2-14
2.1.6 Project Costs 2-14
2.2 ALTERNATIVES 2-15
2.2.1 Framework For Consideration of Alternatives 2-15
2.2.2 Alternatives Addressed in Detail in the EA 2-15
2.2.2.1 Proposed Action: 'Ōla'a #6 Production Well & 1.0 MG Reservoir 2-15
2.2.2.2 No Action Alternative 2-15
2.2.3 Alternatives Eliminated from Detailed Analysis 2-15
2.2.3.1 Smaller Reservoir 2-15
2.2.3.2 Different Size Well Pump 2-16
2.2.3.3 Other Source-Development Alternatives 2-16
2.2.3.4 Delayed Action 2-17

3.0 EXISTING ENVIRONMENT & PROBABLE IMPACTS 3-1
3.1 GEOLOGY 3-1
3.1.1 Existing Conditions 3-1
3.1.2 Probable Impacts 3-1
3.2 TOPOGRAPHY AND SOILS 3-1
3.2.1 Existing Conditions 3-1
3.2.2 Probable Impacts 3-1
3.3 HYDROLOGY 3-2
3.3.1 Existing Conditions 3-2
3.3.1.1 Surface Water 3-2
3.3.1.2 Groundwater 3-2
3.3.2 Probable Impacts 3-2
3.3.2.1 Surface Water 3-2
3.3.2.2 Groundwater 3-4
3.4 CLIMATE AND AIR QUALITY 3-5
3.4.1 Existing Conditions 3-5
3.4.2 Probable Impacts 3-7
3.4.2.1 Construction Phase 3-7
3.4.2.2 Operational Phase 3-7

3.5 FLORA AND FAUNA 3-7
3.5.1 Existing Conditions 3-7
3.5.2 Probable Impacts & Mitigation Measures 3-7
3.6 NOISE 3-7
3.6.1 Existing Conditions 3-7
3.6.2 Probable Impacts & Mitigation Measures 3-10
3.6.2.1 Environmental Noise Guidelines, Standards, and Criteria 3-10
3.6.2.2 Construction Phase Impacts 3-10
3.6.2.3 Operational Phase Noise Impacts 3-12
3.7 ARCHAEOLOGICAL, HISTORIC AND CULTURAL FEATURES 3-12
3.7.1 Existing Conditions 3-12
3.7.2 Probable Impacts & Mitigation Measures 3-12
3.8 NATURAL HAZARD RISKS 3-13
3.8.1 Existing Conditions 3-13
3.8.1.1 Volcanic Hazards 3-13
3.8.1.2 Seismic Hazards 3-13
3.8.1.3 Flood and Tsunami Hazards 3-13
3.8.2 Probable Impacts 3-14
3.8.2.1 Lava Flows 3-14
3.8.2.2 Earthquakes 3-14
3.8.2.3 Flooding from Streams or Tsunami 3-14
3.9 SCENIC AND RECREATIONAL RESOURCES 3-16
3.9.1 Existing Conditions 3-16
3.9.2 Probable Impacts & Mitigation Measures 3-16
3.10 TRANSPORTATION 3-16
3.10.1 Existing Conditions 3-16
3.10.2 Probable Impacts & Mitigation Measures 3-16
3.11 LAND USE & ECONOMIC AND CULTURAL ENVIRONMENT 3-17
3.11.1 Existing Conditions 3-17
3.11.2 Probable Impacts 3-17

4.0 RELATIONSHIPS TO RELEVANT PLANS, POLICIES & CONTROLS 4-1
4.1 COUNTY AND STATE REGULATIONS 4-1
4.1.1 County of Hawaiʻi General Plan 4-1
4.1.1.1 Applicable Goals, Policies, and Recommended Actions 4-1
4.1.1.2 Conformance With the 2005 *Hawaiʻi County General Plan* 4-1
4.1.2 County of Hawaiʻi Zoning Ordinance 4-2
4.1.3 State of Hawaiʻi Land Use 4-2
4.1.4 State Drinking Water State Revolving Fund (DWSRF) 4-2
4.2 CROSS-CUTTING FEDERAL AUTHORITIES 4-2
4.2.1 Archeological and Historic Preservation Acts 4-2
4.2.2 Clean Air Act (42 U.S.C. § 7506(c)) 4-3
4.2.3 Coastal Barrier Resources Act (16 U.S.C. § 3501) 4-3
4.2.4 Coastal Zone Management Act (16 U.S.C. § 1456(c) (1)) 4-3
4.2.5 Endangered Species Act (16 U.S.C. 1536(a)(2) and (4)) 4-4
4.2.6 Environmental Justice (Executive Order 12898) 4-5
4.2.7 Floodplain Management (42 U.S.C. § 4321) 4-5
4.2.8 Fish and Wildlife Coordination Act (16 U.S.C. § 662(a)) 4-5
4.2.9 Farmland Protection Policy Act (7 U.S.C. § 4202(8)) 4-5
4.2.10 Safe Drinking Water Act (42 U.S.C. § 300h-3(e)) 4-6
4.2.11 Protection of Wetlands (42 U.S.C. § 4321) 4-6
4.2.12 Wild and Scenic Rivers Act (16 U.S.C. 1271-1287) 4-7

5.0 ANTICIPATED DETERMINATION 5-1
5.1 SIGNIFICANCE CRITERIA 5-1
5.2 FINDINGS 5-1
5.2.1 Irrevocable Loss or Destruction of Valuable Resource 5-1
5.2.2 Curtails Beneficial Uses 5-1

5.2.3 Conflicts with Long-Term Environmental Policies or Goals 5-2
5.2.4 Substantially Affects Economic or Social Welfare 5-2
5.2.5 Public Health Effects....5-2
5.2.6 Produce Substantial Secondary Impacts....5-2
5.2.7 Substantially Degrade Environmental Quality 5-2
5.2.8 Cumulative Effects or Commitment to a Larger Action 5-2
5.2.9 Affects on Rare, Threatened, or Endangered Species 5-2
5.2.10 Affects Air or Water Quality or Ambient Noise Levels....5-2
5.2.11 Environmentally Sensitive Areas 5-2
5.2.12 Affects Scenic Vistas and Viewplanes 5-3
5.2.13 Requires Substantial Energy Consumption 5-3
5.3 ANTICIPATED DETERMINATION 5-3

6.0 BIBLIOGRAPHY 6-1

7.0 PARTIES CONSULTED....7-1

APPENDIX A. PUMP TEST DATA FROM 'ŌLA'A #6 EXPLORATORY WELL A-1

APPENDIX B. WATER QUALITY DATA FROM 'ŌLA'A #6 EXPLORATORY WELL . B-1

APPENDIX C. HAZARDOUS MATERIALS SURVEY REPORT....C-1

LIST OF FIGURES

FIGURE 1.1 LOCATION MAP 1-2
FIGURE 1.2 EXISTING ʻŌLAʻA WATER SYSTEM & PROJECT COMPONENTS 1-3
FIGURE 2.1 SITE DEMOLITION PLAN 2-3
FIGURE 2.2 SITE PLAN OF PROPOSED PRODUCTION WELL AND RESERVOIR AT ʻŌLAʻA #6 2-4
FIGURE 2.3 SITE PLAN OF PROPOSED CONTROL VALVE AT ʻŌLAʻA TANK #3 SITE 2-5
FIGURE 2.4 SITE PLAN OF PROPOSED CONTROL VALVE AT ʻŌLAʻA TANK #4 SITE 2-6
FIGURE 2.5 SITE PLAN OF PROPOSED CONTROL VALVE AT ʻŌLAʻA TANK #5 SITE 2-7
FIGURE 2.6 SITE PLAN OF PROPOSED SCADA CABINET AT MOUNTAIN VIEW TANK #1 SITE 2-8
FIGURE 2.7 WELL PUMP PLAN & SECTIONS 2-9
FIGURE 2.8 WELL SHAFT SECTIONS 2-10
FIGURE 2.9 CONTROL BUILDING PLAN VIEW 2-11
FIGURE 2.10 CONTROL BUILDING ELEVATION VIEW 2-12
FIGURE 3.1 KEAʻAU AQUIFER SYSTEM 3-3
FIGURE 3.2 PHOTOGRAPHS OF WELL & RESERVOIR SITE 3-9
FIGURE 3.3 RECENT EARTHQUAKES ON AND NEAR THE ISLAND OF HAWAIʻI, 1962-1985. 3-14
FIGURE 3.4 GENERALIZED LOCATIONS OF DAMAGING EARTHQUAKES OF MAGNITUDE 6 OR GREATER SINCE 1868 ON THE ISLAND OF HAWAIʻI. 3-15

LIST OF TABLES

TABLE 1.1 WELL SOURCES IN ʻŌLAʻA -MT. VIEW WATER SYSTEM 1-4
TABLE 1.2 BOOSTER PUMPS IN ʻŌLAʻA -MT. VIEW WATER SYSTEM 1-4
TABLE 1.3 STORAGE FACILITIES IN ʻŌLAʻA -MT. VIEW WATER SYSTEM 1-5
TABLE 2.1 AS-BUILT DIMENSIONS OF ʻŌLAʻA #6 EXPLORATORY WELL 2-2
TABLE 2.2 PRELIMINARY PROJECT SCHEDULE 2-14
TABLE 2.3 PRELIMINARY PROJECT COSTS (IN 2008 DOLLARS) 2-14
TABLE 3.1 RESULTS OF STEP-DRAWDOWN TESTING (APRIL 19, 2005) 3-4
TABLE 3.2 AVERAGE MONTHLY RAINFALL NEAR PROJECT SITE. 3-6
TABLE 3.3 BASELINE SOUND LEVEL AT ʻŌLAʻA #6 WELL SITE ON AUGUST 10, 2007 3-10
TABLE 3.4 MAXIMUM PERMISSIBLE SOUNDS LEVELS IN DBA (HAR §11-46). 3-11
TABLE 3.5 DAMAGING EARTHQUAKES OF MAGNITUDE 6 OR GREATER SINCE 1868 ON THE ISLAND OF HAWAIʻI. 3-15
TABLE 3.6 TRAFFIC VOLUMES FOR MĀMALAHOA HIGHWAY BETWEEN OLD VOLCANO ROAD AND PSZYK ROAD. 3-16
TABLE 3.7 POPULATION GROWTH IN THE PUNA DISTRICT: 1980-2000. 3-17
TABLE 7.1 DRAFT EA DISTRIBUTION LIST 7-1
TABLE 7.2 NEIGHBORING LANDOWNERS SENT COPIES OF THE DRAFT ENVIRONMENTAL ASSESSMENT 7-2

1.0 PURPOSE & NEED

1.1 INTRODUCTION

The proposed ‘Ōla‘a #6 Production Well and Reservoir site is located in the community of Mountain View in the Puna District of the Island of Hawai‘i (TMK 1-8-001:050, see Figure 1.1). The site is owned by the County of Hawai‘i Department of Water Supply (DWS). Access to the well site is via Highway 11. An exploratory well exists at the site (State Well No. 3306-02), and Water Resources International, Inc. performed the pump testing and water quality testing needed to confirm the suitability of the exploratory well for potable water supply in 2005 (see Appendix A). DWS is proposing to outfit the well with a 1,400 gallon per minute (gpm) and add a 1.0 million gallon (MG) storage reservoir and associated controls to the site to serve customers in the ‘Ōla‘a-Mountain View (‘Ōla‘a-Mt.View) water system. As part of the project, the nearby ‘Ōla‘a #6 tank and booster pump system will be demolished and SCADA communications equipment will be added to ‘Ōla‘a Sites #3, #4, and #5 and at Mountain View Site #1 to facilitate communications between the facilities in the ‘Ōla‘a-Mt.View system.

DWS may seek Federal funding for the project under the Drinking Water State Revolving Fund (DWSRF) program administered by the Safe Drinking Water Branch of the State Department of Health. If funds are allocated to the project from the DWSRF, that would constitute a Federal action. Consequently, this *Environmental Assessment* has been prepared under the dual legal authorities of Chapter 343, Hawai‘i Revised Statutes/Hawai‘i Administrative Rules §11-200 and the National Environmental Policy Act (NEPA). It incorporates the content required to comply with the Hawai‘i DWSRF program (see Section 4.1.4 for details).

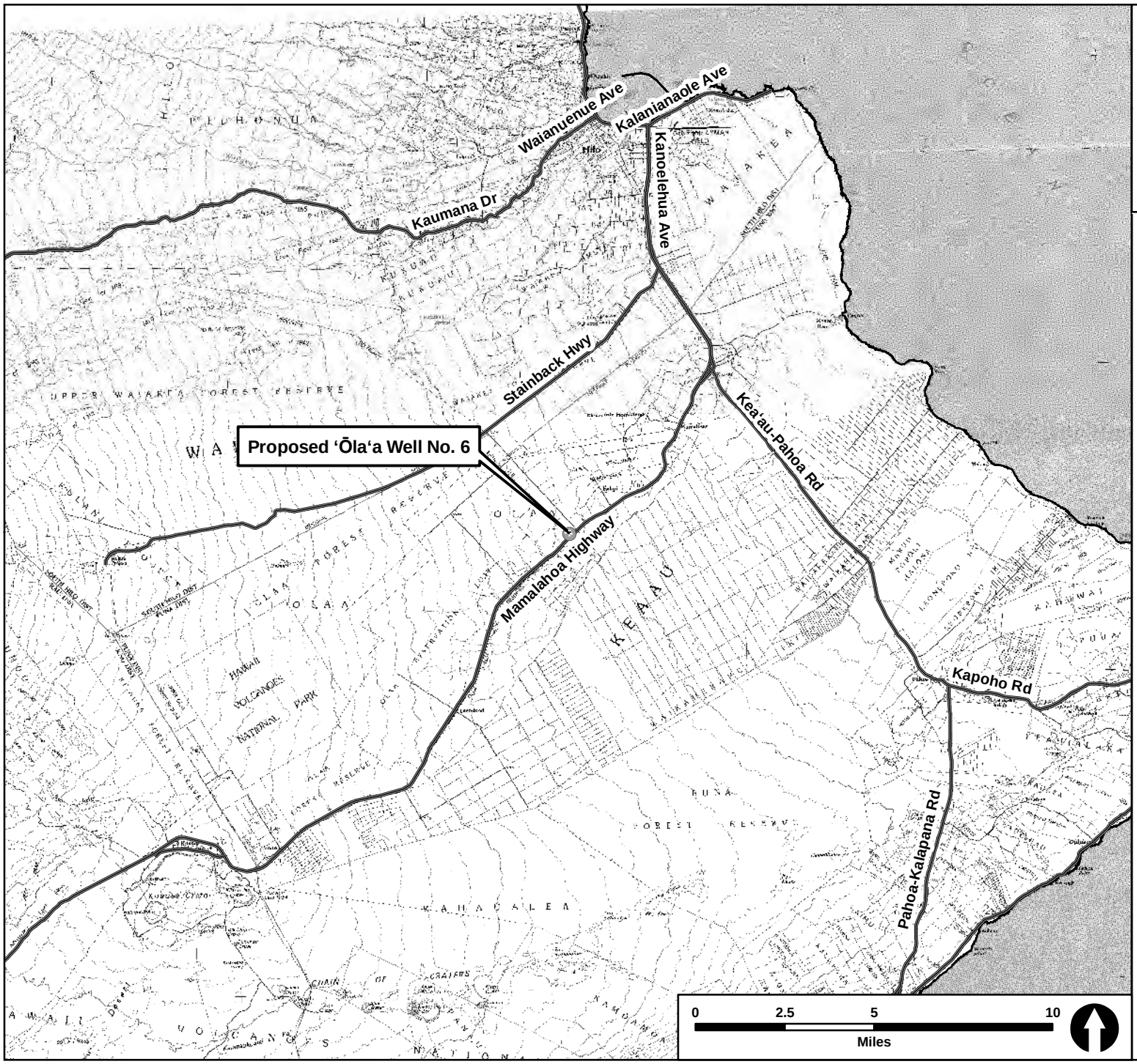
1.2 PURPOSE AND NEED FOR THE PROJECT

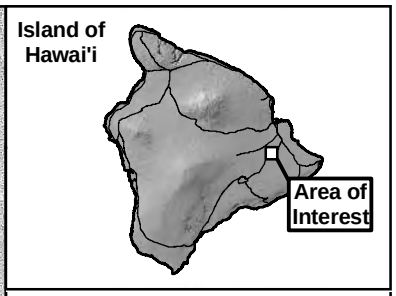
The purpose of the proposed well and reservoir is to supply DWS’ ‘Ōla‘a-Mt. View system with a new source of potable water and increased storage capacity. Currently, there is a storage deficit for the ‘Ōla‘a-Mt. View system that the DWS projects will grow worse in the future as a result of growing demand. The proposed reservoir would help alleviate that deficit. Further, the addition of a well in the *mauka* portion of the system will increase its overall reliability in the event that the primary source fails. Whereas now when that happens most customers are without water, with the new well and reservoir in place, the system could be gravity-fed with little disruption to most customers.

1.2.1 EXISTING ‘ŌLA‘A-MOUNTAIN VIEW WATER SYSTEM

The ‘Ōla‘a -Mt. View water system is served by three wells: ‘Ōla‘a Mauka No. 1 (‘Ōla‘a Well A), ‘Ōla‘a Makai No. 1 (‘Ōla‘a Well B), and ‘Ōla‘a No. 3 (‘Ōla‘a Well C). ‘Ōla‘a No. 3 is the primary source serving the system, with the others providing additional water as needed. The total rated capacity of these three wells is 4.6 million gallons per day (MGD), however DWS regulations require that each well have a 100% backup, so only 2.3 MGD is considered available water supply. Specifications for each of these wells are given in Table 1.1.

The ‘Ōla‘a -Mt. View system serves users between approximately 220 feet and 2,200 feet in elevation. To do this it relies on a series of eight booster pump stations to pump water from the wells *mauka* to customers along Volcano Highway (see Table 1.2). The system has eleven storage tanks currently in service with a total capacity of 2.4 MG (see Table 1.3). Water can flow in either direction between the ‘Ōla‘a -Mt. View system and the Pāhoa water system. However, there is presently no intertie facility between the two systems.





Prepared For:

Tom Nance Water Resource Engineering, Inc. (TNWRE)

Prepared By:

PLANNING SOLUTIONS

Sources:

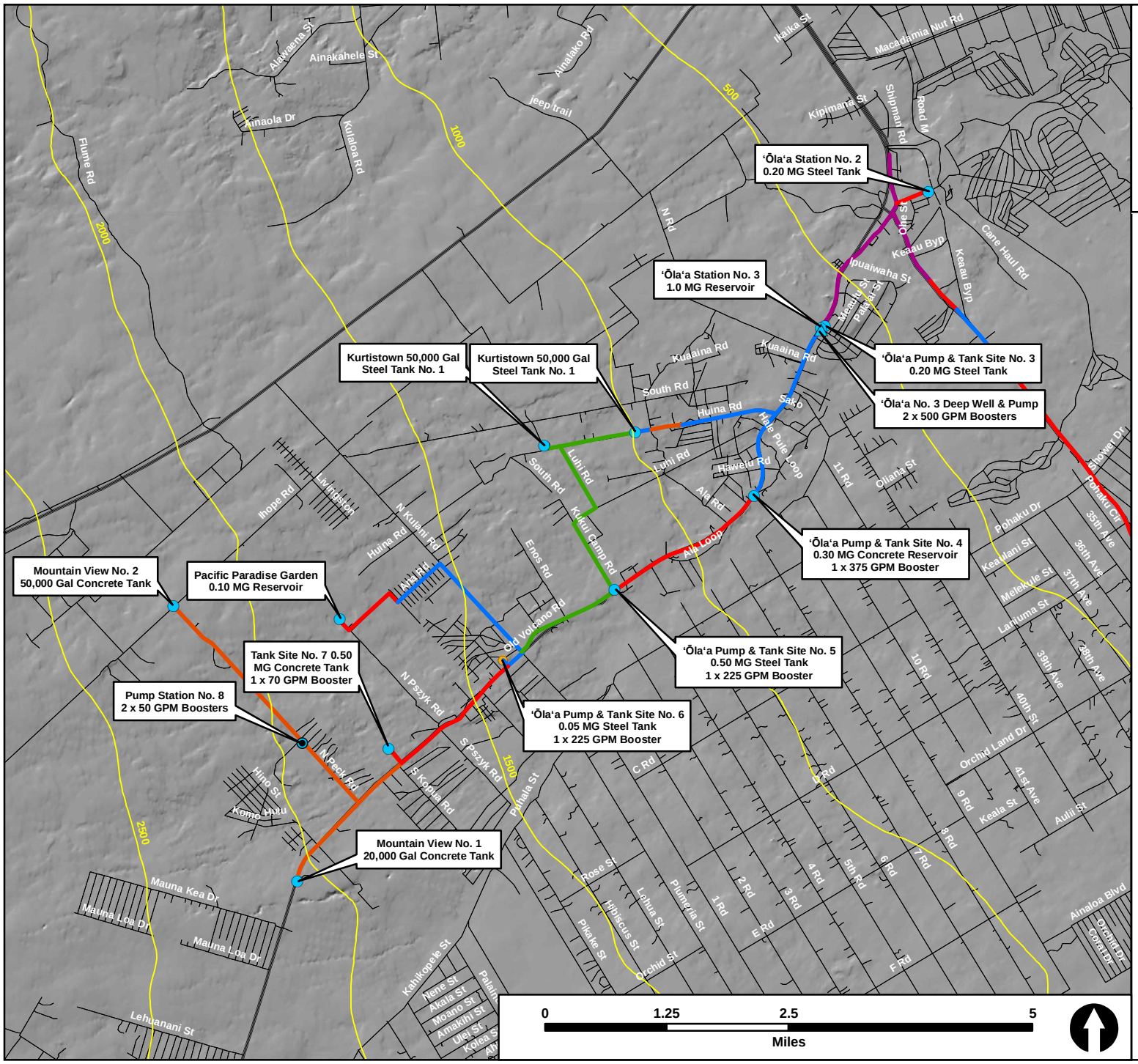
-State of Hawaii GIS
-USGS 7.5' Quad Map

Figure 1.1:

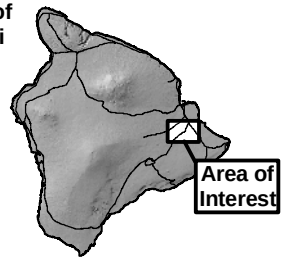
Location Map

‘Ōla‘a No. 6 Production Well & Reservoir

Figure 1.1 Location Map 2009-02-06.mxd



Island of Hawai'i



Existing Water Lines:

- 4 in.
- 6 in.
- 8 in.
- 12 in.
- 16 in.

Legend:

- Pumping Station
- Reservoir
- Well

Prepared For:

Tom Nance Water Resource Engineering, Inc. (TNWRE)

Prepared By:

PLANNING SOLUTIONS

Sources:

-Department of Water Supply, County of Hawai'i
-State of Hawaii GIS

Figure 1.2:

Existing 'Ōla'a Water System

'Ōla'a No. 6 Production Well & Reservoir

Figure 1.2 Existing 'Ola'a Water System 2009-02-17.mxd

Table 1.1 Well Sources in 'Ōla'a -Mt. View Water System

Facility Name	Source Type	Ground Elevation (ft)	Rated Flow (gpm)	Total Dynamic Head (ft)	hp	Voltage
Olaa Mauka No. 1 (Olaa Well A)	Well	222	975	380	125	460
Olaa Makai No. 1 (Olaa Well B)	Well	222	800	350	150	440
Olaa Sta. No. 3 (Olaa Well C)	Well	601	1,400	610	300	2,300

Source: DWS 20-Year Water Master Plan (2006).

Table 1.2 Booster Pumps in 'Ōla'a -Mt. View Water System

Pump Station Name	Elevation (ft)	Rated Flow (gpm)	Total Dynamic Head (ft)	hp	Voltage
Olaa BPS No. 2					
Pump A (NIU)	283	520	338	75	220
Pump B (NIU)	283	520	338	60	220
Milo St (C & D)	Not Available	520	376	75	460
Olaa BPS No. 3					
Pumps A and B (New)	601	500	340	60	460
Olaa BPS No. 4					
Pump A	845	375	325	40	230/460
Pump B	844	225	360	30	230
Pump C	844	225	318	40	240
Olaa BPS No. 5					
Pump A	1,135	250	313	30	208/460
Pump B	1,135	250	313	30	208/460
Pump C	1,138	225	310	25	230/460
Olaa BPS No. 6					
Pump A	1,379	225	318	30	230/460
Pump B	1,379	225	285	20	240
Pump C	1,379	225	360	30	230
Pacific Paradise BPS					
Pump A	Not Available	200	285	20	230/460
Pump B	Not Available	200	285	20	230/460
Olaa BPS No. 7					
Pump A	1,672	150	452	15	220
Pump B	1,675	150	452	15	230
Olaa BPS No. 8					
Pump A	1,894	50	140	5	230
Pump B	1,894	50	140	3	230

Source: DWS 20-Year Water Master Plan (2006).

Table 1.3 Storage Facilities in 'Ōla'a -Mt. View Water System

Facility Name	Year Built	Type	Total Volume (mg)	Overflow Elevation (ft)	Base Elevation (ft)	Height (ft)	Diameter[a] (ft)
Mt. View No. 2 (Peck Road) (Nakano)	1961	Concrete	0.05	2,187	2,172	15	24
Olaa No. 8 (Mt. View No. 1)	1963	Concrete	0.05	2,087	2,074	13	25
Olaa No. 7	1960	Concrete	0.5	1,687	1,672	14	75
Pacific Paradise	1962	Concrete	0.1	1,667	1,652	15	34
Olaa No. 6	1960	Concrete	0.05	1,396	1,379	17	22
Kurtistown Tank No. 1	1971	Redwood	0.05	1,194	1,176	18	22
Olaa No. 5	2000	Concrete	0.05	1,152	1,135	17	22
Kurtistown Tank No. 2	1972	Galv. Lined	0.05	994	977	18	22
Olaa No. 4	1944	Concrete	0.3	860	845	15	58
Olaa No. 3	1990	Concrete	1.0	624	604	20	92
Olaa No. 2	1942	Concrete	0.2	312	283	29	34

a. Diameter is calculated based on the height and volume of the tank and has not been verified based on review of as-built drawings.

Source: DWS 20-Year Water Master Plan (2006).

The proposed 'Ōla'a Well #6 production well and reservoir would serve the most inland five of the system's eight pressure zones, namely zones 1700 (served by the existing 'Ōla'a #6 tank), 1750 (served by the Pacific Paradise tank), 1800 (served by the 'Ōla'a #7 tank), 1850 (served by the 'Ōla'a #8 tank) and 1900 (served by the Mt. View #2 tank). These facilities are labeled on Figure 1.2.

1.2.2 WATER USE/DEMAND IN 'ŌLA'A-MOUNTAIN VIEW WATER SYSTEM

The 'Ōla'a -Mt. View system ranked fifth among DWS's water systems in the number of connections served at 1,984 and sixth in water production at an average of 1.1 MGD (R.W. Beck, Inc, June 2006). Nearly two-thirds of the water demand in the system occurs in Kea'au and Kurtistown below an elevation of 800 feet. The County of Hawai'i predicts, under assumptions of moderate growth, that the resident population of the Puna District will increase by 27,000 people to a total of about 58,000 by 2020, an increase of about 86% (County of Hawai'i 2005, Series B Growth Scenario). Based on this moderate growth scenario, DWS' *20-Year Water Master* Plan (R.W. Beck, Inc, June 2006) projects that demand for water in 'Ōla'a-Mt. View will increase to 1.8 MGD, somewhat less than the entire district average, by the year 2025.

1.2.3 NEED FOR ADDITIONAL SOURCE CAPACITY AND STORAGE

1.2.3.1 Need for Additional Well Source

The existing water sources in the 'Ōla'a-Mt. View system have sufficient capacity to accommodate anticipated future demand discussed in the preceding section. However, they are located substantially downgradient from the *mauka* portions of the system, and as mentioned, water must be pumped up through a series of booster stations to customers there. Adding a well source nearer to these *mauka* areas would increase reliability of service to those customers and reduce the costs associated with operating the booster pumps. Thus, the proposed production well and reservoir will help ensure that DWS continues to provide its customers in the 'Ōla'a-Mt. View system with adequate, high quality, and affordable water into the future.

1.2.3.2 Need for Additional Storage

DWS' *20-Year Water Master Plan* identifies year 2025water storage needs for each of its systems. It bases the estimates on the maximum daily demand plus additional storage to provide emergency firewater reserves. These calculations show that the 'Ōla'a-Mt. View system presently has a storage deficit of about 0.8 MG, with most of the storage shortfall occurring in pressure zones 1450, 1460 and

1750. The *Water Master Plan* forecasts that this deficit will reach almost 2.0 MG by 2025 unless storage is added to the system. The *20-Year Water Master Plan* lists replacing the existing 0.05 MG ‘Ōla‘a #6 tank with a new, 1.0 MG tank among the projects needed to meet projected water storage needs for the ‘Ōla‘a-Mt. View system.

1.3 ORGANIZATION OF THE ENVIRONMENTAL ASSESSMENT

The remainder of this EA is divided into the following parts:

- Chapter 2 describes the proposed action and the “no action” alternative. It also discusses several other alternatives that DWS considered and rejected.
- Chapter 3 describes the existing environment and the impacts that the proposed action and “no action” alternative would have on environmental, cultural, and socioeconomic resources. It also describes the measures that DWS would take to minimize and mitigate unavoidable adverse effects.
- Chapter 4 discusses the consistency of the proposed project with relevant plans, policies, and controls at local, regional, state, and federal levels.
- Chapter 5 evaluates the significance of the anticipated effects using the criterion in Hawai‘i Administrative Rules (HAR) §11-200-12.
- Chapters 6 and 7, respectively, list the references cited and the parties consulted during preparation of this EA.

2.0 PROPOSED ACTION & ALTERNATIVES CONSIDERED

2.1 DESCRIPTION OF THE PROPOSED ACTION

2.1.1 OVERVIEW

DWS proposes to convert the existing exploratory well at the 'Ōla'a #6 site into a production well and to construct a new water storage tank and related facilities. The project will also involve demolition of the small (50,000 gallon capacity) existing 'Ōla'a #6 reservoir and associated booster pumps, as well as clearing and grubbing of the site. The work will include construction and operation of:

- A 1,400 gallon per minute (GPM), 600 horsepower (HP) submersible pump and motor;
- A 1.0 million gallon (MG), reinforced concrete water storage tank;
- A 1,209 square foot control building;
- Chlorination equipment;
- A Supervisory Control and Data Acquisition (SCADA) system;
- A six-foot chain link perimeter fence; and
- A concrete access drive.

A total of approximately 1.1 acres will be disturbed due to these activities. Section 2.1.2 describes the site preparation activities. Section 2.1.3 describes the facilities as they would appear once fully developed. In addition to the work on the 'Ōla'a #6 reservoir site, DWS proposes to add SCADA equipment to 'Ōla'a Sites #3, #4, and #5 and Mountain View Site #1 to facilitate communications between the facilities and to allow them to be monitored remotely from the DWS Hilo base yard.

2.1.2 DEMOLITION AND SITE PREPARATION

Figure 2.1 depicts the existing facilities at the 'Ōla'a #6 site; it also contains the demolition plan for the areas that will be cleared, grubbed, and graded using backhoe, haul trucks, and other construction equipment. If it becomes necessary to use a jackhammer or other unusually loud construction equipment for this, the contractor will be required to obtain the appropriate approvals from the State of Hawai'i. The work will produce a limited amount of construction debris, principally steel from the existing tank and booster pump and concrete and reinforcing steel from the foundations. This will be trucked from the site and disposed of at an approved construction and demolitions waste site.

A hazardous materials inventory of the site identified lead-based paint, asbestos, and smaller amounts of materials that may contain PCB's, mercury, or oil (see Appendix C).

Because of the gentle existing slope of the site, only a limited amount of grading will be needed. Preliminary estimates are that this will amount to approximately 3,500 cubic yards, with 610 cubic yards returned as embankment. In addition, a small amount of select material (principally gravel) will need to be imported from offsite.

2.1.3 DESIGN OF THE PROPOSED FACILITIES

Figure 2.2 provides a site plan of the proposed production well and reservoir. The following subsections describe the major components of the facility. In addition to the major work that will be done on the 'Ōla'a #6 reservoir site, the following minor additions will be made to facilities elsewhere in the DWS' 'Ōla'a-Mt. View system: (1) DWS will add remotely controlled valves to the 'Ōla'a #3, #4, and #5 sites (see Figure 2.3, Figure 2.4, and Figure 2.5 respectively) and (2) it will install a SCADA equipment cabinet at the Mountain View #1 site (Figure 2.6).

2.1.3.1 Well Pump & Equipment

The existing ‘Ōla‘a #6 Exploratory Well is drilled to a depth of about 73 feet below mean sea level (-73 MSL), or about 1,450 feet below ground level. The upper 1,350 feet of the drilled hole is cased in solid steel; the remainder has a perforated casing. Table 2.1 presents the as-built dimensions of the existing exploratory well at the site.

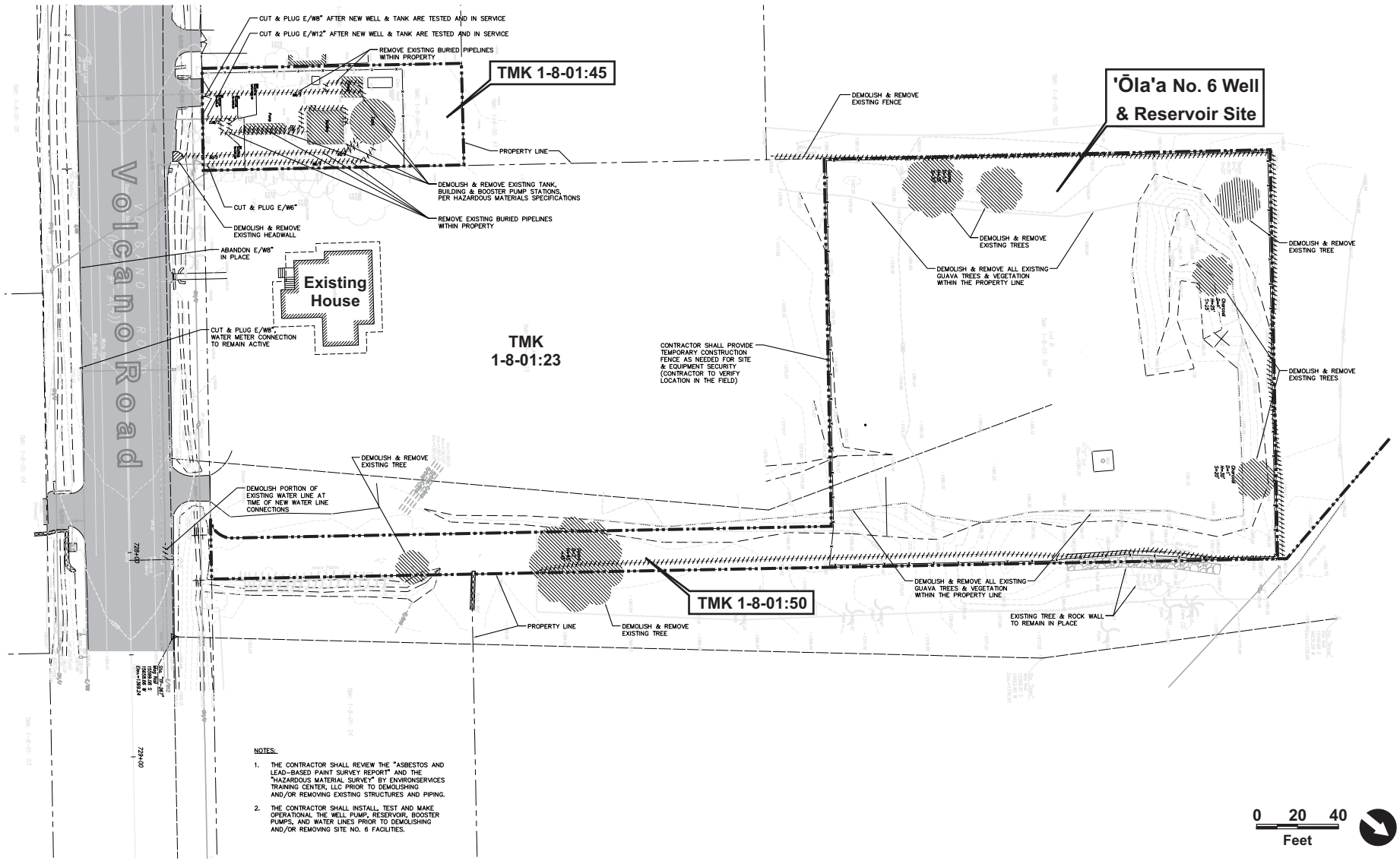
Table 2.1 As-Built Dimensions of ‘Ōla‘a #6 Exploratory Well

Description	*Dimension*
Basic Well Parameters	
Casing Diameter (inches)	20
Ground Elevation (feet MSL)	1,380
Total Well Depth (feet)	1,457
Elevation at Bottom (feet MSL)	-73
Solid Casing	
Length Below Ground (feet)	1,353
Elevation at Bottom (feet MSL)	27
Perforated Casing	
Length (feet)	100
Elevation at Bottom (feet MSL)	-73
Open Hole	
Diameter (inches)	n/a
Length (feet)	n/a
Static Water Level	
Depth Below Ground (feet)	1,260
Elevation (feet MSL)	121
Source: Tom Nance Water Resource Engineering	

Plans for outfitting the well for production call for the use of a submersible deep well vertical turbine pump rated at not more than 1,400 gallons per minute (GPM). The pump will be powered by a 600 HP electric motor; the motor will be controlled by a sensor measuring the water level in the new reservoir. Figure 2.7 contains a plan view and cross sections of the proposed well pump, and Figure 2.8 includes sections of the outfitted well shaft.

2.1.3.2 Control Building

The proposed design includes a single-story, naturally ventilated, approximately 1,200 square-foot concrete block control building (Figure 2.9). That structure will house the motor control center, electrical control panel, SCADA remote system, alarm system, and chlorination system. A concrete walkway will be installed along one side of the building.



Prepared For:

Department of Water Supply
County of Hawai`i

Prepared By:

PLANNING SOLUTIONS

Source:

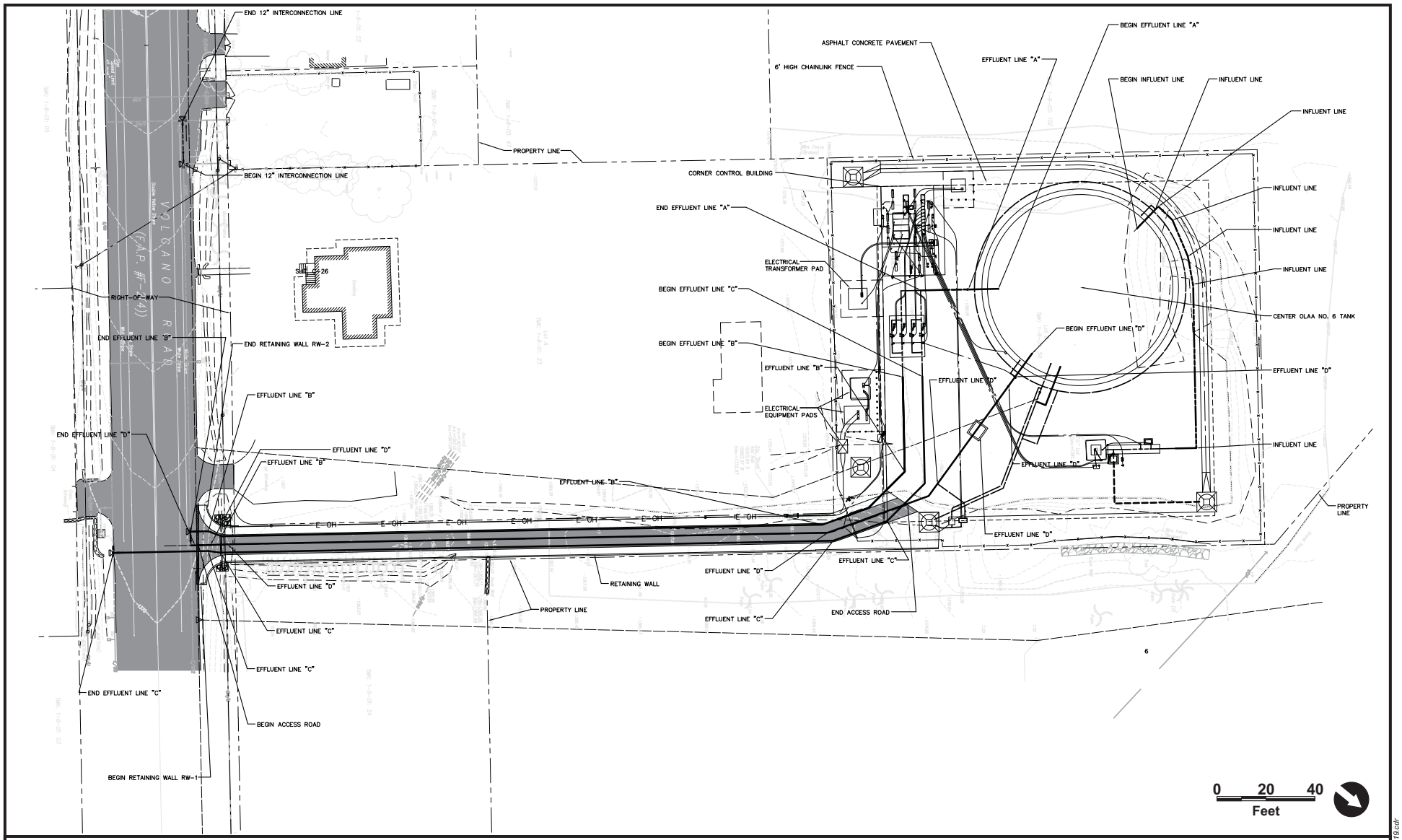
TNWRE
Job No. 2006-899, Sheet C-7

Figure 2.1:

Demolition Plan

'Ôla'a No. 6 Production
Well & Reservoir

Figure 2-1 Demo Plan 2009-02-10.cdr



Prepared For:
Department of Water Supply
County of Hawai`i

Prepared By:
PLANNING SOLUTIONS

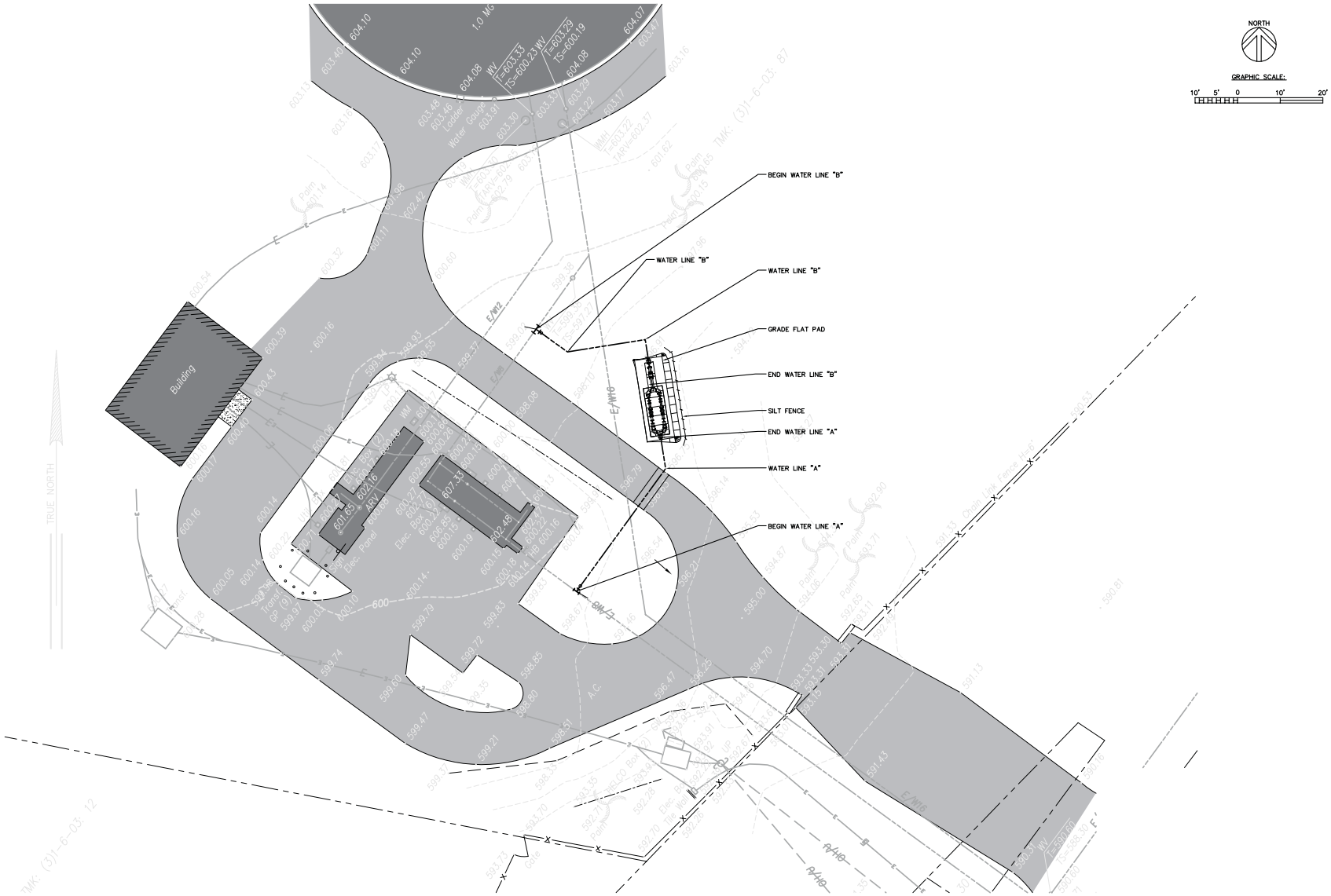
Source:
TNWRE
Job No. 2006-899, Sheet C-4

Figure 2.2:

Site Plan of Proposed Well & Reservoir

'Ôla'a No. 6 Production Well & Reservoir

Figure 2-2 Site Plan of Proposed Well & Reservoir 2009-02-19.cdr



Prepared For:
Department of Water Supply,
County of Hawai`i

Prepared By:
PLANNING SOLUTIONS

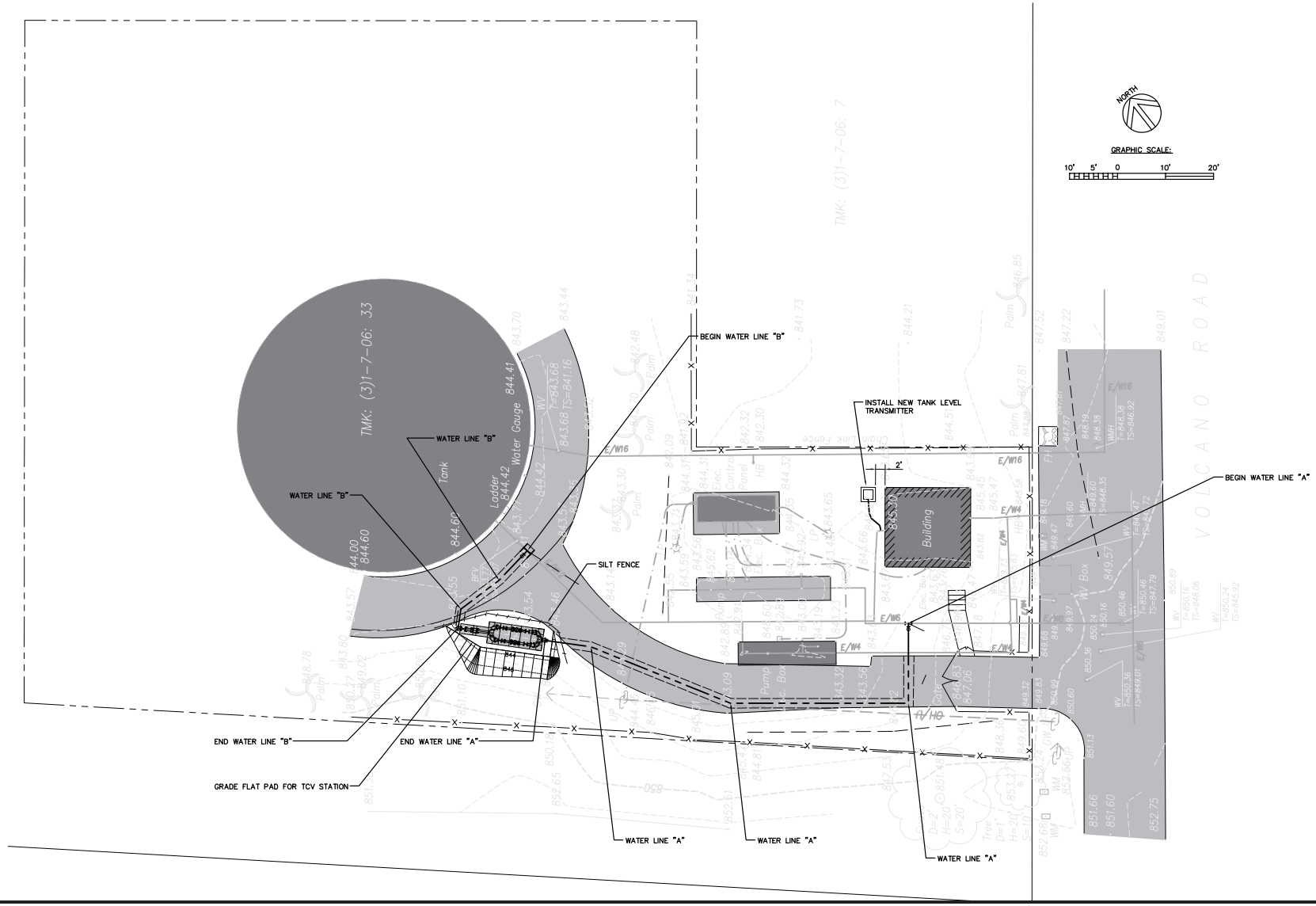
Source:
TNWRE
Job No. 2006-899, Sheet C-33

Figure 2.3:

Site Plan of Proposed Control Valve at 'Ōla'a Tank #3 Site

'Ôla'a No. 6 Production Well & Reservoir

Figure 2-3 Site Plan of Proposed New Control Valve at Ola`a Tank #3 2009-02-12.cdr



Prepared For:

Department of Water Supply, County of Hawai`i

Prepared By:

PLANNING SOLUTIONS

Source:

TNWRE

Job No. 2006-899, Sheet C-34

Figure 2.4:

Site Plan of Proposed Control Valve at 'Ōla'a Tank #4 Site

'Ôla'a No. 6 Production Well & Reservoir

Figure 2-4 Site Plan of Proposed Control Valve at Ola'a Tank #4 Site 2009-02-12.cdr

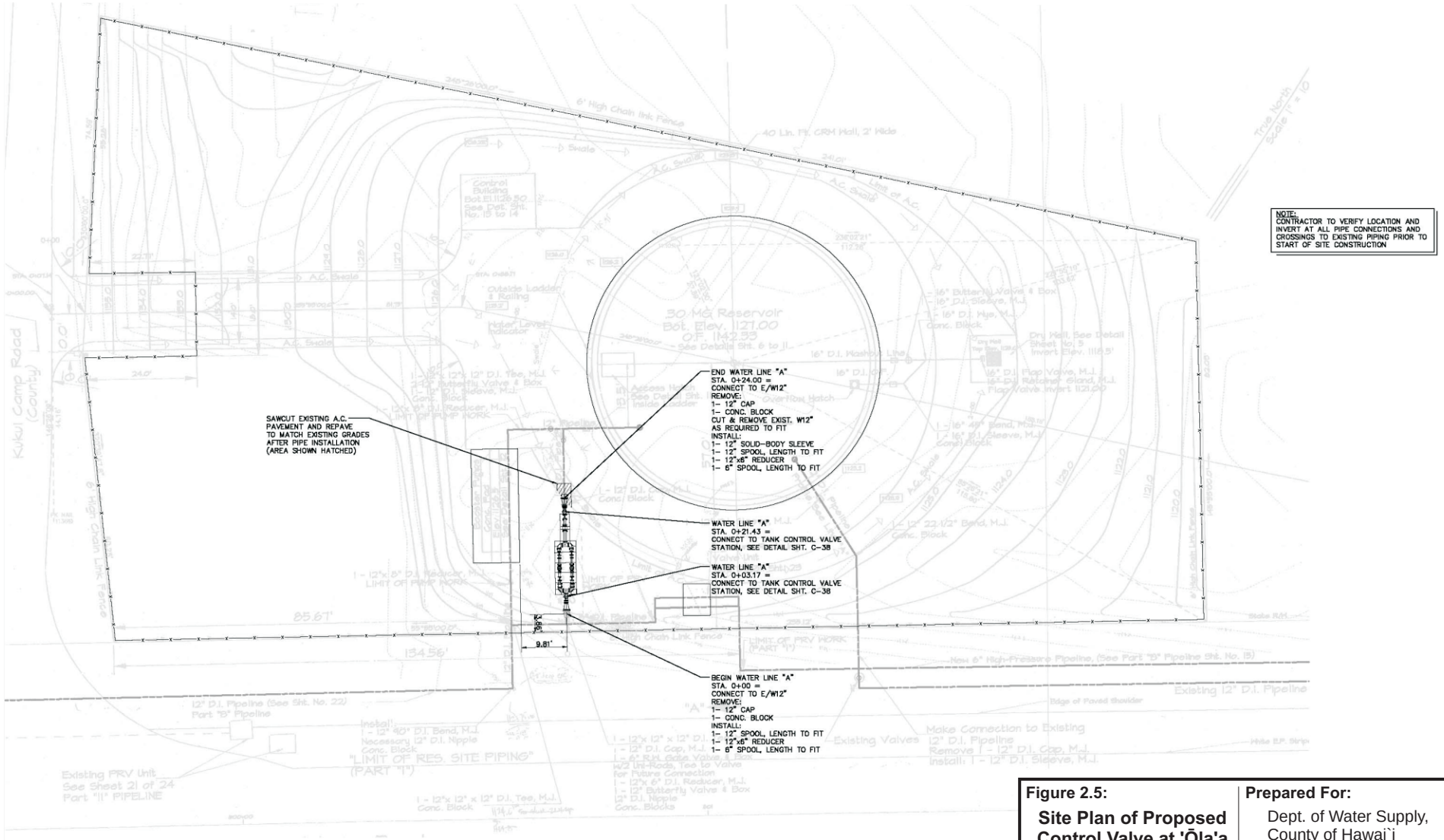


Figure 2.5:

Site Plan of Proposed Control Valve at 'Ōla'a Tank #5 Site

Prepared For:

Dept. of Water Supply, County of Hawai`i

Prepared By:

PLANNING SOLUTIONS

Source:

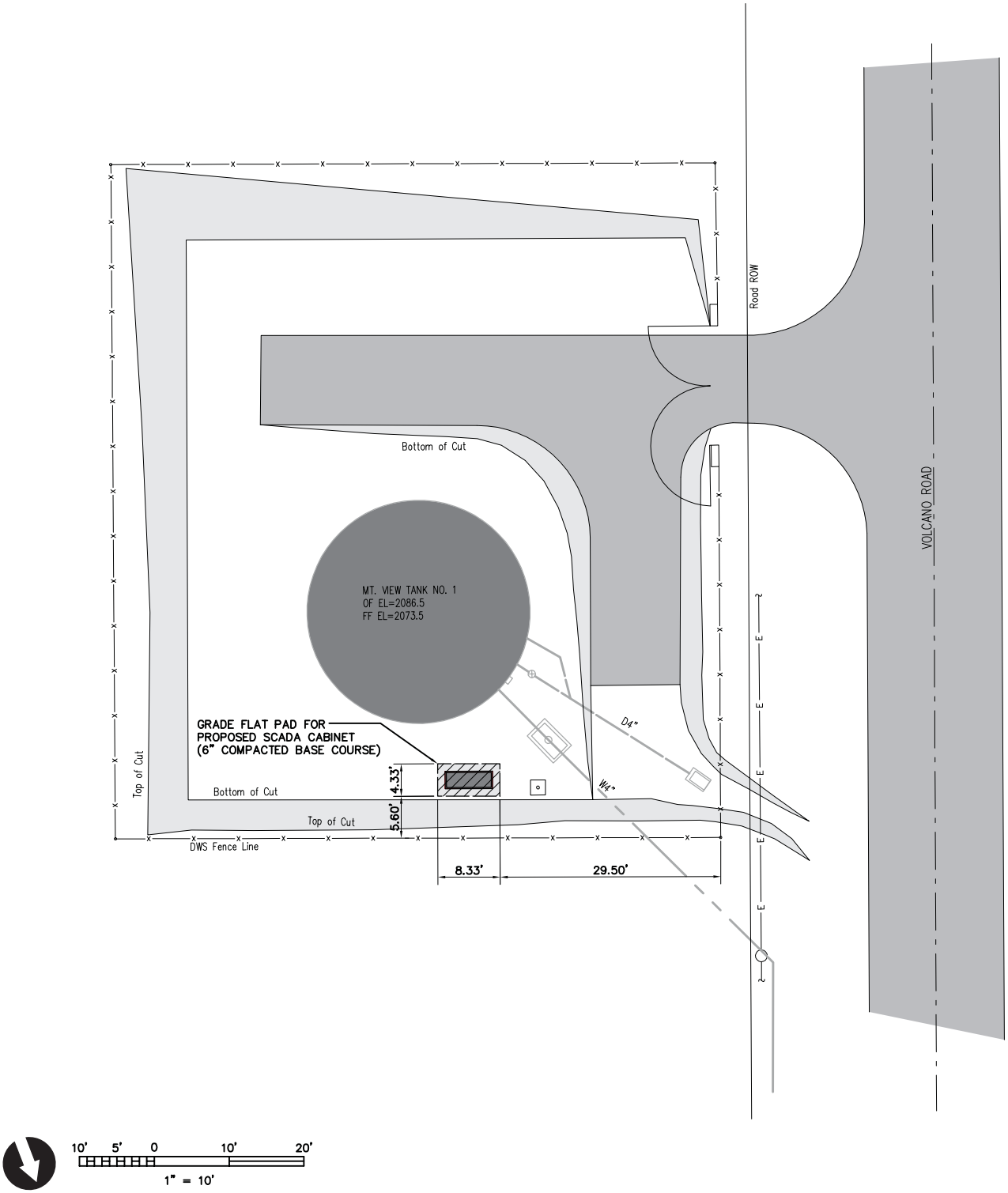
TNWRE

Job No. 2006-899, Sheet C-35

Project:

'Ôla'a #6 Production Well & Reservoir

Figure 2-5 Site Plan of Proposed Control Valve at Ola`a Tank #5 Site 2009-03-24.cdr



Prepared For:

Department of Water Supply,
County of Hawai`i

Prepared By:

PLANNING SOLUTIONS

Sources:

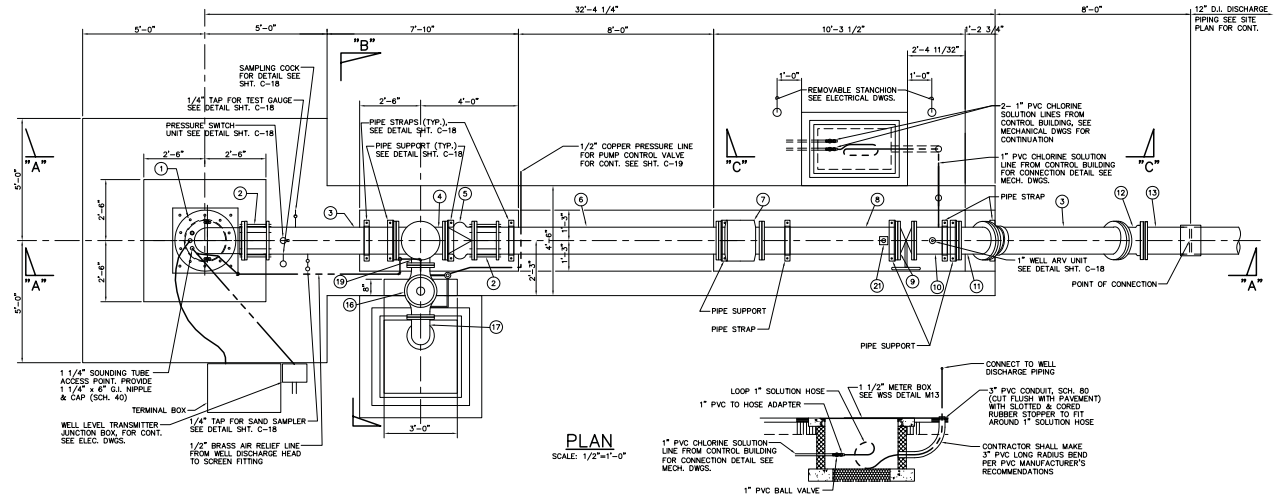
TNWRE
Job No. 2006-899, Sheet C-36

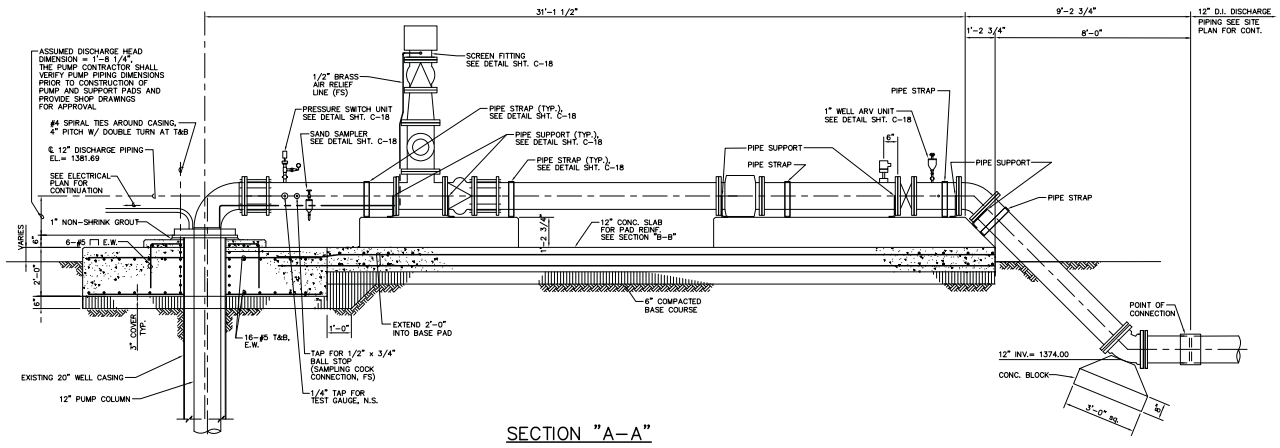
Figure 2.6:

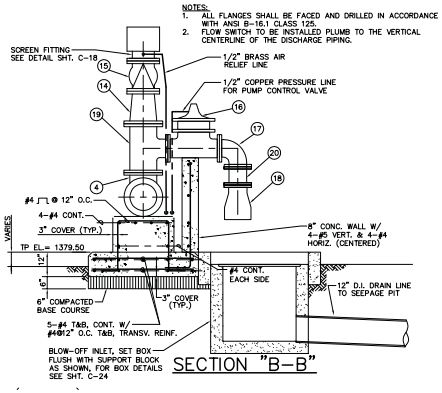
Site Plan of Proposed SCADA Cabinet at Mountain View Tank #1 Site

'Ôla'a No. 6 Production Well & Reservoir

Figure 2-6 Site Plan of Proposed SCADA Cabinet at Mountain View Tank #1 Site 2009-02-12.cdr







1. 12" SUBMERSIBLE WELL DISCHARGE HEAD W/ LIFTING BRACKETS
2. 12" FLANGED COUPLING ADAPTER
3. 12" D.I. PIPE, PExFE, LENGTH TO FIT
4. 12" D.I. TEE, FE
5. 12" CENTER-GUIDED CHECK VALVE, APCO MODEL NO. 612, FE, CL. 125
6. 12" D.I. PIPE, PExFE, 10'-0" LONG
7. 12" ELECTROMAGNETIC FLOW METER, FE, SEE SPECIFICATIONS
8. 12" D.I. PIPE, FE, 5'-0" LONG
9. 12" BUTTERFLY VALVE, FE, W/ HANDWHEEL (INSTALL SIDEWAYS)
10. 12" D.I. PIPE, FE, LENGTH TO FIT
11. 12" 1/8 D.I. BEND, FE
12. 12" 1/8 D.I. BEND, MJ W/ MEGA-LUG RETAINER GLANDS
13. 12" D.I. SPOOL, LENGTH TO FIT
14. 12"x10" D.I. REDUCER, FE
15. 10" PUMP VACUUM RELEASE CHECK VALVE, FE, CL. 125
16. 8" PUMP CONTROL VALVE, CLA-VAL MODEL NO. 61-02, FE, CL. 125 (FOR PIPING DETAIL SEE SHT. C-19)
17. 8" 1/4 D.I. BEND, FE
18. 8" TIDEFLEX CHECK VALVE, FE, SERIES 35
19. 12"x8" D.I. TEE, FE
20. 8" D.I. SPOOL. 8" LONG, FE
21. 1 1/2" FLOW SWITCH

Figure 2.7:
Well Pump Plan & Section Views

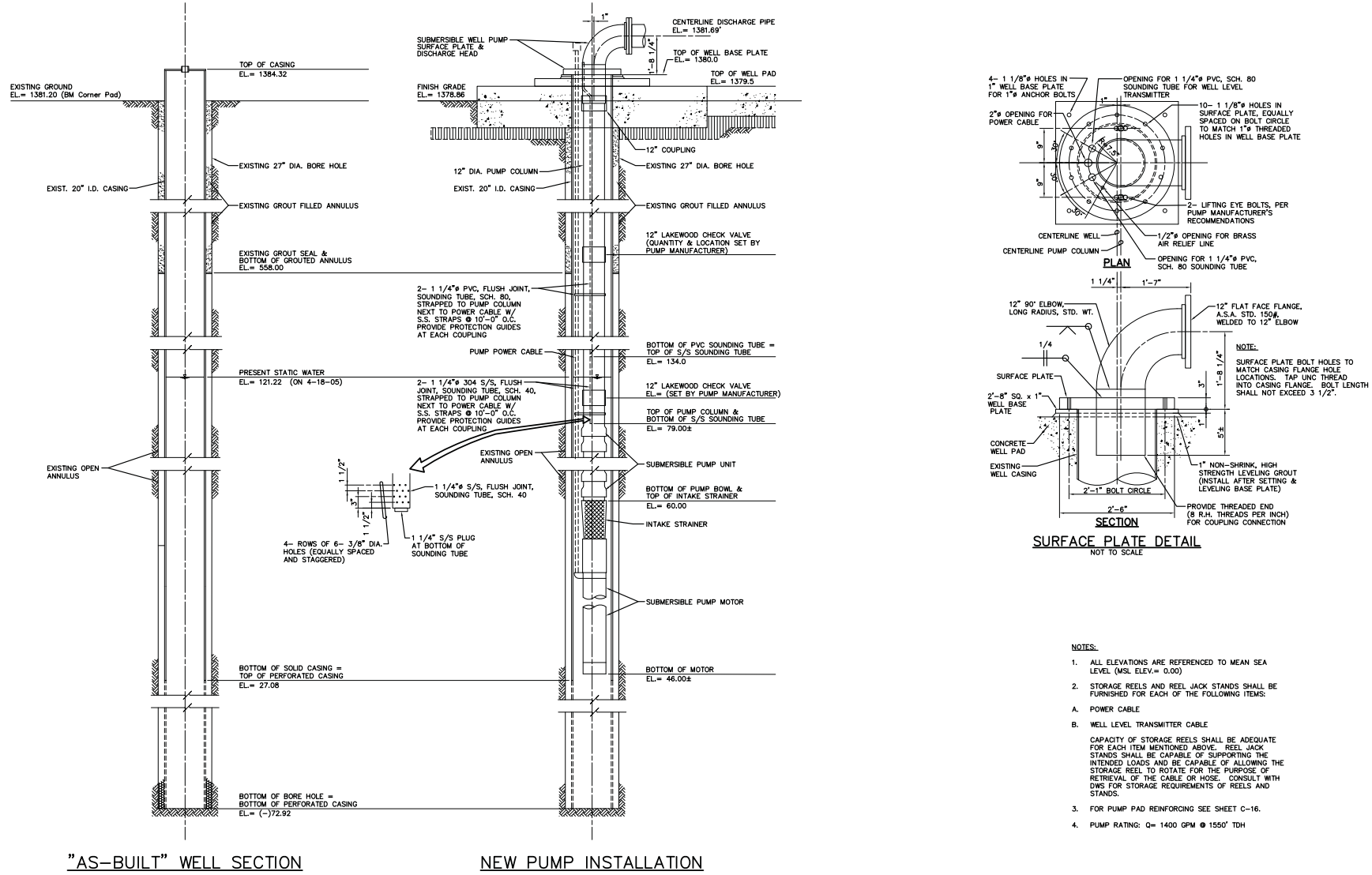
Prepared For:
Dept. of Water Supply, County of Hawai`i

Prepared By:
PLANNING SOLUTIONS

Source:
TNWRE
Job No. 2006-899, Sheet C-4

Project:
'Ôla'a No. 6 Production Well & Reservoir

Figure 2-7 Well Pump Plan & Sections 2009-02-12.cdr



NOTES:

1. ALL ELEVATIONS ARE REFERENCED TO MEAN SEA LEVEL (MSL ELEV.= 0.00)
2. STORAGE REELS AND REEL JACK STANDS SHALL BE FURNISHED FOR EACH OF THE FOLLOWING ITEMS:

A. POWER CABLE

B. WELL LEVEL TRANSMITTER CABLE

CAPACITY OF STORAGE REELS SHALL BE ADEQUATE FOR EACH ITEM MENTIONED ABOVE. REEL JACK STANDS SHALL BE CAPABLE OF SUPPORTING THE INTENDED LOADS AND BE CAPABLE OF ALLOWING THE STORAGE REEL TO ROTATE FOR THE PURPOSE OF RETRIEVAL OF THE CABLE OR HOSE. CONSULT WITH DWS FOR STORAGE REQUIREMENTS OF REELS AND STANDS.

3. FOR PUMP PAD REINFORCING SEE SHEET C-16.
4. PUMP RATING: Q= 1400 GPM @ 1550' TDH

Prepared For:

Department of Water Supply,
County of Hawai`i

Prepared By:

PLANNING SOLUTIONS

Source:

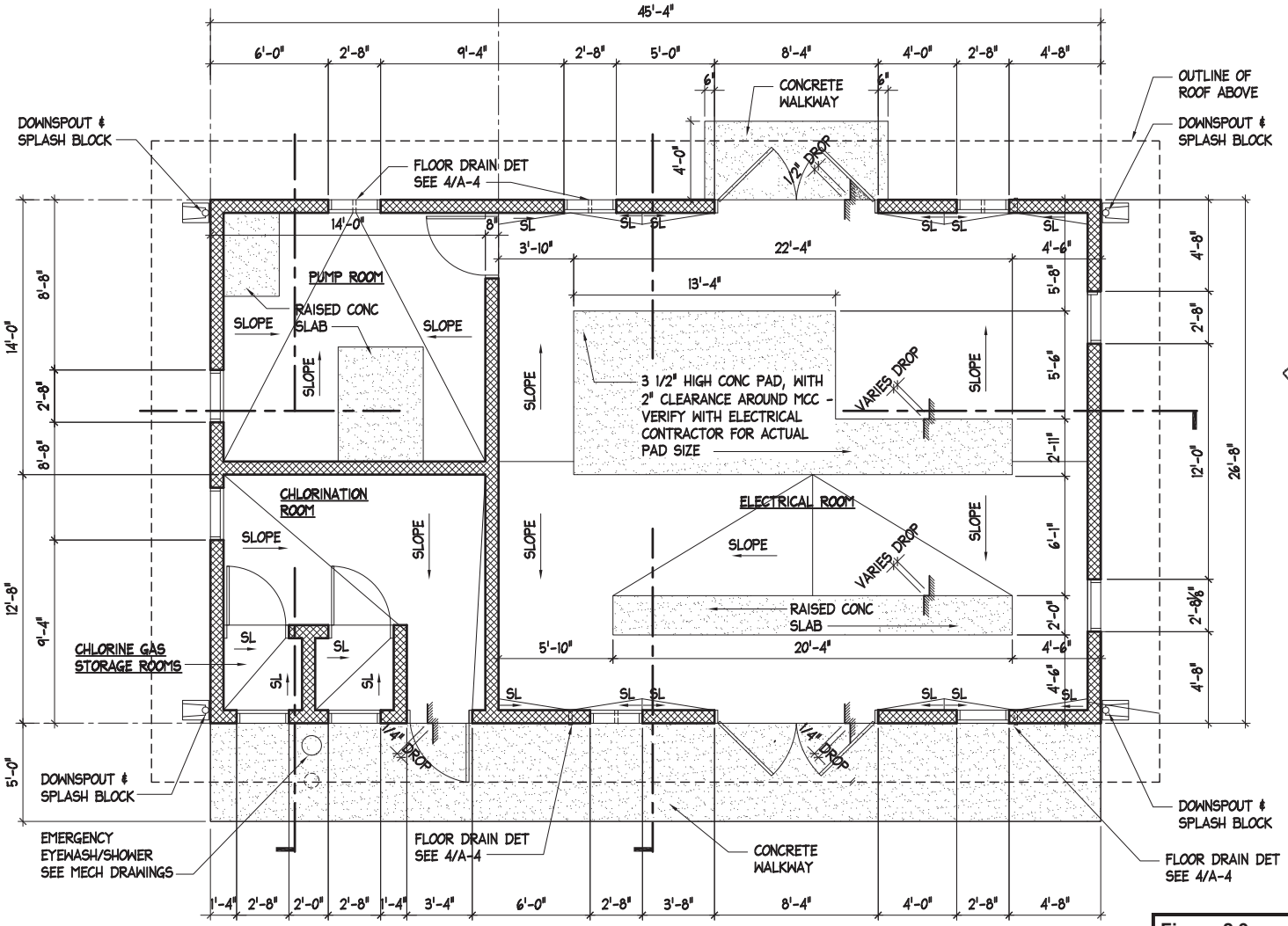
TNWRE
Job No. 2006-899, Sheet C-17

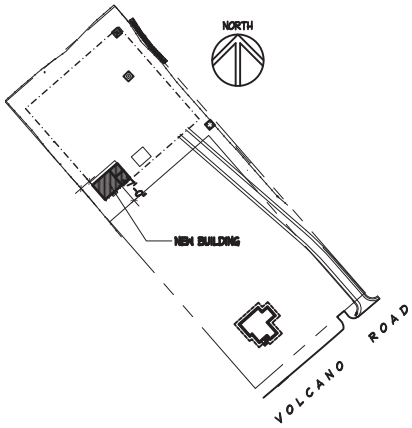
Figure 2.8:

Well Shaft Sections

'Ôla'a No. 6 Production Well & Reservoir

Figure 2-8 Well Shaft Sections 2009-02-13.cdr





NOTE:

1. SLOPE DENOTES SLOPE ON CONCRETE FLOOR TO SCUPPERS. SLOPE FLOOR 1/8" PER FOOT. ALL SLOPES, INCLUDING CROSS SLOPES SHALL NOT EXCEED 2%.
2. ALTERNATE FLOOR SLOPING SCHEMES MAY BE SUBMITTED TO THE ENGINEER FOR REVIEW.

Figure 2.9:
Control Building Plan View

Prepared For:
Dept. of Water Supply, County of Hawai`i

Prepared By:
PLANNING SOLUTIONS

Source:
TNWRE
Job No. 2006-899, Sheet A-1

Project:
'Ôla'a No. 6 Production Well & Reservoir

Figure 2-9 Control Building Plan Views 2009-02-13.cdr

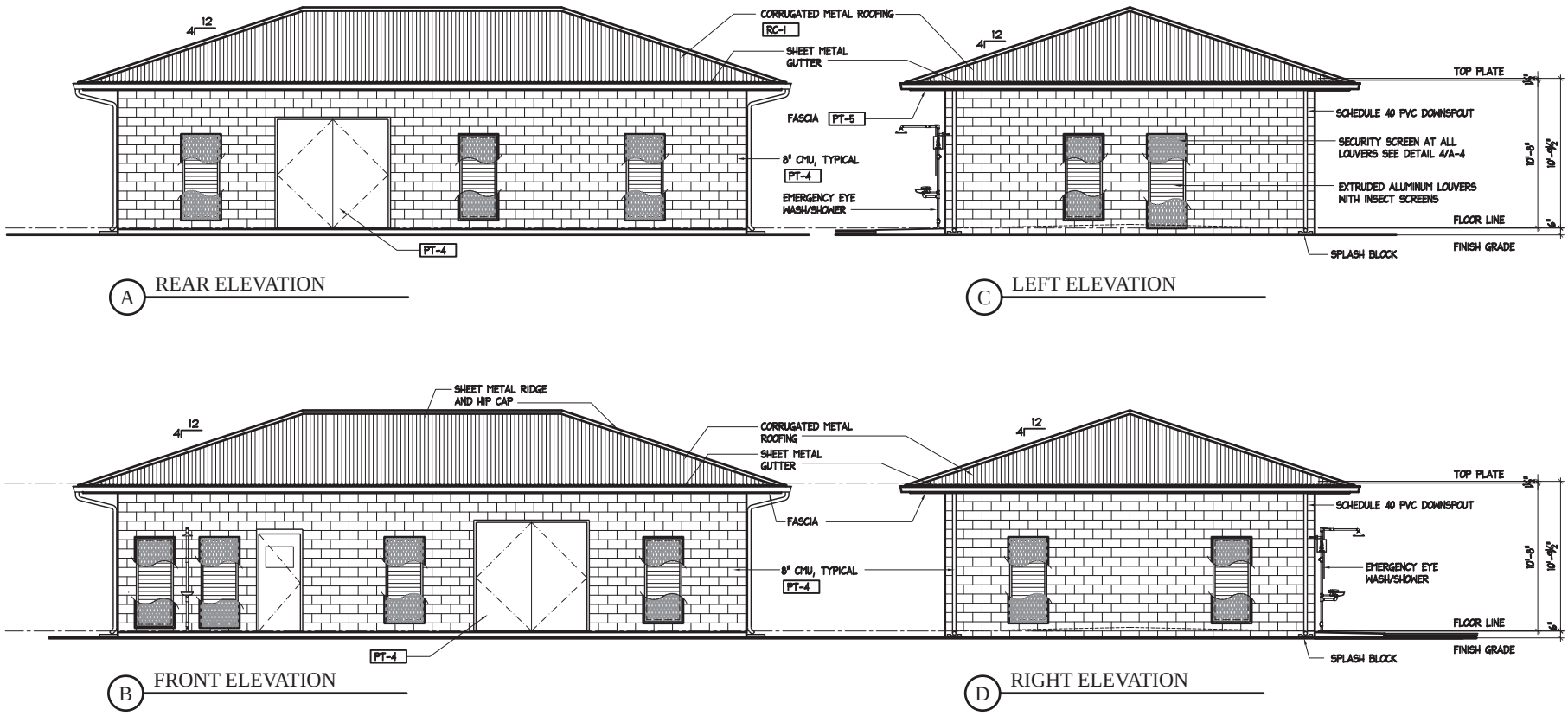


Figure 2.10:
Control Building Elevation View

Prepared For:
Dept. of Water Supply, County of Hawai`i

Prepared By:
PLANNING SOLUTIONS

Source:
TNWRE
Job No. 2006-899, Sheet A-2

Project:
'Ôla'a No. 6 Production Well & Reservoir

Figure 2-10 Control Building Elevation View 2009-02-13.cdr

2.1.3.3 1.0 MG Reservoir

The proposed design calls for a standard DWS reinforced concrete tank with a capacity of 1.0 million gallons. The tank will have a 90-foot diameter and 36-foot height. It will be designed to Seismic Zone 4 standards (see Section 3.8.1.2 for discussion), the highest in the building code.

2.1.3.4 SCADA System

DWS will install a Supervisory Control and Data Acquisition (SCADA) system in the control building to monitor and control system operations. The only exterior component will be a small communications antenna approximately two feet tall mounted to the top of the reservoir. As noted in the introduction to this section, the proposed project also includes installation of an associated SCADA control cabinet (dimensions 8.33' X 4.33') at the existing Mountain View Tank #1 Site. The new SCADA system will provide communications between the 'Ōla'a #6 site and the DWS control center in Hilo. It will also allow the DWS to operate the new control valves that will be installed at the 'Ōla'a Well #3 site and the 'Ōla'a #4 and #5 Tank sites (see Figures 2.3 through 2.5).

2.1.3.5 Seepage pits

DWS will construct an 8-foot internal diameter seepage pit on the proposed 'Ōla'a #6 well site to accommodate overflow from the tank in the unlikely event that it occurs. It will also collect small amounts of stormwater from portions of the facility. After the well begins operation, it will discharge approximately 7,000 gallons of water into the seepage pit each time the pump starts; this discharge prevents particulate matter entrained during each well start-up from entering the water system. This arrangement helps assure that only high quality water reaches the Department of Water Supply's customers. As shown in Figure 2.2, DWS will construct three additional seepage pits on the site to receive the storm runoff from the paved surfaces, as directed by swales and other permanent run-off control structures.

2.1.3.6 Electricity and Communications

Electrical Power. Electrical power will be utilized for lighting and general power in the control building and for the proposed well pump motor. Utility metering will conform to HELCO's standards and design requirements. HELCO will need to upgrade its substation, and replace some poles and wires to accommodate the new pump. The approximate cost for these improvements (included in the overall project cost estimate presented in Table 2.3) will be $2.2 million. The allocation of these costs between DWS and HELCO has not yet been established.

Communications. DWS plans to use radio and licensed DWS FCC frequencies for the SCADA telemetry communications. It will also provide a telephone link in the control building by installing wires between the control building and the existing Hawaiian Telcom line along Volcano Road. The telephone link will provide direct backup communications for the pump station alarm system.

2.1.3.7 Site Access & Security

Access to the site is via a driveway that connects with Volcano Road. The proposed facility includes a six-foot chain-link perimeter fence around the site and a gate at the entrance. DWS will keep the entrance gate locked and install "no trespassing" signage.

2.1.4 WATER TESTING

Water from the existing exploratory well at the site was tested in 2005 and found to meet all applicable standards for potable water (see Appendix B). DWS will incorporate this information into the engineering report that it will submit to the State Department of Health Safe Drinking Water Branch (SDWB). The engineering report will address all the requirements set forth in Hawai'i Administrative Rules §11-20-29. Before placing the well into service, DWS will obtain approval from the SDWB as required by these regulations.

2.1.5 CONSTRUCTION SCHEDULE

As indicated in Table 2.2, the DWS expects that preparing the site, outfitting the well, and constructing the associated control facilities will take approximately a year. During that period, the contractor will demolish the existing tank and booster pumps, finish-grade the site, install the well pump and controls, construct the access roads and underground piping and utilities, set up the SCADA system, and erect the reservoir and control building. The contractor will also install fencing, landscaping, and other minor site improvements during this period.

Table 2.2 Preliminary Project Schedule

Task	*Approximate Duration (days)*	*Estimated Completion Date*
Final Design	180	Feb. 28, 2009
Chapter 343 Environmental Review	180	May 30, 2009
Design Review	120	June 30, 2009
Bid Solicitation	30	July 31, 2009
Bid Evaluation, Contracting, Notice-to-Proceed	30	August 31, 2009
Construction Period	365	August 31, 2010
Source: Tom Nance Water Resource Engineering		

2.1.6 PROJECT COSTS

The project may be partially or wholly funded by Federal funds through the State of Hawaiʻi's Drinking Water State Revolving Fund (DWSRF) program, which would constitute a Federal action and will require the project to meet all of the Hawaiʻi DWSRF program requirements (see Section 4.1.4 for further discussion). Table 2.3 presents the estimated costs of the project.

Table 2.3 Preliminary Project Costs (in 2008 dollars)

Item	*Estimated Cost ($)*
Site Preparation	350,000
Production Well Outfitting	750,000
Reservoir and Control Building	2,500,000
Access Road	200,000
Connection to existing water lines and valves	100,000
Mechanical Systems (Pumps & chlorination)	300,000
Electrical & Comm.Systems (electrical, phone, controls)	4,200,000
Control Valve Stations at ʻŌlaʻa Sites #3, #4, and #5	380,000
Subtotal	8,780,000
Contingency (20%)	**1,756,000**
Total	**$10,536,000**
Source: Tom Nance Water Resource Engineering	

2.2 ALTERNATIVES

2.2.1 FRAMEWORK FOR CONSIDERATION OF ALTERNATIVES

Title 11, Chapter 200 of the Hawai'i Administrative Rules (HAR §11-200) contains the Department of administrative rules governing the preparation and processing of environmental assessments and environmental impact statements, and related documents. HAR §11-200-5 deals with "agency actions" such as the one that DWS is proposing. It requires that, for all agency actions that are not exempt as defined in HAR §11-200-8, the agency consider environmental factors and available alternatives and disclose these in an environmental assessment or environmental impact statement. HAR §11-200-9 requires the proposing agency to analyze alternatives, in addition to the proposed action in the environmental assessment. HAR §11-200-10 establishes the required contents of environmental assessments. Among the requirements listed, HAR §11-200-10 (6) calls for an identification and summary of impacts <u>and alternatives considered</u> (emphasis added).

In accordance with these requirements, DWS considered a number of alternatives before determining that the proposed project is the best course of action. These included "No Action", enhanced water conservation, development of new surface or well sources at other locations, and delayed action. DWS concluded that only two of these alternatives, merit consideration in the impact analysis portion of this EA. They are "No Action" (as required by Chapter 343), and the proposed action of constructing the production well and reservoir as currently designed. The following two subsections describe the alternatives considered in preparation of this EA and the criteria DWS used to decide whether to include them in the impact analysis presented in Section 3.

2.2.2 ALTERNATIVES ADDRESSED IN DETAIL IN THE EA

2.2.2.1 <u>Proposed Action: 'Ōla'a #6 Production Well & 1.0 MG Reservoir</u>

This alternative consists of the proposed action as described in detail in Section 2.1 above. DWS believes constructing these facilities at the proposed site on its present timeline would best enable it to continue to provide adequate, reliable, and affordable drinking water to its customers in Ōla'a-Mt. View, and thus it represents their preferred course of action.

2.2.2.2 <u>No Action Alternative</u>

The "No Action" Alternative consists of continued reliance on the existing water sources and storage facilities serving the 'Ōla'a-Mt. View system. The "No Action" Alternative would not address the storage deficiency for the 'Ōla'a-Mt. View system, leaving the system increasingly vulnerable in the event of an emergency. Further, it would not take advantage of the efficiency and cost benefits that a well source close to customers in *mauka* areas would provide. Finally, continuing to operate the system without the communications and control efficiencies that are possible with modern SCADA systems will increase the operating cost and reduce the reliability of the system. Thus, DWS believes that "No Action" is not a viable alternative. It is included in this EA to fulfill the legal requirements of NEPA, Chapter 343 Hawai'i Revised Statutes, and HAR §11-200. It also provides a baseline against which to measure the environmental and social impacts of the proposed action.

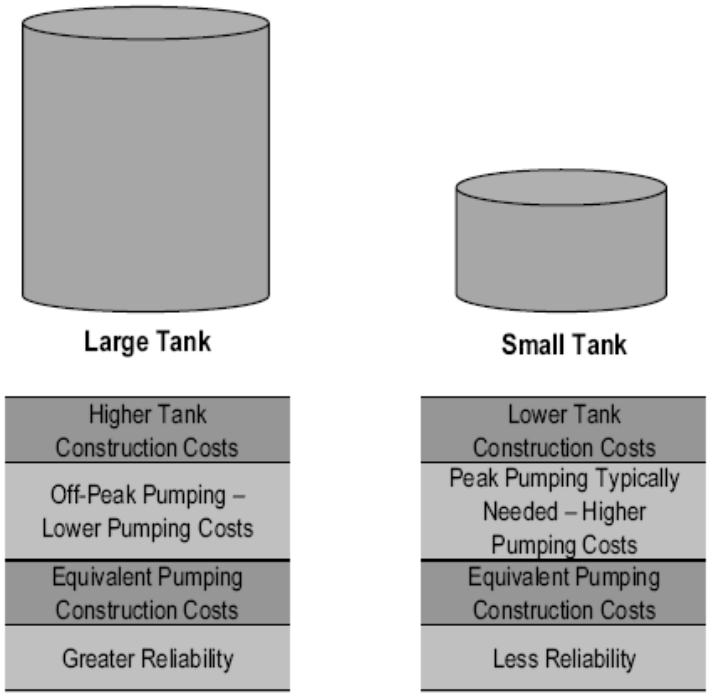
2.2.3 ALTERNATIVES ELIMINATED FROM DETAILED ANALYSIS

2.2.3.1 <u>Smaller Reservoir</u>

This alternative would entail installing a smaller reservoir (i.e., larger than the existing 0.05 MG tank but less than the 1.0 MG that is proposed) along with the proposed production well. Currently, much of DWS' system relies on smaller reservoirs served by pump stations that often must pump for more than 16 hours per day to fill the reservoirs. This strategy reduces the construction cost of the reservoirs but has the following drawbacks:

- It leaves many DWS water systems with storage deficits and unable to meet DWS’ storage criteria for operating and emergency firewater reserves.
- It forces DWS to incur higher pumping costs because it needs to operate well pumps during the hours of 7 AM to 9 PM, when electricity is priced at peak rates, rather than at off-peak periods.

Constructing larger reservoirs such as the one proposed potentially allows DWS to refill reservoirs only at night, thereby taking advantage of lower off-peak electricity prices. DWS’ 2006 *20-Year Water Master Plan* includes a cost-benefit analysis of larger versus smaller reservoirs. The results indicate that the higher capital costs of putting in a larger reservoir are offset in the long term by decreased pumping costs. Moreover, larger reservoirs have the added benefit of providing additional reliability to the system (see inset below). Consequently, DWS believes that the proposed 1.0 MG reservoir is the most economically viable alternative.



Source: DWS *20-Year Water Master Plan* (2006).

2.2.3.2 Different Size Well Pump

As discussed in Section 2.1.3.1, the proposed well will be outfitted with a 1,400 gpm pump. DWS selected this pump size based on the results of the pump tests conducted on the existing exploratory well. According to the pump test report, 1,400 gpm is a sustainable well yield from the perspective of the individual well and the aquifer system. It is in the interest of DWS and its customers to keep water supply costs at a reasonable level by maximizing the sustainable output of each source. Consequently, DWS believes that, in the absence of compelling environmental or economic reasons, a smaller well pump is not a desirable option.

2.2.3.3 Other Source-Development Alternatives

Because of the substantial groundwater flux through the region, it is likely that wells drilled in other locations at similar high elevations could also be productive. While DWS could probably develop a production well elsewhere in the Puna District, the proposed ‘Ōla‘a #6 Production Well and Reservoir

project has several characteristics that make it unlikely that a different location would be superior from an economic, environmental, or operational viewpoint. These include:

- The proposed location is an existing DWS facility that has a proven exploratory well in place. Other possible well locations would require the acquisition of property and exploration of a new well in addition to the development of the production and storage facilities that are part of the proposed action. The duplication of these existing assets would unnecessarily increase the project cost and would add the risk of drilling an unsuccessful exploratory well.
- The proposed well’s strategic location near the center and top of the ‘Ōla‘a-Mt. View water system would provide additional flexibility and reliability to the water distribution system. It would also reduce pumping costs by reducing the system’s dependency on booster pumps.
- The proposed site’s close proximity to the existing water transmission and distribution system avoids the need for significant new waterline construction. The majority of other locations are not as well situated in this regard.

A detailed analysis of potential environmental impacts from development of alternative water sources was beyond the scope of this assessment. However, in view of the absence of adverse effects documented above and in Chapter 3, it seems unlikely that other well locations might be better from an environmental standpoint.

2.2.3.4 Delayed Action

For reasons documented above and in the Department’s *20-Year Water Master Plan* and because of the long lead-time necessary to develop a production well (see Table 2.2), it is undesirable to delay development of the proposed well and reservoir. There are no existing activities or conditions at the site or in the project area that would make delaying the project desirable or that would allow delay to reduce the impacts associated with it appreciably. DWS wants to act quickly to minimize construction-related impacts and ensure that it maintains reliable and efficient service to its customers in the ‘Ōla‘a-Mt. View water system. Therefore, it does not consider delayed action a viable alternative.

THIS PAGE INTENTIONALLY LEFT BLANK

3.0 EXISTING ENVIRONMENT & PROBABLE IMPACTS

3.1 GEOLOGY

3.1.1 EXISTING CONDITIONS

The 'Ōla'a #6 Production Well and Reservoir site is situated at an elevation of about 1,400 feet above mean sea level (MSL) on the eastern flank of Mauna Loa. Mauna Loa is a geologically young and physically massive volcano; at about 10,000 cubic miles, it is probably the largest volcanic mountain on earth. The oldest Mauna Loa lava dated so far was formed between 100,000 and 200,000 years ago. However, scientists estimate that the earliest sub-aerial eruptions (i.e., eruptions that occurred once the volcano emerged out of the ocean) occurred about 400,000 years ago and the first eruptions from the seafloor vent that started the mountain occurred 700,000 to 1,000,000 years ago. Forty percent of Mauna Loa's surface is covered by lava flows less than 1,000 years old. Mauna Loa has continued to erupt frequently during the 19th and first half of the 20th century, however it is thought to have reached nearly its present size by the end of the Ice Age. Since about 1950, volcanic activity has tapered off at Mauna Loa, mostly shifting to the nearby yet independent Kīlauea volcano. No commercially useful minerals are known to be present (McDonald, Abbott, and Peterson 1983).

3.1.2 PROBABLE IMPACTS

The project site does not contain any significant geological features or landmarks. The extent to which the proposed facilities will be exposed to geologically related hazards (e.g., eruptions, earthquakes, etc.) is discussed in Section 3.8. No significant geological resources (such as sand, gravel, or special minerals)) are present.

3.2 TOPOGRAPHY AND SOILS

3.2.1 EXISTING CONDITIONS

In general, the topography of the project area reflects the relative youth of Mauna Loa. There are no well-defined stream valleys; lava channels and spatter ramparts serve as water courses during periods of heavy rainfall. The project site itself is nearly flat, with an average slope of 0-2% from *mauka* to *makai*. The soil at the proposed well site is classified as 'Ō'hia extremely stony silty clay loam, 0 to 20 percent slopes (Foote et al., 1972). This soil type overlies fragmented a'a lava at depths of about 20-36 inches; stones cover from 3-15 percent of the ground surface. Runoff is slow to medium, and the erosion hazard is slight to moderate. This soil type is used mostly for sugarcane, woodland, and pasture. The site and adjacent properties are <u>not</u> designated as Agricultural Lands of Special Interest to the State of Hawai'i.

3.2.2 PROBABLE IMPACTS

'Ōla'a #6 Site. Construction of the proposed facility will require clearing, grubbing, and grading over an area of 1.1 acres to accommodate the proposed well, access road, reservoir, and associated equipment. The contractor will re-vegetate the portions of the site not used for structures or pavement. These localized modifications will not substantially change the overall topography of the surrounding area. Because the soil type at the project site has limited agricultural applications and the site has not been used for agriculture in recent years, the project will not affect agricultural activities. Neither will it interfere with existing or future agricultural use of the surrounding areas.

Mountain View Tank #1 SCADA. The construction of an associated SCADA control cabinet at this existing site will require just a few days work and will not require significant grading or other work with the potential to affect topography or soils.

ʻŌlaʻa Well #3 Site and the ʻŌlaʻa #4 and #5 Tank Sites. The installation of new control valves at these existing sites will require just a few days work and will not affect topography or soils.

3.3 HYDROLOGY

3.3.1 EXISTING CONDITIONS

3.3.1.1 Surface Water

As mentioned above, the youthful geology and well-drained soils of southeast Mauna Loa means that well-defined streams and waterways have not formed in the area. Likewise, there are no wetlands or other special aquatic sites present. Due to the high permeability of the lava flows and associated soils, runoff only occurs as sheet flow during the most severe storms. Any excess runoff that does not immediately percolate into the soil will flow from the site into the roadside swale.

3.3.1.2 Groundwater

The ʻŌlaʻa #6 well site is situated in the Keaʻau Aquifer System of the N.E. Mauna Loa Sector (see Figure 3.1). The State of Hawaiʻi Commission on Water Resource Management (CWRM) has determined that the Keaʻau Aquifer System has a Sustainable Yield of 393 million gallons per day (MGD), while the entire N.E. Mauna Loa Sector Sustainable Yield is 740 MGD (CWRM 2008). The Keaʻau Aquifer System estimated sustainable aquifer yield reflects the high rainfall and permeable rocks in the area.

The ʻŌlaʻa #6 exploratory well (State Well No 3306-02) that DWS is proposing to convert into a production well taps high-level groundwater, the top of which is about 120 feet above sea level. As such, it is not subject to salt-water intrusion and the water the well produces is extremely fresh.

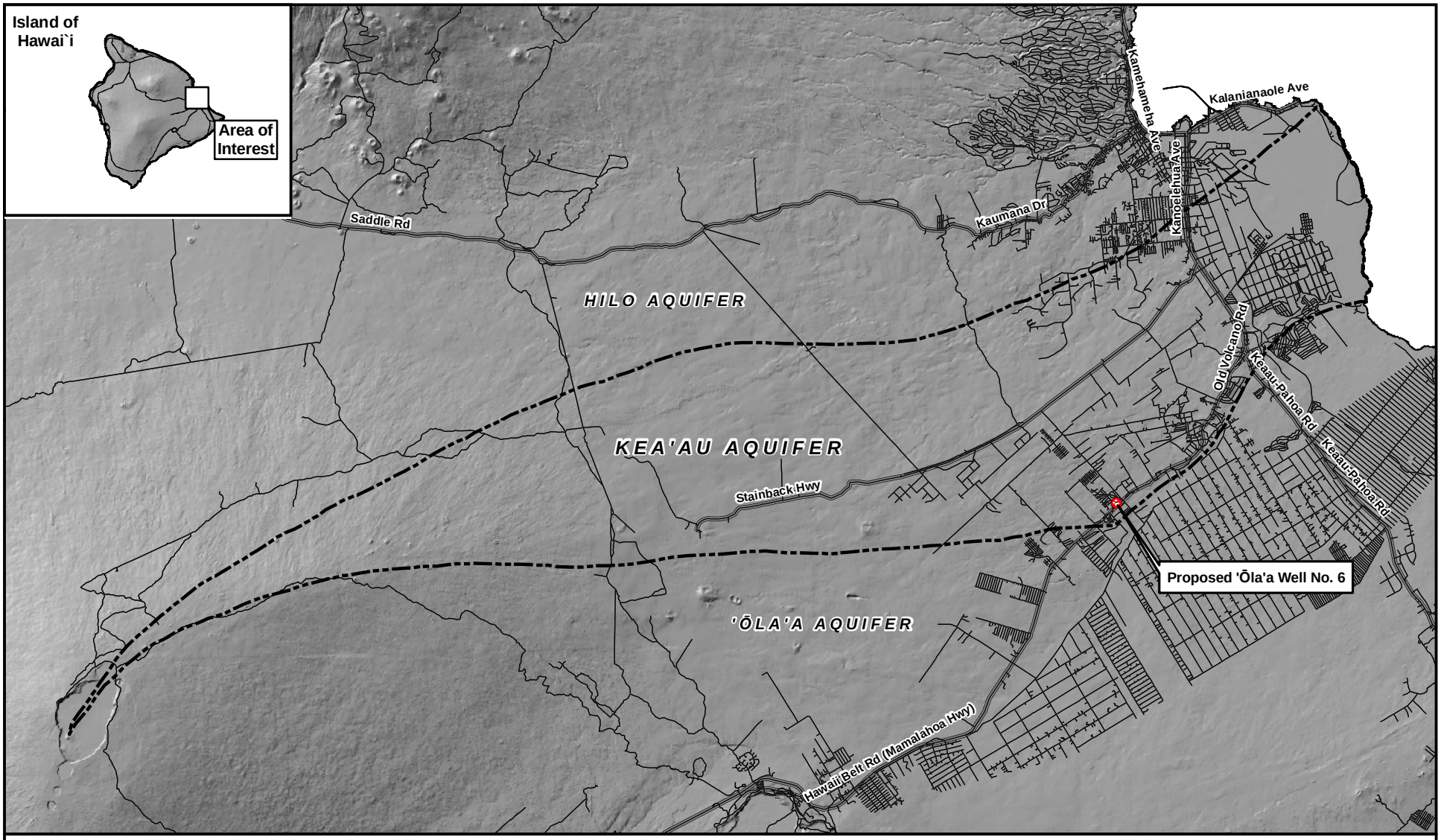
3.3.2 PROBABLE IMPACTS

3.3.2.1 Surface Water

Construction Phase. Since the disturbed area is expected to be more than an acre, NPDES Construction Storm water General permit coverage is required.[1] The contractor will be required to use best management practices as necessary during construction to prevent contaminants such as sediment, petroleum products, and debris from leaving the site via storm water runoff. In particular, DWS will ensure that the hazardous materials identified at the existing booster pump site will be removed using appropriate procedures, as recommended in Appendix C. BMPs will call for the heaviest earthwork to be scheduled for periods when heavy rainfall is least expected, for the installation of silt fences, and for the placement of permanent erosion control measures on lands denuded of vegetation as quickly as possible. During the pump installation phase of the project, the contractor will direct the discharge from testing into the new seepage pit so that runoff will not occur.

There are no State waters in the vicinity of the proposed project, and thus none could potentially be impacted during construction. Regardless, the BMPs that the contractor will implement during construction will ensure that runoff leaving the property will contain minimum amounts of suspended sediments and other potential contaminants from the construction site.

[1] National Pollutant Discharge Elimination System administered through the Clean Water Branch of the State Department of Health (Hawaiʻi Administrative Rules, 11-55, Appendix C)



Prepared For:
Tom Nance Water Resource Engineering, Inc. (TNWRE)

Prepared By:
PLANNING SOLUTIONS

Sources:
-TNWRE
-State of Hawaii GIS

Legend:

Kea'au Aquifer Boundary

Roadways

Highways

0 2.5 5 10
Miles

Figure 3.1:

Kea'au Aquifer System

'Ōla'a No. 6 Production Well & Reservoir

Figure 3.1 Kea'au Aquifer System 2009-02-13.mxd

Operational Phase. Once construction is completed, the majority of the ground surface at the well and reservoir site will be permeable (i.e., covered with gravel or soil with vegetation). However, the access driveway and the central portion of the site housing the reservoir, well pump, and control building will be paved with impermeable asphaltic concrete.

As shown in Figure 2.2, the proposed design provides a concrete swale and drainage system to collect runoff from paved areas and divert it through underground drain lines into the on-site seepage pits. The project engineer estimates that a rainfall event with a ten-year 1-hour occurrence interval (5.0 inches per hour) will generate peak runoff of 10.03 cfs from the entire site. The new drainage system will capture most of this (7.78 cfs) and divert it into the new seepage pits, resulting in a net flow off the site of 2.25 cfs. As this is less than the estimated existing site runoff of 2.45 cfs, the proposed project will decrease the volume of storm water runoff from the site.

Much of the runoff would be from paved or graveled surfaces that would contribute little suspended sediment. There will be virtually no vehicle-traffic or other activity that could add oil, grease, or other common roadway pollutants to the paved areas. Hence, the quality of the runoff will not change significantly.

The high-level groundwater from which the proposed well would draw does not contribute to stream flow in the project area. Stream channels that have incised sufficiently deeply into the surrounding lavas may receive some groundwater influent over the seaward reach, however, and to the extent that this occurs, the proposed withdrawal from the new well could marginally reduce flows in affected stream segments. Because the proposed pumping is small relative to the total groundwater flux, it is unlikely that this could affect stream flow measurably.

3.3.2.2 Groundwater

Waimea Water Company conducted a series of pump tests of the exploratory well on April 19, 2005. The results of a step-drawdown test conducted on that date suggest that at the proposed pumping rate of 1,400 gpm, the drawdown would be approximately 1 foot (see Table 3.1).

Table 3.1 Results of Step-Drawdown Testing (April 19, 2005)

Pumping Rate (GPM)	*Drawdown (feet)*
748	0.58
900	0.70
1,070	0.80
1,200	0.93
Source: Waimea Water Company, Steve Bowles	

Based on these results, it appears that the planned pumping rate of 1,400 GPM (2.0 MGD) is sustainable from the viewpoint of the individual well. As noted in Section 3.3.1.2, CWRM has set the sustainable yield for the Kea‘au Aquifer System at 393 MGD. Present total withdrawals of potable water from this aquifer system are on the order of 14.1 MGD (CWRM 2008). Since the proposed withdrawal rate of 2.0 MGD is only 0.5 percent of the aquifer system’s sustainable yield and will leave approximately 96 percent of the sustainable yield untapped, the use of the ‘Ōla‘a #6 Production Well appears to be sustainable on an overall aquifer basis as well.

In addition to having minimal impact on the sustainability of the aquifer, for reasons outlined below, there is a low probability that water from the proposed ‘Ōla‘a #6 Production Well is, or would become, contaminated.

- The area surrounding the proposed well site is not heavily developed. No industrial uses exist up-gradient of the well site. Agricultural chemicals that could affect groundwater have not been used in the area for many years.
- As required by the State Department of Health to obtain certification before putting the well into service, in April 2005 MWH Laboratories completed extensive testing of the 'Ōla'a #6 exploratory well water and found no evidence of contamination. The results of these tests, which will be repeated before the well is placed in service, show that the well water meets all State and Federal regulatory requirements for potable water (see Appendix B).
- According to the County of Hawai'i Department of Environmental Management, Solid Waste Division, the nearest landfill to the project site is in Hilo, more than 11 miles down-gradient from the well site. Hence, there is no potential for contamination from that source.
- The nearest solid-waste transfer station is in Glenwood, approximately 3.7 miles up the mountain from the site. While this facility is generally up-gradient from the proposed well, the distance through which groundwater would have to travel before reaching the well is sufficient that the risk of contamination is remote.
- The nearest existing cesspool is a few hundred feet from the well site. However, as shown in Figure 2.8, the solid casing in the well extends to an elevation of 27.08 ft. MSL, some 1,354 ft. below the existing ground surface. In addition, the well is sealed around the casing with grout to an elevation of 558 ft. Thus, there will be no means through which any potential contaminants from these surface sources could affect the water quality from the well.
- Based on the State Department of Health Office of Hazard Evaluation and Emergency Response report covering the area (DOH 2006b), no identified site of concern to the State Department of Health is located near the 'Ōla'a #6 well site.

3.4 CLIMATE AND AIR QUALITY

3.4.1 EXISTING CONDITIONS

Temperature. Temperatures in the area are very moderate. Daily low temperatures are typically 58-59˚ F between December and March and 63-64˚ between June and November. Normal daily high temperatures are 76-77˚ between December and May and 79-80˚ between August and November.

Wind. No site-specific wind data are available from the 'Ōla'a #6 Production Well area. In general, the wind direction varies diurnally. Winds move gently down slope and to the northwest during nighttime hours at speeds averaging 1-2 mph. During midday, they are usually upslope to the east-northeast at speeds averaging 8-9 miles per hour. Kona storms, which usually occur in the winter, bring stronger southerly winds to the site (Juvik, Juvik & Paradise 1998).

Rainfall. Table 3.2 lists the monthly and annual rainfall averages for the years 1971 to 2000 collected at two rain gauge stations that are near to the project site and at similar elevations. As shown in this table, this area receives just under 200 inches of rainfall annually, with the highest average monthly levels in November, and the lowest in May and June. The average monthly rainfall overall is 16.4 inches.

Air Quality. Passing vehicles on Māmalahoa Highway is the primary source of anthropogenic air emissions near the project site. Emissions from Kīlauea volcano can occasionally impair air quality in the project area substantially when it is erupting and the winds blow emissions toward the project site.

Table 3.2 Average Monthly Rainfall Near Project Site.

Month	Rainfall (in inches) by Station Number and Name	
	177/Glenwood	**191/Waiakea**
January	16.09	14.69
February	12.24	12.61
March	21.91	22.39
April	19.78	20.82
May	12.99	13.81
June	13.22	12.21
July	16.66	17.96
August	14.12	16.37
September	12.88	13.35
October	14.29	14.99
November	24.82	22.07
December	16.82	15.95
Annual	***195.82***	***197.22***
Distance from Site (mi.)	6.1	7.8
Elevation (feet msl.)	+2,285	+1,050

Source: *Climatography of the United States No. 81*, 1971-2000, NOAA, 2002

Air pollution caused by sulfur dioxide and other volcanic gases became a frequent problem on the island in the mid-1980s, when Kilauea Volcano’s ongoing eruption (which began in 1983) changed to a nearly constant but quiet outflow of lava and gas. Since that time, it has emitted an average of about 2,000 tons of sulfur dioxide (SO_2) each day. “Vog” is created when SO_2 and other volcanic gases combine and interact chemically in the atmosphere with oxygen, moisture, dust, and sunlight over periods of minutes to days. Vog is a visible haze consisting of gas plus a suspended mixture of tiny liquid and solid particles, called aerosol. The aerosol in vog is composed primarily of sulfuric acid and other sulfate compounds. Small amounts of several toxic metals, including selenium, mercury, arsenic, and iridium, have also been found in the volcanic air pollution coming from Kilauea. Far away from the volcano, such as along the Kona coast on the Island of Hawaii's west side, aerosol particles dominate vog; nearer Kilauea SO_2 gas is a major component of vog. In the absence of strong winds, SO_2 emitted by Kilauea can accumulate in the air and reach levels that exceed Federal and State ambient air quality standards. In contrast to SO_2 gas concentration near Kilauea, the amount of aerosol particles in Hawaii's air does not routinely exceed Federal ambient air quality standards, but the unique combination of acidic particles, trace amounts of toxic metals, and SO_2 gas in vog may account for the wide variety of physical symptoms reported.

During prevailing trade wind conditions, the nearly constant stream of vog is blown to the southwest and west, ending up the island’s Kona coast. There, it becomes trapped by daytime (onshore) and nighttime (offshore) sea. In contrast, when light "kona" winds (red arrows) blow, much of the vog is concentrated on the eastern side of the island, but some can even reach O‘ahu, more than 200 miles to the northwest.

3.4.2 PROBABLE IMPACTS

3.4.2.1 Construction Phase

The clearing and grading for the proposed well and reservoir site and associated facilities will disturb slightly more than one acre of land. No more than a few pieces of construction equipment would operate on the site at any one time. Moreover, work would be limited to period of a several months. The site's high rainfall and generally moderate wind speeds will help to minimize fugitive dust during construction. In addition, the contractor will utilize best management practices to ensure that the work conforms with the State Department of Health's guidelines for controlling fugitive dust as outlined in Hawai'i Administrative Rules §11-60.1. Consequently, pollutant emissions from the operation of construction equipment and fugitive dust from exposed soil do not have the potential to affect the local or regional air quality substantially.

3.4.2.2 Operational Phase

Normal operation of the proposed facilities will not produce on-site air emissions, will not alter airflow in the vicinity, and will have no other measurable effect on the area's microclimate. The electrical power consumed in the operation of the well and controls will require power generation (and, therefore, fuel consumption and gaseous emissions) by the Hawai'i Electric Light Company (HELCO). This will occur only insofar as pumping from the proposed well is not offset by reduced pumping elsewhere in DWS system. In any event, forecast electrical power use by the proposed well represents such a small portion of total electrical power use on the island that its operation would have no discernible effect on power plant emissions.

3.5 FLORA AND FAUNA

3.5.1 EXISTING CONDITIONS

The well and reservoir site has been heavily disturbed by grading for the existing exploratory well, and little vegetation exists on the graded portions of the site. Non-graded portions are dominated by introduced grasses and common weedy species such as strawberry guava (*Psidium cattleianum*), fountain grass (*Pennisetum setaceum*), *Mimosa pudica*, and sword fern (*Nephrolepis sp.*). A thicket of strawberry guava, ginger, and other common forest species surrounds the site. Based on the disturbed nature of the site, no rare, threatened, or endangered species are known or likely to exist there.

No faunal survey was conducted, but the disturbed nature of the habitat strongly suggests that it is limited to introduced birds and mammals. Given the degraded quality of the habitat, there is no reason to believe that any rare or endangered species might be present. Photographs of the proposed well site are provided in Figure 3.2.

3.5.2 PROBABLE IMPACTS & MITIGATION MEASURES

Construction of the proposed facilities will affect approximately one acre of land. The plants that are present in the affected area are primarily introduced and invasive species. The affected area is not habitat for any rare, threatened or endangered species. Consequently, the proposed action will not have any substantial direct impacts on flora or fauna.

3.6 NOISE

3.6.1 EXISTING CONDITIONS

Existing noise sources at the proposed well and reservoir site include birds, insects, wind in the foliage, and traffic sounds from nearby Māmalahoa Highway.

Baseline A-weighted noise levels[2] at the ‘Ōla‘a #6 Well site were measured on August 10, 2007 using a Brüel & Kjær Integrating meter, Type 2239A. The instrument was set to collect data for 10-minute intervals and to integrate the data within this interval every second. The data were used to determine the baseline levels shown in Table 3.3 for four parameters:

- Equivalent Sound Level (Leq). This variable is the root-mean square (RMS) average of the time-varying sound energy measured during the 10-minute measurement interval. Leq correlates reasonably well with the effects of noise on people, even for wide variations in environmental sound levels and time patterns.
- Maximum Sound Level (Lmax). This is the maximum sound level (1-second integrated value) recorded during the measurement interval.
- Minimum Sound Level (Lmin). This is the minimum sound level (1-second integrated value) recorded during the measurement interval.
- Maximum Peak Level (MaxP). This is the instantaneous maximum sound level measured during the measurement interval.

[2] The U.S. Environmental Protection Agency (EPA) recommends the A-weighting scale for environmental noise because it is convenient to use, accurate for most purposes, and is used extensively throughout the world.

A. View SE across well site, note existing exploratory well.

B. View across SW portion of well site.

C. View SW from site to Māmalahoa Highway.

D. Existing 'Ōla'a #6 tank and booster pump to be demolished.

Prepared For:

Tom Nance Water Resouce Engineering, Inc. (TNWRE)

Prepared By:

PLANNING SOLUTIONS

Sources:

Planning Solutions, Inc.
Photos taken August 10, 2007

Figure 3.2:

Photographs of the Well & Reservoir Site

'Ôla'a No. 6 Production Well & Reservoir

Figure 3-2 Photographs of the Well & Reservoir Site 2009-02-13.cdr

Table 3.3 Baseline Sound Level at ‘Ōla‘a #6 Well Site on August 10, 2007

Station Description	*Leq*	*MaxP*	*MinL*	*MaxL*
Near exploratory well	46.4	86.7	32.2	63.9
Notes: A-Weighted, 10-minute interval; 1-sec. integration; 30-100 dBA scale; August 10, 2007				
Source: Planning Solutions, Inc.				

•

3.6.2 PROBABLE IMPACTS & MITIGATION MEASURES

3.6.2.1 Environmental Noise Guidelines, Standards, and Criteria

Hawai‘i Administrative Rules (HAR) §11-46 defines three classes of zoning districts and specifies corresponding maximum permissible sound levels due to (i) stationary noise sources and (ii) equipment related to agricultural, construction, and industrial activities. Those limits, applicable at the property boundary of the parcels containing the affected land use, are shown in Table 3.4. The noise limit for “Class A Districts” [which §11-46-3(3) defines as “...all areas equivalent to lands zoned residential, conservation, preservation, public space, open space, or similar type.”] is 55 dBA during daytime hours and 45 dBA at night.

3.6.2.2 Construction Phase Impacts

Demolition and construction at all project sites will involve the operation of diesel-powered equipment sporadically for a period of about 12 months. Noise from the loudest un-muffled equipment of this sort can be as high as 80 to 85 dBA measured at a distance of 50 feet. Currently, the nearest residence is approximately 60 feet from the well and reservoir site and similar distances from the ‘Ōla‘a #3, #4, and #5, and Mountain View #1 sites.

Depending upon the construction equipment that is used, demolition and construction activities associated with the proposed project could exceed the 55 dBA daytime property line noise limit for residential areas (as the location is zoned). Because of this, a construction noise permit will likely be needed from the State Department of Health.

HAR §11-46-7 gives the Director of Health the authority to issue permits that allow the limits shown in the table to be exceeded so long as:

- the best available control technology is used;
- the granting of the permit is in the public interest;
- the services or activities for which the permit is sought are temporary and cannot be delayed, postponed, or rescheduled to a time period in which they are permitted;
- additional time is needed to alter or modify the activity or operation to comply with the regulation;
- the applicant has disclosed any possible impact from noises created by any proposed nighttime activity which may affect the immediate surrounding; and
- The applicant plans to notify the people in the surrounding area of planned nighttime activity.

The regulations prohibit issuance of a construction noise permit for construction activities which:

- emit noise in excess of the maximum permissible sound levels for the hours before 7:00 a.m. and after 6:00 p.m. of the same day, Monday through Friday;
- emit noise in excess of the maximum permissible sound levels for hours before 9:00 a.m. and after 6:00 p.m. on Saturday; and
- emit noise in excess of the maximum permissible sound levels on Sundays and on holidays.

Table 3.4 Maximum Permissible Sounds Levels in dBA (HAR §11-46).

Zoning Districts	***Daytime (7 a.m. to 10 p.m.)***	***Nighttime (10 p.m. to 7a.m.)***
Class A	55	45
Class B	60	50
Class C	70	70

Notes:
(a) The maximum permissible sound levels apply to any excessive noise source emanating within the specified zoning district, and at any point at or beyond (past) the property line.
(b) Noise levels may not exceed the maximum permissible sound levels for more than ten per cent of the time within any twenty-minute period, except by permit or variance issued under sections 11-46-7 and 11-46-8.
(c) For mixed zoning districts, the primary land use designation shall be used to determine the applicable zoning district class and the maximum permissible sound level.
(d) Measurements values are for "A" weighting network and "slow" meter response unless otherwise stated. Sound level meters and calibrators must conform to American National Standard, ANSI S1.4-1983, specifications. The maximum permissible sound level for impulsive noise is ten dBA above the maximum permissible sound levels shown and is measured using the "Fast" meter response.
(e) The limits do not apply to the operation of emergency generators, provided the best available control technology is implemented.
(f) For the purpose of the regulations, the following definitions apply:
"*Construction activities*" means any or all activities, including but not limited to those activities necessary or incidental to the erection, demolition, assembling, renovating, installing, or equipping of buildings, public or private highways, roadways, premises, and parks.
"*Construction equipment*" means any device designed and intended for use in construction, including but not limited to any air compressor, pile driver, bulldozer, pneumatic hammer, steam shovel, derrick, crane, tractor, grader, loader, power saw, pump, pneumatic drill, compactor, on-site vehicle, and power hand tool.
"*Construction site*" means any or all areas, necessary or incidental for the purpose of conducting construction activities.
(g) Class A zoning districts include all areas equivalent to lands zoned residential, conservation, preservation, public space, open space, or similar type.
Class B zoning districts include all areas equivalent to lands zoned for multi-family dwellings, apartment, business, commercial, hotel, resort, or similar type.
Class C zoning districts include all areas equivalent to lands zoned agriculture, country, industrial, or similar type.

Source: Hawai'i Administrative Rules, Title 11, Department of Health, Chapter 46, Community Noise Control

HAR §11-46-8 also provides for variances in situations where it is not possible to meet all of the conditions required for permits. At present it is anticipated that development of the ‘Ōla‘a #6 Production Well and Reservoir would qualify for a noise permit if required; hence, it is not anticipated that a variance will be needed.

3.6.2.3 Operational Phase Noise Impacts

A submersible pump and motor will be used, limiting aboveground noise to the hum of the transformer. This is below the most stringent noise limit in HAR §11-46 (45 dBA).

3.7 ARCHAEOLOGICAL, HISTORIC AND CULTURAL FEATURES

3.7.1 EXISTING CONDITIONS

The proposed well and reservoir site has been extensively modified and disturbed during historic times by agricultural activities such as sugarcane production and cattle grazing. The ‘Ōla‘a #3, #4, and #5, and Mountain View #1 sites are all already fully developed, and project activities at these sites will not be disturbing undeveloped land. Modern development present on the site includes the exploratory well pad and access road, both of which required grading. As discussed above, the vegetation at the site is characteristic of disturbed areas and consists mainly of weedy species. The State Historic Preservation Division was consulted during preparation of the Environmental Assessment for the existing exploratory well, and indicated in a letter dated December 31, 2001 that no historic sites are known to exist in the project vicinity and that none are likely to be found on the subject parcel given the location and history of previous land disturbance. No historic sites or archaeological remains were discovered during development of the exploratory well. There is no indication that the area that would be disturbed by the proposed project is currently being used by Native Hawaiian cultural practitioners exercising traditional and customary access and use rights or by individuals of any other cultural affiliation for any traditional cultural purposes. The information presented in this report indicates that it does not possess the kinds of resources Native Hawaiian cultural practitioners would typically use in exercising traditional and customary access and use rights for any traditional cultural purposes. Accordingly, a detailed cultural impact assessment was not prepared for the project.

3.7.2 PROBABLE IMPACTS & MITIGATION MEASURES

The DWS construction contract for work on the parcel will stipulate that, should any new artifact or burial site be encountered during construction, all activities would halt and SHPD would be notified. It will provide that work may be resumed only after consultation with the SHPD is completed and a monitoring program is in place.

Based on the lack of any evidence that the proposed well and reservoir site and the other project sites are used for traditional cultural purposes, along with the absence of unique biological or archaeological resources at the site, the project is not anticipated to have direct adverse effects on cultural uses. Neither will it impair or limit the ability of native Hawaiian practitioners to access cultural resources in adjacent areas. Should review of this draft environmental assessment result in information indicating that traditional and customary practices and uses are present, additional consultation and analyses will be conducted and evaluated.

3.8 NATURAL HAZARD RISKS

3.8.1 EXISTING CONDITIONS

3.8.1.1 Volcanic Hazards

Mauna Loa erupts less frequently than does Kīlauea, but it tends to produce much greater lava discharge rates than does Kīlauea. Nearly all of the Mauna Loa eruptions observed since the early 1800's began at its summit caldera; during half of these, the activity subsequently shifted to either the northeast or the southwest rift zone. In addition to the summit and rift zones, the upper northwest flank of Mauna Loa has been the source of three eruptions in the last two centuries. The largest of these, in 1859, produced a lava flow that reached the ocean north of Kīholo Bay on Hawai'i's west coast. Mauna Loa has also erupted from a submarine vent on its west flank in historic time. In 1877, a 1-day eruption took place beneath Kealakekua Bay within 1 mile of shore. This eruption produced turbulent water and floating blocks of lava, but it caused no injuries to onlookers who approached the area in canoes and other small boats (USGS 1997).

Between 1868 and 1950, lava flows from the southwest rift zone reached the ocean during five eruptions. Flows from four of these eruptions traveled to the sea in 3 to 48 hours. Since 1900, Mauna Loa has erupted 15 times, with eruptions lasting from a few hours to 145 days. After the 1950 eruption, Mauna Loa was quiet for 25 years. It reawakened with a 1-day summit eruption in 1975.

The most recent eruption of Mauna Loa occurred in 1984. This eruption originated at the summit and, within a few hours, migrated to the northeast rift zone. The resulting lava flows advanced to within 4 miles of Hilo before the 3-week-long eruption ended. Similar short-duration eruptions of Mauna Loa's northeast rift zone in 1852 and 1942 produced flows that came within about the same distance of Hilo. In 1855, a much longer-lived eruption fed a flow that stopped half a mile east of the upper Kaūmana area on the western outskirts of modern Hilo. Lava invaded the present boundaries of Hilo in 1881, although the flow did not reach the shoreline, where the village of Hilo was located at that time. The 1881 flow underlies much of Kaūmana and extends a half-mile downslope of Komohana Road.

The U.S. Geological Survey has divided the island into zones based on the probability of coverage by future lava flows; Zone 1 represents the greatest hazard and Zone 9 the least. The project area is in Zone 3. About 1-5 percent of the land surface in areas classified as Zone 3 has been covered by lava since 1800, and 15-75 percent has been covered by lava in the last 750 years. Areas included in Zone 3 are gradationally less hazardous than Zone 2 because of greater distance from recently active vents and/or because the topography makes it less likely that flows will cover these areas (USGS 1997).

3.8.1.2 Seismic Hazards

Defining hazard zones for the effects of earthquakes is more difficult than for eruptions and has not been attempted in any great detail for the Island of Hawai'i. For the most part, earthquakes on Hawai'i are concentrated beneath Kīlauea and Mauna Loa, and particularly beneath the south flanks of both volcanoes and in the Ka'ōiki region between them. The likelihood of a damaging earthquake on Kīlauea or Mauna Loa probably increases with long-lived activity of the rift zones, but its precise time and magnitude are impossible to predict. Large earthquakes unrelated to volcanic activity also occur at irregular intervals on the Island (USGS 1997). For the purposes of structural design, the Island of Hawai'i is classified as Seismic Zone 4 by the Uniform Building Code adopted by the County of Hawai'i in 1999 (USGS 1997).

3.8.1.3 Flood and Tsunami Hazards

The most recent Flood Insurance Rate Map (FIRM) indicates that the proposed well and reservoir site is in Flood Zone X, which signifies areas which are determined to be outside of the 500-year flood plain and designates areas of minimal flood hazard. The project site is outside of Flood Hazard Safety Areas (FHSA) and is not within a Tsunami Evacuation area (State of Hawai'i 2002a).

3.8.2 PROBABLE IMPACTS

3.8.2.1 Lava Flows

As previously noted, the U.S. Geological Survey (1987) has designated the area in which the project site is located as Volcanic Lava Flow Hazard Level 3, which is slightly above midway along its risk scale. Because the remainder of DWS’ ‘Ōla‘a-Mt. View water system is in the same risk zone, it is not practicable to relocate the well to a safer location where it could draw water from the same aquifer.

3.8.2.2 Earthquakes

The Island of Hawai‘i experiences thousands of earthquakes each year, but the vast majority are so small that they can only be detected by instruments. Strong earthquakes endanger people and property by shaking structures and by causing ground cracks, ground settling, and landslides. The size of an earthquake is commonly expressed by its magnitude on the Richter scale; an increase of one whole number on the Richter scale represents a tenfold increase in the amplitude of the seismograph recording.

As can be seen by the U.S. Geological Survey’s plot of the location and size of the larger earthquakes that occurred on the Island of Hawai‘i between 1962 and 1985 (Figure 3.3), the majority of the earthquakes are centered near Kīlauea, but no part of the island is completely free of them. Figure 3.4, another U.S. Geological Survey drawing, shows the generalized locations of damaging earthquakes of magnitude 6 or greater that have occurred since 1868 on the Island. Information on those events is presented in Table 3.5. All structures associated with the proposed project will be built to comply with the Uniform Building Codes for Seismic Zone 4.

3.8.2.3 Flooding from Streams or Tsunami

As discussed above, DWS’ ‘Ōla‘a #6 site is not vulnerable to flooding or tsunami. Neither will it increase runoff in a way that might increase hazards on other properties. Hence, there is no natural hazard risk from that source.

Figure 3.3 Recent Earthquakes on and Near the Island of Hawai‘i, 1962-1985.

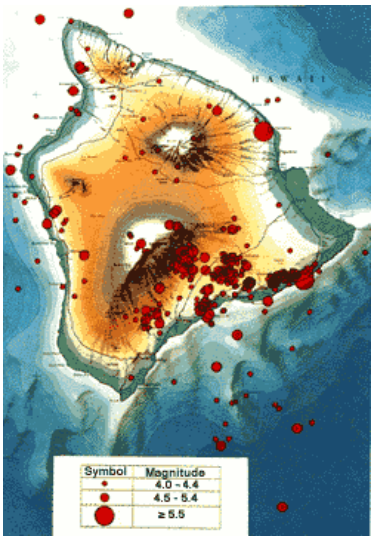
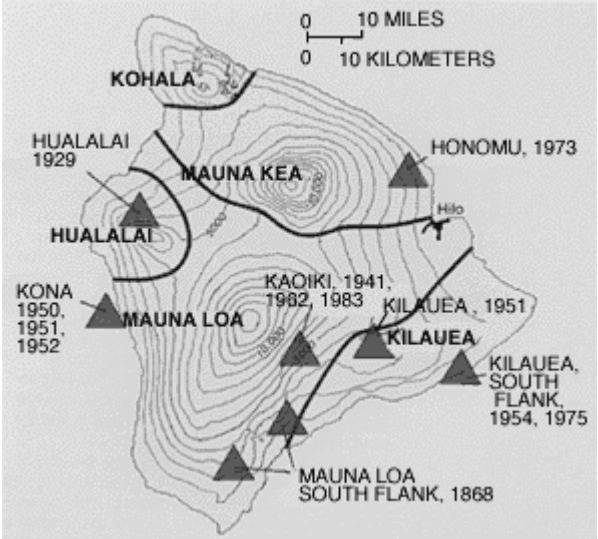


Figure 3.4 Generalized Locations of Damaging Earthquakes of Magnitude 6 or Greater Since 1868 on the Island of Hawai‘i.



Source: Volcanic and Seismic Hazards on the Island of Hawai‘i. Updated July 18, 1997

Table 3.5 Damaging Earthquakes of Magnitude 6 or Greater Since 1868 on the Island of Hawai‘i.

Year	Date	Region	Magnitude	Depth (Miles)
1868	Mar. 28	Mauna Loa south flank	6.5-7.0*	No data
1868	Apr. 2	Mauna Loa south flank	7.5-8.1*	No data
1929	Oct. 5	Hualalai	6.5*	No data
1941	Sept. 25	Ka’oiki	6.0*	No data
1950	May 29	Mauna Loa southwest rift	6.2	No data
1951	Apr. 22	Kīlauea	6.3	20
1951	Aug. 21	Kona	6.9	5
1952	May 23	Kona	6.0	5
1954	Mar. 30	Kīlauea south flank	6.5	5
1962	June 27	Ka‘oiki	6.1	6
1973	Apr. 26	Honomū	6.2	25
1975	Nov. 29	Kīlauea south flank	7.2	6
1983	Nov. 16	Ka‘oiki	6.6	7
1989	June 25	Kīlauea south flank	6.1	9
2006[1]	Oct. 15	Kona	6.7	24

[1] USGS Earthquake Hazards Program website: http://earthquake.usgs.gov/eqcenter/ (2006).

Source: *Volcanic and Seismic Hazards on the Island of Hawai‘i*. Updated July 18, 1997

3.9 SCENIC AND RECREATIONAL RESOURCES

3.9.1 EXISTING CONDITIONS

The proposed well and reservoir is located on a flag lot along Māmalahoa Highway. Because of the thick vegetation, the planned fencing, and the existence of a residence between the proposed facility and the road, will not be visible to traffic along that thoroughfare. The facility is shielded from other surrounding areas by a surrounding thicket of guava forest. No unique or outstanding viewpoints exist at the site. No recreational facilities exist in the project vicinity.

3.9.2 PROBABLE IMPACTS & MITIGATION MEASURES

As noted above, trees, structures, fencing, and topographic features will screen most of the facilities to be constructed from the highway and from surrounding residences. No established scenic viewpoints will be affected by the project. For these reasons, the project will not have any substantial impacts on scenic and aesthetic resources. The project will not affect recreational activities in the area.

3.10 TRANSPORTATION

3.10.1 EXISTING CONDITIONS

Access to the project site is via the Māmalahoa Highway which is the main road encircling the Island of Hawaiʻi; in the project area, it is a two-lane highway running southwest in one direction and northeast in the other. The Highway Planning Branch of the Hawaiʻi State Department of Transportation, performed a 24-hour traffic count for two consecutive days on October 24 and 25, 2006. As seen in Table 3.6, the data shows that traffic volumes are moderate at both morning and evening peak time periods.

Table 3.6 Traffic Volumes for Māmalahoa Highway Between Old Volcano Road and Pszyk Road.

Station B71001101355	***AM Peak***				***PM Peak***			***24-Hour Count***		
	Traffic Direction				***Traffic Direction***			***Traffic Direction***		
	Date	**SW**	**NE**	**Total**	**SW**	**NE**	**Total**	**SW**	**NE**	**Total**
Btw. Old Volcano Rd. & Pszyk Rd.	10/24-25/2006	279	560	839	481	345	826	4,891	4,865	9,756
	10/25-26/2006	292	561	853	480	375	855	4,882	4,783	9,665
Source: Station B71001101355 counts from DOT Highway Planning Branch (2006).										

3.10.2 PROBABLE IMPACTS & MITIGATION MEASURES

Construction Period. Construction of the proposed project will generate at most 10 to 20 vehicle-trips per day on the highway except on the day when the concrete foundation for the reservoir is being poured, when the volume may be slightly higher. The total peak-hour traffic with the additional project will be less than half the roadway's capacity and will not have a measureable effect on the level-of-service. Adequate space exists alongside the roadway and on the project sites to allow construction vehicles to park without interfering with the active traffic lanes. The only possible exception to this is brief intervals when large construction equipment and material for the tanks and other structures are moved onto and off the site. Some work will have to be done within the highway right-of-way to connect the new facilities to the existing waterline that is located there. Thus, the contractor will have to get the appropriate approvals from the State Department of Transportation.

However, most of this work will be of short duration and will only obstruct the margins of the highway.

Operational Period. The proposed project is unmanned, with visits being made periodically by personnel tasked with maintaining the equipment, checking the chlorination equipment, caring for the landscaping, and other related tasks. On average, this would generate no more than 1-2 vehicle-trips per day. Service vehicles will park in designated on-site areas and will not interfere with traffic. For these reasons, the construction and operation of the facility will not lead to substantial impacts on area roadways.

3.11 LAND USE & ECONOMIC AND CULTURAL ENVIRONMENT

3.11.1 EXISTING CONDITIONS

The parcel on which the proposed facilities would be developed is owned by DWS. Other than the existing exploratory well, the parcel is vacant. The project site and the properties abutting Māmalahoa Highway are within the State Urban Land Use District, which comprises only 2% of the land in the Puna District. The majority of the land surrounding the well site is within the State Agricultural Land Use District, as is more than half of Puna. Crops include macadamia nuts, flowers, foliage, papaya, bananas, and other tropical fruits, and vegetables. The remaining 43% of the land in Puna is Conservation land, including State and federally owned lands such as Ahalanui Park and Lava Tree State Park (DWS *20-Year Water Plan* 2006).

As shown in Table 3.7, the population of the Puna District increased significantly between 1980 and 2000. The County General Plan (2005) attributes this growth to employment opportunities in agriculture as well as more affordable housing for workers commuting to Hilo. The General Plan predicts that Puna's population will continue to grow at a rapid rate and that agriculture will remain the cornerstone of its economy. The Plan also acknowledges the potential for more visitor facilities such as bed and breakfasts, recreational areas, and botanical parks.

Table 3.7 Population Growth in the Puna District: 1980-2000.

1980	1990	2000	1980-1990 Change (in %)	1990-2000 Change (in %)
11,751	20,781	31,335	76.8	50.8

Source: Economic Assessment, PKF Hawaii, January 2000; U.S. Census, 2000; Hawai'i County Department of Research and Development

The well and reservoir site is located in Census Tract 210.02. The 2000 population of this census tract was 10,962 persons. The median household income for that year was $31,500, significantly lower than the statewide median household income of $49,820. In that year, sixteen percent of Puna's households had incomes below the poverty level and 71 percent had a combined income of less than $50,000, making it one of the County's lowest-income districts. Unemployment in that year was 5.1 percent, slightly lower than the statewide unemployment average of 6.3 percent.

3.11.2 PROBABLE IMPACTS

DWS owns the project site and an exploratory well has existed there since 2005. Consequently, the proposed facilities do not constitute a significant change in the existing use and ownership of the site. The site is bordered by residential uses, but is well screened from them by existing vegetation and topography.

The proposed well and reservoir will increase DWS’ total source and storage capacity in the Puna District. It is not intended to facilitate growth in the service area. Rather, it would alleviate an existing storage deficit and improve the system’s efficiency for DWS’ existing customers and for future demand that is projected by County-approved plans. Aside from the temporary construction employment and expenditures that it would create, the project will not in and of itself stimulate or otherwise promote population growth or economic activity.

4.0 RELATIONSHIPS TO RELEVANT PLANS, POLICIES & CONTROLS

4.1 COUNTY AND STATE REGULATIONS

4.1.1 COUNTY OF HAWAI‘I GENERAL PLAN

4.1.1.1 Applicable Goals, Policies, and Recommended Actions

The Department of Water Supply operates and maintains over twenty separate water systems on the Island of Hawai‘i, including the ‘Ōla‘a-Mt. View System. The 2005 *Hawai‘i County General Plan* contains goals and policies concerning the development and operation of essential water supply facilities. The *General Plan* recognizes that water supply facilities are needed to support the patterns of development which the *General Plan* seeks to achieve. It makes planning for the location of utility facilities such as wells, reservoirs, and pumping stations an integral part of the land planning process.

The *2005 General Plan* identifies the following County policies with regard to public water systems that are relevant to the proposed project:

> *(a) Water system improvements shall correlate with the County's desired land use development pattern.*
>
> *(b) All water systems shall be designed and built to Department of Water Supply standards.*
>
> *(c) Improve and replace inadequate systems.*
>
> *(d) Water sources shall be adequately protected to prevent depletion and contamination from natural and man-made occurrences or events.*
>
> *(e) Water system improvements should be first installed in areas that have established needs and characteristics, such as occupied dwellings, agricultural operations and other uses, or in areas adjacent to them if there is need for urban expansion.*
>
> *(f) A coordinated effort by County, State and private interests shall be developed to identify sources of additional water supply and be implemented to ensure the development of sufficient quantities of water for existing and future needs of high growth areas and agricultural production.*

The *2005 Hawai‘i County General Plan* identifies a number of actions to implement these policies in the Puna District. Specifically, it directs DWS to:

- Continue to improve inadequate water system facilities.
- Water source investigation and exploration should be continued in order to provide service for anticipated needs.
- Investigate additional groundwater sources in the ‘Ōla‘a area.
- Investigate alternative means to finance the extension of water systems to subdivisions that rely on catchment.

4.1.1.2 Conformance With the 2005 *Hawai‘i County General Plan*

DWS constructed the existing exploratory well at the ‘Ōla‘a #6 site in accordance with the *General Plan* policy for the Puna District that encourages groundwater source investigation for this fast-growing area of the island. The production well and reservoir that is part of the proposed action is responsive to the same directive.

The proposed project meets all applicable design standards. It will allow DWS to continue to meet the needs of the people along Volcano Highway between Kea‘au and Glenwood in a cost-effective

manner while complying with the State Department of Health requirements for reliability and quality of potable water sources. The well will allow DWS to reduce withdrawals from existing well sources that might otherwise be overused. The proposed well and ancillary facilities are located on a site that is already part of the DWS system; they fit into their surroundings; and they will be largely hidden from public view. The facilities are allowable under existing State and County zoning and development regulations. Operation of the well will not produce substantial air or noise emissions that would disturb existing uses on adjacent properties.

4.1.2 COUNTY OF HAWAIʻI ZONING ORDINANCE

The County zoning in the project area is Agriculture (Ag-5a), as is the majority of the zoned land in the Puna District. The Hawaiʻi County Code (2000 Edition), Section 25-4-11(b) states:

> *Any substation used by a public utility for the purpose of furnishing telephone, gas, electricity, water, radio, or television shall be a permitted use in any district provided that the use is not hazardous or dangerous to the surrounding area and the director has issued plan approval for such use.*

The proposed well and reservoir would be a public use that would furnish water for the community along Volcano Highway between Keaau and approximately Oshiro Road in Glenwood and thus qualifies as a permitted use under this portion of the code. DWS will submit an *Application for Plan Approval* to the Hawaiʻi County Department of Planning to obtain the necessary director's approval for the project once the Chapter 343 process is completed.

4.1.3 STATE OF HAWAIʻI LAND USE

As discussed in Section 3.11, the site is in the State Urban District. HRS Chapter 205 §205-4.5 (7) lists public utility facilities such as those that are proposed as permissible uses within the State Agricultural District.

4.1.4 STATE DRINKING WATER STATE REVOLVING FUND (DWSRF)

This project may be funded by Federal funds through the State of Hawaiʻi's Drinking Water State Revolving Fund (DWSRF) program. The U.S. Congress established the DWSRF program as a new section 1452 of the Safe Drinking Water Act (SDWA), 33 U.S.C. 300j-12, by the SDWA Amendments of 1996, Public Law 104-182. The intent of the DWSRF is to help water system operators construct the infrastructure needed to maintain or improve compliance with the SDWA. This document includes all of the environmental information required for compliance with the DWSRF program.

4.2 CROSS-CUTTING FEDERAL AUTHORITIES

4.2.1 ARCHEOLOGICAL AND HISTORIC PRESERVATION ACTS

The results of investigations conducted during preparation of this document indicate that the proposed ʻŌlaʻa #6 Production Well and Reservoir project is consistent with the Archeological and Historic Preservation Act (16 U.S.C. § 469a-1) and the National Historic Preservation Act (16 U.S.C. § 470(f)). It is also consistent with all applicable State historic preservation requirements, including Hawaiʻi Revised Statutes Chapter 6E - Historic Preservation and Hawaii Administrative Rules §13-198 and §13-300 (see Appendix A).

4.2.2 CLEAN AIR ACT (42 U.S.C. § 7506(C))

The entire State of Hawai'i an air quality attainment area as defined by the State of Hawai'i Department of Health in its EPA-approved air quality program.[3] As discussed in Section 3.4, air quality at the 'Ōla'a #6 site is good except when the area is affected by natural emissions from the ongoing eruption of Kilauea Volcano.

Grading and excavation will disturb a little more than an acre of land during construction of the project. This and the relatively wet climate mean that fugitive dust will not be a problem during construction so long as the contractor follows the dust control measures that the County will require in its construction documents.

Normal operation of the proposed facilities will not produce on-site air emissions, will not alter airflow in the vicinity, and will have no other measurable effect on the area's microclimate. The electrical power consumed in the operation of the well and reservoir will require additional power generation (and, therefore, fuel consumption and gaseous emissions) by the Hawaii Electric Light Company. Much of this will be offset by decreased electrical use at other DWS facilities. The increase represents such a small portion of total power used that its effect will not be significant in and of itself.

4.2.3 COASTAL BARRIER RESOURCES ACT (16 U.S.C. § 3501)

Coastal Barrier Resources Act (CBRA), Public Law 97-348 (96 Stat. 1653; 16 U.S.C. 3501 et seq.), enacted October 18, 1982, designated various undeveloped coastal barrier islands, depicted by specific maps, for inclusion in the Coastal Barrier Resources System (System). Areas so designated were made ineligible for direct or indirect Federal financial assistance that might support development, including flood insurance, except for emergency life-saving activities. Exceptions for certain activities, such as fish and wildlife research, are provided, and National Wildlife Refuges and other, otherwise protected areas are excluded from the System. The proposed project will not affect any areas protected by this Act.

4.2.4 COASTAL ZONE MANAGEMENT ACT (16 U.S.C. § 1456(C) (1))

Enacted as Chapter 205A, HRS, the Hawai'i Coastal Zone Management (CZM) Program was promulgated in 1977 in response to the Federal Coastal Zone Management Act of 1972. The CZM area encompasses the entire state, including all marine waters seaward to the extent of the state's police power and management authority. It also includes the 12-mile U.S. territorial sea and all archipelagic waters.

The Hawai'i Coastal Zone Management Program focuses on ten policy objectives:

- Recreational Resources. To provide coastal recreational opportunities accessible to the public and protect coastal resources uniquely suited for recreational activities that cannot be provided elsewhere.
- Historic Resources. To protect, preserve, and where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.
- Scenic and Open Space Resources. To protect, preserve, and where desirable, restore or improve the quality of coastal scenic and open space resources.
- Coastal Ecosystems. To protect valuable coastal ecosystems, including reefs, from disruption and to minimize adverse impacts on all coastal ecosystems.

[3] Note that as mentioned elsewhere in this report the ongoing eruption of Kilauea Volcano can degrade air quality in the area when the winds are blowing from the active vent over the site.

- Economic Uses. To provide public or private facilities and improvements important to the state's economy in suitable locations; and ensure that coastal dependent development such as harbors and ports, energy facilities, and visitor facilities, are located, designed, and constructed to minimize adverse impacts in the coastal zone area.
- Coastal Hazards. To reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution.
- Managing Development. To improve the development review process, communication, and public participation in the management of coastal resources and hazards.
- Public Participation. To stimulate public awareness, education, and participation in coastal management; and maintain a public advisory body to identify coastal management problems and provide policy advice and assistance to the CZM program.
- Beach Protection. To protect beaches for public use and recreation; locate new structures inland from the shoreline setback to conserve open space and to minimize loss of improvements due to erosion.
- Marine Resources. To implement the state's ocean resources management plan.

Other key areas of the CZM program include: a permit system to control development within a Special Management Area (SMA) managed by the Counties and the Office of Planning; a Shoreline Setback Area which serves as a buffer against coastal hazards and erosion, and protects view-planes; and the Marine and Coastal Affairs. Finally, a Federal Consistency provision requires that federal activities, permits and financial assistance be consistent with the Hawai‘i CZM program.

The proposed ‘Ōla‘a #6 Production Well and Reservoir project is located a little under ten miles from the coast. It does not involve the placement, erection, or removal of materials near the coastline. As documented in this environmental assessment, the type and scale of the activities that it involves do not have the potential to affect coastal resources. Finally, it is consistent with the CZM objectives that are relevant to a project of this sort. Specifically, it does not affect coastal resources uniquely suited for recreational activities or historic and pre-historic resources that are significant in Hawaiian and American history and culture. Neither does it affect the quality of coastal scenic and open space resources or coastal ecosystems. It is not5 situated such that is exposed to coastal hazards and would not affect beaches or marine resources.

A copy of the *Draft EA* is being sent to the Office of Coastal Zone Management at the State of Hawai‘i Department of Business, Economic Development, and Tourism and responses to their comments, if any, will be reproduced in the *Final EA.*

4.2.5 ENDANGERED SPECIES ACT (16 U.S.C. 1536(A)(2) AND (4))

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

Section 3.5 describes existing biota on and near the project site. The discussion documents the fact that there are no known rare or endangered species on or immediately adjacent to the project site. Copies of the *Draft EA* are being provided to the U.S. Fish and Wildlife Service and to the State Department of Land and Natural Resources for review and comment.

4.2.6 ENVIRONMENTAL JUSTICE (EXECUTIVE ORDER 12898)

The Environmental Justice Executive Order was issued in 1994 for the purpose of protecting low-income and minority residents of the United States from disproportionate exposure to environmental and health hazards. Section 1-101 of the Executive Order States:

> *To the greatest extent practicable and permitted by law, and consistent with the principles set forth in the report on the National Performance Review, each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories and possessions, the District of Columbia, the Commonwealth of Puerto Rico, and the Commonwealth of the Mariana Islands.*

As discussed in Section 3.11, the Census Tract in which the proposed well is located exhibits a median household income that is only slightly less than the statewide average, and an unemployment rate that is significantly lower. The project area is not considered a low-income area. The purpose of the proposed well is to continue to provide residents along Volcano Highway between Keaau and approximately Oshiro Road in Glenwood with a clean and affordable source of drinking water that conforms to State and Federal standards. The project will not have adverse secondary environmental, economic, or social impacts, as discussed in detail in Chapter 3. Moreover, the State and Federal regulations regarding safe drinking water are applicable to all water systems in Hawai'i, irrespective of the economic or demographic characteristics of their residents. Thus, the proposed 'Ōla'a #6 Production Well and Reservoir complies with this Executive Order.

4.2.7 FLOODPLAIN MANAGEMENT (42 U.S.C. § 4321)

Based on the Flood Insurance Rate Map for the area, the site proposed for the 'Ōla'a #6 Production Well and Reservoir lies outside a defined floodplain. The project does not involve property acquisition, management, or construction within a 100-year flood plain (Zones A or V), and it does not involve a "critical action" within a 500-year flood plain. Consequently, it is consistent with applicable regulations and guidance relating to floodplain management.

4.2.8 FISH AND WILDLIFE COORDINATION ACT (16 U.S.C. § 662(A))

The Federal Fish and Wildlife Coordination Act, as amended, authorizes the Secretaries of Agriculture and Commerce to require consultation with the U.S. Fish and Wildlife Service and the fish and wildlife agencies of States where the *"waters of any stream or other body of water are proposed or authorized, permitted or licensed to be impounded, diverted . . . or otherwise controlled or modified"* by any agency under a Federal permit or license. Consultation is to be undertaken for the purpose of *"preventing loss of and damage to wildlife resources."*

As documented in this report, the proposed project will not result in impacts to any water body and or to fish or wildlife resources. The U.S. Fish and Wildlife Service and the State Department of Land and Natural Resources are being sent copies of the *Draft EA* and their comments, if any, will be reproduced in the *Final EA.*

4.2.9 FARMLAND PROTECTION POLICY ACT (7 U.S.C. § 4202(8))

The U.S. Congress adopted the Farmland Protection Policy Act (FPPA) (Public Law 97-98) on December 22, 1981). The U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) has national leadership for administering the FPPA. The effective date of the FPPA rule (part 658 of Title 7 of the Code of Federal Regulations) is August 6, 1984.

The stated purposes of the FPPA are to:

- Minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses.

- Assure that Federal programs are administered in a manner that, to the extent practicable, will be compatible with State, unit of local government, and private programs and policies to protect farmland.

"Farmland", as used in the FPPA, includes prime farmland, unique farmland, and land of statewide or local importance. "Farmland" subject to FPPA requirements does not have to be currently used for cropland. As discussed in Section 3.11, the ʻŌlaʻa #6 Production Well and Reservoir site is within a designated agricultural area. The surrounding lands and portions of the site were previously used for agricultural activities, but that use ceased many years ago. Neither the proposed well site nor the immediately adjacent properties are recognized as prime or unique agricultural lands on the Agricultural Lands of Importance to the State of Hawaiʻi (ALISH) map (State of Hawaiʻi 2002c). As such, the well site does not qualify as farmland protected by the provisions of the FPPA.

4.2.10 SAFE DRINKING WATER ACT (42 U.S.C. § 300H-3(E))

The Safe Drinking Water Act (SDWA) is the principal federal law that ensures the quality of Americans' drinking water. Under SDWA, the U.S. Environmental Protection Agency (EPA) sets standards for drinking water quality and oversees the states, localities, and water suppliers who implement those standards. The SDWA requires that all public water systems meet stringent water quality standards. These standards cover a long list of potential chemical, radiological and biological contaminants.

As discussed in Section 2.1.4 of this report, the tests of water drawn from the existing ʻŌlaʻa #6 exploratory well show that it meets all drinking water standards. Before connecting the new ʻŌlaʻa #6 Production Well to its existing system, DWS will test water from it to ensure that the water is consistent with all State and Federal standards for potable water.

The Safe Drinking Water Act also provides the impetus behind the development of regulatory protection of principal or sole source aquifers. Part C of this Law pertains specifically to the protection of underground sources of drinking water, including the establishment of regulations on the injection of materials into subsurface aquifers in those areas of the United States where only one aquifer (principal or sole source aquifer) exists. Section 1424(e) of PL 93-523 states:

> *(e) If the Administrator determines, on his own initiative or upon petition, that an area has an aquifer which is the sole or principal drinking water source for the area and which, if contaminated, would create a significant hazard to public health, he shall publish notice of the determination in the Federal Register. After the publication of any such notice, no commitment for Federal financial assistance (through a grant, contract, loan guarantee, or otherwise) may be entered into for any project which the Administrator determines may contaminate such aquifer through a recharge zone so as to create a significant hazard to public health, but a commitment for Federal financial assistance may, if authorized under another Provision of law, be entered into to plan or design the project to assure that it will not so contaminate the aquifer.*

As identified by the U.S. Environmental Protection Agency, Region IX groundwater Office (http://www.epa.gov/OGWDW/swp/ssa/reg9.html), there are only two Sole Source Aquifers in Hawaiʻi. They are the Southern Oʻahu Basal Aquifer on the Island of Oʻahu and the Molokaʻi Aquifer on the island of Molokaʻi. There are no sole source aquifers on the Island of Hawaiʻi where the proposed ʻŌlaʻa #6 Production Well and Reservoir project is located.

4.2.11 PROTECTION OF WETLANDS (42 U.S.C. § 4321)

As noted in Section 3.3, there are no wetlands on or near the site. Neither are there food resources on the site that are important to wildlife that use wetlands elsewhere on the island. Copies of the *Draft EA* are being sent to the administrator of the Pacific Island Eco-Region, U.S. Fish & Wildlife Service,

and to the State Department of Land and Natural Resources Division of Aquatic Resources to ensure adequate consideration of this topic in the environmental review for this project.

4.2.12 WILD AND SCENIC RIVERS ACT (16 U.S.C. 1271-1287)

The purpose of this act, as stated in Section (b) of its preamble is as follows:

> *It is hereby declared to be the policy of the United States that certain selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations. The Congress declares that the established national policy of dam and other construction at appropriate sections of the rivers of the United States needs to be complemented by a policy that would preserve other selected rivers or sections thereof in their free-flowing condition to protect the water quality of such rivers and to fulfill other vital national conservation purposes.*

As discussed in Section 3.3.1, no perennial streams or major fresh water bodies exist near the proposed project site. As such, development of the ‘Ōla‘a #6 Production Well and Reservoir does not have the potential to affect the hydrology, water quality, or aquatic resources in any streams and therefore is consistent with the provisions of the Wild and Scenic Rivers Act.

THIS PAGE INTENTIONALLY LEFT BLANK

5.0 ANTICIPATED DETERMINATION

5.1 SIGNIFICANCE CRITERIA

Hawai'i Administrative Rules (HAR) §11-200-11.2 establishes procedures for determining if an environmental impact statement (EIS) should be prepared or if a finding of no significant impact is warranted. HAR §11-200-11.2 (1) provides that proposing agencies should issue an environmental impact statement preparation notice (EISPN) for actions that it determines may have a significant effect on the environment. HAR §11-200-12 lists the following criteria to be used in making that determination:

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

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

5.2 FINDINGS

The DWS evaluated the potential effects of the proposed project described earlier in this document using these significance criteria. The findings with respect to each criterion are summarized below:

5.2.1 IRREVOCABLE LOSS OR DESTRUCTION OF VALUABLE RESOURCE

The proposed project would be constructed on previously disturbed land at an existing Department of Water Supply facility. It does not involve the loss of any significant cultural or natural resources.

5.2.2 CURTAILS BENEFICIAL USES

Construction and operation will not curtail beneficial uses of the site. The water that the DWS proposes to withdraw is a small fraction of the sustainable yield of the aquifer, and its removal from

the groundwater flow into the ocean will not have a measurable effect on ocean or groundwater quality. The project would significantly enhance the utility of the ʻŌlaʻa #6 site for DWS customers residing along Volcano Highway between Keaau and approximately Oshiro Road in Glenwood.

5.2.3 CONFLICTS WITH LONG-TERM ENVIRONMENTAL POLICIES OR GOALS

The proposed project is consistent with the *County of Hawaiʻi's General Plan* and with the State's long-term environmental policies and goals as expressed in Chapter 344, Hawaiʻi Revised statutes and elsewhere in State law (see Section 4.1).

5.2.4 SUBSTANTIALLY AFFECTS ECONOMIC OR SOCIAL WELFARE

The proposed well is intended to provide a continuing supply of water to existing residents along Volcano Highway between Keaau and approximately Oshiro Road in Glenwood and to accommodate the likely growth provided for in the *County of Hawaiʻi General Plan*. It will not have a substantial adverse effect on economic or social welfare; it will benefit the region's residents and businesses by allowing DWS to assure its customers an adequate supply of high-quality potable water.

5.2.5 PUBLIC HEALTH EFFECTS

The proposed project will not adversely affect air or water quality. Neither will it generate solid waste or produce other emissions that will have a significant adverse effect on public health. Construction noise has the potential to exceed noise standards at the property line, but the potential adverse effects of this will be short-lived and will be mitigated by the noise abatement and attenuation measures that the County will require of the construction contractor.

5.2.6 PRODUCE SUBSTANTIAL SECONDARY IMPACTS

The proposed project will not produce significant secondary impacts. It is not designed to foster population growth or to promote economic development. Instead, it will only support development already envisioned by the *County of Hawaiʻi General Plan*.

5.2.7 SUBSTANTIALLY DEGRADE ENVIRONMENTAL QUALITY

As discussed in detail in Chapter 3, the proposed project will not have substantial adverse long-term environmental effects.

5.2.8 CUMULATIVE EFFECTS OR COMMITMENT TO A LARGER ACTION

Development of the proposed well and reservoir is not a commitment to a larger action and is not intended to facilitate substantial population growth.

5.2.9 AFFECTS ON RARE, THREATENED, OR ENDANGERED SPECIES

The proposed project will be constructed on an already developed site. It will not utilize a resource needed for the protection of rare, threatened, or endangered species.

5.2.10 AFFECTS AIR OR WATER QUALITY OR AMBIENT NOISE LEVELS

Construction and operation of the proposed well will not have a measurable effect on air or water quality. Neither will it have a long-term effect on noise levels. The project does have the potential to increase noise levels during the construction phase. Adequate mitigation measures will be taken to limit these to reasonable levels.

5.2.11 ENVIRONMENTALLY SENSITIVE AREAS

There are no environmentally sensitive areas or resources near the proposed project. The Island of Hawaiʻi as a whole is subject to certain geologic hazards, such as earthquakes and lava flows. The project site is above the tsunami evacuation zone and is not any more subject to lava flows than any

other prospective well site in the region. The structures built as part of the well and reservoir development will be constructed consistent with the Hawai‘i Uniform Building Code for Earthquake Zone 4.

5.2.12 AFFECTS SCENIC VISTAS AND VIEWPLANES

The proposed well and reservoir site is camouflaged from adjacent areas by vegetation and a tall forest canopy. The proposed new facilities are not within a designated scenic area. They will not significantly alter the visual character of the site (which has been previously disturbed) or change views across it.

5.2.13 REQUIRES SUBSTANTIAL ENERGY CONSUMPTION

Operation of the new well will require a small amount of electrical energy. The increase will be partially offset by a decrease in the electrical energy that is now used to pump water from existing sources.

5.3 ANTICIPATED DETERMINATION

In view of the foregoing, DWS concludes that the proposed project will not have a significant adverse impact on the environment. Consequently, it anticipates issuing a Finding of No Significant Impact for the proposed action.

THIS PAGE INTENTIONALLY LEFT BLANK

6.0 BIBLIOGRAPHY

County of Hawai'i (2005) *County of Hawai'i General Plan.* County of Hawai'i Planning Department, February 2005.

CWRM (State of Hawai'i Commission on Water Resource Management). (1995) *Ground Water Hydrologic Units.* In Water Data Section of CWRM web site. URL: http://www.state.hi.us/dlnr/cwrm/data/maps.htm

CWRM (State of Hawai'i Commission on Water Resource Management). (2008). *Hawai'i Water Resources Protection Plan.*

DLNR (Department of Land and Natural Resources). (1998) Hawai'i Administrative Rules, Title 13, Department of Land and Natural Resources, Subtitle 13, *State Historic Preservation Division Rules.*

DOH (State of Hawai'i Department of Health) (2006a) *Groundwater Contamination Maps for the State of Hawai'i, 2005.* Environmental Health Division, Safe Drinking Water Branch. URL: http://hawaii.gov/health/environmental/water/sdwb/conmaps/conmaps.html

––– (2006b) *Facilities, Sites, or Areas in which HEER has an Interest.* URL: http://www.state.hi.us/health/environmental/hazard/records.html

DOH (State of Hawai'i Department of Health) (2000c) *Classification of Hawaii State Waters.* URL: http://www.state.hi.us/health/eh/cwb/wqmaps/wqstand.htm

––– (State of Hawai'i Department of Health (1996) *Hawai'i Administrative Rules, Title 11, Chapter 46, Community Noise Control*.

Ellis, W. (1963). *The Journal of William Ellis, Narrative of a Tour of Hawai'i, or Owhyee.* Honolulu: Advertiser Publishing Co.

EPA (U.S. Environmental Protection Agency, Region IX Groundwater Office) URL: (http://www.epa.gov/OGWDW/swp/ssa/reg9.html)

Foote, Donald E., Elmer L. Hill, Sakuichi Nakamura, and Floyd Stephens (1972). *Soil Survey of Islands of Kaua'i, O'ahu, Maui, Molokai, and Lanai, State of Hawai'i.* U.S. Department of Agriculture Soil Conservation Service in cooperation with the University of Hawai'i Agricultural Experiment Station. U.S. Government Printing Office. Washington, DC. 233 p.

Hawai'i, State of, Use Commission (August 1, 2005). Findings of Fact, Conclusions of Law, and Decision and Order in Docket No. A04-747.

Juvik, S.P., J.O. Juvik, and T.R. Paradise (1998) *Atlas of Hawai'i, Third Edition.* University of Hawai'i Press, Honolulu, 333 p.

Kamakau, S. (1961). *Ruling Chiefs of Hawai'i.* Honolulu: The Kamehameha Schools Press.

Kirch, P.V. (1985). *Feathered Gods and Fishhooks: An Introduction to Hawaiian Archaeology and Prehistory*. Honolulu: University of Hawai'i Press.

Macdonald, G.A., A.T. Abbott, and F.L. Peterson. (1983). *Volcanoes in the Sea: The Geology of Hawai'i.* 2nd Edition. Honolulu: University Press, 517 p.

Maly, K. (1996). *Historical Documentary Research*. Appendix A in Henry, Wolforth and Rosendahl (1996).

Newman, T.S. (1970). *Hawaiian Fishing and Farming on the Island of Hawai'i in A.D. 1778.* Department of Land and Natural Resources, Division of State Parks.

NOAA (National Oceanic and Atmospheric Administration) (2002) *CLIMATOGRAPHY OF THE UNITED STATES NO. 81: Monthly Station Normals of Temperature, Precipitation, and Heating and Cooling, Degree Days: 1971 - 2000*. 51 Hawaiʻi. 21 p.

Pukui, M., S. Elbert and E. Moʻokini. (1976). *Place Names of Hawaiʻi.* University of Hawaiʻi Press, Honolulu.

R.W. Beck, Inc. (2006). *20-Year Water Master Plan, County of Hawaii Department of Water Supply.*

Sato, H.H., W. Ikeda, R. Paeth, R. Smythe, and M. Takehiro, Jr. (1973) *Soil Survey of the Island of Hawaii, State of Hawaii.* U.S. Dept. of Agriculture, Soil Conservation Service in cooperation with the University of Hawaiʻi Agricultural Experiment Station.

State of Hawaiʻi (2002a) *Hawaii Statewide GIS Program.* Hazard Layer. URL:http://www.state.hi.us/dbedt/gis/hazard.htm

––– (2002b) *Hawaii Statewide GIS Program.* Office of Planning, Department of Business, Economic Development and Tourism. URL: http://www.hawaii.gov/dbedt/gis/

––– (2002c) *(ALISH) Maps.* URL: http://www.state.hi.us/dbedt/gis/misc**maps**.htm

USGS (United States Geological Survey) (2006). Earthquake Hazards Program website. URL: http://earthquake.usgs.gov/eqcenter/

––– (June 2000). Fact Sheet 169-97, Online Version 1.1, revised.

––– (1997). *Earthquake Hazards.* Compiled by USGS Staff Kathie Watson. URL: http://pubs.usgs.gov/ gip/hazards/earthquakes.html

––– (1987) *Lava Flow Hazard Zone Maps.* Compiled by USGS Staff members Donal Mullineaux and Donald Peterson. URL: http://pubs.usgs.gov/gip/hazards/maps.html

7.0 PARTIES CONSULTED

Copies of this *Draft EA* are being mailed to the organizations specified in the office of Environmental Quality Control’s Distribution List for Draft EAs (see Table 7.1). Notice of the *Draft EA* will be printed in the *Environmental Notice* published by the State Office of Environmental Quality Control. The public will have 30 days from the publication date to comment on the proposed project in accordance with HRS Chapter 343.

Table 7.1 Draft EA Distribution List

Federal Agencies	
Environmental Protection Agency, Pacific Islands Contact Office	District Engineer, U.S. Army Engineer District, Honolulu
U.S. Department of Agriculture, Natural Resources Conservation Service	U.S. Fish & Wildlife Service, Pacific Island Eco-Region
District Chief, Geological Survey, Department of the Interior	
State Agencies	
Office of Environmental Quality Control (4 copies)	Department of Business and Economic Development & Tourism, Planning Office
Department of Hawaiian Home Lands	Department of Health, Clean Water Branch
Office of Hawaiian Affairs	Department of Health, Environmental Planning Office (3 copies)
Department of Accounting and General Services	Department of Health, Safe Drinking Water Branch
Department of Agriculture	Department of Land and Natural Resources (5 copies)
Commission on Water Resource Management	DLNR Historic Preservation Division
Department of Transportation	Environmental Center, University of Hawai‘i
	Water Resources Center, University of Hawai‘i
County of Hawai‘i	
Planning Department	Fire Department
Department of Public Works	Police Department
Department of Parks and Recreation	Department of Environmental Management, Solid Waste Division
Utilities	
Hawaiian Electric Light Company	Hawaiian Telcom
Libraries and Depositories	
Hawai‘i State Library Hawai‘i Documents Center	Hilo Regional Library
University of Hawai‘i, Hilo Campus Library	Mountain View Public Library
DBEDT Library	

Copies of the DEA will also be sent to the landowners that abut the project sites and the existing access road nearest to the proposed electrical extension. Table 7.2 lists the owners and Tax Map Key numbers of these neighbors.

Table 7.2 Neighboring Landowners Sent Copies of the Draft Environmental Assessment

Landowner Name	*Property Tax Map Key(s)*
B P Bishop Estate Trustees	1-6-003:012
Nathan & Enid Saiki	1-7-006:007
Dione W. Perreira	1-7-009:029
Clyde K. Eborn Trust	1-7-010:014
Ann Ignacio	1-7-013:087
Davis Family Trust	1-7-013:106
Murray Lee Family Trust	1-8-001:022
Minnie Galante	1-8-001:023
Paulino & Audrey Villanueva	1-8-001:024
Yasuko Trust Niimi	1-8-005:047
Charles & Barbara Bostwick	1-8-005:095
Laurel L Prudholm	1-8-005:102
Clesson Y Chikasuye	1-8-008:002
State of Hawaiʻi, Conservation Land	1-8-008:021
Arthur and Nittaya Frechette	1-8-008:024

Source: Hawaiʻi County Real Property Tax Office

APPENDIX A. PUMP TEST DATA FROM ‘ŌLA‘A #6 EXPLORATORY WELL

State of Hawaii
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources

WELL COMPLETION REPORT - PART I
Well Construction

For Official Use Only:

Instructions: Please print in ink or type and send completed report (with attachments, if applicable) to the Commission on Water Resource Management, P.O. Box 621, Honolulu, Hawaii 96809. The Commission may not accept incomplete reports. This form shall be submitted within 60 days of the completion of work. For assistance, please consult the Hawaii Well Construction and Pump Installation Standards or call the Regulation Branch at 587-0225. For updates to this form or additional information, please visit our website at http://www.hawaii.gov/dlnr/cwrm/

1. State Well No.: **3306-02** Well Name: **Olaa 6 Exploratory Well** Island: **Hawaii**
2. Address: **Mountain View** Tax Map Key: **1-8-1: 050**
3. Drilling Company: Water Resources International, Inc.
4. Drilling method used during contruction: ☒ Rotary ☐ Percussion ☐ Other (describe)
5. Date Well Construction (drilled,cased,grouted) completed: 5-13-2005 (month/day/year) **Fill out attached Driller's Log**

   In addition to the driller's log, if a geologic log was prepared, please submit with this form.
6. Was the subject well cored? ☐ Yes ☒ No
7. Initial water-level encountered 1,250' ft. below ground Date and time of measurement: 10/22/2004 7:00 a.m., (month/day/year time)
8. Step-Drawdown Test completed? ☐ No ☒ Yes **Attach Step-Drawdown Test form (*12/17/97 SDPTD Form*)**
9. Constant Rate Aquifer Test completed? ☐ No ☒ Yes **Attach Constant Rate Aquifer Test form (*12/17/97 CRPTD Form*)**

Parameters prior to pump test:

10. Water-level: 121.22 ft. above msl Date and time of measurement: 4/19/2005 3:38 p.m. (month/day/year time)
11. Chloride: EC 94.6/TDS 50.1 ppm Date and time of sampling: 4/19/2005 3:43 p.m. (month/day/year time)
12. Temperature: 67.10 °F Date and time of measurement: 4/19/2005 8:30 p.m. (month/day/year time)
13. **Fill in the as-built section on the other side of this sheet.**
14. **Fill in attached surveyor's report.**
15. If a pump is not planned to be installed, please describe (below in the remarks section) how well is secured to prevent unauthorized access (example: lockable cover, threaded coupling, etc.)
16. The proposed manufacturer's rated pump capacity is n/a gpm at a head of _____ ft. (Attach pump specifications and rating curve)
17. Remarks: Lockable cover with threaded coupling

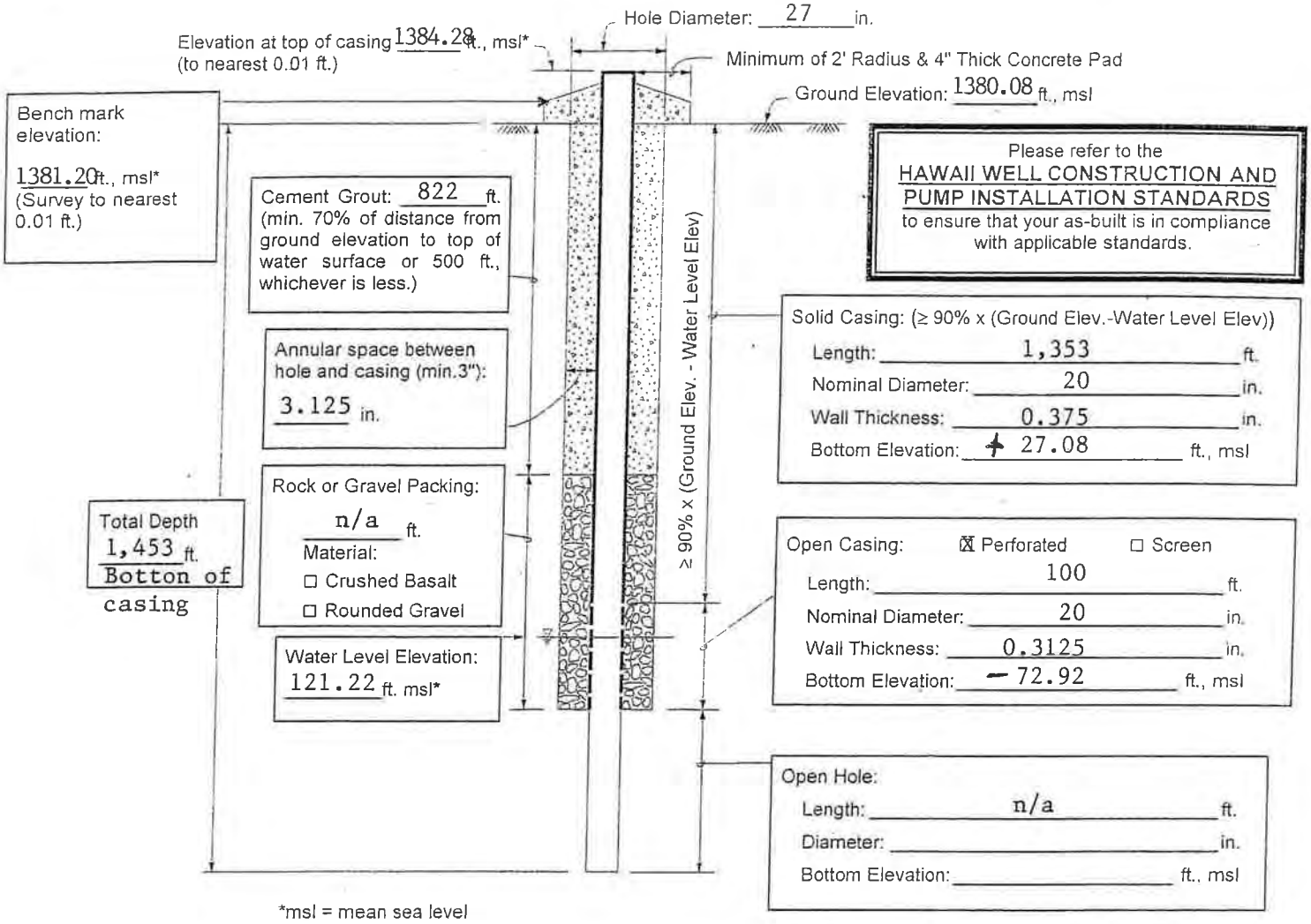
Licensed Driller (print) Blaise Clay C-57 Lic. No. 17737

Signature [signature] Date 8/22/05

Permittee (print) Milton D. Pavao, Manager - Dept. of Water Supply, County of Hawaii

Signature [signature] Date 9/29/05

13. AS-BUILT WELL SECTION *(Please attach as-built if different from diagram provided below)*



*msl = mean sea level

Solid Casing Material:

Carbon Steel: compliant with (*check one or more*): ☐ ANSI/AWWA C200 ☐ API Spec. 5L ☐ ASTM A53 ☒ ASTM A139 1,228 ft

And compliant with (*check one or more*): ☐ ASTM A242 ☐ Type E ☐ Type S ☒ Grade B ☐ Other

Stainless Steel: (*check one*): ☐ ASTM A409 (production wells) ☐ ASTM A312 (monitor wells) ASTM 709, Type 304

ABS Plastic conforming to ASTM F480 and ASTM D1527: (*check one*) ☐ Schedule 40 ☐ Schedule 80 125 ft.

PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (*check one*): ☐ Schedule 40 ☐ Schedule 80 ☐ Schedule 120

Thermoset Plastic: (*check one*)
- ☐ Filament Wound Resin Pipe conforming to ASTM D2996
- ☐ Centrifugally Cast Resin Pipe conforming to ASTM D2997
- ☐ Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
- ☐ Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
- ☐ PTFE Fluorocarbon Tubing conforming to ASTM D3296
- ☐ FEP Fluorocarbon Tubing conforming to ASTM D3296

Open Casing Material:

Carbon Steel: compliant with (*check one or more*): ☐ ANSI/AWWA C200 ☐ API Spec. 5L ☐ ASTM A53 ☐ ASTM A139

And compliant with (*check one or more*): ☐ ASTM A242 ☐ Type E ☐ Type S ☐ Grade B ☐ Other

Stainless Steel: (*check one*): ☐ ASTM A409 (production wells) ☐ ASTM A312 (monitor wells) ASTM 709, Type 304

ABS Plastic conforming to ASTM F480 and ASTM D1527: (*check one*) ☐ Schedule 40 ☐ Schedule 80

PVC Plastic conforming to ASTM F480 and (ASTM D1785 or ASTM D2241): (*check one*): ☐ Schedule 40 ☐ Schedule 80 ☐ Schedule 120

Thermoset Plastic: (*check one*)
- ☐ Filament Wound Resin Pipe conforming to ASTM D2996
- ☐ Centrifugally Cast Resin Pipe conforming to ASTM D2997
- ☐ Reinforced Plastic Mortar Pressure Pipe conforming to ASTM D3517
- ☐ Glass Fiber Reinforced Resin Pressure Pipe conforming to AWWA C950
- ☐ PTFE Fluorocarbon Tubing conforming to ASTM D3296
- ☐ FEP Fluorocarbon Tubing conforming to ASTM D3296

EPTG Form 1983/2004

STEP DRAWDOWN PUMP TEST DATA

(not required for wells producing < 100,000 gpd or 70 gpm)

Pumped Well No. 6

Pumped Well name Olaa Expl. Well

Target Q 750,900,1050,1200 gpm

Observation Well No. _____

Distance between Obs. & Pumped Well _____ ft

Reference pt. for depth to water Elev. 1390.89 RT ft msl

Static Water Level @ start of test _____ ft msl

Water level measurements by: ☐ electrical sounder ☐ pressure transducer ☒ sounder 121.22

START TEST Date: 19 April 2005 Time of day 10:12a

Flow Meas. Reading Start 38744300 gallons

Suggested Elapsed time t (min)	Actual Elapsed Time t (min)	Depth to water (adjusted to datum)	Drawdown s (adjusted to datum)	Pumping rate Q (gal/min) Step (gpm)	SC (umhos)	Cl (mg/l)	Temp. ___°F or ___°C	Data in this table is for ☐ Pumped Well ☐ Observation Well Remarks
-45				0				Start test/ Step 1
-30				0				
-15				0				
0	0	1258.86	0					Start pump @ 10:12a
1	1	1257.35	1.51	748				
1.5		1257.35	1.51	748				
2	2	1257.35	1.51	748				
2.5		1257.35	1.51	748				
3	3	1257.35	1.51	748				
4	4	1257.35	1.51	748				
5	5	1257.23	1.63	748				
6	6	1257.23	1.63	748				
7	7	1257.23	1.63	748				
8	8	1257.11	1.75	748				
10	10	1257.11	1.75	748				
15	15	1258.28	.58	748				
20	20	1257.59	1.27	748				
25	25	1258.06	.80	748				
30	30	1258.28	.58	748				Chloride sample taken
	35	1258.28	.58	748				Step 1 begin
	40	1258.28	.58	748				
	45	1258.28	.58	748				

SSP10 Form 4/8/2004

Suggested Elapsed time t (min)	Actual Elapsed Time t (min)	Depth to water (nearest 0.1 ft)	Drawdown s (unadjusted to nearest 0.1 ft)	Pumping rate Q (at least 3 steps) (gpm)	EC (uS/cm)	Cl (mg/L)	Temp ___°F or ___°C	Data in this table is for: ☐ Pumped Well ☐ Observation Well Remarks
	50	1258.28	.58	748				
	55	1258.28	.58	748				Water meter @ 38786200
11:12a	60	1258.28	.58	748				Increase GPM to 900
	65	1258.28	.58	900				
	70	1258.28	.58	900				
	75	1258.28	.58	900				
	80	1258.28	.58	900				
	85	1258.28	.58	900				
	90	1258.28	.58	900				
	95	1258.28	.58	900				TDS= 54.8
	100	1258.28	.58	900	103.4			Sample #2
	105	1258.28	.58	900				
	110	1258.28	.58	900				
	115	1258.16	.70	900				Water meter @ 38841500
12:11p	120	1258.16	.70	900				Increase GPM to 1070
	125	1258.16	.70	1070				
	130	1258.06	.80	1070				
	135	1258.06	.80	1070				
	140	1258.06	.80	1070				
	145	1258.06	.80	1070				
	150	1258.06	.80	1070				
	155	1258.06	.80	1070				
	160	1258.06	.80	1070				
	165	1258.06	.80	1070				
	170	1258.06	.80	1070				TDS= 53.6
	175	1258.06	.80	1070	101.6			Sample #3
1:10p	180	1258.06	.80	1070				Increase GPM to 1200
	185	1257.93	.93	1200				Water meter @ 38909200
	190	1257.93	.93	1200				
	195	1257.93	.93	1200				
	200	1257.93	.93	1200				
	205	1257.93	.93	1200				

SDPTD Form 10/23/2004

Suggested Elapsed time t (min)	Actual Elapsed Time t (min)	Depth to water (nearest 0.1 ft)	Drawdown S (unadjusted (nearest 0.1 ft)	Pumping rate Q (at least 3 steps) (gpm)	EC (µmhos)	Cl⁻ (mg/l)	Temp. ___ °F or X °C	Data in this table is for: ☒ Pumped Well ☐ Observation Well Remarks
	210	1257.93	.93	1200				
	215	1257.93	.93	1200				
	220	1257.93	.93	1200				
	225	1257.93	.93	1200				
	230	1257.93	.93	1200				
	235	1257.93	.93	1200				
2:12p	240	1257.93	.93	1200				Stop SDPTD
								Water meter @ 38981800
								Max possible duration: water level + cavity fill not stable for any 24 period
								Begin recovery data next page
								Flow meter reading at end of pumped period: 38981800 gals

Pumping Duration: 240 ☐
Minimum length of step period: 30 min Pumping rate
Minimum measurements: Drawdown ☒ Pump adjustment/sampling at end of every step
Use same testing procedure: ☒ Yes ☐ No for recovery

DOH/CWB Form 10/25/2004

Suggested elapsed time t (min)	Actual elapsed time t (min)	Depth To Water (nearest 0.1 ft)	Recovery Drawdown s (unadjusted to nearest 0.1 ft)	Pumping rate Q (gpm)	EC (umhos)	Cl⁻ (mg/l)	Temp. ___ °F or ___ °C	Data in this table is for: ☒ Pumped Well ☐ Observation Well Remarks
0	0	1257.93	.93	0				Pump off, start recovery
1		1258.45	.47	0				
1.5		1258.45	.47	0				
2		1258.45	.47	0				
2.5		1258.86	-0-	0				
3		1259.10	+.24	0				Water surged above static
4		1259.44	+.58	0				
5		1259.10	+.24	0				
6		1258.86	-0-	0				
7		1258.62	.24	0				
8		1258.86	-0-	0				
10		1258.86	-0-	0				
15		1258.86	-0-	0				
20		1258.86	-0-	0				
25		1258.86	-0-	0				
30		1258.86	-0-	0				
45		1258.86	-0-	0				
50		1258.86	-0-	0				
60		1258.86	-0-	0				
70				0				
80				0				
90				0				
100				0				
150				0				
200				0				
250				0				X % Recovery achieved ☐ 90% recovery not achieved

END TEST Date 19 April 2005 Time of day 3:12p

ADDITIONAL REMARKS

Person in charge of well test (print): Steve Bowles (Waimea Water Co.)

Signature: _____

The undersigned hereby certifies that to the best of his/her knowledge and belief the information contained herein is true, complete and accurate.

CONSTANT-RATE PUMP TEST DATA

(not required for wells producing < 50 gpm)

Pumped Well No 6

Pumped Well Name Olaa expl. well

Target Q 1150/1200 gpm

Observation Well No

Distance between Obs. & Pumped Well ____ ft.

Reference pt. for depth to water Elev. 1390.89 RT ft. msl

Static Water Level @ start of test ____ ft. msl

Water level measurements by: ☐ electrical sounder ☐ pressure transducer ☒ airline 121.22

START TEST Date: 19 April 2005 Time of day: 3:38p

Flow Meter Reading Start 38981800 gallons

Suggested elapsed time t (min)	Actual elapsed time t (min)	Depth to water (nearest 0.01 ft)	Drawdown s (unadjusted to nearest 0.01 ft)	Pumping rate Q (gpm)	EC (µmhos)	Cl (mg/l)	Temp. ___ °C or X °C	Data in this table is for: ☒ Pumped Well ☐ Observation Well Remarks
-45								Start test
-30								
-15								
0	3:38p 0	1258.86	0.00					Start pump/Cl taken
1		1257.11	1.75					
1.5		1257.23	1.63					
2		1258.16	.70					
2.5		1258.16	.70					
3		1258.16	.70					Water to Surface in 3min.16sec.
4		1258.06	.80		94.6			TDS= 50.1
5		1258.06	.80	1209				
6		1258.06	.80					
7		1257.93	.93					
8		1257.93	.93					
10		1257.93	.93					
15		1257.93	.93					
20		1257.93	.93					
25		1257.93	.93					
30	4:08p	1257.93	.93	1209				
40		1257.93	.93					
50		1257.93	.93					
60	4:38p	1257.93	.93	1209				

GRPTD Form 10/28/2004

	Suggested elapsed time t (min)	Actual elapsed time t (min)	Depth to water (nearest 0.1 ft)	Drawdown S (unadjusted to nearest 0.1 ft)	Pumping rate Q (gpm)	EC (umhos)	Cl⁻ (mg/l)	Temp. ___ °F or X °C	Data in this table is for ☒ Pumped Well ☐ Observation Well Remarks
	70		1257.93	.93	1195				
	80		1257.93	.93					
	90		1257.93	.93	1195				
	100		1257.93	.93					
	150	6:00p	1257.93	.93	1146				
	200		1257.93	.93	1150				
	250		1257.70	1.16	1151				
	300		1257.47	1.39	1150	101.5		19.5	
	400		1257.47	1.39	1146	101.3		18.7	Cl⁻ sample taken
4-20-05	500	1:30a	1257.47	1.39	1158	100.9		17.7	
	600		1257.70	1.16	1150	101.1		17.5	
	700		1257.70	1.16	1150	105.8		16.4	
	800		1257.70	1.16	1153	101.7		16.6	Cl⁻ sample taken
	900		1257.47	1.39	1148	102.3			
	1000	9:00a	1257.70	1.16	1151	105.7			Cl⁻ sample taken
	1500		1257.93	.93	1141	98.9		18.7	Cl⁻ sample taken
4-21-05	2000	2:00a	1257.70	1.16	1139	101.9		18.0	Cl⁻ sample taken
	2500		1257.70	1.16	1145	99.9		18.8	Cl⁻ sample taken
4-21-05	3000	8:30p	1257.93	.93	1139	94.6		18.8	Cl⁻ sample taken
4-22-05	4000	12:30p	1257.93	.93	1147	99.4		19.0	Cl⁻ sample taken
4-22-05	4240	3:40p	1257.93	.93	1139	99.4			Cl⁻ sample taken
	6000								Cl⁻ sample taken
	7000								Cl⁻ sample taken
	8000								Cl⁻ sample taken
	9000								Cl⁻ sample taken
	10000								Max possible duration. Water level or quality did not stabilize for any 24 period
									Begin recovery data next page Flow meter reading at end of pumped period: 43918600 gal.

[illegible] squared

[illegible] drawdown [illegible]

CRPTD Form 10/23/2004

Suggested elapsed time t (min)	Actual elapsed time t (min)	Depth to water (nearest 0.1 ft)	Recovery Drawdown S (unadjusted to nearest 0.1 ft)	Pumping rate Q (gpm)	EC (µmhos)	Cl⁻ (mg/l)	Temp ___°F or ___°C	Data in this table is for: ☒ Pumped Well ☐ Observation Well Remarks
0	3:40p 0	1257.93	.93	0			.	Start recovery
1		1258.45	.47	0			.	
1.5		1258.45	.47	0			.	
2		1258.45	.47	0			.	
2.5		1258.86	-0-	0			.	
3		1259.10	+24	0			.	
4		1259.44	+58	0			.	
5		1259.10	+24	0			.	
6		1258.86	-0-	0			.	
7		1258.62	.24	0			.	
8		1258.86	-0-	0			.	
10		1258.86	-0-	0			.	
15		1258.86	-0-	0			.	
20		1258.86	-0-	0			.	
25		1258.86	-0-	0			.	
30		1258.86	-0-	0			.	
40		1258.86	-0-	0			.	
50		1258.86	-0-	0			.	
60	5:40p	1258.86	-0-	0			.	
70				0			.	
80				0			.	
90				0			.	
100				0			.	
150				0			.	
200				0			.	
250				0			.	X 90% recovery achieved ☐ 90% recovery not achieved

END TEST Date: 22 April 2005 Time of day: 4:40p

ADDITIONAL REMARKS: None

Person in charge of pump test (print): Steve Bowles (Waimea Water Co.)

Signature: _____

The signature above indicates that the data reported on this form is accurate and true to the best of my knowledge. We operated the pump last.

DRILLER'S LOG

WELL NUMBER: J-503

Depths (ft.)	Rock Description, Water Level, etc.	Date 04
15' to 20'	Blue - Ex hard	8-5-4
20 to 30	BLK-Rd HARD	8-6
30 to 40	BLK-Rd "	"
40 to 57	BLK-Rd HARD	8-9
57 to 59	PUKA Lost Circ	"
59 to 64	HARD	"
64 to 71	HARD	8-10
71 to 76	Soft	"
76 to 85	med	"
85 to 93	soft	"
93 to 101	HARD	"
101 to 106	med	8-11
106 to 109	HARD	"
109 to 110	Ex HARD RATTY	"
110 to 116	med - RATTY	"
116 to 119	med	"
119 to 122	hard-RATTY	"
122 to 123	X-hard-RATTY	8-12

Depths (ft.)	Rock Description, Water Level, etc.	Date 06
123 to 126	med RATTY	8-12
126 to 127	hard	"
127 to 131	Ex HARD	"
131 to 137	HARD	"
137 to 140	HARD	8-13
140 to 146	soft	"
146 to 154	med (regain circulation - 150 BLK RD)	"
154 to 159	X hard (Blue)	8-16
159 to 160	hard "	"
160 to 162	med "	"
162 to 169	soft "	"
169 to 172	med Blue	"
172 to 176	HARD	8-17
176 to 183	soft (170-180 BLK-RD)	"
183 to 188	med (180-190 BLK-RD)	"
188 to 194	soft	"
194 to 197	med (197-200 maroon)	"
197 to 200	X hard	"

Remarks:

DRILLER'S LOG

WELL NUMBER: OLAA #6

Depths (ft.)	Rock Description, Water Level, etc.	Dates 04
200 to 201	med	8-18
201 to 205	soft (200-210 maroon + BLK)	"
205 to 213	med	"
213 to 214	X hard (210-220 maroon BLK-RD)	"
214 to 220	hard	"
220 to 223	hard (220-230 maroon BLK-RD)	"
223 to 228	hard	8-19
228 to 231	hard	"
231 to 233	X hard (230-240 maroon BLK-RD)	"
233 to 242	med	8-23
242 to 244	soft (240-250 BLK-GRY RD)	"
245 to 250	med	"
250 to 257	soft (250-260 maroon Br. BLK RD)	"
257 to 258	med	"
258 to 274	soft (260-270 Same as above)	
274 to 279	soft (270-280 RD. BLK Br.)	"
279 to 284	med (280-290 BLK GRY RD)	"
284 to 292	med	8-24

Depths (ft.)	Rock Description, Water Level, etc.	Dates 04
292 to 295	med (290-300 BLK RD)	8-24
295 to 302	soft (310-320 Rd. Br. BLK)	"
302 to 312	med	"
312 to 325	soft (320-330 Rd Br BLK)	"
325 to 342	soft	"
342 to 346	med (330-340 Rd Gry Br)	"
346 to 355	med (340-350 BLK. Gry Brn Grn)	"
355 to 360	soft (350-360 BLK GRY Grn)	"
360 to 364	soft (360-370 GRY GRN)	8-25
364 to 376	med (370-380 RD Gry Grn BLK)	"
376 to 402	med (380-390 Rd Gry Grn)	"
402 to 409	soft (390-400 med)	"
409 to 418	med GRY GRN Rd	"
418 to 420	hard (400-410 Gry Mrn Rd)	8-26
420 to 423	soft (410-420 MRN. GRY.)	"
423 to 441	hard	"
441 to 445	med (420-430 BLK MRN)	"
445 to 449	soft (430-440 Bleu Red)	"
449 - 460	med (440-450 BLK + RD) (450-460 GRY BLK RD)	8-26

Remarks:

DRILLER'S LOG

WELL NUMBER: _____

Depths (ft.)	Rock Description, Water Level, etc.	Dates
460 to 461	med (460-470 Grn Brn Rd)	8-30
461 to 472	soft (470-480 Grn Brn Rd)	"
472 to 481	med (480-490 Blk Brn Rd Grn)	
481 to 498	med (490-500 Blk Rd Brn Grn)	"
498 to 502	(soft 500-510)	
502 to 513	med (Blk, Mrn, Rd)	8-31
513 to 517	soft (510-520 Blk Mrn Rd)	9-1
517 to 530	med (520-530 same as below)	"
530 to 533	hard (530-540 Blk Brn Rd Grn)	"
533 to 543	soft (540-550 Blk Rd Grn)	"
543 to 549	soft (550-560 Blk Rd Grn)	"
549 to 565	hard	"
565 to 574	med (560-570 Blk Rd Grn)	9-2
574 to 576	hard (570-580 Blk Mrn Brn)	9-3
576 to 578	soft (580-590 Blk Rd)	"
578 to 581	hard	"
581 to 600	soft (590-600 Rd, Blk, Brn)	"
600 to 615	med (600-620 Blk, Brn Rd Grn)	"
615 to 630	soft (630-640 Blk Rd Gr)	9-3
630 to 635	(620-630 Blk Rd Grn)	"
635 to 648	med	"
648 to 654	med (640-650 Blk Brn Rd Grn)	9-7
654 to 657	hard (650-660 same as above)	"
657 to 662	med (660-670 Blk, Mrn, Brn Grn)	"
662 to 665	soft	"
665 to 675	med (670-680 Brn Blk Rd)	"
675 to 678	med-hard (680-690 Brn Blk Rd)	"
678 to 680	med	"
680 to 684	med hard (680 690 Blue Rock)	"
684 to 691	med (690-700 Blk Rd brn)	9-8
691 to 694	med (700-720 Blk Brn Rd)	"
694 to 695	soft	"
695 to 701	med	"
701 to 705	hard	"
705 to 706	med	"
706 to 712	soft	"
712 to 713	med	
713-715	hard	9-8-04
715-723	med	

Remarks:

DRILLER'S LOG

WELL NUMBER: _____

Depths (ft.)	Rock Description, Water Level, etc.	Dates
723 to 729	med (720-780 BLK Brn Rd MAROON)	9-27
729 to 741	med soft	"
741 to 778	med	
778 to 782	hard (780-790 BLK Brn)	9-28
782 to 783	soft	"
783 to 784	hard	
784 to 785	med (790-830 BLK Brn RD Mrn)	
785 to 786	hard	
786 to 788	med	
788 to 794	hard	
794 to 797	soft	
797 to 800	hard	
800 to 806	med	
806 to 817	soft	
817 to 818	hard	
818 to 822	soft	
822 to 827	hard	
827 to 828	hard	9-29

Depths (ft.)	Rock Description, Water Level, etc.	Dates
828 to 829	med	9-29
829 to 832	hard (830-840 Blue Mrn Grn)	"
832 to [illegible]	Ex hard	
[illegible] to [illegible]	hard (840-850 RD BLK Brn)	
[illegible] to 848	med	
848 to 864	soft	
864 to 875	med (850-860 BLK Brn RD MRN GRN)	
875 to [illegible]	hard	
876 to [illegible]	soft (860-870 same)	9-30
[illegible] to [illegible]	hard	" 870-890 SAME
895 to [illegible]	med (890-900 Blu Brn)	"
906 to 912	hard	10-1-04
912 to 915	med (900-910 Blu Brn)	"
915 to 919	soft (910-920 " SAME)	"
919 to 925	med (920-930 BLK Brn Rd)	"
925 to 927	soft	"
927 to 929	hard (930-940 BLK Rd Brn)	
929 to 933	med (940-950 BLK Brn RD MRN, Grn)	
933-937	hard	"
937-938	med	"
938-941	hard	
941-945	med	
945-946	hard	
946-947	Ex hard	
947-957	soft	
957-958	hard	
958-967	med — 10-1-04	

Remarks:

DRILLER'S LOG

WELL NUMBER: _____

Depths (ft.)	Rock Description, Water Level, etc.	Dates
969 to 973	soft (960-970 BLK BRN RD)	10-4
973 to 977	med (970-980 BLK Brn RD MRN GRN)	"
977 to 1000	soft	"
1000 to 1005	soft (980-990 BLK MRN GRN Rd)	"
1005 to 1010	med	"
1010 to 1022	hard (990-1000 BLK MRN GRN)	"
1022 to 1023	med (1000-1010 BLK MRN RD)	"
1023 to 1029	soft (1010-1020 BLK MRN)	"
1029 to 1039	med (1020-1030 BLK MRN)	10-5
1039 to 1042	soft (1030-1060 BLK Br. Mrn)	"
1042 to 1051	med	"
1051 to 1056	hard	"
1056 to 1058	med (1060-1080 BLK MRN BRN)	"
1058 to 1062	soft	"
1062 to 1066	hard	"
1066 to 1068	Ex hard (1080-1090 BLK. Brn)	"
1068 to 1082	med	"
1082 to 1092	soft	10-5
1092 - 1097	med	"

Remarks:

Depths (ft.)	Rock Description, Water Level, etc.	Dates
1097 to 1100	med (1090-1100 BLK Brn Mrn)	10-6-04
1100 to 1103	soft	"
1103 to 1111	med (1100-1110 BLK Brn Rd)	"
1111 to 1114	soft (1110-1120 BLK Brn Mrn)	"
1114 to 1119	hard	"
1119 to 1126	soft (1120-1130 BLK Brn Rd, Grn)	"
1126 to 1134	med (1130-1140 BLK Brn Grn)	"
1134 to 1140	soft	"
1140 to 1145	med (1140-1150 BLK Mrn)	"
1145 to 1146	soft	"
1146 to 1147	med (1150-1160 BLK, Brn Rd Grn)	"
1147 to 1151	soft	"
1151 to 1159	hard	"
1159 to 1163	soft	"
1163 to 1168	med	"
1168 to 1172	hard	10-7
1172 to 1179	soft (1160-1190 BLK Rd BRN)	"
1179 to 1181	hard	"
1181 - 1191	med	
1191 - 1193	hard (1190-1200 BLK Brn Rd GRN)	"
1193 - 1201	med	"
1201 - 1209	med (1200-1210 Rd Brn)	"
1209 - 1218	med - hard	10-7

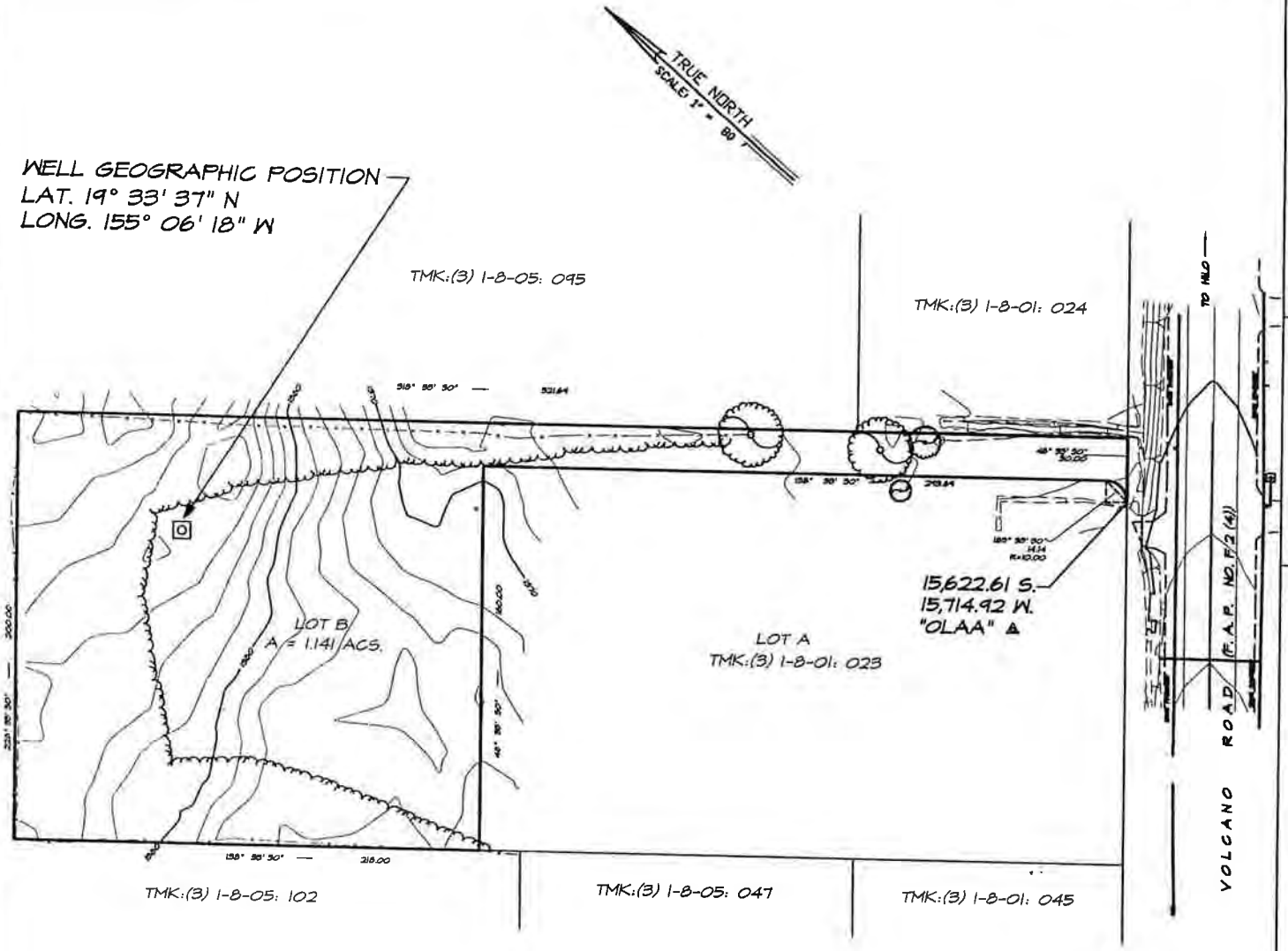
DRILLER'S LOG

WELL NUMBER: 01AA

Depths (ft.)	Rock Description, Water Level, etc.	Dates
1216 to 1219	hard (1210 - 1220 Blk Rd Grn)	10-19
1219 to 1221	med (1220 - 1230 Blk Brn Rd Mrn)	"
1221 to 1224	hard (1230 - 1240 Blk Brn Mrn)	"
1224 to 1229	soft (1240 - 1250 Blk Rd. Brn Grn)	"
1229 to 1232	hard	RED ZONE
1232 to 1235	soft (1250 - 1260 Blk Rd Brn Grn)	
1235 to 1244	hard (1260 - 1270 Rd Blk Grn)	"
1244 to 1249	med	"
1249 to 1250	hard (1270 - 1280 Blk. Rd. Brn)	"
1250 to 1269	soft	"
1269 to 1272	med	"
1272 to 1273	hard	"
1273 to 1278	med	"
1278 to 1285	soft	"
1285 to 1294	med	10-20
1294 to 1307	soft (1280 - 1290 Rd Blk Grn)	"
1307 to 1308	med (1290 - 1300 Blk Rd Grn)	"
1308 to 1312	hard	"
1312 - 1330	med (1300 - 1310 Blk. Rd)	"
1330 - 1333	Ex hard	"
1333 - 1346	Soft (1310 - 1320 Rd Brn Blk)	"
1343 - 1352	hard (1320 - 1330 Rd Mrn Grn)	
	(1330 - 1340 Rd Blk)	
	(1340 - 1350 Rd. Blk)	

Depths (ft.)	Rock Description, Water Level, etc.	Dates
1352 to 1355	hard (1350 - 1370 Blk Rd, Brn Grn)	10-21
1355 to 1364	Ex hard	"
1364 to 1367	hard	"
1367 to 1370	med	"
1370 to 1371	Ex hard	"
1371 to 1373	hard	"
1373 to 1374	hard	10-22
1374 to 1378	med (1370 - 1380 Blk RD Brn)	"
1378 to 1382	hard	
1382 to 1387	soft (1380 - 1390 Rd Blk)	" RED ZONE
1387 to 1389	med	
1389 to 1393	soft (1390 - 1400 Rd Blk Grn)	"
1393 to 1398	med	"
1398 to 1409	soft (1400 - 1410 Blk Rd Grn)	"
1409 to 1410	hard	"
to		
to		
to		

Remarks:

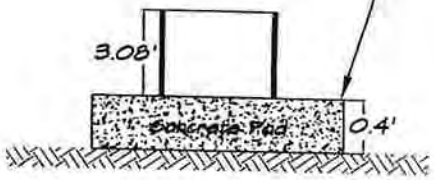


PLOT PLAN

(Provide Latitude and Longitude of well referenced to NAD27 to nearest second)

Well Elevation

Benchmark Elevation 1381.20 FT.
(0.01 ft. above msl)



Benchmark reference control point

USGS Bench Mark
Mean Sea Level (MSL)

Surveyor's stamp and signature

RONALDO B. AURELIO
LICENSED PROFESSIONAL LAND SURVEYOR
No. 7564
HAWAII, U.S.A.

This work was prepared by me or under my direct supervision.

RONALDO B. AURELIO
Licensed Professional Land Surveyor
Certificate Number 7564
Expires April 30, 2006

AUGUST 4, 2005

APPENDIX B. WATER QUALITY DATA FROM ‘ŌLA‘A #6 EXPLORATORY WELL

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Laboratory Report

for

Hawaii Department of Water Supply (Hilo)
25 Aupuni St.

Hilo , HI 96720

Attention: Mae Kise
Fax: (808) 961-8759

DATE OF ISSUE
MAY 1 2 2005
MWH LABORATORIES

JCH Jim Hein
Project Manager

ACCREDITED IN ACCORDANCE WITH nelac 01114CA

Report#: 146881
PHASEV

Laboratory certifies that the test results meet all **NELAC** requirements unless noted in the Comments section or the Case Narrative. Following the cover page are Comments,QC Report,QC Summary,Data Report,Hits Report, totaling 40 page[s].

MWH Laboratories
MONTGOMERY WATSON HARZA

CHAIN OF CUSTODY RECORD

146881

750 Royal Oaks, Suite 100
Monrovia, California 91016
Phone: (626) 386-1100
(800) 566-5227
Fax: (626) 386-1101

MWH LABS USE ONLY:

LOGIN COMMENTS: T-B's for S24.

SAMPLES CHECKED AGAINST COC BY: T-F

SAMPLES LOGGED IN BY: MLD

SAMPLE TEMP WHEN REC'D AT LAB: 6° (Compliance: 4 +/- 2°C)

SAMPLES REC'D DAY OF COLLECTION? ☐ (check for yes)

CONDITION OF BLUE ICE: FROZEN ✓ PARTIALLY FROZEN ___ THAWED ___

TO BE COMPLETED BY SAMPLER:

COMPANY, UTILITY or PROJECT: DEPT. OF WATER SUPPLY, COUNTY OF HAWAII

SYSTEM #:

COMPLIANCE SAMPLES (check for yes) X
- Requires state forms ☐

NON-COMPLIANCE SAMPLES (check for yes) ☐
REGULATION INVOLVED: SDWA (eg. SDWA, Phase V, NPDES, FDA,...)

Type of samples (circle one): (ROUTINE) SPECIAL CONFIRMATION

MWH LABS CLIENT CODE: HAWAII

P.O.# / JOB # / PROJECT : CONTRACT 2002-02

SEE ATTACHED BOTTLE ORDER FOR ANALYSES ☐ (check for yes), OR

LIST ANALYSES REQUIRED BELOW (enter number of bottles sent for each test for each sample):

SAMPLER PRINTED NAME AND SIGNATURE: M. KISE

TAT requested: rush by adv notice only

STD___ 1 week ___ 3 day ___ 2 day___ 1 day ___

SAMPLE DATE	SAMPLE TIME	STATION # or LOCATION	SITE NAME OR SAMPLE I.D.	MATRIX*	GRAB	COMP		SAMPLER COMMENTS
4/20/05	1510	WELL HEAD	OLAA #6 WELL (EXPLORATORY)	RGW	X		NEW SOURCE TESTING	

Orig 4/22/05

* DID NOT RECEIVE METAL CONTAINER MLD 4-22-05
- GOT SOME FROM IC UNPRESERVED CONTAINER AND PRESERVED W/ HNO3 IN HOUSE MLD 4-22-05

*** MATRIX TYPES:**
RSW = Raw Surface Water; CFW = Chlor(am)inated Finished Water; CWW = Chlorinated Waste Water; BW = Bottled Water; SO = Soil
RGW = Raw Ground Water; FW = Other Finished Water; WW = Other Waste Water; SW = Storm Water; SL = Sludge

	SIGNATURE	PRINT NAME	COMPANY/TITLE	DATE	TIME
RELINQUISHED BY:		MAE KISE	HI COUNTY DWS / MICRO.IV	4/20/05	1510 hrs
RECEIVED BY:		OREN TSUNEZUMI	HI COUNTY DWS / MICRO.I	4/21/05	1100 HRS
RELINQUISHED BY:		OREN TSUNEZUMI	HI COUNTY DWS / MICRO. I	4/21/05	1100 HRS
RECEIVED BY:		Terrence S. Lee	MWH	04-22-05	1000
RELINQUISHED BY:					
RECEIVED BY:					

C-O-C# _____

PAGE ____ OF ____

MWH Laboratories
A Division of MWH Americas,Inc.
750 Royal Oaks Drive Suite 100
Monrovia, CA 91016-3629
Ph (626) 386-1100 Fax (626) 386-1095

Date 04/25/05

Submittal Form & Purchase Order 99-16808

***REPORTING REQUIREMENTS:** *Do Not Combine Report with any other samples submitted under different MWH project numbers!*
Report & Invoice must have the MWH Project Number **146881** Sub PO# **99-16808** and Job # **1000023**

Report all quality control data according to Method. Include dates analyzed, date extracted (if extracted) and Method reference on the report.
Results must have Complete data & QC with Approval Signature. See reverse side for List of Terms and Conditions

Ship To **Holly Peepers**
Pace Analytical

1700 Elm Street SE Suite 200
Minneapolis, Minnesota 55414

Bill Recipient FedEx Acct:1797-5692-7

612-607-6407 Fax 612-607-6444

Reports: Michael Lettona Sub-contracting Administrator
EMAIL TO: Michael.Lettona@mwhglobal.com
MWH Laboratories 750 Royal Oaks Dr. Monrovia, CA 91016
Phone (626) 386-1137 Fax (626) 386-1095
Invoices to: MWH LABORATORIES
Accounts Payable PO BOX 7009, Pasadena, CA 91109-7009

Provide in each Report the Specified State Certification # & Exp Date for requested tests + matrix

Hawaii DW

MWH Project #	Report Due:	Sub PO#
146881	05/10/05	99-16808

mgl

	Use MWH Lab # for ID	Client Sample ID for reference only	Analysis Requested	Sample Date & Time	Matrix		Container
1 D1613EDD	2504220057	WELL HEAD OLAA 6 EXPLORATOR	2,3,7,8-Tcdd Dioxin in drinking water 1613b	04/20/05 14:15	dw	1	1L amber glass / no preservative [7day HT for NJ NY UT] 1613B-DW

Relinquished by: Sample Control Date 04/25/05 Time 1:35 MUST HAVE NOTIFICAION IF TEMP IS GREATER THAN 6 OR LESS THAN 2 CELSIUS

Received by: Date Time

An Acknowledgement of Receipt is requested to attn: Michael Lettona

MWH Laboratories, a Divsion of MWH Americas, Inc.
750 Royal Oaks Drive Suite 100
Monrovia CA 91016 (626) 386-1100 FAX (626) 386-1124

Bottle Order for Hawaii Dept. of Water Supply (Hilo)

Group #
Date Sampled
Date Received
1

Jim Hein — Your MWL Project Manager
(626) 386-1149 — Direct Phone/Voice Mail

Client Code HAWAII — HI New Source — ProjectName
Project Code PHASEV
PO# / Job#

BO# 28759

Sampler: please return this paper with your samples

Created by JCH

Order Date 11/26/04

Date Needed bv Client 12/02/06

Date Samples to Arrive at MWL 12/07/04

Ship Sample Kits to
Hawaii Dept. of Water Supply
Micro Lab
889 Leilani St.
Hilo, HI 96720
ATTN: Mae Kise
PHONE: (808) 961-8670

Send Report to
Hawaii Dept. of Water Supply
25 Aupuni St.
Hilo, HI 96720
ATTN: Mae Kise
PHONE: (808) 961-8670
FAX: (808) 961-8759

Billing Address
Hawaii Dept. of Water Supply
Micro Lab
889 Leilani St.
Hilo, HI 96720

# of Samples	Tests	Qteline#	Bottles-Qty for each sample, type & preservative if any	UN DOT #
1	@DIQUAT	264-01	1 1L amber poly/ no preservative	
1	@EDB-DBC	264-02	4 40ml amber glass vials/ no preservative	
1	@VOASDWA	264-04	4 40ml amber glass vials+4 drops of 1:1 HCL	UN 1789
1	@525REG	264-05	2 1L amber glass+ 2 ml of 6N HCl.	UN 1789
1	@ML531.2 PRESERVED ONLY WITH MCAA	264-06	2-40 ml amber vials/ teflon lined screw + 0.38g KH2Citrate+1 drop 8% thio	UN 1750
1	@ML515.4	264-08	2 125ml amber glass+ 7 mg SULFITE xls	
1	@ML505	264-09	4 40ml amber vial + 3-4 mg thiosulfate XLS	
1	ENDOTHAL	264-20	1 250ml amber glass/no preservative	
1	GLYPHOS	264-22	1 125ml amber glass/no preservative	
1	D1613EDD	264-27	2 1L amber glass / no preservative	
1	CNDW	264-16	1 125ml poly +1 ml NaOH (25%)+3 scoops Ascorbic Acid	
1	#MET-HI, CA		1 250ml poly acid rinsed+2 ml HNO3 (18%)	
1	NO2-N, NO3, F, ALK, EC, PH		2 500 mL poly/ no preservative	
1	@VOASDWA TB		TRIP BLANK: 2 40ml amb glass+4 drops 1:1 HCL+DI Water	UN 1789

Comments

SHIPPING:

Label cooler:
NEW SOURCE - SDWA Sampling

te 4/21/05 FedEx Tracking Number 839121381792
nder's me MAE KISE Phone 808 961-8670
Company DEPARTMENT OF WATER SUPPLY
Address 889 LEILANI ST HILO WQACB LAB. Dept./Floor/Suite/Room
HILO State HI ZIP 96720
ur Internal Billing Reference

Code 1 Status shipped Date Shipped 11/30/04 Via FEDX P1 Tracking # 6912 3655 5729 # of Coolers 1 Prepared By Roger Velasco

SCANNED

MWH Laboratories
750 Royal Oaks Drive, Monrovia, CA 91016
PHONE: 626-386-1100/FAX: 626-386-1101

ACKNOWLEDGMENT OF SAMPLES RECEIVED

Hawaii Department of Water Supply (Hilo)
25 Aupuni St.
Hilo, HI 96720
Attn: Mae Kise
Phone: (808) 961-8670

Customer Code: HAWAII
PO#: Contract 2002-02
Group#: 146881
Project#: PHASEV
Proj Mgr: Jim Hein
Phone: (626) 386-1189

The following samples were received from you on **04/22/05**. They have been scheduled for the tests listed beside each sample. If this information is incorrect, please contact your service representative. Thank you for using MWH Laboratories.

Sample#	Sample Id	Matrix	Sample Date
2504220057	WELL HEAD OLAA 6 EXPLORATORY	Water	20-apr-2005 14:15:00
	Tests Scheduled		
	@525REG @DIQUAT @EDB-DBC @ML505 @ML515.4 @ML531		
	@VOASDWA ALK AS-MS BA-MS BE-MS CA		
	CD-MS CNDW CR-MS CU-MS D1613EDD EC		
	ENDOTHAL F GLYPHOS HG NI-MS NO2-N		
	NO3 NO3A P PB-MS PH SB-MS		
	SE-MS T TL-MS		
2504220061	TRAV BLANK-ANALYZE	Water	20-apr-2005 00:00:00
	@VOASDWA		

Test Acronym Description

Test Acronym	Description
@525REG	525 Semivolatiles by GC/MS
@DIQUAT	Diquat and Paraquat
@EDB-DBC	EDB and DBCP by GC-ECD
@ML505	Pesticides by EPA 505
@ML515.4	Herbicides by 515.4
@ML531	Aldicarbs
@VOASDWA	Regulated VOCs plus Lists 1&3
ALK	Alkalinity in CaCO3 units
AS-MS	Arsenic, Total, ICAP/MS
BA-MS	Barium, Total, ICAP/MS
BE-MS	Beryllium, Total, ICAP/MS
CA	Calcium, Total, ICAP
CD-MS	Cadmium, Total, ICAP/MS
CNDW	Cyanide
CR-MS	Chromium, Total, ICAP/MS
CU-MS	Copper, Total, ICAP/MS
D1613EDD	2,3,7,8-TCDD 1613 DW (subbed)
EC	Specific Conductance
ENDOTHAL	Endothall
F	Fluoride

Hawaii Department of Water Supply (Hilo)
25 Aupuni St.
Hilo, HI 96720
Attn: Mae Kise
Phone: (808) 961-8670

Customer Code: HAWAII
PO#: Contract 2002-02
Group#: 146881
Project#: PHASEV
Proj Mgr: Jim Hein
Phone: (626) 386-1189

Test Acronym Description

Test Acronym	Description
GLYPHOS	Glyphosate
HG	Mercury
NI-MS	Nickel, Total, ICAP/MS
NO2-N	Nitrite, Nitrogen by IC
NO3	Nitrate as Nitrogen by IC
NO3A	Nitrate as NO3 by IC (calc)
P	Metals sample pH
PB-MS	Lead, Total, ICAP/MS
PH	PH (H1=past HT, not compliant)
SB-MS	Antimony, Total, ICAP/MS
SE-MS	Selenium, Total, ICAP/MS
T	Metals Turbidity
TL-MS	Thallium, Total, ICAP/MS

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Report
Comments
#146881

Group Comments

Analytical results for TCDD Dioxin by 1613B are submitted by Pace Analytical Services, Minneapolis, MN. NELAP01155CA

(QC Ref#: 2504220057)
Test: Bromomethane (Methyl Bromide) (ML/EPA 524.2)
L1-The associated blank spike recovery was above laboratory acceptance limits. See case narrative.

(QC Ref#: 2504220061)
Test: Bromomethane (Methyl Bromide) (ML/EPA 524.2)
L1-The associated blank spike recovery was above laboratory acceptance limits. See case narrative.

(QC Ref#: 269808)
Test: Bromomethane (Methyl Bromide) (ML/EPA 524.2)
QC Type: LCS1
BRM1 recoveries for LCS1 at 133% and LCS2 at 131% are above the method limit of 70-130%.
QC Type: LCS2
BRM1 recoveries for LCS1 at 133% and LCS2 at 131% are above the method limit of 70-130%.

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Laboratory
Hits Report
#146881

Hawaii Department of Water Supply
(Hilo)
Mae Kise
25 Aupuni St.
Hilo , HI 96720

Samples Received

22-apr-2005 14:22:32

Analyzed	Sample#	Sample ID	Result	Federal MCL	UNITS	MRL
	2504220057	**WELL HEAD OLAA 6 EXPLORATORY**				
04/29/05	Alkalinity in CaCO3 units		34.8		mg/l	2.0
04/26/05	Calcium, Total, ICAP		7.1		mg/l	1.0
04/25/05	Chromium, Total, ICAP/MS		1.3	100	ug/l	1.0
04/26/05	Fluoride		0.07	4	mg/l	0.050
04/25/05	Nitrate as NO3 by IC (calc)		0.57	45	mg/l	0.44
04/22/05	Nitrate as Nitrogen by IC		0.13	10	mg/l	0.10
04/25/05	PH (H1=past HT, not compliant)		8.0	6.5-8.5	Units	0.0010
04/25/05	Specific Conductance		94		umho/cm	2.0
	2504220061	**TRAV BLANK-ANALYZE**				

SUMMARY OF POSITIVE DATA ONLY.

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Laboratory
Data Report
#146881

Hawaii Department of Water Supply
(Hilo)
Mae Kise
25 Aupuni St.
Hilo , HI 96720

Samples Received

04/22/05

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
WELL HEAD OLAA 6 EXPLORATORY (2504220057) Sampled on 04/20/05 14:15								
	04/29/05 15:41	270187	(SM2320B/E310.1)	Alkalinity in CaCO3 units	34.8	mg/l	2.0	1
	04/25/05 15:50	269630	(ML/EPA 200.8)	Arsenic, Total, ICAP/MS	ND	ug/l	1.0	1
	04/25/05 15:50	269649	(ML/EPA 200.8)	Barium, Total, ICAP/MS	ND	ug/l	2.0	1
	04/25/05 15:50	269620	(ML/EPA 200.8)	Beryllium, Total, ICAP/MS	ND	ug/l	1.0	1
	04/26/05 14:54	269831	(ML/EPA 200.7)	Calcium, Total, ICAP	7.1	mg/l	1.0	1
	04/25/05 15:50	269643	(ML/EPA 200.8)	Cadmium, Total, ICAP/MS	ND	ug/l	0.50	1
	04/26/05 00:00	269789	(SM4500CN-F)	Cyanide	ND	mg/l	0.025	1
	04/25/05 15:50	269611	(ML/EPA 200.8)	Chromium, Total, ICAP/MS	1.3	ug/l	1.0	1
	04/25/05 15:50	269624	(ML/EPA 200.8)	Copper, Total, ICAP/MS	ND	ug/l	2.0	1
05/02/05	05/09/05 00:00		(EPA 1613)	2,3,7,8-TCDD 1613 DW (subbed)	ND	pg/l	5.0	1
	04/25/05 15:07	269588	(ML/S2510B)	Specific Conductance	94	umho/cm	2.0	1
04/25/05	04/26/05 00:00	269969	(ML/EPA 548.1)	Endothall	ND	ug/l	5.0	1
	04/26/05 00:00	269787	(SM4500F-C)	Fluoride	0.07	mg/l	0.050	1
	04/28/05 00:00	270460	(ML/EPA 547)	Glyphosate	ND	ug/l	6.0	1
	04/27/05 14:53	269905	(ML/EPA 245.1)	Mercury	ND	ug/l	0.20	1
	04/25/05 15:50	269621	(ML/EPA 200.8)	Nickel, Total, ICAP/MS	ND	ug/l	5.0	1
	04/22/05 11:04	269505	(ML/EPA 300.0)	Nitrite, Nitrogen by IC	ND	mg/l	0.10	1
	04/22/05 11:04	269506	(ML/EPA 300.0)	Nitrate as Nitrogen by IC	0.13	mg/l	0.10	1
	04/25/05 23:04		(ML/EPA 300.0)	Nitrate as NO3 by IC (calc)	0.57	mg/l	0.44	1
	04/25/05 15:50	269656	(ML/EPA 200.8)	Lead, Total, ICAP/MS	ND	ug/l	0.50	1
	04/25/05 00:00	269599	(4500HB/ E 150)	PH (Hl=past HT, not compliant)	8.0	Units	0.0010	1
	04/25/05 15:50	269646	(ML/EPA 200.8)	Antimony, Total, ICAP/MS	ND	ug/l	1.0	1
	04/25/05 15:50	269633	(ML/EPA 200.8)	Selenium, Total, ICAP/MS	ND	ug/l	5.0	1
	04/25/05 15:50	269652	(ML/EPA 200.8)	Thallium, Total, ICAP/MS	ND	ug/l	1.0	1
			525 Semivolatiles by GC/MS					
04/26/05	04/27/05 22:03	270012	(ML/EPA 525.2)	Atrazine	ND	ug/l	0.050	1
04/26/05	04/27/05 22:03	270012	(ML/EPA 525.2)	Benzo(a)pyrene	ND	ug/l	0.020	1
04/26/05	04/27/05 22:03	270012	(ML/EPA 525.2)	Di(2-Ethylhexyl)phthalate	ND	ug/l	0.60	1
04/26/05	04/27/05 22:03	270012	(ML/EPA 525.2)	Di-(2-Ethylhexyl)adipate	ND	ug/l	0.60	1
04/26/05	04/27/05 22:03	270012	(ML/EPA 525.2)	Hexachlorobenzene	ND	ug/l	0.050	1

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
04/26/05	04/27/05 22:03	270012	(ML/EPA 525.2)	Hexachlorocyclopentadiene	ND	ug/l	0.050	1
04/26/05	04/27/05 22:03	270012	(ML/EPA 525.2)	Molinate	ND	ug/l	0.20	1
04/26/05	04/27/05 22:03	270012	(ML/EPA 525.2)	Simazine	ND	ug/l	0.050	1
04/26/05	04/27/05 22:03	270012	(ML/EPA 525.2)	Thiobencarb	ND	ug/l	0.20	1
			(ML/EPA 525.2)	1.3-dimethyl-2-nbenz(70-130)	88	% Rec		
			(ML/EPA 525.2)	Perylene-d12(70-130)	88	% Rec		
			(ML/EPA 525.2)	Triphenylphosphate(70-130)	101	% Rec		
			Aldicarbs					
	04/30/05 01:01	270242	(ML/EPA 531.1)	3-Hydroxycarbofuran	ND	ug/l	2.0	1
	04/30/05 01:01	270242	(ML/EPA 531.1)	Aldicarb (Temik)	ND	ug/l	0.50	1
	04/30/05 01:01	270242	(ML/EPA 531.1)	Aldicarb sulfone	ND	ug/l	0.70	1
	04/30/05 01:01	270242	(ML/EPA 531.1)	Aldicarb sulfoxide	ND	ug/l	0.50	1
	04/30/05 01:01	270242	(ML/EPA 531.1)	Baygon	ND	ug/l	2.0	1
	04/30/05 01:01	270242	(ML/EPA 531.1)	Carbofuran (Furadan)	ND	ug/l	0.90	1
	04/30/05 01:01	270242	(ML/EPA 531.1)	Carbaryl	ND	ug/l	2.0	1
	04/30/05 01:01	270242	(ML/EPA 531.1)	Methiocarb	ND	ug/l	2.0	1
	04/30/05 01:01	270242	(ML/EPA 531.1)	Methomyl	ND	ug/l	1.0	1
	04/30/05 01:01	270242	(ML/EPA 531.1)	Oxamyl (Vydate)	ND	ug/l	2.0	1
			(ML/EPA 531.1)	BDMC(70-130)	98	% Rec		
			Aldicarbs by 531.2					
			(ML/EPA 531.2)	BDMC(70-130)	98	% Rec		
			Diquat and Paraquat					
04/26/05	04/28/05 00:00	270198	(ML/EPA 549.2)	Diquat	ND	ug/l	0.40	1
04/26/05	04/28/05 00:00	270198	(ML/EPA 549.2)	Paraquat	ND	ug/l	2.0	1
			EDB and DBCP by GC-ECD					
04/27/05	04/28/05 00:02	270111	(ML/EPA 504.1)	Dibromochloropropane (DBCP)	ND	ug/l	0.010	1
04/27/05	04/28/05 00:02	270111	(ML/EPA 504.1)	Ethylene Dibromide (EDB)	ND	ug/l	0.010	1
			Herbicides by 515.4					
04/27/05	04/28/05 16:18	270110	(ML/EPA 515.4)	2,4,5-T	ND	ug/l	0.20	1
04/27/05	04/28/05 16:18	270110	(ML/EPA 515.4)	2,4,5-TP (Silvex)	ND	ug/l	0.20	1

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
04/27/05	04/28/05 16:18	270110	(ML/EPA 515.4)	2,4-D	ND	ug/l	0.10	1
04/27/05	04/28/05 16:18	270110	(ML/EPA 515.4)	2,4-DB	ND	ug/l	2.0	1
04/27/05	04/28/05 16:18	270110	(ML/EPA 515.4)	Dichlorprop	ND	ug/l	0.50	1
04/27/05	04/28/05 16:18	270110	(ML/EPA 515.4)	Acifluorfen	ND	ug/l	0.20	1
04/27/05	04/28/05 16:18	270110	(ML/EPA 515.4)	Bentazon	ND	ug/l	0.50	1
04/27/05	04/28/05 16:18	270110	(ML/EPA 515.4)	Dalapon	ND	ug/l	1.0	1
04/27/05	04/28/05 00:00	270110	(ML/EPA 515.4)	3,5-Dichlorobenzoic acid	ND	ug/l	0.50	1
04/27/05	04/28/05 16:18	270110	(ML/EPA 515.4)	Tot DCPA Mono&Diacid Degradate	ND	ug/l	1.0	1
04/27/05	04/28/05 00:00	270110	(ML/EPA 515.4)	Dicamba	ND	ug/l	0.080	1
04/27/05	04/28/05 16:18	270110	(ML/EPA 515.4)	Dinoseb	ND	ug/l	0.20	1
04/27/05	04/28/05 16:18	270110	(ML/EPA 515.4)	Pentachlorophenol	ND	ug/l	0.040	1
04/27/05	04/28/05 16:18	270110	(ML/EPA 515.4)	Picloram	ND	ug/l	0.10	1
			(ML/EPA 515.4)	2.4-DCPAA (70-130)	117	% Rec		
			(ML/EPA 515.4)	4.4-Dibrombiphenyl(60-140)	103	% Rec		

Pesticides by EPA 505

04/27/05	04/27/05 19:18	270558	(ML/EPA 505)	PCB 1016 Aroclor	ND	ug/l	0.070	1
04/27/05	04/27/05 19:18	270558	(ML/EPA 505)	PCB 1221 Aroclor	ND	ug/l	0.10	1
04/27/05	04/27/05 19:18	270558	(ML/EPA 505)	PCB 1232 Aroclor	ND	ug/l	0.10	1
04/27/05	04/27/05 19:18	270558	(ML/EPA 505)	PCB 1242 Aroclor	ND	ug/l	0.10	1
04/27/05	04/27/05 19:18	270558	(ML/EPA 505)	PCB 1248 Aroclor	ND	ug/l	0.10	1
04/27/05	04/27/05 19:18	270558	(ML/EPA 505)	PCB 1254 Aroclor	ND	ug/l	0.10	1
04/27/05	04/27/05 19:18	270558	(ML/EPA 505)	PCB 1260 Aroclor	ND	ug/l	0.10	1
04/27/05	04/27/05 19:18	270558	(ML/EPA 505)	Alachlor (Alanex)	ND	ug/l	0.050	1
04/27/05	04/27/05 19:18	270558	(ML/EPA 505)	Aldrin	ND	ug/l	0.010	1
04/27/05	04/27/05 19:18	270558	(ML/EPA 505)	Chlordane	ND	ug/l	0.10	1
04/27/05	04/27/05 19:18	270558	(ML/EPA 505)	Dieldrin	ND	ug/l	0.010	1
04/27/05	04/27/05 19:18	270558	(ML/EPA 505)	Endrin	ND	ug/l	0.010	1
04/27/05	04/27/05 19:18	270558	(ML/EPA 505)	Heptachlor	ND	ug/l	0.010	1
04/27/05	04/27/05 19:18	270558	(ML/EPA 505)	Heptachlor Epoxide	ND	ug/l	0.010	1
04/27/05	04/27/05 19:18	270558	(ML/EPA 505)	Lindane (gamma-BHC)	ND	ug/l	0.010	1
04/27/05	04/27/05 19:18	270558	(ML/EPA 505)	Methoxychlor	ND	ug/l	0.050	1
04/27/05	04/27/05 19:18	270558	(ML/EPA 505)	Total PCBs	ND	ug/l	0.070	1
04/27/05	04/27/05 19:18	270558	(ML/EPA 505)	Toxaphene	ND	ug/l	0.50	1

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

Regulated VOCs plus Lists 1&3

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	04/22/05 00:00	269808	(ML/EPA 524.2)	1,1,1,2-Tetrachloroethane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	1,1,1-Trichloroethane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	1,1,2,2-Tetrachloroethane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	1,1,2-Trichloroethane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	1,1-Dichloroethane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	1,1-Dichloroethylene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	1,1-Dichloropropene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	1,2,3-Trichlorobenzene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	1,2,3-Trichloropropane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	1,2,4-Trichlorobenzene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	1,2,4-Trimethylbenzene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	1,2-Dichloroethane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	1,2-Dichloropropane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	1,3,5-Trimethylbenzene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	1,3-Dichloropropane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	p-Dichlorobenzene (1,4-DCB)	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	2,2-Dichloropropane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	2-Butanone (MEK)	ND	ug/l	5.0	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	o-Chlorotoluene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	p-Chlorotoluene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	4-Methyl-2-Pentanone (MIBK)	ND	ug/l	5.0	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Benzene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Bromobenzene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Bromomethane (Methyl Bromide)	ND(L1)	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Bromoethane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	cis-1,2-Dichloroethylene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Chlorobenzene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Carbon Tetrachloride	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	cis-1,3-Dichloropropene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Bromoform	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Chloroform (Trichloromethane)	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Bromochloromethane	ND	ug/l	0.50	1

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	04/22/05 00:00	269808	(ML/EPA 524.2)	Chloroethane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Chloromethane(Methyl Chloride)	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Chlorodibromomethane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Dibromomethane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Bromodichloromethane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Dichloromethane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Di-isopropyl ether	ND	ug/l	3.0	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Ethyl benzene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Dichlorodifluoromethane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Fluorotrichloromethane-Freon11	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Hexachlorobutadiene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Isopropylbenzene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	m-Dichlorobenzene (1,3-DCB)	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	m,p-Xylenes	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Methyl Tert-butyl ether (MTBE)	ND	ug/l	1.0	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Naphthalene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	n-Butylbenzene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	n-Propylbenzene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	o-Xylene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	o-Dichlorobenzene (1,2-DCB)	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Tetrachloroethylene (PCE)	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	p-Isopropyltoluene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	sec-Butylbenzene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Styrene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	trans-1,2-Dichloroethylene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	tert-amyl Methyl Ether	ND	ug/l	3.0	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	tert-Butyl Ethyl Ether	ND	ug/l	3.0	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	tert-Butylbenzene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Trichloroethylene (TCE)	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Trichlorotrifluoroethane(Freon	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	trans-1,3-Dichloropropene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Toluene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Total 1,3-Dichloropropene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Total THM	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Total xylenes	ND	ug/l	0.50	1

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	04/22/05 00:00	269808	(ML/EPA 524.2)	Vinyl chloride (VC)	ND	ug/l	0.30	1
			(EPA 524.2)	1.2-Dichloroethane-d4(70-130)	116	% Rec		
			(EPA 524.2)	4-Bromofluorobenzene(70-130)	95	% Rec		
			(EPA 524.2)	Toluene-d8(70-130)	93	% Rec		

TRAV BLANK-ANALYZE (2504220061) Sampled on 04/20/05 00:00

Regulated VOCs plus Lists 1&3

	04/22/05 00:00	269808	(ML/EPA 524.2)	1,1,1,2-Tetrachloroethane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	1,1,1-Trichloroethane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	1,1,2,2-Tetrachloroethane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	1,1,2-Trichloroethane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	1,1-Dichloroethane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	1,1-Dichloroethylene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	1,1-Dichloropropene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	1,2,3-Trichlorobenzene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	1,2,3-Trichloropropane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	1,2,4-Trichlorobenzene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	1,2,4-Trimethylbenzene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	1,2-Dichloroethane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	1,2-Dichloropropane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	1,3,5-Trimethylbenzene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	1,3-Dichloropropane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	p-Dichlorobenzene (1,4-DCB)	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	2,2-Dichloropropane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	2-Butanone (MEK)	ND	ug/l	5.0	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	o-Chlorotoluene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	p-Chlorotoluene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	4-Methyl-2-Pentanone (MIBK)	ND	ug/l	5.0	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Benzene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Bromobenzene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Bromomethane (Methyl Bromide)	ND(L1)	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Bromoethane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	cis-1,2-Dichloroethylene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Chlorobenzene	ND	ug/l	0.50	1

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	04/22/05 00:00	269808	(ML/EPA 524.2)	Carbon Tetrachloride	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	cis-1,3-Dichloropropene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Bromoform	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Chloroform (Trichloromethane)	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Bromochloromethane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Chloroethane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Chloromethane(Methyl Chloride)	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Chlorodibromomethane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Dibromomethane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Bromodichloromethane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Dichloromethane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Di-isopropyl ether	ND	ug/l	3.0	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Ethyl benzene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Dichlorodifluoromethane	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Fluorotrichloromethane-Freon11	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Hexachlorobutadiene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Isopropylbenzene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	m-Dichlorobenzene (1,3-DCB)	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	m,p-Xylenes	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Methyl Tert-butyl ether (MTBE)	ND	ug/l	1.0	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Naphthalene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	n-Butylbenzene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	n-Propylbenzene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	o-Xylene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	o-Dichlorobenzene (1,2-DCB)	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Tetrachloroethylene (PCE)	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	p-Isopropyltoluene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	sec-Butylbenzene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Styrene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	trans-1,2-Dichloroethylene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	tert-amyl Methyl Ether	ND	ug/l	3.0	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	tert-Butyl Ethyl Ether	ND	ug/l	3.0	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	tert-Butylbenzene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Trichloroethylene (TCE)	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Trichlorotrifluoroethane(Freon	ND	ug/l	0.50	1

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	04/22/05 00:00	269808	(ML/EPA 524.2)	trans-1,3-Dichloropropene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Toluene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Total 1,3-Dichloropropene	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Total THM	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Total xylenes	ND	ug/l	0.50	1
	04/22/05 00:00	269808	(ML/EPA 524.2)	Vinyl chloride (VC)	ND	ug/l	0.30	1
			(EPA 524.2)	1.2-Dichloroethane-d4(70-130)	114	% Rec		
			(EPA 524.2)	4-Bromofluorobenzene(70-130)	94	% Rec		
			(EPA 524.2)	Toluene-d8(70-130)	93	% Rec		

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Laboratory
QC Summary
#146881

Hawaii Department of Water Supply
(Hilo)

QC Ref #269505 - Nitrite, Nitrogen by IC **Analysis Date: 04/22/2005**

2504220057 WELL HEAD OLAA 6 EXPLORATORY

QC Ref #269506 - Nitrate as Nitrogen by IC **Analysis Date: 04/22/2005**

2504220057 WELL HEAD OLAA 6 EXPLORATORY

QC Ref #269588 - Specific Conductance **Analysis Date: 04/25/2005**

2504220057 WELL HEAD OLAA 6 EXPLORATORY

QC Ref #269599 - PH (H1=past HT, not compliant)Analysis Date: 04/25/2005

2504220057 WELL HEAD OLAA 6 EXPLORATORY

QC Ref #269611 - Chromium, Total, ICAP/MS **Analysis Date: 04/25/2005**

2504220057 WELL HEAD OLAA 6 EXPLORATORY

QC Ref #269620 - Beryllium, Total, ICAP/MS **Analysis Date: 04/25/2005**

2504220057 WELL HEAD OLAA 6 EXPLORATORY

QC Ref #269621 - Nickel, Total, ICAP/MS **Analysis Date: 04/25/2005**

2504220057 WELL HEAD OLAA 6 EXPLORATORY

QC Ref #269624 - Copper, Total, ICAP/MS **Analysis Date: 04/25/2005**

2504220057 WELL HEAD OLAA 6 EXPLORATORY

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

QC Ref #269630 - Arsenic, Total, ICAP/MS **Analysis Date: 04/25/2005**

2504220057 WELL HEAD OLAA 6 EXPLORATORY

QC Ref #269633 - Selenium, Total, ICAP/MS **Analysis Date: 04/25/2005**

2504220057 WELL HEAD OLAA 6 EXPLORATORY

QC Ref #269643 - Cadmium, Total, ICAP/MS **Analysis Date: 04/25/2005**

2504220057 WELL HEAD OLAA 6 EXPLORATORY

QC Ref #269646 - Antimony, Total, ICAP/MS **Analysis Date: 04/25/2005**

2504220057 WELL HEAD OLAA 6 EXPLORATORY

QC Ref #269649 - Barium, Total, ICAP/MS **Analysis Date: 04/25/2005**

2504220057 WELL HEAD OLAA 6 EXPLORATORY

QC Ref #269652 - Thallium, Total, ICAP/MS **Analysis Date: 04/25/2005**

2504220057 WELL HEAD OLAA 6 EXPLORATORY

QC Ref #269656 - Lead, Total, ICAP/MS **Analysis Date: 04/25/2005**

2504220057 WELL HEAD OLAA 6 EXPLORATORY

QC Ref #269787 - Fluoride **Analysis Date: 04/26/2005**

2504220057 WELL HEAD OLAA 6 EXPLORATORY

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

QC Ref #269789 - Cyanide **Analysis Date: 04/26/2005**

2504220057	WELL HEAD OLAA 6 EXPLORATORY

QC Ref #269808 - Regulated VOCs plus Lists 1&3 Analysis Date: 04/22/2005

2504220057	WELL HEAD OLAA 6 EXPLORATORY
2504220061	TRAV BLANK-ANALYZE

QC Ref #269831 - Calcium, Total, ICAP **Analysis Date: 04/26/2005**

2504220057	WELL HEAD OLAA 6 EXPLORATORY

QC Ref #269905 - Mercury **Analysis Date: 04/27/2005**

2504220057	WELL HEAD OLAA 6 EXPLORATORY

QC Ref #269969 - Endothall **Analysis Date: 04/26/2005**

2504220057	WELL HEAD OLAA 6 EXPLORATORY

QC Ref #270012 - 525 Semivolatiles by GC/MS **Analysis Date: 04/27/2005**

2504220057	WELL HEAD OLAA 6 EXPLORATORY

QC Ref #270110 - Herbicides by 515.4 **Analysis Date: 04/28/2005**

2504220057	WELL HEAD OLAA 6 EXPLORATORY
2504220057	WELL HEAD OLAA 6 EXPLORATORY

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

QC Ref #270111 - EDB and DBCP by GC-ECD **Analysis Date: 04/28/2005**

2504220057 WELL HEAD OLAA 6 EXPLORATORY

QC Ref #270187 - Alkalinity in CaCO3 units **Analysis Date: 04/29/2005**

2504220057 WELL HEAD OLAA 6 EXPLORATORY

QC Ref #270198 - Diquat and Paraquat **Analysis Date: 04/28/2005**

2504220057 WELL HEAD OLAA 6 EXPLORATORY

QC Ref #270242 - Aldicarbs **Analysis Date: 04/30/2005**

2504220057 WELL HEAD OLAA 6 EXPLORATORY

QC Ref #270460 - Glyphosate **Analysis Date: 04/28/2005**

2504220057 WELL HEAD OLAA 6 EXPLORATORY

QC Ref #270558 - Pesticides by EPA 505 **Analysis Date: 04/27/2005**

2504220057 WELL HEAD OLAA 6 EXPLORATORY

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Laboratory
QC Report
#146881

Hawaii Department of Water Supply
(Hilo)

QC Ref #269505 Nitrite, Nitrogen by IC

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
LCS1	Nitrite, Nitrogen by IC	1.0	1.08	MGL	108.0	(90-110)	
LCS2	Nitrite, Nitrogen by IC	1.0	1.07	MGL	107.0	(90-110)	0.93
MBLK	Nitrite, Nitrogen by IC	ND	<0.10	MGL			
MS	Nitrite, Nitrogen by IC	1.0	1.03	MGL	103.0	(90-110)	
MSD	Nitrite, Nitrogen by IC	1.0	1.05	MGL	105.0	(90-110)	1.9

QC Ref #269506 Nitrate as Nitrogen by IC

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
LCS1	Nitrate as Nitrogen by IC	2.5	2.59	MGL	103.6	(90-110)	
LCS2	Nitrate as Nitrogen by IC	2.5	2.59	MGL	103.6	(90-110)	0.00
MBLK	Nitrate as Nitrogen by IC	ND	<0.10	MGL			
MS	Nitrate as Nitrogen by IC	2.5	2.5	MGL	100.0	(90-110)	
MSD	Nitrate as Nitrogen by IC	2.5	2.48	MGL	99.2	(90-110)	0.80

QC Ref #269588 Specific Conductance

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
DUP	Specific Conductance	94	94	UMHO		(0-20)	0.0

QC Ref #269599 PH (H1=past HT, not compliant)

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
DUP	PH (H1=past HT, not compliant)	8.1	8.1	UNIT		(0-20)	0.0

Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and DUP are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

QC Ref #269611 Chromium, Total, ICAP/MS

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 25	04210012	UGL		(0-0)	
LCS1	Chromium, Total, ICAP/MS	100	100	UGL	100.0	(85-115)	
LCS2	Chromium, Total, ICAP/MS	100	99.8	UGL	99.8	(85-115)	0.20
MBLK	Chromium, Total, ICAP/MS	ND	<1.0	UGL			
MS	Chromium, Total, ICAP/MS	100	88.6	UGL	88.6	(70-130)	
MSD	Chromium, Total, ICAP/MS	100	93	UGL	93.0	(70-130)	4.8

QC Ref #269620 Beryllium, Total, ICAP/MS

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 25	04210012	UGL		(0-0)	
LCS1	Beryllium, Total, ICAP/MS	5.00	4.92	UGL	98.4	(70-130)	
LCS2	Beryllium, Total, ICAP/MS	5.00	5.06	UGL	101.2	(85-115)	2.8
MBLK	Beryllium, Total, ICAP/MS	ND	<1.0	UGL			
MS	Beryllium, Total, ICAP/MS	5.00	5.14	UGL	102.8	(70-130)	
MSD	Beryllium, Total, ICAP/MS	5.00	5.51	UGL	110.2	(70-130)	6.9

QC Ref #269621 Nickel, Total, ICAP/MS

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 25	04210012	UGL		(0-0)	
LCS1	Nickel, Total, ICAP/MS	50	49.1	UGL	98.2	(85-115)	
LCS2	Nickel, Total, ICAP/MS	50	49.3	UGL	98.6	(85-115)	0.41
MBLK	Nickel, Total, ICAP/MS	ND	<5.0	UGL			
MS	Nickel, Total, ICAP/MS	50	43.9	UGL	87.8	(70-130)	
MSD	Nickel, Total, ICAP/MS	50	45.1	UGL	90.2	(70-130)	2.7

Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and DUP are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

QC Ref #269624 Copper, Total, ICAP/MS

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 25	04210012	UGL		(0-0)	
LCS1	Copper, Total, ICAP/MS	100	98.9	UGL	98.9	(85-115)	
LCS2	Copper, Total, ICAP/MS	100	99.2	UGL	99.2	(85-115)	0.30
MBLK	Copper, Total, ICAP/MS	ND	<2.0	UGL			
MS	Copper, Total, ICAP/MS	100	88.2	UGL	88.2	(70-130)	
MSD	Copper, Total, ICAP/MS	100	93.5	UGL	93.5	(70-130)	5.8

QC Ref #269630 Arsenic, Total, ICAP/MS

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 25	04210012	UGL		(0-0)	
LCS1	Arsenic, Total, ICAP/MS	20	19.4	UGL	97.0	(85-115)	
LCS2	Arsenic, Total, ICAP/MS	20	19.4	UGL	97.0	(85-115)	0.00
MBLK	Arsenic, Total, ICAP/MS	ND	<1.0	UGL			
MS	Arsenic, Total, ICAP/MS	20	20.9	UGL	104.5	(70-130)	
MSD	Arsenic, Total, ICAP/MS	20	21.5	UGL	107.5	(70-130)	2.8

QC Ref #269633 Selenium, Total, ICAP/MS

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 25	04210012	UGL		(0-0)	
LCS1	Selenium, Total, ICAP/MS	20	20.9	UGL	104.5	(85-115)	
LCS2	Selenium, Total, ICAP/MS	20	20.8	UGL	104.0	(85-115)	0.48
MBLK	Selenium, Total, ICAP/MS	ND	<5.0	UGL			
MS	Selenium, Total, ICAP/MS	20	24.3	UGL	121.5	(70-130)	
MSD	Selenium, Total, ICAP/MS	20	23.7	UGL	118.5	(70-130)	2.5

Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and DUP are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

QC Ref #269643 Cadmium, Total, ICAP/MS

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 25	04210012	UGL		(0-0)	
LCS1	Cadmium, Total, ICAP/MS	20	19.6	UGL	98.0	(85-115)	
LCS2	Cadmium, Total, ICAP/MS	20	19.5	UGL	97.5	(85-115)	0.51
MBLK	Cadmium, Total, ICAP/MS	ND	<0.50	UGL			
MS	Cadmium, Total, ICAP/MS	20	19.9	UGL	99.5	(70-130)	
MSD	Cadmium, Total, ICAP/MS	20	20.8	UGL	104.0	(70-130)	4.4

QC Ref #269646 Antimony, Total, ICAP/MS

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 25	04210012	UGL		(0-0)	
LCS1	Antimony, Total, ICAP/MS	50	49.4	UGL	98.8	(85-115)	
LCS2	Antimony, Total, ICAP/MS	50	49.4	UGL	98.8	(85-115)	0.00
MBLK	Antimony, Total, ICAP/MS	ND	<1.0	UGL			
MS	Antimony, Total, ICAP/MS	50	48.1	UGL	96.2	(70-130)	
MSD	Antimony, Total, ICAP/MS	50	50.4	UGL	100.8	(70-130)	4.7

QC Ref #269649 Barium, Total, ICAP/MS

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 25	04210012	UGL		(0-0)	
LCS1	Barium, Total, ICAP/MS	100	99.5	UGL	99.5	(85-115)	
LCS2	Barium, Total, ICAP/MS	100	100	UGL	100.0	(85-115)	0.50
MBLK	Barium, Total, ICAP/MS	ND	<2.0	UGL			
MS	Barium, Total, ICAP/MS	100	97.6	UGL	97.6	(70-130)	
MSD	Barium, Total, ICAP/MS	100	99	UGL	99.0	(70-130)	1.4

Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and DUP are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

QC Ref #269652 Thallium, Total, ICAP/MS

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 25	04210012	UGL		(0-0)	
LCS1	Thallium, Total, ICAP/MS	20.0	18.6	UGL	93.0	(85-115)	
LCS2	Thallium, Total, ICAP/MS	20.0	19	UGL	95.0	(85-115)	2.1
MBLK	Thallium, Total, ICAP/MS	ND	<1.0	UGL			
MS	Thallium, Total, ICAP/MS	20.0	18.1	UGL	90.5	(70-130)	
MSD	Thallium, Total, ICAP/MS	20.0	19	UGL	95.0	(70-130)	4.9

QC Ref #269656 Lead, Total, ICAP/MS

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 25	04210012	UGL		(0-0)	
LCS1	Lead, Total, ICAP/MS	20	19.2	UGL	96.0	(85-115)	
LCS2	Lead, Total, ICAP/MS	20	19.4	UGL	97.0	(85-115)	1.0
MBLK	Lead, Total, ICAP/MS	ND	<0.50	UGL			
MS	Lead, Total, ICAP/MS	20	18.1	UGL	90.5	(70-130)	
MSD	Lead, Total, ICAP/MS	20	19.1	UGL	95.5	(70-130)	5.4

QC Ref #269787 Fluoride

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MS	Spiked sample	Lab # 25	04220057	MGL		(0-0)	
LCS1	Fluoride	1.00	1.03	MGL	103.0	(90-110)	
LCS2	Fluoride	1.00	1.03	MGL	103.0	(90-110)	0.00
MBLK	Fluoride	ND	<0.050	MGL			
MS	Fluoride	1.00	1.01	MGL	101.0	(80-120)	
MSD	Fluoride	1.00	1.02	MGL	102.0	(80-120)	0.99
MS_2ND	Fluoride	1.00	0.90	MGL	90.0	(80-120)	
RPD_LCS	Fluoride	103.000	103.000	MGL	0.0	(0-10)	

Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and DUP are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

RPD_MS	Fluoride	101.000	102.000	MGL	1.0	(0-20)

QC Ref #269789 Cyanide

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MS	Spiked sample	Lab # 25	04250180	MGL		(0-0)	
LCS1	Cyanide	0.10	0.110	MGL	110.0	(80-120)	
MBLK	Cyanide	ND	<0.025	MGL			
MS	Cyanide	0.10	0.115	MGL	115.0	(80-120)	
MSD	Cyanide	0.10	0.120	MGL	120.0	(80-120)	4.3

QC Ref #269808 Regulated VOCs plus Lists 1&3

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
LCS1	1,1,1,2-Tetrachloroethane	5	5.06	UGL	101.2	(70-130)	
LCS2	1,1,1,2-Tetrachloroethane	5	4.98	UGL	99.6	(70-130)	1.6
MBLK	1,1,1,2-Tetrachloroethane	ND	<0.50	UGL			
RPD_LCS	1,1,1,2-Tetrachloroethane	101.200	99.600	UGL	1.6	(0-20)	
LCS1	1,1,1-Trichloroethane	5	5.25	UGL	105.0	(70-130)	
LCS2	1,1,1-Trichloroethane	5	5.09	UGL	101.8	(70-130)	3.1
MBLK	1,1,1-Trichloroethane	ND	<0.50	UGL			
RPD_LCS	1,1,1-Trichloroethane	105.000	101.800	UGL	3.1	(0-20)	
LCS1	1,1,2,2-Tetrachloroethane	5	5.44	UGL	108.8	(70-130)	
LCS2	1,1,2,2-Tetrachloroethane	5	5.58	UGL	111.6	(70-130)	2.5
MBLK	1,1,2,2-Tetrachloroethane	ND	<0.50	UGL			
RPD_LCS	1,1,2,2-Tetrachloroethane	108.800	111.600	UGL	2.5	(0-20)	
LCS1	1,1,2-Trichloroethane	5	4.90	UGL	98.0	(70-130)	
LCS2	1,1,2-Trichloroethane	5	4.90	UGL	98.0	(70-130)	0.00
MBLK	1,1,2-Trichloroethane	ND	<0.50	UGL			
RPD_LCS	1,1,2-Trichloroethane	98.000	98.000	UGL	0.0	(0-20)	
LCS1	1,1-Dichloroethane	5	5.10	UGL	102.0	(70-130)	
LCS2	1,1-Dichloroethane	5	5.11	UGL	102.2	(70-130)	0.20
MBLK	1,1-Dichloroethane	ND	<0.50	UGL			

Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and DUP are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

RPD_LCS	1,1-Dichloroethane	102.000	102.200	UGL	0.2	(0-20)	
LCS1	1,1-Dichloroethylene	5	5.78	UGL	115.6	(70-130)	
LCS2	1,1-Dichloroethylene	5	5.39	UGL	107.8	(70-130)	7.0
MBLK	1,1-Dichloroethylene	ND	<0.50	UGL			
RPD_LCS	1,1-Dichloroethylene	115.600	107.800	UGL	7.0	(0-20)	
LCS1	1,1-Dichloropropene	5	4.63	UGL	92.6	(70-130)	
LCS2	1,1-Dichloropropene	5	4.46	UGL	89.2	(70-130)	3.7
MBLK	1,1-Dichloropropene	ND	<0.50	UGL			
RPD_LCS	1,1-Dichloropropene	92.600	89.200	UGL	3.7	(0-20)	
LCS1	1,2,3-Trichlorobenzene	5	4.78	UGL	95.6	(70-130)	
LCS2	1,2,3-Trichlorobenzene	5	5.16	UGL	103.2	(70-130)	7.6
MBLK	1,2,3-Trichlorobenzene	ND	<0.50	UGL			
RPD_LCS	1,2,3-Trichlorobenzene	95.600	103.200	UGL	7.6	(0-20)	
LCS1	1,2,3-Trichloropropane	5	5.23	UGL	104.6	(70-130)	
LCS2	1,2,3-Trichloropropane	5	5.34	UGL	106.8	(70-130)	2.1
MBLK	1,2,3-Trichloropropane	ND	<0.50	UGL			
RPD_LCS	1,2,3-Trichloropropane	104.600	106.800	UGL	2.1	(0-20)	
LCS1	1,2,4-Trichlorobenzene	5	4.74	UGL	94.8	(70-130)	
LCS2	1,2,4-Trichlorobenzene	5	5.01	UGL	100.2	(70-130)	5.5
MBLK	1,2,4-Trichlorobenzene	ND	<0.50	UGL			
RPD_LCS	1,2,4-Trichlorobenzene	94.800	100.200	UGL	5.5	(0-20)	
LCS1	1,2,4-Trimethylbenzene	5	4.86	UGL	97.2	(70-130)	
LCS2	1,2,4-Trimethylbenzene	5	4.95	UGL	99.0	(70-130)	1.8
MBLK	1,2,4-Trimethylbenzene	ND	<0.50	UGL			
RPD_LCS	1,2,4-Trimethylbenzene	97.200	99.000	UGL	1.8	(0-20)	
LCS1	1,2-Dichloroethane	5	5.08	UGL	101.6	(70-130)	
LCS2	1,2-Dichloroethane	5	5.07	UGL	101.4	(70-130)	0.20
MBLK	1,2-Dichloroethane	ND	<0.50	UGL			
RPD_LCS	1,2-Dichloroethane	101.600	101.400	UGL	0.2	(0-20)	
LCS1	1,2-Dichloropropane	5	4.89	UGL	97.8	(70-130)	
LCS2	1,2-Dichloropropane	5	4.65	UGL	93.0	(70-130)	5.0
MBLK	1,2-Dichloropropane	ND	<0.50	UGL			
RPD_LCS	1,2-Dichloropropane	97.800	93.000	UGL	5.0	(0-20)	
LCS1	1,3,5-Trimethylbenzene	5	4.84	UGL	96.8	(70-130)	
LCS2	1,3,5-Trimethylbenzene	5	4.71	UGL	94.2	(70-130)	2.7

Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and DUP are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

MBLK	1,3,5-Trimethylbenzene	ND	<0.50	UGL			
RPD_LCS	1,3,5-Trimethylbenzene	96.800	94.200	UGL	2.7	(0-20)	
LCS1	1,3-Dichloropropane	5	4.91	UGL	98.2	(70-130)	
LCS2	1,3-Dichloropropane	5	4.87	UGL	97.4	(70-130)	0.82
MBLK	1,3-Dichloropropane	ND	<0.50	UGL			
RPD_LCS	1,3-Dichloropropane	98.200	97.400	UGL	0.8	(0-20)	
LCS1	p-Dichlorobenzene (1,4-DCB)	5	5.30	UGL	106.0	(70-130)	
LCS2	p-Dichlorobenzene (1,4-DCB)	5	5.51	UGL	110.2	(70-130)	3.9
MBLK	p-Dichlorobenzene (1,4-DCB)	ND	<0.50	UGL			
RPD_LCS	p-Dichlorobenzene (1,4-DCB)	106.000	110.200	UGL	3.9	(0-20)	
LCS1	2,2-Dichloropropane	5	5.15	UGL	103.0	(70-130)	
LCS2	2,2-Dichloropropane	5	5.05	UGL	101.0	(70-130)	2.0
MBLK	2,2-Dichloropropane	ND	<0.50	UGL			
RPD_LCS	2,2-Dichloropropane	103.000	101.000	UGL	2.0	(0-20)	
LCS1	2-Butanone (MEK)	50	38.6	UGL	77.2	(70-130)	
LCS2	2-Butanone (MEK)	50	44.3	UGL	88.6	(70-130)	14
MBLK	2-Butanone (MEK)	ND	<5.0	UGL			
RPD_LCS	2-Butanone (MEK)	77.200	88.600	UGL	13.8	(0-20)	
LCS1	o-Chlorotoluene	5	5.48	UGL	109.6	(70-130)	
LCS2	o-Chlorotoluene	5	5.36	UGL	107.2	(70-130)	2.2
MBLK	o-Chlorotoluene	ND	<0.50	UGL			
RPD_LCS	o-Chlorotoluene	109.600	107.200	UGL	2.2	(0-20)	
LCS1	p-Chlorotoluene	5	5.35	UGL	107.0	(70-130)	
LCS2	p-Chlorotoluene	5	5.15	UGL	103.0	(70-130)	3.8
MBLK	p-Chlorotoluene	ND	<0.50	UGL			
RPD_LCS	p-Chlorotoluene	107.000	103.000	UGL	3.8	(0-20)	
LCS1	4-Methyl-2-Pentanone (MIBK)	50	44.4	UGL	88.8	(70-130)	
LCS2	4-Methyl-2-Pentanone (MIBK)	50	46.1	UGL	92.2	(70-130)	3.8
MBLK	4-Methyl-2-Pentanone (MIBK)	ND	<5.0	UGL			
RPD_LCS	4-Methyl-2-Pentanone (MIBK)	88.800	92.200	UGL	3.8	(0-20)	
LCS1	Benzene	5	5.17	UGL	103.4	(70-130)	
LCS2	Benzene	5	4.92	UGL	98.4	(70-130)	5.0
MBLK	Benzene	ND	<0.50	UGL			
RPD_LCS	Benzene	103.400	98.400	UGL	5.0	(0-20)	
LCS1	Bromobenzene	5	5.46	UGL	109.2	(70-130)	

Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and DUP are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

LCS2	Bromobenzene	5	5.54	UGL	110.8	(70-130)	1.5
MBLK	Bromobenzene	ND	<0.50	UGL			
RPD_LCS	Bromobenzene	109.200	110.800	UGL	1.5	(0-20)	
LCS1	Bromomethane (Methyl Bromide)	5	6.65	UGL	133.0	(70-130)	
LCS2	Bromomethane (Methyl Bromide)	5	6.55	UGL	131.0	(70-130)	1.5
MBLK	Bromomethane (Methyl Bromide)	ND	<0.50	UGL			
RPD_LCS	Bromomethane (Methyl Bromide)	133.000	131.000	UGL	1.5	(0-20)	
LCS1	cis-1,2-Dichloroethylene	5	5.20	UGL	104.0	(70-130)	
LCS2	cis-1,2-Dichloroethylene	5	5.06	UGL	101.2	(70-130)	2.7
MBLK	cis-1,2-Dichloroethylene	ND	<0.50	UGL			
RPD_LCS	cis-1,2-Dichloroethylene	104.000	101.200	UGL	2.7	(0-20)	
LCS1	Chlorobenzene	5	4.91	UGL	98.2	(70-130)	
LCS2	Chlorobenzene	5	4.73	UGL	94.6	(70-130)	3.7
MBLK	Chlorobenzene	ND	<0.50	UGL			
RPD_LCS	Chlorobenzene	98.200	94.600	UGL	3.7	(0-20)	
LCS1	Carbon Tetrachloride	5	5.52	UGL	110.4	(70-130)	
LCS2	Carbon Tetrachloride	5	5.29	UGL	105.8	(70-130)	4.3
MBLK	Carbon Tetrachloride	ND	<0.50	UGL			
RPD_LCS	Carbon Tetrachloride	110.400	105.800	UGL	4.3	(0-20)	
LCS1	cis-1,3-Dichloropropene	5	4.43	UGL	88.6	(70-130)	
LCS2	cis-1,3-Dichloropropene	5	4.33	UGL	86.6	(70-130)	2.3
MBLK	cis-1,3-Dichloropropene	ND	<0.50	UGL			
RPD_LCS	cis-1,3-Dichloropropene	88.600	86.600	UGL	2.3	(0-20)	
LCS1	Bromoform	5	5.36	UGL	107.2	(70-130)	
LCS2	Bromoform	5	5.28	UGL	105.6	(70-130)	1.5
MBLK	Bromoform	ND	<0.50	UGL			
RPD_LCS	Bromoform	107.200	105.600	UGL	1.5	(0-20)	
LCS1	Chloroform (Trichloromethane)	5	5.16	UGL	103.2	(70-130)	
LCS2	Chloroform (Trichloromethane)	5	5.06	UGL	101.2	(70-130)	2.0
MBLK	Chloroform (Trichloromethane)	ND	<0.50	UGL			
RPD_LCS	Chloroform (Trichloromethane)	103.200	101.200	UGL	2.0	(0-20)	
LCS1	Bromochloromethane	5	5.54	UGL	110.8	(70-130)	
LCS2	Bromochloromethane	5	5.48	UGL	109.6	(70-130)	1.1
MBLK	Bromochloromethane	ND	<0.50	UGL			
RPD_LCS	Bromochloromethane	110.800	109.600	UGL	1.1	(0-20)	

Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and DUP are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

LCS1	Chloroethane	5	5.50	UGL	110.0	(70-130)	
LCS2	Chloroethane	5	5.27	UGL	105.4	(70-130)	4.3
MBLK	Chloroethane	ND	<0.50	UGL			
RPD_LCS	Chloroethane	110.000	105.400	UGL	4.3	(0-20)	
LCS1	Chloromethane(Methyl Chloride)	5	5.56	UGL	111.2	(70-130)	
LCS2	Chloromethane(Methyl Chloride)	5	5.52	UGL	110.4	(70-130)	0.72
MBLK	Chloromethane(Methyl Chloride)	ND	<0.50	UGL			
RPD_LCS	Chloromethane(Methyl Chloride)	111.200	110.400	UGL	0.7	(0-20)	
LCS1	Chlorodibromomethane	5	4.88	UGL	97.6	(70-130)	
LCS2	Chlorodibromomethane	5	4.89	UGL	97.8	(70-130)	0.20
MBLK	Chlorodibromomethane	ND	<0.50	UGL			
RPD_LCS	Chlorodibromomethane	97.600	97.800	UGL	0.2	(0-20)	
LCS1	Dibromomethane	5	5.13	UGL	102.6	(70-130)	
LCS2	Dibromomethane	5	5.04	UGL	100.8	(70-130)	1.8
MBLK	Dibromomethane	ND	<0.50	UGL			
RPD_LCS	Dibromomethane	102.600	100.800	UGL	1.8	(0-20)	
LCS1	Bromodichloromethane	5	4.88	UGL	97.6	(70-130)	
LCS2	Bromodichloromethane	5	4.75	UGL	95.0	(70-130)	2.7
MBLK	Bromodichloromethane	ND	<0.50	UGL			
RPD_LCS	Bromodichloromethane	97.600	95.000	UGL	2.7	(0-20)	
LCS1	Dichloromethane	5	5.27	UGL	105.4	(70-130)	
LCS2	Dichloromethane	5	5.31	UGL	106.2	(70-130)	0.76
MBLK	Dichloromethane	ND	<0.50	UGL			
RPD_LCS	Dichloromethane	105.400	106.200	UGL	0.8	(0-20)	
LCS1	Di-isopropyl ether	5	4.15	UGL	83.0	(70-130)	
LCS2	Di-isopropyl ether	5	4.07	UGL	81.4	(70-130)	1.9
MBLK	Di-isopropyl ether	ND	<3.0	UGL			
RPD_LCS	Di-isopropyl ether	83.000	81.400	UGL	1.9	(0-20)	
LCS1	Ethyl benzene	5	4.41	UGL	88.2	(70-130)	
LCS2	Ethyl benzene	5	4.30	UGL	86.0	(70-130)	2.5
MBLK	Ethyl benzene	ND	<0.50	UGL			
RPD_LCS	Ethyl benzene	88.200	86.000	UGL	2.5	(0-20)	
LCS1	Dichlorodifluoromethane	5	5.31	UGL	106.2	(70-130)	
LCS2	Dichlorodifluoromethane	5	5.05	UGL	101.0	(70-130)	5.0
MBLK	Dichlorodifluoromethane	ND	<0.50	UGL			

Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and DUP are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

RPD_LCS	Dichlorodifluoromethane	106.200	101.000	UGL	5.0	(0-20)	
LCS1	Fluorotrichloromethane-Freon11	5	5.49	UGL	109.8	(70-130)	
LCS2	Fluorotrichloromethane-Freon11	5	5.30	UGL	106.0	(70-130)	3.5
MBLK	Fluorotrichloromethane-Freon11	ND	<0.50	UGL			
RPD_LCS	Fluorotrichloromethane-Freon11	109.800	106.000	UGL	3.5	(0-20)	
LCS1	Hexachlorobutadiene	5	5.22	UGL	104.4	(70-130)	
LCS2	Hexachlorobutadiene	5	5.27	UGL	105.4	(70-130)	0.95
MBLK	Hexachlorobutadiene	ND	<0.50	UGL			
RPD_LCS	Hexachlorobutadiene	104.400	105.400	UGL	1.0	(0-20)	
LCS1	Isopropylbenzene	5	4.81	UGL	96.2	(70-130)	
LCS2	Isopropylbenzene	5	4.75	UGL	95.0	(70-130)	1.3
MBLK	Isopropylbenzene	ND	<0.50	UGL			
RPD_LCS	Isopropylbenzene	96.200	95.000	UGL	1.3	(0-20)	
LCS1	m-Dichlorobenzene (1,3-DCB)	5	5.64	UGL	112.8	(70-130)	
LCS2	m-Dichlorobenzene (1,3-DCB)	5	5.66	UGL	113.2	(70-130)	0.35
MBLK	m-Dichlorobenzene (1,3-DCB)	ND	<0.50	UGL			
RPD_LCS	m-Dichlorobenzene (1,3-DCB)	112.800	113.200	UGL	0.4	(0-20)	
LCS1	m,p-Xylenes	10	9.39	UGL	93.9	(70-130)	
LCS2	m,p-Xylenes	10	9.05	UGL	90.5	(70-130)	3.7
MBLK	m,p-Xylenes	ND	<0.50	UGL			
RPD_LCS	m,p-Xylenes	93.900	90.500	UGL	3.7	(0-20)	
LCS1	Methyl Tert-butyl ether (MTBE)	5	4.13	UGL	82.6	(70-130)	
LCS2	Methyl Tert-butyl ether (MTBE)	5	4.23	UGL	84.6	(70-130)	2.4
MBLK	Methyl Tert-butyl ether (MTBE)	ND	<1.0	UGL			
RPD_LCS	Methyl Tert-butyl ether (MTBE)	82.600	84.600	UGL	2.4	(0-20)	
LCS1	Naphthalene	5	3.89	UGL	77.8	(70-130)	
LCS2	Naphthalene	5	4.28	UGL	85.6	(70-130)	9.5
MBLK	Naphthalene	ND	<0.50	UGL			
RPD_LCS	Naphthalene	77.800	85.600	UGL	9.5	(0-20)	
LCS1	n-Butylbenzene	5	4.30	UGL	86.0	(70-130)	
LCS2	n-Butylbenzene	5	4.32	UGL	86.4	(70-130)	0.46
MBLK	n-Butylbenzene	ND	<0.50	UGL			
RPD_LCS	n-Butylbenzene	86.000	86.400	UGL	0.5	(0-20)	
LCS1	n-Propylbenzene	5	5.04	UGL	100.8	(70-130)	
LCS2	n-Propylbenzene	5	5.06	UGL	101.2	(70-130)	0.40

Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and DUP are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

MBLK	n-Propylbenzene	ND	<0.50	UGL			
RPD_LCS	n-Propylbenzene	100.800	101.200	UGL	0.4	(0-20)	
LCS1	o-Xylene	5	4.69	UGL	93.8	(70-130)	
LCS2	o-Xylene	5	4.53	UGL	90.6	(70-130)	3.5
MBLK	o-Xylene	ND	<0.50	UGL			
RPD_LCS	o-Xylene	93.800	90.600	UGL	3.5	(0-20)	
LCS1	o-Dichlorobenzene (1,2-DCB)	5	5.05	UGL	101.0	(70-130)	
LCS2	o-Dichlorobenzene (1,2-DCB)	5	5.00	UGL	100.0	(70-130)	1.00
MBLK	o-Dichlorobenzene (1,2-DCB)	ND	<0.50	UGL			
RPD_LCS	o-Dichlorobenzene (1,2-DCB)	101.000	100.000	UGL	1.0	(0-20)	
LCS1	Tetrachloroethylene (PCE)	5	5.56	UGL	111.2	(70-130)	
LCS2	Tetrachloroethylene (PCE)	5	5.23	UGL	104.6	(70-130)	6.1
MBLK	Tetrachloroethylene (PCE)	ND	<0.50	UGL			
RPD_LCS	Tetrachloroethylene (PCE)	111.200	104.600	UGL	6.1	(0-20)	
LCS1	p-Isopropyltoluene	5	4.82	UGL	96.4	(70-130)	
LCS2	p-Isopropyltoluene	5	4.74	UGL	94.8	(70-130)	1.7
MBLK	p-Isopropyltoluene	ND	<0.50	UGL			
RPD_LCS	p-Isopropyltoluene	96.400	94.800	UGL	1.7	(0-20)	
LCS1	sec-Butylbenzene	5	4.84	UGL	96.8	(70-130)	
LCS2	sec-Butylbenzene	5	4.88	UGL	97.6	(70-130)	0.82
MBLK	sec-Butylbenzene	ND	<0.50	UGL			
RPD_LCS	sec-Butylbenzene	96.800	97.600	UGL	0.8	(0-20)	
LCS1	Styrene	5	4.19	UGL	83.8	(70-130)	
LCS2	Styrene	5	4.08	UGL	81.6	(70-130)	2.7
MBLK	Styrene	ND	<0.50	UGL			
RPD_LCS	Styrene	83.800	81.600	UGL	2.7	(0-20)	
LCS1	trans-1,2-Dichloroethylene	5	5.54	UGL	110.8	(70-130)	
LCS2	trans-1,2-Dichloroethylene	5	5.42	UGL	108.4	(70-130)	2.2
MBLK	trans-1,2-Dichloroethylene	ND	<0.50	UGL			
RPD_LCS	trans-1,2-Dichloroethylene	110.800	108.400	UGL	2.2	(0-20)	
LCS1	tert-amyl Methyl Ether	5	4.23	UGL	84.6	(70-130)	
LCS2	tert-amyl Methyl Ether	5	4.13	UGL	82.6	(70-130)	2.4
MBLK	tert-amyl Methyl Ether	ND	<3.0	UGL			
RPD_LCS	tert-amyl Methyl Ether	84.600	82.600	UGL	2.4	(0-20)	
LCS1	tert-Butyl Ethyl Ether	5	4.12	UGL	82.4	(70-130)	

Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and DUP are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

LCS2	tert-Butyl Ethyl Ether	5	4.21	UGL	84.2	(70-130)	2.2
MBLK	tert-Butyl Ethyl Ether	ND	<3.0	UGL			
RPD_LCS	tert-Butyl Ethyl Ether	82.400	84.200	UGL	2.2	(0-20)	
LCS1	tert-Butylbenzene	5	4.69	UGL	93.8	(70-130)	
LCS2	tert-Butylbenzene	5	4.85	UGL	97.0	(70-130)	3.4
MBLK	tert-Butylbenzene	ND	<0.50	UGL			
RPD_LCS	tert-Butylbenzene	93.800	97.000	UGL	3.4	(0-20)	
LCS1	Trichloroethylene (TCE)	5	5.16	UGL	103.2	(70-130)	
LCS2	Trichloroethylene (TCE)	5	5.09	UGL	101.8	(70-130)	1.4
MBLK	Trichloroethylene (TCE)	ND	<0.50	UGL			
RPD_LCS	Trichloroethylene (TCE)	103.200	101.800	UGL	1.4	(0-20)	
LCS1	Trichlorotrifluoroethane(Freon	5	5.58	UGL	111.6	(70-130)	
LCS2	Trichlorotrifluoroethane(Freon	5	5.43	UGL	108.6	(70-130)	2.7
MBLK	Trichlorotrifluoroethane(Freon	ND	<0.50	UGL			
RPD_LCS	Trichlorotrifluoroethane(Freon	111.600	108.600	UGL	2.7	(0-20)	
LCS1	trans-1,3-Dichloropropene	5	4.38	UGL	87.6	(70-130)	
LCS2	trans-1,3-Dichloropropene	5	4.43	UGL	88.6	(70-130)	1.1
MBLK	trans-1,3-Dichloropropene	ND	<0.50	UGL			
RPD_LCS	trans-1,3-Dichloropropene	87.600	88.600	UGL	1.1	(0-20)	
LCS1	Toluene	5	4.78	UGL	95.6	(70-130)	
LCS2	Toluene	5	4.66	UGL	93.2	(70-130)	2.5
MBLK	Toluene	ND	<0.50	UGL			
RPD_LCS	Toluene	95.600	93.200	UGL	2.5	(0-20)	
LCS1	Vinyl chloride (VC)	5	4.92	UGL	98.4	(70-130)	
LCS2	Vinyl chloride (VC)	5	4.88	UGL	97.6	(70-130)	0.82
MBLK	Vinyl chloride (VC)	ND	<0.30	UGL			
RPD_LCS	Vinyl chloride (VC)	98.400	97.600	UGL	0.8	(0-20)	

QC Ref #269831 Calcium, Total, ICAP

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
LCS1	Calcium, Total, ICAP	50	51.1	MGL	102.2	(85-115)	
LCS2	Calcium, Total, ICAP	50	50.8	MGL	101.6	(85-115)	0.59
MBLK	Calcium, Total, ICAP	ND	<1.0	MGL			

Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and DUP are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

MS	Calcium, Total, ICAP	50	47.3	MGL	94.6	(70-130)	
MSD	Calcium, Total, ICAP	50	51.2	MGL	102.4	(70-130)	7.9

QC Ref #269905 Mercury

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MS	Spiked sample	Lab # 25	04210167	UGL		(0-0)	
LCS1	Mercury	1.50	1.62	UGL	108.0	(85-115)	
LCS2	Mercury	1.50	1.62	UGL	108.0	(85-115)	0.00
MBLK	Mercury	ND	<0.20	UGL			
MS	Mercury	1.50	1.57	UGL	104.7	(70-130)	
MSD	Mercury	1.50	1.60	UGL	106.7	(70-130)	1.9

QC Ref #269969 Endothall

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MS	Spiked sample	Lab # 25	04220057	UGL		(0-0)	
LCS1	Endothall	25	26.7	UGL	106.8	(66-130)	
MBLK	Endothall	ND	<5.0	UGL			
MS	Endothall	25	26.8	UGL	107.2	(66-130)	
MSD	Endothall	25	27.5	UGL	110.0	(66-130)	2.6
MS_2ND	Endothall	25	25.9	UGL	103.6	(66-130)	
RPD_MS	Endothall	107.200	110.000	UGL	2.6	(0-20)	

QC Ref #270012 525 Semivolatiles by GC/MS

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MS	Spiked sample	Lab # 25	04190228	NONE		(0-0)	
LCS1	Atrazine	2	1.99	UGL	99.5	(70-130)	
LCS2	Atrazine	2	2.07	UGL	103.5	(70-130)	3.9
MBLK	Atrazine	ND	<0.050	UGL			
MS	Atrazine	2	2.40	UGL	120.0	(70-130)	

Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and DUP are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

MSD	Atrazine	2	2.11	UGL	105.5	(70-130)	13
RPD_LCS	Atrazine	99.500	103.500	UGL	3.9	(0-20)	
RPD_MS	Atrazine	120.000	105.500	UGL	12.9	(0-20)	
LCS1	Benzo(a)pyrene	2	1.85	UGL	92.5	(70-130)	
LCS2	Benzo(a)pyrene	2	1.87	UGL	93.5	(70-130)	1.1
MBLK	Benzo(a)pyrene	ND	<0.020	UGL			
MS	Benzo(a)pyrene	2	1.87	UGL	93.5	(70-130)	
MSD	Benzo(a)pyrene	2	1.73	UGL	86.5	(70-130)	7.8
RPD_LCS	Benzo(a)pyrene	92.500	93.500	UGL	1.1	(0-20)	
RPD_MS	Benzo(a)pyrene	93.500	86.500	UGL	7.8	(0-20)	
LCS1	Di(2-Ethylhexyl)phthalate	2	1.87	UGL	93.5	(70-130)	
LCS2	Di(2-Ethylhexyl)phthalate	2	1.94	UGL	97.0	(70-130)	3.7
MBLK	Di(2-Ethylhexyl)phthalate	ND	<0.60	UGL			
MS	Di(2-Ethylhexyl)phthalate	2	2.11	UGL	105.5	(70-130)	
MSD	Di(2-Ethylhexyl)phthalate	2	2.17	UGL	108.5	(70-130)	2.8
RPD_LCS	Di(2-Ethylhexyl)phthalate	93.500	97.000	UGL	3.7	(0-20)	
RPD_MS	Di(2-Ethylhexyl)phthalate	105.500	108.500	UGL	2.8	(0-20)	
LCS1	Di-(2-Ethylhexyl)adipate	2	1.74	UGL	87.0	(70-130)	
LCS2	Di-(2-Ethylhexyl)adipate	2	1.84	UGL	92.0	(70-130)	5.6
MBLK	Di-(2-Ethylhexyl)adipate	ND	<0.60	UGL			
MS	Di-(2-Ethylhexyl)adipate	2	1.82	UGL	91.0	(70-130)	
MSD	Di-(2-Ethylhexyl)adipate	2	1.81	UGL	90.5	(70-130)	0.55
RPD_LCS	Di-(2-Ethylhexyl)adipate	87.000	92.000	UGL	5.6	(0-20)	
RPD_MS	Di-(2-Ethylhexyl)adipate	91.000	90.500	UGL	0.6	(0-20)	
LCS1	Hexachlorobenzene	2	1.90	UGL	95.0	(70-130)	
LCS2	Hexachlorobenzene	2	1.93	UGL	96.5	(70-130)	1.6
MBLK	Hexachlorobenzene	ND	<0.050	UGL			
MS	Hexachlorobenzene	2	1.93	UGL	96.5	(70-130)	
MSD	Hexachlorobenzene	2	1.91	UGL	95.5	(70-130)	1.0
RPD_LCS	Hexachlorobenzene	95.000	96.500	UGL	1.6	(0-20)	
RPD_MS	Hexachlorobenzene	96.500	95.500	UGL	1.0	(0-20)	
LCS1	Hexachlorocyclopentadiene	2	1.72	UGL	86.0	(70-130)	
LCS2	Hexachlorocyclopentadiene	2	1.76	UGL	88.0	(70-130)	2.3
MBLK	Hexachlorocyclopentadiene	ND	<0.050	UGL			
MS	Hexachlorocyclopentadiene	2	1.79	UGL	89.5	(70-130)	

Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and DUP are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

MSD	Hexachlorocyclopentadiene	2	1.73	UGL	86.5	(70-130)	3.4
RPD_LCS	Hexachlorocyclopentadiene	86.000	88.000	UGL	2.3	(0-20)	
RPD_MS	Hexachlorocyclopentadiene	89.500	86.500	UGL	3.4	(0-20)	
LCS1	Molinate	2	1.74	UGL	87.0	(70-130)	
LCS2	Molinate	2	1.79	UGL	89.5	(70-130)	2.8
MBLK	Molinate	ND	<0.20	UGL			
MS	Molinate	2	1.81	UGL	90.5	(70-130)	
MSD	Molinate	2	1.81	UGL	90.5	(70-130)	0.00
RPD_LCS	Molinate	87.000	89.500	UGL	2.8	(0-20)	
RPD_MS	Molinate	90.500	90.500	UGL	0.0	(0-20)	
LCS1	Simazine	2	2.11	UGL	105.5	(70-130)	
LCS2	Simazine	2	2.20	UGL	110.0	(70-130)	4.2
MBLK	Simazine	ND	<0.050	UGL			
MS	Simazine	2	2.04	UGL	102.0	(70-130)	
MSD	Simazine	2	2.08	UGL	104.0	(70-130)	1.9
RPD_LCS	Simazine	105.500	110.000	UGL	4.2	(0-20)	
RPD_MS	Simazine	102.000	104.000	UGL	1.9	(0-20)	
LCS1	Perylene-d12	100	97	%R	97.0	(70-130)	
LCS2	Perylene-d12	100	96	%R	96.0	(70-130)	1.0
MBLK	Perylene-d12	100	94	%R	94.0		
MS	Perylene-d12	100	94	%R	94.0	(70-130)	
MSD	Perylene-d12	100	92	%R	92.0	(70-130)	2.2
LCS1	1,3-dimethyl-2-nitrobenzene	100	89	%R	89.0	(70-130)	
LCS2	1,3-dimethyl-2-nitrobenzene	100	89	%R	89.0	(70-130)	0.00
MBLK	1,3-dimethyl-2-nitrobenzene	100	88	%R	88.0		
MS	1,3-dimethyl-2-nitrobenzene	100	90	%R	90.0	(70-130)	
MSD	1,3-dimethyl-2-nitrobenzene	100	91	%R	91.0	(70-130)	1.1
LCS1	Triphenylphosphate	100	102	%R	102.0	(70-130)	
LCS2	Triphenylphosphate	100	105	%R	105.0	(70-130)	2.9
MBLK	Triphenylphosphate	100	100	%R	100.0		
MS	Triphenylphosphate	100	104	%R	104.0	(70-130)	
MSD	Triphenylphosphate	100	105	%R	105.0	(70-130)	0.96
LCS1	Thiobencarb	2	1.87	UGL	93.5	(70-130)	
LCS2	Thiobencarb	2	1.90	UGL	95.0	(70-130)	1.6
MBLK	Thiobencarb	ND	<0.20	UGL			

Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and DUP are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

MS	Thiobencarb	2	1.90	UGL	95.0	(70-130)	
MSD	Thiobencarb	2	1.85	UGL	92.5	(70-130)	2.7
RPD_LCS	Thiobencarb	93.500	95.000	UGL	1.6	(0-20)	
RPD_MS	Thiobencarb	95.000	92.500	UGL	2.7	(0-20)	

QC Ref #270110 Herbicides by 515.4

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
CCCH	2,4,5-T	4.0	4.02	UGL	100.5	(70-130)	
CCCL	2,4,5-T	1.0	1.00	UGL	100.0	(70-130)	
LCS1	2,4,5-T	0.75	0.74	UGL	98.7	(70-130)	
LCS2	2,4,5-T	3.0	2.96	UGL	98.7	(70-130)	
LCS3	2,4,5-T	3.0	3.03	UGL	101.0	(70-130)	
MBLK	2,4,5-T	ND	<0.20	UGL			
MS	2,4,5-T	3.0	3.23	UGL	107.7	(70-130)	
MSD	2,4,5-T	3.0	3.19	UGL	106.3	(70-130)	1.2
CCCH	2,4,5-TP (Silvex)	4.0	4.01	UGL	100.2	(70-130)	
CCCL	2,4,5-TP (Silvex)	1.0	1.03	UGL	103.0	(70-130)	
LCS1	2,4,5-TP (Silvex)	0.75	0.80	UGL	106.7	(70-130)	
LCS2	2,4,5-TP (Silvex)	3.0	3.02	UGL	100.7	(70-130)	
LCS3	2,4,5-TP (Silvex)	3.0	3.04	UGL	101.3	(70-130)	
MBLK	2,4,5-TP (Silvex)	ND	<0.20	UGL			
MS	2,4,5-TP (Silvex)	3.0	3.04	UGL	101.3	(70-130)	
MSD	2,4,5-TP (Silvex)	3.0	3.02	UGL	100.7	(70-130)	0.66
CCCH	2,4-D	2.0	1.87	UGL	93.5	(70-130)	
CCCL	2,4-D	0.50	0.60	UGL	120.0	(70-130)	
LCS1	2,4-D	0.375	0.38	UGL	101.3	(70-130)	
LCS2	2,4-D	1.5	1.47	UGL	98.0	(70-130)	
LCS3	2,4-D	1.5	1.52	UGL	101.3	(70-130)	
MBLK	2,4-D	ND	<0.10	UGL			
MS	2,4-D	1.5	1.63	UGL	108.7	(70-130)	
MSD	2,4-D	1.5	1.47	UGL	98.0	(70-130)	10
CCCH	2,4-DB	40.0	40.0	UGL	100.0	(70-130)	
CCCL	2,4-DB	10.0	10.3	UGL	103.0	(70-130)	

Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and DUP are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

LCS1	2,4-DB	7.50	7.02	UGL	93.6	(70-130)	
LCS2	2,4-DB	30.0	28.2	UGL	94.0	(70-130)	
LCS3	2,4-DB	30.0	29.0	UGL	96.7	(70-130)	
MBLK	2,4-DB	ND	<2.0	UGL			
MS	2,4-DB	30.0	31.4	UGL	104.7	(70-130)	
MSD	2,4-DB	30.0	30.8	UGL	102.7	(70-130)	1.9
CCCH	Dichlorprop	10.0	9.94	UGL	99.4	(70-130)	
CCCL	Dichlorprop	2.50	2.34	UGL	93.6	(70-130)	
LCS1	Dichlorprop	1.875	1.89	UGL	100.8	(70-130)	
LCS2	Dichlorprop	7.5	7.57	UGL	100.9	(70-130)	
LCS3	Dichlorprop	7.5	7.82	UGL	104.3	(70-130)	
MBLK	Dichlorprop	ND	<0.50	UGL			
MS	Dichlorprop	7.5	8.18	UGL	109.1	(70-130)	
MSD	Dichlorprop	7.5	7.66	UGL	102.1	(70-130)	6.6
MS	Spiked sample	Lab # 25	04260396	NONE		(0-0)	
CCCH	Acifluorfen	4.0	4.01	UGL	100.2	(70-130)	
CCCL	Acifluorfen	1.00	0.99	UGL	99.0	(70-130)	
LCS1	Acifluorfen	0.75	0.74	UGL	98.7	(70-130)	
LCS2	Acifluorfen	3.0	3.02	UGL	100.7	(70-130)	
LCS3	Acifluorfen	3.0	3.02	UGL	100.7	(70-130)	
MBLK	Acifluorfen	ND	<0.20	UGL			
MS	Acifluorfen	3.0	3.21	UGL	107.0	(70-130)	
MSD	Acifluorfen	3.0	3.14	UGL	104.7	(70-130)	2.2
CCCH	Bentazon	10.0	9.78	UGL	97.8	(70-130)	
CCCL	Bentazon	2.50	2.43	UGL	97.2	(70-130)	
LCS1	Bentazon	1.875	1.85	UGL	98.7	(70-130)	
LCS2	Bentazon	7.5	7.19	UGL	95.9	(70-130)	
LCS3	Bentazon	7.5	7.51	UGL	100.1	(70-130)	
MBLK	Bentazon	ND	<0.50	UGL			
MS	Bentazon	7.5	7.45	UGL	99.3	(70-130)	
MSD	Bentazon	7.5	7.42	UGL	98.9	(70-130)	0.40
CCCH	Dalapon	20.0	19.5	UGL	97.5	(70-130)	
CCCL	Dalapon	5.00	4.33	UGL	86.6	(70-130)	
LCS1	Dalapon	3.75	3.57	UGL	95.2	(70-130)	
LCS2	Dalapon	15.0	14.4	UGL	96.0	(70-130)	

Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and DUP are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

LCS3	Dalapon	15.0	15.2	UGL	101.3	(70-130)	
MBLK	Dalapon	ND	<1.0	UGL			
MS	Dalapon	15.0	14.7	UGL	98.0	(70-130)	
MSD	Dalapon	15.0	14.0	UGL	93.3	(70-130)	4.9
CCCH	3,5-Dichlorobenzoic acid	10.0	9.93	UGL	99.3	(70-130)	
CCCL	3,5-Dichlorobenzoic acid	2.50	2.46	UGL	98.4	(70-130)	
LCS1	3,5-Dichlorobenzoic acid	1.875	1.90	UGL	101.3	(70-130)	
LCS2	3,5-Dichlorobenzoic acid	7.5	7.43	UGL	99.1	(70-130)	
LCS3	3,5-Dichlorobenzoic acid	7.5	7.63	UGL	101.7	(70-130)	
MBLK	3,5-Dichlorobenzoic acid	ND	<0.50	UGL			
MS	3,5-Dichlorobenzoic acid	7.5	8.08	UGL	107.7	(70-130)	
MSD	3,5-Dichlorobenzoic acid	7.5	7.73	UGL	103.1	(70-130)	4.4
CCCH	Tot DCPA Mono&Diacid Degradate	2.0	2.01	UGL	100.5	(70-130)	
CCCL	Tot DCPA Mono&Diacid Degradate	0.50	0.47	UGL	94.0	(70-130)	
LCS1	Tot DCPA Mono&Diacid Degradate	0.75	0.92	UGL	122.7	(70-130)	
LCS2	Tot DCPA Mono&Diacid Degradate	3.0	3.36	UGL	112.0	(70-130)	
LCS3	Tot DCPA Mono&Diacid Degradate	3.0	3.47	UGL	115.7	(70-130)	
MBLK	Tot DCPA Mono&Diacid Degradate	ND	<1.0	UGL			
MS	Tot DCPA Mono&Diacid Degradate	1.5	1.58	UGL	105.3	(70-130)	
MSD	Tot DCPA Mono&Diacid Degradate	1.5	1.60	UGL	106.7	(70-130)	1.3
CCCH	Dicamba	1.0	1.00	UGL	100.0	(70-130)	
CCCL	Dicamba	0.25	0.27	UGL	108.0	(70-130)	
LCS1	Dicamba	0.1875	0.20	UGL	106.7	(70-130)	
LCS2	Dicamba	0.75	0.80	UGL	106.7	(70-130)	
LCS3	Dicamba	0.75	0.81	UGL	108.0	(70-130)	
MBLK	Dicamba	ND	<0.080	UGL			
MS	Dicamba	0.75	0.81	UGL	108.0	(70-130)	
MSD	Dicamba	0.75	0.76	UGL	101.3	(70-130)	6.4
CCCH	Dinoseb	4.0	3.94	UGL	98.5	(70-130)	
CCCL	Dinoseb	1.0	0.98	UGL	98.0	(70-130)	
LCS1	Dinoseb	0.75	0.71	UGL	94.7	(70-130)	
LCS2	Dinoseb	3.0	2.84	UGL	94.7	(70-130)	
LCS3	Dinoseb	3.0	2.87	UGL	95.7	(70-130)	
MBLK	Dinoseb	ND	<0.20	UGL			
MS	Dinoseb	3.0	3.09	UGL	103.0	(70-130)	

Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and DUP are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

MSD	Dinoseb	3.0	3.03	UGL	101.0	(70-130)	2.0
CCCH	Pentachlorophenol	0.8	0.78	UGL	97.5	(70-130)	
CCCL	Pentachlorophenol	0.20	0.19	UGL	95.0	(70-130)	
LCS1	Pentachlorophenol	0.15	0.16	UGL	106.7	(70-130)	
LCS2	Pentachlorophenol	0.60	0.60	UGL	100.0	(70-130)	
LCS3	Pentachlorophenol	0.60	0.61	UGL	101.7	(70-130)	
MBLK	Pentachlorophenol	ND	<0.040	UGL			
MS	Pentachlorophenol	0.6	0.57	UGL	95.0	(70-130)	
MSD	Pentachlorophenol	0.6	0.55	UGL	91.7	(70-130)	3.6
CCCH	Picloram	2.0	2.06	UGL	103.0	(70-130)	
CCCL	Picloram	0.50	0.58	UGL	116.0	(70-130)	
LCS1	Picloram	0.375	0.41	UGL	109.3	(70-130)	
LCS2	Picloram	1.5	1.66	UGL	110.7	(70-130)	
LCS3	Picloram	1.5	1.73	UGL	115.3	(70-130)	
MBLK	Picloram	ND	<0.10	UGL			
MS	Picloram	1.5	1.79	UGL	119.3	(70-130)	
MSD	Picloram	1.5	1.75	UGL	116.7	(70-130)	2.3
CCCH	2,4-Dichlorophenylacetic acid	100	105	%R	105.0	(70-130)	
CCCL	2,4-Dichlorophenylacetic acid	100	98	%R	98.0	(70-130)	
LCS1	2,4-Dichlorophenylacetic acid	100	94	%R	94.0	(70-130)	
LCS2	2,4-Dichlorophenylacetic acid	100	101	%R	101.0	(70-130)	7.2
LCS3	2,4-Dichlorophenylacetic acid	100	101	%R	101.0	(70-130)	
MBLK	2,4-Dichlorophenylacetic acid	100	99	%R	99.0		
MS	2,4-Dichlorophenylacetic acid	100	111	%R	111.0	(70-130)	
MSD	2,4-Dichlorophenylacetic acid	100	98	%R	98.0	(70-130)	12
CCCH	4,4'-Dibromooctafluorobiphenyl	100	98	%R	98.0	(50-150)	
CCCL	4,4'-Dibromooctafluorobiphenyl	100	101	%R	101.0	(50-150)	
LCS1	4,4'-Dibromooctafluorobiphenyl	100	99	%R	99.0	(50-150)	
LCS2	4,4'-Dibromooctafluorobiphenyl	100	98	%R	98.0	(50-150)	1.0
LCS3	4,4'-Dibromooctafluorobiphenyl	100	104	%R	104.0	(50-150)	
MBLK	4,4'-Dibromooctafluorobiphenyl	100	99	%R	99.0		
MS	4,4'-Dibromooctafluorobiphenyl	100	99	%R	99.0	(50-150)	
MSD	4,4'-Dibromooctafluorobiphenyl	100	101	%R	101.0	(50-150)	2.0

Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and DUP are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

QC Ref #270111 EDB and DBCP by GC-ECD

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MS	Spiked sample	Lab # 25	04260569	NONE		(0-0)	
LCS1	Dibromochloropropane (DBCP)	0.02	0.018	UGL	90.0	(70-130)	
LCS2	Dibromochloropropane (DBCP)	0.20	0.20	UGL	100.0	(70-130)	
MBLK	Dibromochloropropane (DBCP)	ND	<0.010	UGL			
MS	Dibromochloropropane (DBCP)	0.20	0.17	UGL	85.0	(65-135)	
MSD	Dibromochloropropane (DBCP)	0.20	0.18	UGL	90.0	(65-135)	5.7
RPD_MS	Dibromochloropropane (DBCP)	85.000	90.000	UGL	5.7	(0-20)	
LCS1	Ethylene Dibromide (EDB)	0.02	0.019	UGL	95.0	(70-130)	
LCS2	Ethylene Dibromide (EDB)	0.20	0.19	UGL	95.0	(70-130)	
MBLK	Ethylene Dibromide (EDB)	ND	<0.010	UGL			
MS	Ethylene Dibromide (EDB)	0.20	0.19	UGL	95.0	(65-135)	
MSD	Ethylene Dibromide (EDB)	0.20	0.19	UGL	95.0	(65-135)	0.00
RPD_MS	Ethylene Dibromide (EDB)	95.000	95.000	UGL	0.0	(0-20)	
LCS1	1,2-dibromopropane (surr)	100	108	%R	108.0	(74-149)	
LCS2	1,2-dibromopropane (surr)	100	102	%R	102.0	(74-149)	5.7
MBLK	1,2-dibromopropane (surr)	100	102	%R	102.0		
MS	1,2-dibromopropane (surr)	100	105	%R	105.0	(60-140)	
MSD	1,2-dibromopropane (surr)	100	100	%R	100.0	(60-140)	4.9
RPD_MS	1,2-dibromopropane (surr)	105.000	100.000	%R	4.9	(0-20)	

QC Ref #270187 Alkalinity in CaCO3 units

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MS	Spiked sample	Lab # 25	04260406	MGL		(0-0)	
LCS1	Alkalinity in CaCO3 units	100	96.2	MGL	96.2	(90-110)	
LCS2	Alkalinity in CaCO3 units	100	96.6	MGL	96.6	(90-110)	0.41
MBLK	Alkalinity in CaCO3 units	ND	<2.0	MGL			
MS	Alkalinity in CaCO3 units	100	93.5	MGL	93.5	(80-120)	
MSD	Alkalinity in CaCO3 units	100	93.7	MGL	93.7	(80-120)	0.21

Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and DUP are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

RPD_LCS	Alkalinity in CaCO3 units	96.200	96.600	MGL	0.4	(0-10)
RPD_MS	Alkalinity in CaCO3 units	93.500	93.700	MGL	0.2	(0-10)

QC Ref #270198 Diquat and Paraquat

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MS	Spiked sample	Lab # 25	04220057	NONE	0.0	(0-0)	
LCS1	Diquat	5.0	4.31	UGL	86.2	(70-130)	
MBLK	Diquat	ND	<0.40	UGL			
MS	Diquat	5.0	4.43	UGL	88.6	(70-130)	
MSD	Diquat	5.0	4.57	UGL	91.4	(70-130)	3.1
RPD_MS	Diquat	88.600	91.400	UGL	3.1	(0-20)	
LCS1	Paraquat	5.0	4.02	UGL	80.4	(70-130)	
MBLK	Paraquat	ND	<2.0	UGL			
MS	Paraquat	5.0	4.09	UGL	81.8	(70-130)	
MSD	Paraquat	5.0	4.25	UGL	85.0	(70-130)	3.8
RPD_MS	Paraquat	81.800	85.000	UGL	3.8	(0-20)	

QC Ref #270242 Aldicarbs

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
LCS1	3-Hydroxycarbofuran	10.0	9.45	UGL	94.5	(80-120)	
MBLK	3-Hydroxycarbofuran	ND	<2.0	UGL			
MS	3-Hydroxycarbofuran	10.0	10.1	UGL	101.0	(65-135)	
MSD	3-Hydroxycarbofuran	10.0	10.1	UGL	101.0	(65-135)	0.00
MS	Spiked sample	Lab # 25	04200028	NONE		(0-0)	
LCS1	Aldicarb (Temik)	10.0	9.79	UGL	97.9	(80-120)	
MBLK	Aldicarb (Temik)	ND	<0.50	UGL			
MS	Aldicarb (Temik)	10.0	9.91	UGL	99.1	(65-135)	
MSD	Aldicarb (Temik)	10.0	9.64	UGL	96.4	(65-135)	2.8
LCS1	Aldicarb sulfone	10.0	9.63	UGL	96.3	(80-120)	
MBLK	Aldicarb sulfone	ND	<0.70	UGL			
MS	Aldicarb sulfone	10.0	10.0	UGL	100.0	(65-135)	

Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and DUP are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

MSD	Aldicarb sulfone	10.0	10.1	UGL	101.0	(65-135)	1.00
LCS1	Aldicarb sulfoxide	10.0	9.86	UGL	98.6	(80-120)	
MBLK	Aldicarb sulfoxide	ND	<0.50	UGL			
MS	Aldicarb sulfoxide	10.0	10.0	UGL	100.0	(65-135)	
MSD	Aldicarb sulfoxide	10.0	10.0	UGL	100.0	(65-135)	0.00
LCS1	Baygon	10.0	9.42	UGL	94.2	(80-120)	
MBLK	Baygon	ND	<2.0	UGL			
MS	Baygon	10.0	10.0	UGL	100.0	(65-135)	
MSD	Baygon	10.0	10.1	UGL	101.0	(65-135)	1.00
LCS1	Carbofuran (Furadan)	10.0	9.29	UGL	92.9	(80-120)	
MS	Carbofuran (Furadan)	10.0	10.1	UGL	101.0	(65-135)	
MSD	Carbofuran (Furadan)	10.0	10.1	UGL	101.0	(65-135)	0.00
LCS1	Carbaryl	10.0	9.21	UGL	92.1	(80-120)	
MBLK	Carbaryl	ND	<2.0	UGL			
MS	Carbaryl	10.0	9.94	UGL	99.4	(65-135)	
MSD	Carbaryl	10.0	10.1	UGL	101.0	(65-135)	1.6
LCS1	Methiocarb	10.0	9.21	UGL	92.1	(80-120)	
MBLK	Methiocarb	ND	<2.0	UGL			
MS	Methiocarb	10.0	9.57	UGL	95.7	(65-135)	
MSD	Methiocarb	10.0	10.3	UGL	103.0	(65-135)	7.3
LCS1	Methomyl	10.0	9.54	UGL	95.4	(80-120)	
MBLK	Methomyl	ND	<1.0	UGL			
MS	Methomyl	10.0	10.1	UGL	101.0	(65-135)	
MSD	Methomyl	10.0	10.1	UGL	101.0	(65-135)	0.00
LCS1	Oxamyl (Vydate)	10.0	9.33	UGL	93.3	(80-120)	
MBLK	Oxamyl (Vydate)	ND	<2.0	UGL			
MS	Oxamyl (Vydate)	10.0	10.1	UGL	101.0	(65-135)	
MSD	Oxamyl (Vydate)	10.0	10.1	UGL	101.0	(65-135)	0.00
LCS1	BDMC	100	98	%R	98.0	(70-130)	
MBLK	BDMC	100	98	%R	98.0		
MS	BDMC	100	97	%R	97.0	(70-130)	
MSD	BDMC	100	101	%R	101.0	(70-130)	4.0

Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and DUP are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

QC Ref #270460 Glyphosate

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MS	Spiked sample	Lab # 25	04270249	UGL		(0-0)	
LCS1	Glyphosate	10	8.59	UGL	85.9	(70-130)	
MBLK	Glyphosate	ND	<6.0	UGL			
MS	Glyphosate	10	9.26	UGL	92.6	(70-130)	
MSD	Glyphosate	10	9.80	UGL	98.0	(70-130)	5.7

QC Ref #270558 Pesticides by EPA 505

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
LCS1	PCB 1016 Aroclor	0.5	0.56	UGL	112.0	(70-130)	
LCS2	PCB 1016 Aroclor	0.5	0.59	UGL	118.0	(70-130)	5.2
MBLK	PCB 1016 Aroclor	ND	<0.070	UGL			
MS	PCB 1016 Aroclor	0.5	0.54	UGL	108.0	(65-135)	
MS2	PCB 1016 Aroclor	0.5	0.56	UGL	112.0	(65-135)	
MBLK	PCB 1221 Aroclor	ND	<0.10	UGL			
MBLK	PCB 1232 Aroclor	ND	<0.10	UGL			
MBLK	PCB 1242 Aroclor	ND	<0.10	UGL			
MBLK	PCB 1248 Aroclor	ND	<0.10	UGL			
MBLK	PCB 1254 Aroclor	ND	<0.10	UGL			
LCS1	PCB 1260 Aroclor	0.5	0.37	UGL	74.0	(70-130)	
LCS2	PCB 1260 Aroclor	0.5	0.37	UGL	74.0	(70-130)	0.00
MBLK	PCB 1260 Aroclor	ND	<0.10	UGL			
MS	PCB 1260 Aroclor	0.5	0.36	UGL	72.0	(65-135)	
MS2	PCB 1260 Aroclor	0.5	0.39	UGL	78.0	(65-135)	
MS	Spiked sample	Lab # 25	04220057	NONE		(0-0)	
MS2	Spiked sample	Lab # 25	04260388	NONE		(0-0)	
LCS1	Alachlor (Alanex)	0.2	0.21	UGL	105.0	(70-130)	
LCS2	Alachlor (Alanex)	1.0	1.00	UGL	100.0	(70-130)	
MBLK	Alachlor (Alanex)	ND	<0.050	UGL			

Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and DUP are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

MS	Alachlor (Alanex)	0.2	0.20	UGL	100.0	(65-135)
MS2	Alachlor (Alanex)	1.0	1.06	UGL	106.0	(65-135)
LCS1	Aldrin	0.02	0.023	UGL	115.0	(70-130)
LCS2	Aldrin	0.10	0.106	UGL	106.0	(70-130)
MBLK	Aldrin	ND	<0.010	UGL		
MS	Aldrin	0.02	0.023	UGL	115.0	(65-135)
MS2	Aldrin	0.10	0.114	UGL	114.0	(65-135)
MBLK	Chlordane	ND	<0.10	UGL		
LCS1	Dieldrin	0.02	0.022	UGL	110.0	(70-130)
LCS2	Dieldrin	0.10	0.108	UGL	108.0	(70-130)
MBLK	Dieldrin	ND	<0.010	UGL		
MS	Dieldrin	0.02	0.022	UGL	110.0	(65-135)
MS2	Dieldrin	0.10	0.111	UGL	111.0	(65-135)
LCS1	Endrin	0.02	0.020	UGL	100.0	(70-130)
LCS2	Endrin	0.10	0.082	UGL	82.0	(70-130)
MBLK	Endrin	ND	<0.010	UGL		
MS	Endrin	0.02	0.021	UGL	105.0	(65-135)
MS2	Endrin	0.10	0.110	UGL	110.0	(65-135)
LCS1	Heptachlor	0.02	0.020	UGL	100.0	(70-130)
LCS2	Heptachlor	0.10	0.091	UGL	91.0	(70-130)
MBLK	Heptachlor	ND	<0.010	UGL		
MS	Heptachlor	0.02	0.022	UGL	110.0	(65-135)
MS2	Heptachlor	0.10	0.099	UGL	99.0	(65-135)
LCS1	Heptachlor Epoxide	0.02	0.017	UGL	85.0	(70-130)
LCS2	Heptachlor Epoxide	0.10	0.092	UGL	92.0	(70-130)
MBLK	Heptachlor Epoxide	ND	<0.010	UGL		
MS	Heptachlor Epoxide	0.02	0.018	UGL	90.0	(65-135)
MS2	Heptachlor Epoxide	0.10	0.104	UGL	104.0	(65-135)
LCS1	Lindane (gamma-BHC)	0.02	0.022	UGL	110.0	(70-130)
LCS2	Lindane (gamma-BHC)	0.10	0.100	UGL	100.0	(70-130)
MBLK	Lindane (gamma-BHC)	ND	<0.010	UGL		
MS	Lindane (gamma-BHC)	0.02	0.021	UGL	105.0	(65-135)
MS2	Lindane (gamma-BHC)	0.10	0.109	UGL	109.0	(65-135)
LCS1	Methoxychlor	0.10	0.10	UGL	100.0	(70-130)
LCS2	Methoxychlor	0.50	0.44	UGL	88.0	(70-130)

Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and DUP are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3629
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Hawaii Department of Water Supply
(Hilo)
(continued)

MBLK	Methoxychlor	ND	<0.050	UGL		
MS	Methoxychlor	0.10	0.09	UGL	90.0	(65-135)
MS2	Methoxychlor	0.50	0.58	UGL	116.0	(65-135)
MBLK	Toxaphene	ND	<0.50	UGL		

Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and DUP are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.

MONTGOMERY WATSON LABORATORIES

555 East Walnut Street
Pasadena, California 91101
818 568 6400; Fax: 818 568 6324;
1 800 566 LABS (1 800 566 5227)

Laboratory
Report
146881

Hawaii Department of Water Supply (Hilo)
Mae Kise
25 Aupuni St.
Hilo , HI 96720

Sample Received
22-apr-2005 14:22:32
2504220057

SAFE DRINKING WATER BRANCH
PHASE II AND PHASE V CONTAMINANTS
SUMMARY FORM

Water System Name: _____ PWS ID No. _____

Sample Location: WELL HEAD OLAA 6 EXPLORATORY

Sample Date: 04/20/05

Laboratory Name: Montgomery Laboratories Lab Report No. 2504220057

Contaminant	EPA Method	Detection Limit	Concentration
2,4-D (ug/L)	515.4	0.1	ND
2,4,5-TP (ug/L)	515.4	0.2	ND
Pentachlorophenol (ug/L)	515.4	0.04	ND
Pichloram (ug/L)	515.4	0.1	ND
Dalapon (ug/L)	515.4	1	ND
Dinoseb (ug/L)	515.4	0.2	ND
Benzo(a)pyrene (ug/L)	525.2	0.02	ND
Di(2-ethylhexyl)adipate (ug/L)	525.2	0.6	ND
Diethylhexylphthalate (ug/L)	525.2	0.6	ND
Dioxin (Picograms/L)	1613	5	ND
Diquat (ug/L)	549.2	0.4	ND
Endothall (ug/L)	548.1	5	ND
Cyanide (Milligrams/L)	500CN-F	0.025	ND

Group A,B,C -- Note: Surface water systems must take annual samples for cynanide

Pace Analytical™
www.pacelabs.com

146881
HAWAII

Pace Analytical Services, Inc.
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: 612.607.1700
Fax: 612.607.6444

DETERMINATION OF 2,3,7,8-TCDD

Prepared for:
MWH
Attn: Michael Lettona
750 Royal Oaks Drive, Suite 100
Monrovia, CA 91016-3629

ACCREDITED IN ACCORDANCE WITH nelac

This report contains 4 pages.

The results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: 612.607.1700
Fax: 612.607.6444

May 10, 2005
Attn: Michael Lettona
MWH
750 Royal Oaks Drive, Suite 100
Monrovia, CA 91016-3629

MWL Project # 146881
MWL Sub PO # 99-16808
Pace Project # 1012133
State Cert. #: Hawaii
Expiration Date: 30-Jun-2005

Dear Mr. Lettona:

Enclosed are analytical results of one drinking water sample analyzed for 2,3,7,8 -TCDD content. This sample was was analyzed according to Method 1613B by High Resolution Gas Chromatography/High Resolution Mass Spectrometry.

MWL Sample ID	Pace Sample ID	Date Collected	Date Received
2504220057	1012133001	04/20/2005	04/26/2005

The results reported for this sample and the associated quality control samples were all within the criteria described in Method 1613B. If you have any questions or concerns regarding these results, please contact me at (612) 607-6407, by facsimile at (612) 607-6444 or by e-mail at Holly.Peepers@pacelabs.com.

Sincerely,

Holly Peepers

Holly Peepers, Project Manager
High Resolution Mass Spectrometry
Pace Analytical Services
Minneapolis MN

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

MWH Laboratories
A Division of MWH Americas,Inc.
750 Royal Oaks Drive Suite 100
Monrovia, CA 91016-3629
Ph (626) 386-1100 Fax (626) 386-1095

Date 04/25/05

Submittal Form & Purchase Order 99-16808

***REPORTING REQUIREMENTS:** *Do Not Combine Report with any other samples submitted under different MWH project numbers!*
Report & Invoice must have the MWH Project Number **146881** Sub PO# **99-16808** and Job # **1000023**

Report all quality control data according to Method. Include dates analyzed, date extracted (if extracted) and Method reference on the report.
Results must have Complete data & QC with Approval Signature. See reverse side for List of Terms and Conditions

Ship To **Holly Peepers**
Pace Analytical

1700 Elm Street SE Suite 200
Minneapolis, Minnesota 55414

Bill Recipient FedEx Acct:1797-5692-7

612-607-6407 Fax 612-607-6444

Reports: Michael Lettona Sub-contracting Administrator
EMAIL TO: Michael.Lettona@mwhglobal.com
MWH Laboratories 750 Royal Oaks Dr. Monrovia, CA 91016
Phone (626) 386-1137 Fax (626) 386-1095
Invoices to: MWH LABORATORIES
Accounts Payable PO BOX 7009, Pasadena, CA 91109-7009

Provide in each Report the Specified State Certification # & Exp Date for requested tests + matrix

Hawaii DW

1012133

MWH Project #	Report Due:	Sub PO#
146881	05/10/05	99-16808

mgl

		Use MWH Lab # for ID	Client Sample ID for reference only	Analysis Requested	Sample Date & Time	Matrix		Container
1	D1613EDD	2504220057	WELL HEAD OLAA 6 EXPLORATOR	2,3,7,8-Tcdd Dioxin in drinking water 1613b	04/20/05 14:15	dw	1	1L amber glass / no preservative [7day HT for NJ NY UT] 1613B-DW

001

2.7°C

Relinquished by: Sample Control Date 04/25/05 Time 1330 MUST HAVE NOTIFICAION IF TEMP IS GREATER THAN 6 OR LESS THAN 2 CELSIUS

Received by: Date 4/26/05 Time 0905

Page 1

An Acknowledgement of Receipt is requested to attn: Michael Lettona

3/4

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612-607-6444

Drinking Water Analysis Results
2,3,7,8-TCDD -- USEPA Method 1613B
Montgomery Watson Harza Labs

Sample ID.....2504220057 Source ID.....WELL HEAD OLAA 6 EXPLORATOR
Project #.....146881 Date Collected.....04/20/2005 Spike..... 200 pg
Sub PO #.....99-16808 Date Received.....04/26/2005 IS Spike.....2000 pg
Lab Sample ID.....1012133001 Date Extracted.....05/02/2005 CS Spike..... 200 pg

	Sample 1012133001	**Method** Blank	**Lab** Spike	**Lab** Spike Dup
[2,3,7,8-TCDD]	**ND**	ND	--	--
RL	5 pg/L	5 pg/L	--	--
2,3,7,8-TCDD Recovery	--	--	83%	79%
Spike Recovery Limit	--	--	73-146%	73-146%
RPD			4.9%	
IS Recovery	**93%**	78%	62%	72%
pg Recovered	1860 pg/L	1559 pg/L	1231 pg/L	1430 pg/L
IS Recovery Limits	31-137%	31-137%	25-141%	25-141%
CS Recovery	**90%**	87%	81%	84%
pg Recovered	180 pg/L	174 pg/L	162 pg/L	168 pg/L
CS Recovery Limits	42-164%	42-164%	37-158%	37-158%
Filename	F50509B_10	F50505B_21	F50505B_03	F50505B_04
Analysis Date	05/09/2005	05/06/2005	05/06/2005	05/06/2005
Analysis Time	21:15	12:23	02:00	02:35
Analyst	MRO	MRO	MRO	MRO
Volume	1.025L	0.982L	1.010L	1.022L
Dilution	NA	NA	NA	NA
CCAL Filename	F50510A_03	F50505B_02	F50505B_02	F50505B_02

! = Outside the Control Limits
ND = Not Detected
RL = Reporting Limit
Limits = Control Limits from Method 1613 (10/94 Revision), Tables 6A and 7A
RPD = Relative Percent Difference of Lab Spike Recoveries
IS = Internal Standard [2,3,7,8-TCDD-$^{13}C_{12}$]
CS = Cleanup Standard [2,3,7,8-TCDD-$^{37}Cl_4$]

Analyst: Nathan Hoffe

Project No.....1012133

APPENDIX C. HAZARDOUS MATERIALS SURVEY REPORT

EnviroServices & Training Center, LLC

2850 Paa Street, Suite 150 • Honolulu, Hawaii 96819 •Tel: (808) 839-7222 • Fax: (808) 839-4455 • E-mail: info@gotoetc.com

RECEIVED
JUL 19 2007
TOM NANCE
WATER RESOURCE ENGINEERING

TN
GF
TY
GS
LT
ACCTG
JOB

July 18, 2007

Greg Fukumitsu
Tom Nance Water Resource Engineering
680 Ala Moana Blvd., Suite 406
Honolulu, Hawaii, 96813

Subject: **HAZARDOUS MATERIALS SURVEY REPORT - REVISED**
OLAA TANK AND BOOSTER SITE NUMBER 6
HILO, HAWAII

Dear Greg:

The purpose of this Letter Report is to document the hazardous materials sampling activities recently completed by EnviroServices & Training Center, LLC (ETC) at the Olaa tank and booster site number 6 (Subject Location) located in Hilo, Hawaii.

SCOPE OF WORK

ETC performed the following scope of work:

- Identified potentially hazardous and regulated materials on and within the Subject Location (including a lead-based/lead-containing paint and asbestos-containing materials survey);
- Collected forty-two (42) samples of suspected lead containing paint from interior and exterior surfaces of the Subject Location;
- Utilized a portable X-Ray Fluorescence (XRF) analyzer to evaluate the lead content in the paint at the Subject Location;
- Collected a total of six (6) bulk samples from suspect materials of the Subject Location in accordance with EPA guidelines;
- Analyzed each bulk sample by polarized light microscopy to determine asbestos type and content; and,
- Provided this Letter Report documenting ETC's methodologies, findings and recommendations.

WORK ACTIVITIES

Lead Paint

ETC personnel collected and analyzed forty-two (42) paint samples from the Subject Location using a portable XRF spectrum analyzer, in accordance with the EPA and HUD guidelines and recommendations. XRF measurements indicated that several of the sampled surfaces of the Subject Location contained lead in excess of the EPA/HUD guideline of 1.0 mg/cm^2.

The XRF measurements were collected using an EDAX MAP4 portable XRF spectrum analyzer. This portable XRF uses a 10-millicurie cobalt 57 (CO^{57}) radioactive source that, when exposed to lead containing building components, causes lead to emit X-rays with a characteristic frequency or energy.

The intensity of the radiation is then measured by the instrument and reported as lead in milligrams per square centimeter (mg/cm^2). The MAP4 measures both the L-shell X-ray and K-shell X-ray lines of lead. The K-shell X-ray lines are used to determine the level of lead in the paint. The EDAX MAP4 portable XRF spectrum analyzer has a detection limit of 0.05 mg/cm^2, with a maximum precision of +/- 0.05 mg/cm^2, and an accuracy of +/- 5.0% at 1.0 mg/cm^2.

Measurements were collected by placing the MAP 4 faceplate flat against the sample surface and then pulling the trigger. The trigger is then held until a K-shell reading is displayed at a 95% confidence level.

XRF measurement data were interpreted as follows:

- Positive results (lead-based paint) were determined when the K-shell results revealed a lead concentration equal to or greater than 1.0 mg/cm^2.
- Negative results (non lead-based paint) were determined when the K-shell results revealed a lead concentration at less than 1.0 mg/cm^2.

Quality control was accomplished by conducting validation checks. Such checks require the XRF Operator to collect a measurement from a calibration sample with a known concentration (1.05 mg/cm^2) of lead. The manufacturer recommends that such measurements be within $\pm$ 0.15 of 1.05 mg/cm^2. These quality control procedures were conducted at the beginning, and at the end of the inspection. All measurements were within the manufacturer's guidelines.

Asbestos

ETC personnel collected six (6) samples of suspect materials from the Subject Location for asbestos analysis. These samples were collected in accordance with EPA guidelines and recommendations.

Each suspect asbestos containing material was first wetted with water. A small piece was then carefully cut out and placed in a labeled re-sealable plastic bag. The sampling equipment was cleaned between each sample collection to avoid cross-contamination between samples.

All samples were properly logged and recorded following strict chain of custody procedure and submitted to InaLab, Inc. (InaLab) for analysis by polarized light microscopy in accordance with EPA Method 600/R-93/116. InaLab is accredited for bulk asbestos analysis through successful participation in the National Voluntary Lab Accreditation Program (NVLAP).

Miscellaneous Hazardous Materials

In addition to evaluating the building for ACM and lead-based/lead-containing paint, ETC also made visual observations to inventory and identify the presence of other hazardous or regulated materials such as: assumed PCB ballasts and assumed mercury-containing fluorescent light bulbs. Fluorescent light ballasts were inspected for the presence of labeling stating "No PCBs". If labeling was not observed on the light ballast and/or if the ballast was not accessible, the ballast was assumed to be PCB-containing. Fluorescent light bulbs were inspected for the presence of labeling stating "No Mercury". If labeling was

not observed on the light bulb and/or if the light bulb was not accessible, the light bulb was assumed to be mercury-containing.

RESULTS

Asbestos

Six (6) samples were taken during the course of this investigation. Laboratory analysis **did** identify asbestos in the transite wall material present in all walls of the Olaa Booster Site #6 Structure and in the transite ceiling material of the Olaa Booster Site #6 Structure. Table 1 lists the results. The attached Map 1 shows sample locations.

TABLE 1
ASBESTOS BULK SAMPLE RESULTS
OLAA TANK AND BOOSTER SITE #6
HILO, HAWAII

Sample ID	*Sample Location*	*Sample Description*	*Homogenous Areas*	*Asbestos Content*
A-1	Olaa Booster Structure	Roofing/ Ceiling Material	All Roofing and Ceiling Materials	**Chrysotile 30%**
A-2	Olaa Booster Structure	Roofing/ Ceiling Material		**Chrysotile 30%**
A-3	Olaa Booster Structure	Roofing/ Ceiling Material		**Chrysotile 30%**
A-4	Olaa Booster Structure	Wall Material	All Wall Materials	**Chrysotile 20%**
A-5	Olaa Booster Structure	Wall Material		**Chrysotile 20%**
A-6	Olaa Booster Structure	Wall Material		**Chrysotile 20%**

Lead Paint

XRF measurements indicated that painted surfaces of the Subject Location **did** contain lead in excess of the EPA/HUD guideline of 1.0 mg/cm^2. In addition, detectable levels of lead were found to be present on various sampled surfaces throughout the Subject Location at levels less than 1.0 mg/cm^2. The attached Table 2 lists the results. The attached Map 1 shows sample locations.

Miscellaneous Hazardous Materials

ETC personnel made visual observations to identify and inventory other hazardous materials within the Subject Location. Hazardous materials found at the Subject Location are summarized in Table 3 below.

Table 3
Miscellaneous Hazardous Materials
Olaa Tank and Booster Site #6
Hilo, Hawaii

Location	Material	Type	Amount
Booster Site #6 Structure	Ballast	Assumed PCM	4
	Fluorescent Lamp	4 ft. Assumed Mercury	8
Exterior	Various Equipment	Assumed Oil Containing	Various

RECOMMENDATIONS

In summary, based on ETC's visual inspection of the Subject Location and laboratory data, ETC recommends the following.

- Manage and/or remove and dispose of hazardous and regulated materials (e.g. PCB containing ballasts, mercury containing lamps) in accordance with applicable local, state, and federal regulations, prior to renovation and/or demolition activities that may disturb these materials.
- Prior to any renovation and/or demolition activities that will disturb ACM, Category II non-friable ACM, which could be crumbled and pulverized during renovation/demolition activities must be removed and disposed of by a qualified asbestos abatement contractor. In addition, the services of a qualified consultant should be obtained to monitor and inspect the removal activities to ensure compliance with applicable Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), and Hawaii Occupational Safety and Health (HIOSH) and Department of Health (HIDOH) regulations pertaining to the handling of asbestos containing material.
- Remove and dispose of loose and flaking lead-containing and lead-based paint that may be disturbed during renovation/demolition activities in accordance with applicable local, state, and federal regulations.
- Any abatement and demolition contractor(s) must take appropriate measures to comply with applicable EPA, OSHA, HIOSH and HIDOH regulations pertaining to the handling of asbestos and lead containing materials and worker protection. Note that OSHA and HIOSH regulate activities that disturb paint which contain any detectable concentration of lead. Note that detectable levels of lead in the paint were found throughout the Subject Location.
- Have air monitoring conducted for airborne asbestos fibers by a State of Hawaii certified Project Monitor and airborne lead by qualified personnel during the lead and asbestos abatement and general renovation/demolition activities of areas that were determined to contain these contaminants.

LIMITATIONS

ETC's findings, conclusions, and recommendations are based on research, site observations, and/or analytical data, which were gathered and accessible at the time and location of this project. We make no guarantee or warranty, either expressed or implied, except that our services are consistent with good commercial or customary practices designed to conform with acceptable industry standards. ETC has completed this project in accordance with the Guidelines, Standards, and Code of Ethics adopted by members of the American Industrial Hygiene Association, and American Conference of Governmental Industrial Hygienists.

This report is exclusively for the use and benefit of Tom Nance Water Resource Engineering. Reuse of the information contained herein by any other party will be at such party's own risk.

Thank you for allowing ETC to serve you. Please contact us at 839-7222 with any questions.

Sincerely,

Kamalana Kobayashi
Industrial Hygienist

Attachment: XRF Data and Laboratory Results
Map 1 – Lead Paint XRF and Asbestos Sample Locations

INALAB, Inc.

ANALYTICAL REPORT

11 July 2007

3615 Harding Avenue, Ste. 308 Honolulu, Hawaii 96816
VOICE: 808-735-0422 / FAX: 808-735-0047
WWW.INALAB.COM

AIHA Industrial Hygiene ACCREDITED LABORATORY

NVLAP

NVLAP LAB CODE 200655-0

Mr. Kamalana Kobayashi
EnviroServices & Training Center, LLC
2850 Pa'a St. Suite 150
Honolulu HI 96819

Phone Number: (808) 839-7222
Facsimile: (808) 839-4455

Bulk Asbestos Determination

Our Job Number 20071670
Your Project Olaa pump house

Inalab No	YOUR SAMPLE DESCRIPTION Layer Remarks	Asbestos Present?	Type Type 2 Type 3	%v/v	Other Fibrous	% v/v	Matrix	% v/v	Date Receive	Date Analyzed
20070709120	*A-1; roofing mat.* *Whole Sample Basis* Gray fibrous transite material. Visual estimation: 20-30%.	Yes	Chrysotile	30	None Detected	< 1	binder + cementitious	> 70	09-Jul-07	11-Jul-07
20070709121	*A-2; roofing mat.* *Whole Sample Basis* Gray fibrous transite material. Visual estimation: 20-30%.	Yes	Chrysotile	30	None Detected	< 1	binder + cementitious	> 70	09-Jul-07	11-Jul-07
20070709122	*A-3; roofing mat.* *Whole Sample Basis* Gray fibrous transite material. Visual estimation: 20-30%.	Yes	Chrysotile	30	None Detected	< 1	binder + cementitious	> 70	09-Jul-07	11-Jul-07

INALAB, Inc. is an AIHA IHLAP AND ELLAP ACCREDITED LABORATORY (Accreditation No. 101812 with scope of accreditation including metals, lead, solvents, fiber count and bulk asbestos). INALAB Inc. is a NIST NVLAP ACCREDITED LABORATORY (NVLAP Lab Code: 200655-0). INALAB, Inc. is a CERTIFIED ISO/ IEC 17025 AND ISO 9002 ANALYTICA FACILITY.

Mr. Kamalana Kobayashi
EnviroServices & Training Center, LLC
2850 Pa'a St. Suite 150
Honolulu HI 96819

Phone Number: (808) 839-7222
Facsimile: (808) 839-4455

Bulk Asbestos Determination

Our Job Number 20071670
Your Project Olaa pump house

Inalab No	YOUR SAMPLE DESCRIPTION / Layer / Remarks	Asbestos Present?	Type / Type 2 / Type 3	%v/v	Other Fibrous	% v/v	Matrix	% v/v	Date Receive	Date Analyzed
20070709123	*A-4; wall mat.* **Whole Sample Basis** Gray fibrous transite material Visual estimation: 20-30%.	Yes	Chrysotile	20	None Detected	< 1	binder + cementitious + quartz	> 80	09-Jul-07	11-Jul-07
20070709124	*A-5; wall mat.* **Whole Sample Basis** Gray fibrous transite material. Visual estimation: 20-30%	Yes	Chrysotile	20	None Detected	< 1	binder + cementitious + quartz	> 80	09-Jul-07	11-Jul-07
20070709125	*A-6; wall mat.* **Whole Sample Basis** Gray fibrous transite material. Visual estimation: 20-30%.	Yes	Chrysotile	20	None Detected	< 1	binder + cementitious + quartz	> 80	09-Jul-07	11-Jul-07

INALAB, Inc. is an AIHA IHLAP AND ELLAP ACCREDITED LABORATORY (Accreditation No. 101812 with scope of accreditation including metals, lead, solvents, fiber count and bulk asbestos). INALAB Inc. is a NIST NVLAP ACCREDITED LABORATORY (NVLAP Lab Code: 200655-0). INALAB, Inc. is a CERTIFIED ISO/ IEC 17025 AND ISO 9002 ANALYTICA FACILITY.

11 July 2007

Mr. Kamalana Kobayashi
EnviroServices & Training Center, LLC
2850 Pa'a St, Suite 150
Honolulu HI 96819

Phone Number: (808) 839-7222
Facsimile: (808) 839-4455

"The bulk sample(s) analysis(ses) subject of this analytical report was (were) conducted in general accordance with the procedures outlined in the United States Environmental Protection Agency's "Interim Method for the Determination of Asbestos in Bulk Insulation Samples" (EPA-600/M4-82-020, Dec. 1982) and/ or "Method for Determination of Asbestos in bulk Building Materials" (EPA-600/R-93-116, July 1993). The analysis of each bulk sample relates only to the material examined, and may or may not represent the overall composition of its original source. Floor tile and other resinously bound materials, when analyzed by the EPA methods referenced above may yield false negative results because of limitations in separating closely bound fibers and in detecting fibers of small length and diameter. Alternative methods of identification, including Transmission Electron Microscopy (TEM) may or may not be applicable and suffer from serious analytical limitations of their own including a lack of standardized or accredited methodology. We utilize visual area estimation on a routine basis and do not conduct point counting unless specifically requested to do so. Estimated error for the visual determinations presented are 50% relative (1 to 5%); 25% relative (6 to 25%) and 20% (>26% v/v). Whole sample percentage results are estimated on the basis of the relative "volume" of each readily discernable layer. We will not separate layers which in our opinion are not readily discernable. ** "None Detected" means that asbestos was not observed in the sample. Tr means TRACE, i.e., asbestos WAS detected but BELOW quantifiable limits of 1.0%. ">" means greater than and "<" means less than. This report is not to be duplicated except in full without the expressed written permission of INALAB. This report does not represent a product endorsement by the AIHA, NIST or any affiliated organizations.

DID INALAB FORENSIC DIVISION COLLECT THESE SAMPLES? No

Designated Signatory
Laboratory Manager

INALAB, Inc. is an AIHA IHLAP AND ELLAP ACCREDITED LABORATORY (Accreditation No. 101812 with scope of accreditation including metals, lead, solvents, fiber count and bulk asbestos). INALAB Inc. is a NIST NVLAP ACCREDITED LABORATORY (NVLAP Lab Code: 200655-0). INALAB, Inc. is a CERTIFIED ISO/ IEC 17025 AND ISO 9002 ANALYTICA FACILITY.

11 July 2007

INALAB, Inc.

3615 Harding Avenue, Suite 308 Honolulu, Hawaii 96816
Voice (808) 735-0422 / Fax (808) 735-0047
e-mail: sample_custodian@inalab.com / www.inalab.com
Experts in Environmental, Forensic, Occupational and Laboratory Services

AIHA Industrial Hygiene ACCREDITED LABORATORY

OFFICIAL LABORATORY CHAIN OF CUSTODY

COLLECTED / SAMPLED OR DELIVERED BY (CIRCLE ONE): _____ CLIENT ER

SIGNATURE: _____ PHONE NUMBER: 839-7222 CLIENT ID # Olaa pump house

INALAB Number	Your Field ID	Sampling Location	Sample Description	Date / Time Collected	Sample Matrix	Analysis Required (with ID No)
20070705120	A-1	olaa pump house	roofing mat.	7/6/07 /		Asbestos /
20070705121	A-2		"	/		
20070705122	A-3		"	/		
20070705123	A-4		wall mat.	/		
20070705124	A-5		"	/		
20070705125	A-6		"	/		
				/		
				/		
				/		
				/		
				/		
				/		

Relinquished by: (Signature)	(date) / (time)	Received by: (Signature)	(date) / (time)
	7/9/07 /		7.9.07 / 2pm
	/		/
	/		/

JOB NO: 20071670 SAMPLES: _____ to _____ Page____ of____

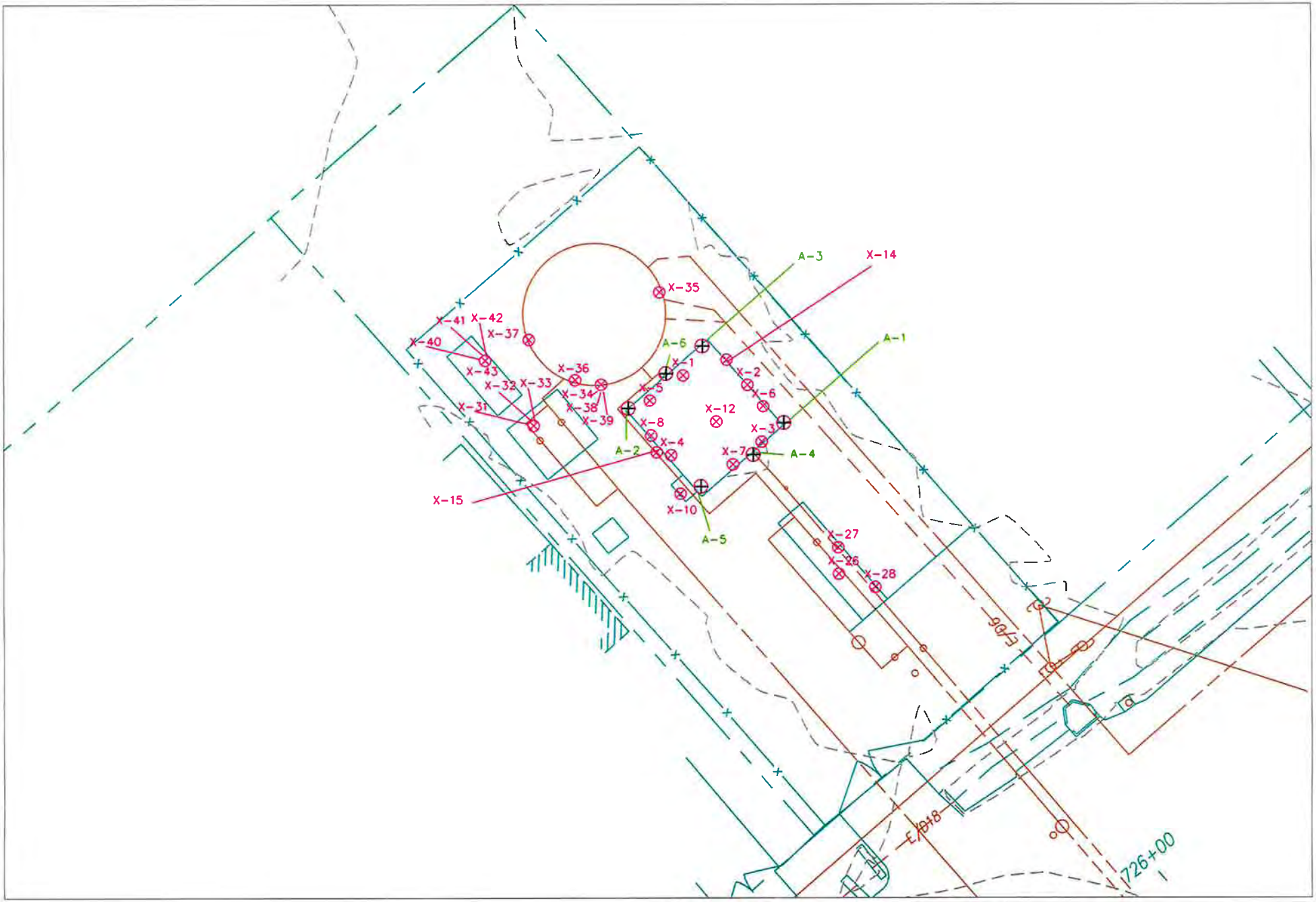
Controlled Document ID: INALAB CHAIN OF CUSTODY WITH REQUEST FOR ANALYTICAL SERVICES, REV 20060104

Table 2. XRF Results - Lead Paint
Olaa Tank and Booster Site #6
Hilo, Hawaii

Sample #	Interior/ Exterior	Area	Side	Description	Condition	Substrate	Color	Pb Conc.
Calibration 1								**0.99**
Calibration 2								**1.02**
Calibration 3								**0.96**
X-1	**Interior**	**Booster Building**	**North**	**Wall**	**Fair**	**Transite**	**Grey**	**1.16**
X-2	**Interior**	**Booster Building**	**East**	**Wall**	**Fair**	**Transite**	**Grey**	**1.31**
X-3	**Interior**	**Booster Building**	**South**	**Wall**	**Fair**	**Transite**	**Grey**	**1.24**
X-4	**Interior**	**Booster Building**	**West**	**Wall**	**Fair**	**Transite**	**Grey**	**1.07**
X-5	**Interior**	**Booster Building**	**North**	**Building Frame**	**Fair**	**Wood**	**Grey**	**1.09**
X-6	**Interior**	**Booster Building**	**East**	**Building Frame**	**Fair**	**Wood**	**Grey**	**1.05**
X-7	**Interior**	**Booster Building**	**South**	**Building Frame**	**Fair**	**Wood**	**Grey**	**1.17**
X-8	**Interior**	**Booster Building**	**West**	**Building Frame**	**Fair**	**Wood**	**Grey**	**1.20**
X-9	Interior	Booster Building	South	Door	Fair	Wood	Grey	0.89
X-10	**Interior**	**Booster Building**	**South**	**Door Jamb**	**Fair**	**Wood**	**Grey**	**1.17**
X-11	Interior	Booster Building	Ceilng	Ceiling Beams	Fair	Wood	Grey	0.73
X-12	**Interior**	**Booster Building**	**Ceilng**	**Ceiling Beams**	**Fair**	**Wood**	**Grey**	**1.10**
X-13	Interior	Booster Building	North	Window Frame	Fair	Wood	Grey	0.89
X-14	**Interior**	**Booster Building**	**East**	**Window Frame**	**Fair**	**Wood**	**Grey**	**1.13**
X-15	**Interior**	**Booster Building**	**West**	**Window Frame**	**Fair**	**Wood**	**Grey**	**1.08**
X-16	Interior	Booster Building	North	Pipe	Fair	Metal	Red	0.21
X-17	Interior	Booster Building	East	Pipe	Fair	Metal	Grey	0.17
X-18	Interior	Booster Building	East	Pipe	Fair	Metal	Yellow	0.33
X-19	Interior	Booster Building	South	Pipe	Fair	Metal	Black	0.16
X-20	Interior	Booster Building	West	Pipe	Fair	Metal	Blue	0.23
X-21	Interior	Booster Building	South	Electrical Boxes	Fair	Metal	Green	0.13
X-22	Interior	Booster Building	South	Electrical Boxes	Fair	Metal	Grey	0.13
X-23	Interior	Booster Building	South	Electrical Boxes	Fair	Metal	Grey	0.07
X-24	Interior	Booster Building	East	Electrical Boxes	Fair	Metal	Black	0.31
X-25	Exterior	Exterior	East	Pipe	Fair	Metal	Black	0.29
X-26	Exterior	Exterior	East	Pipe	Poor	Metal	Red	0.75
X-27	Exterior	Exterior	East	Pipe	Poor	Metal	Green	0.31
X-28	Exterior	Exterior	East	Pipe	Poor	Metal	Green	0.29
X-29	Exterior	Exterior	East	Electrical Boxes	Fair	Metal	Green	0.63
X-30	Exterior	Exterior	East	Electrical Boxes	Fair	Metal	Grey	0.20
X-31	Exterior	Olaa Tank	South	Pipe	Poor	Metal	Green	0.36
X-32	Exterior	Olaa Tank	South	Pipe	Poor	Metal	Green	0.29
X-33	Exterior	Olaa Tank	South	Pipe	Poor	Metal	Red	0.66
X-34	Exterior	Olaa Tank	North	Tank	Poor	Metal	Black	0.15
X-35	**Exterior**	**Olaa Tank**	**East**	**Tank**	**Poor**	**Metal**	**Green**	**7.51**
X-36	**Exterior**	**Olaa Tank**	**South**	**Tank**	**Poor**	**Metal**	**Green**	**6.91**
X-37	**Exterior**	**Olaa Tank**	**West**	**Tank**	**Poor**	**Metal**	**Green**	**6.96**
X-38	**Exterior**	**Olaa Tank**	**West**	**Ladder**	**Poor**	**Metal**	**Green**	**7.53**
X-39	**Exterior**	**Olaa Tank**	**West**	**Ladder**	**Poor**	**Metal**	**Green**	**11.51**
X-40	Exterior	Electrical Structure	North	Electrical Structure	Poor	Metal	Grey	0.35
X-41	Exterior	Electrical Structure	East	Electrical Structure	Poor	Metal	Grey	0.22
X-42	Exterior	Electrical Structure	South	Electrical Structure	Poor	Metal	Grey	0.16

Table 2. XRF Results - Lead Paint
Olaa Tank and Booster Site #6
Hilo, Hawaii

Sample #	Interior/ Exterior	Area	Side	Description	Condition	Substrate	Color	Pb Conc.
X-43	Exterior	Electrical Structure	West	Electrical Structure	Poor	Metal	Grey	0.30
Calibration 4								**1.05**
Calibration 5								**0.94**
Calibration 6								**0.98**



Legend

⊗ = Lead Paint XRF Samples

⊕ = Asbestos Samples

*Asbestos samples begin with "A" and Lead paint samples begin with "X". Lead paint samples shown are either considerer poor condition and/or lead-based paint.

EnviroServices & Training Center LLC

ETC# 07-4036	Map 1. Olaa Well and Booster Site #6 Sample Locations
Scale: 1" = 20'	
July 2007	