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GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

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OCT 6 2003

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OFC. OF ENVIRONMENT/
QUALITY CONTROL

TO: Genevieve Salmonson, Director
Office of Environmental Quality Control

FROM: Eric T. Hirano, Chief Engineer *Eric T. Hirano*

SUBJECT: Honokaa Well "B" Production Well
Final Environmental Assessment

The Department of Land and Natural Resources has completed their Environmental Assessment (EA) in compliance with Chapter 343, HRS, and Title 11, Chapter 200 HAR and has determined a "Finding of No Significant Impact" is appropriate for the subject project.

Enclosed are four (4) copies of the Final EA, a publication notice for the OEQC Environmental Notice and Summary. Our consultant, Dr. Ron Terry, has e-mailed your office a copy of the Summary.

Should you have any questions on this matter, please contact Mr. Hiram Young of the Design Section at extension 70260.

c: DMT Consulting Engineers

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OCT 23 2003

FILE COPY

2003-10-23-HA-PEA

(HONOKAA WELL "B" PRODUCTION WELL)
HONOKAA, ISLAND OF HAWAII
STATE OF HAWAII

FINAL ENVIRONMENTAL ASSESSMENT

Submitted Pursuant to Chapter 343, Hawaii Revised Statutes (HRS)

State of Hawaii
Department of Land and Natural Resources

October 2003

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FILE COPY

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STATE OF HAWAII

FINAL ENVIRONMENTAL ASSESSMENT

Submitted Pursuant to Chapter 343, Hawaii Revised Statutes (HRS)

State of Hawaii
Department of Land and Natural Resources

October 2003

**HONOKAA WELL "B" PRODUCTION WELL
HONOKAA, ISLAND OF HAWAII, HAWAII**

FINAL ENVIRONMENTAL ASSESSMENT

**PROPOSING
AGENCY:**

State of Hawaii
Department of Land and Natural Resources

CONSULTANT:

Geometrician Associates
HC 2 Box 9575
Keaau, Hawaii 96749

and

Okahara & Associates
200 Kohola Street
Hilo, Hawaii 96720

CLASS OF ACTION:

Use of State Funds
Use of County Land

This document is prepared pursuant to:
the Hawaii Environmental Protection Act,
Chapter 343, Hawaii Revised Statutes (HRS), and
Title 11, Chapter 200, Hawaii Department of Health Administrative Rules (HAR).

SUMMARY

In response to the need to develop an additional potable water well source for the Honokaa region, the project would convert an existing exploratory well to a production well. This region currently relies on the Haina Well, which during peak water demand periods must be supplemented by surface water from the Waimea area.

The site is located at the existing reservoir site Honokaa Reservoir site, just mauka of Honokaa town, approximately two miles inland from the coast. The well taps the Honokaa Aquifer System of the East Mauna Kea Hydrologic Sector, which has an estimated sustainable yield of 31 million gallons per day (mgd) and current withdrawals of less than 2.0 mgd.

The well (Honokaa Well B) has a 14-inch diameter solid casing to a depth of 1,310 feet (+24 ft., mean sea level) and then 270 feet of shutter screen casing to a depth of 1,580 feet (-246 ft., msl). Drawdown tests indicate that a pumping rate of 300 gallons per minute (gpm) yields stable recharge rates. The well will be fitted with a submersible deep well pump with a capacity of 300 gpm. Honokaa Well B will then be integrated into the County water system and will operate during droughts and periods of low supply to supplement the Haina Well, thus ensuring an adequate supply in Honokaa. The budget for the project, which is funded by the Hawai'i State Department of Land and Natural Resources, is \$1.5 million. Design would be finished and construction would begin after completion of the EA and the project would be operational within one year.

Some new on-site grading will be required to accommodate the construction, expansion and/or modification of appurtenant facilities, including a control building, valves, water transmission piping, access driveway, electrical facilities, storm drains, and fencing.

No adverse impact upon the sustainable yield of the aquifer will occur. An adjacent inactive well will be used to monitor drawdown. Water quality tests indicate that, consistent with the land use context, the well will likely yield a consistent supply of high-quality potable water with either non-detectable or minimal contaminants. As the site has been completely converted to water utility uses, no native flora, fauna or historic sites are present. Noise and visual impacts will be negligible.

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LIST OF ABBREVIATIONS

ALISH	Agricultural Lands of Importance to the State of Hawaii
BMP	Best Management Practice
CDUP	Hawai'i State Conservation District Use Permit
DLNR	Hawai'i State Department of Land and Natural Resources
DOFAW	Hawai'i Division of Forestry and Wildlife
DWS	Hawai'i County Department of Water Supply
DPW	Hawai'i County Department of Public Works
EA	Environmental Assessment
EIS	Environmental Impact Statement
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
gpm	Gallons per minute
HDOH	Hawai'i State Department of Health
HAR	Hawai'i Administrative Rules
HEPA	Hawai'i Environmental Policy Act
HCGP	Hawai'i County General Plan
HRS	Hawai'i Revised Statutes
MCL	Maximum Contaminant Level
mgd	Million gallons per day
mg/L	Milligrams per liter
OEQC	Hawai'i State Office of Environmental Quality Control
SFHA	Special Flood Hazard Area
SHPD/O	State Historic Preservation Division/Officer
SMA	Special Management Area
tgd	Thousand gallons per day
UH	University of Hawai'i
USF&WS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USNRCS	U.S. Natural Resources Conservation Service

1 PROJECT LOCATION, DESCRIPTION, PURPOSE AND NEED

1.1 Project Location

The Hawai'i State Department of Land and Natural Resources, Engineering Division (hereafter referred to as DLNR) proposes to convert an exploratory well located at the Honokaa Reservoir site (TMK 4-5-19:20) to a production well that would serve the Honokaa area (Figs. 1-2). After conversion, the well will be operated and maintained by the Hawai'i County Department of Water Supply (DWS).

1.2 Project Purpose and Need

This area currently relies on the Haina Well, which during peak water demand periods must be supplemented by water from the Waimea area. Long distance transport of water from a surface source, which must undergo extensive treatment and may also be critically required in Waimea, is inefficient and costly. There is therefore a need to develop a local, reliable supply of quality drinking water.

1.3 Project Background and Water System Details

The Hawai'i DLNR is responsible for managing State-owned lands in ways that will promote the social, environmental and economic well-being of Hawai'i's people and for insuring that these lands are used in accordance with the goals, policies and plans of the State. As part of this role, DLNR identified the need to develop an additional potable water well source for the Honokaa region.

In 1993, DLNR prepared an Environmental Assessment (EA) and drilled an exploratory well (Honokaa Well A) on the Honokaa Reservoir site just mauka of Honokaa town (see attached map), approximately two miles inland from the coast. The well lies within the Honokaa Aquifer System of the East Mauna Kea Hydrologic Sector, which has an estimated sustainable yield of 31 million gallons per day. The well was determined to be substandard as drilled. DLNR therefore decided to implement a replacement exploratory well (Honokaa Well B), which was drilled and successfully tested between 1996 and 2002.

The Hawai'i County DWS is responsible for planning and operating water sources and systems that implement the County's General Plan. DWS currently operates and maintains twenty-three separate water systems. The service area of the Hamakua Water System extends from Ahualoa to near Paauilo. Domestic water is available in all of the urban areas of the Hamakua District. Except for the town of Honokaa, the major portion of the system serves a dispersed population in Ahualoa, Kalopa, Kaapahu, Pohakea, Paauhau and Paauilo Homesteads. The Hamakua system currently obtains most its water from the Haina deep well, supplemented as necessary by the high

Honokaa Well "B" Production Well

level streams in the Kohala Mountains near Waimea. Over fifty-five per cent of the 0.63 mgd used by the Hamakua system is used in Honokaa (estimate from update to Hawai'i County General Plan http://www.hawaii-county.com/general_plan_rev/main.htm).

The Paauilo system is connected to the Hamakua system but also has an additional source. The capacity of the Paauilo deep well is 0.43 mgd and the service area extends from Paauilo Village to Kaa. The present average daily consumption is 0.10 mgd (estimate from update to Hawai'i County General Plan:Ibid).

1.4 Project Components

The exploratory well has already been drilled and tested and would now be converted to production. Honokaa Well B has a 14-inch diameter solid casing to a depth of 1,310 feet (+24 ft., mean sea level) and then 270 feet of shutter screen casing to a depth of 1,580 feet (-246 ft., msl). Drawdown tests indicate that a pumping rate of 300 gallons per minute (gpm) yields stable recharge rates, so the well will be fitted with a submersible deep well pump with a capacity of 300 gpm. Honokaa Well B would then be integrated into the DWS water system and would operate during droughts and periods of low supply to supplement the Haina Well, thus ensuring an adequate supply in Honokaa.

Some new on-site grading would be required to accommodate the construction, expansion and/or modification of appurtenant facilities, including a control building, valves, water transmission piping, access driveway, electrical facilities, storm drains, and fencing. Figure 2a depicts the site layout, and Figures 2b and 2c illustrate the control building.

The budget for the project, which is funded by the Hawai'i State Department of Land and Natural Resources, is \$1.5 million. Design would be finished and construction would begin after completion of the EA and the project would be operational within one year.

1.5 Alternatives Considered

1.5.1 Production Well Alternative

This refers to the proposed project, which is described in Section 1.4, above.

1.5.2 Alternative Water Well Sites

The feasibility of alternative well sites was considered during the planning process for the exploratory well based on several criteria. These included position in the aquifer upflow from Honokaa Hospital and its wastewater facilities, location on County property, reduction of pumping costs, and minimization of associated infrastructure (e.g., access road and water transmission main length). Locations in or near Honokaa minimized infrastructure costs and

allowed County property to be used. Within this search target, lower elevations would have been unsuitable because of being downflow from Honokaa Hospital. More inland locations would have put the well head at higher elevations and would have induced higher construction, maintenance and pumping costs. The reservoir site was by the only site that reasonably met all criteria, and it was thus unnecessary to consider other specific sites in detail.

1.5.3 Surface Water, Catchment, Wastewater Re-Use, and Desalination

Surface water is used in certain locations in Hawai'i, but compliance with State and federal requirements for surface water necessitates costly water treatment plants. Surface water from Waimea is currently used to supplement well water in the Hamakua system, and one of the goals of this project is to reduce reliance on this source.

Rainfall catchment is widely used in many parts of Hawai'i County, including parts of Hamakua where County water service is not available. Although catchment does provide a potable water source of last resort, it has many drawbacks, including high maintenance costs and susceptibility to microbiological and chemical contamination. Sources of these contaminants vary from dead animals in the storage tank to materials eroded or leached from roofs, gutters and paint. The State Department of Health (DOH) recommends using catchment water for non-consumptive needs and obtaining drinking or cooking water from regulated public water systems and/or purchased bottled drinking water.

Wastewater re-use can be an important source of water, particularly for irrigation, although treatment expense may elevate the cost of the water beyond the budget of agricultural users. In situations with critical water shortages, the cost of treated wastewater can be borne by municipal users, who then are able to utilize surface water or groundwater that would otherwise be used for irrigation. Such measures would appear to be currently infeasible for Honokaa, which lacks a municipal wastewater treatment plant. They are also unnecessary, given the relatively low use of abundant groundwater resources.

Similarly, DWS considers desalination, an energy-intensive and expensive process, to be unjustified for cost reasons on the island of Hawai'i and unnecessary to consider when better options exist.

1.5.4 Optimize Distribution of Existing Potable/Non-Potable Supplies

Delivery of non-potable water would require dual distribution systems, which would be cost-prohibitive. Such systems are sometimes justified when there is high demand for irrigation water by existing users of potable water. A separate \$10.6 million project has repaired the Hamakua Ditch, which is now operational and is undergoing final testing. It will provide irrigation systems for more than 100 farms and ranches (Source: Brian Kau, Hawai'i State Department of Agriculture, quoted in Hawai'i Tribune Herald, March 26, 2003, p.1).

1.5.5 Conservation/Demand Side Strategies Alternative

According to agency officials, current conservation activities at DWS include the following:

- o *100 percent customer metering.* All customer accounts are metered.
- o *Meter repair/replacement programs.* Testing, repair and replacement of water meters are done on a systematic basis.
- o *Water analysis/reports.* The difference between metered source production and metered sales to consumers is monitored to determine whether a leak detection program is justified.
- o *Leak detection programs.* DWS is implementing investigations and repair for suspected sections of leaking pipelines.
- o *Tank overflow controls/alarms.* These facilities prevent system losses from unnecessary overflows.
- o *Voluntary water restriction notices.* DWS requests voluntary water conservation during dry periods and emergency water outages.
- o *Public education outreach/education programs.* Exhibits in trade shows, the County fair, and public schools, among other venues, allow DWS to share information about the potable water system and water conservation.

The existing and future water conservation programs are expected to reduce the growth of future water demand. In particular, an island-wide reduction in non-metered water use is expected to be realized. Rather than an alternative to developing new sources, water conservation is seen by DWS as an integral and ever-increasing part of its strategy to provide safe, affordable and reliable water service to the island of Hawai'i in a sustainable and financially secure manner.

1.5.6 Selection of Project Alternative

DLNR and DWS have determined that the most rational and efficient strategy for dealing with the need for reliable supply in the Hamakua Service Area is to convert the exploratory well to production. The decision to advance this alternative was based on satisfaction of the following criteria:

- The exploratory well provides water of a quality that meets DWS requirements
- The well can produce at a sustainable yield at a pumping rate of 300 gpm
- No substantial adverse environmental effects would result from the use of the well
- No alternative sources (such as catchment, wastewater reuse, or desalination) would provide a practical or economical source of potable water in this service area.

1.6 Consistency with Government Plans and Policies

The project is highly consistent with government plans and policies, which in general call for water systems that meet the needs of residents, support planned growth, and minimize environmental degradation. The following sections discuss consistency with key plans.

1.6.1 Hawai'i State Plan

The Hawai'i State Plan was adopted in 1978. It was revised in 1986 and again in 1991 (Hawai'i Revised Statutes, Chapter 226, as amended). The Plan establishes a set of goals, objectives and policies that are meant to guide the State's long-run growth and development activities. The proposed project is consistent with State goals and objectives that call for increases in employment, income and job choices, and a growing, diversified economic base extending to the neighbor islands.

The sections of the Hawai'i State Plan most relevant to the proposed project are centered on the theme of facility systems. The following objectives and policies are taken from the section dealing with water development.

- Objective a): Planning for the State's facility systems with regard to water shall be directed towards achievement of the objective of the provision of water to adequately accommodate domestic, agricultural, commercial, industrial, recreational and other needs within resource capacities.
- Objective b): To achieve the facility systems water objective, it shall be the policy of this State to:
 - (1) Coordinate development of land use activities with existing and potential water supply.
 - (2) Support research and development of alternative methods to meet future water requirements well in advance of anticipated needs.
 - (3) Reclaim and encourage the productive use of runoff water and wastewater discharges.
 - (4) Assist in improving the quality, efficiency, service and storage capabilities of water systems for domestic and agricultural use.
 - (5) Support water supply services to areas experiencing critical water problems.
 - (6) Promote water conservation programs and practices in government, private industry, and the general public to help ensure adequate water to meet long-term needs.

The proposed project supports all relevant objectives and policies of the Hawai'i State Plan.

1.6.2 Hawai'i State Water Resources Development Plan

The purpose of the *Hawai'i State Water Resources Development Plan* (Hawai'i DLNR 1980) is to set forth specific objectives, policies, programs and projects to guide State and County governments. In summary, this plan presents guidelines for development of water resources for municipal, agricultural and industrial requirements; preservation of ecological, recreational, and aesthetic values and quality; and regulation of the use of water to assure adequate supplies for the future. The proposed project would develop a municipal water source in a rational manner to improve drinking water quality, assure adequate water for planned growth and would not adversely affect ecological, recreational or aesthetic values. The project is thus consistent with the basic guidelines of the plan.

In particular, the following objectives are noteworthy:

- Objective A. Assure adequate municipal water supplies for planned urban growth.
- Objective B. Support long-range municipal water supply planning by the counties.
- Objective C. Promote municipal water conservation.
- Objective D. Improve drinking water quality.
- Objective E. Upgrade rural water systems.

Because there is no threat of exceeding sustainable levels of withdrawal from the aquifer in Hamakua presently or in the foreseeable future, it has not been declared a Groundwater Management Area by the State Commission on Water Resources Management. The proposed project supports or is not inconsistent with each objective of the plan.

1.6.3 Hawai'i County Water Use and Development Plan

The *Hawai'i County Water Use and Development Plan* (Hawai'i County DWS 1989) is the most recent Hawai'i County water plan to be formally adopted by DWS and the Hawai'i State Commission on Water Resource Management (CWRM).¹ The Plan is meant to aid CWRM in granting permits for water use and designating water management areas, as well as serving as a reference document of current and future water resource conditions. The Plan includes an inventory of existing water uses and developments by hydrologic units, addresses future land uses and related water needs, and is consistent with State and County land and water policies. This plan also guides DWS in future operations and to identify the improvements and facilities required to continue to provide safe, affordable and reliable water service to the island of Hawai'i

¹ An update of the Plan (Hawai'i County DWS 1991) was performed but never formally adopted. The update contained no significant differences concerning water use or water facility needs for the Hamakua District.

in a sustainable and financially secure manner. On page 5-7, the Plan summarized the needs of the Hamakua District thus:

"The thrust of the development plans for the district is to develop an independent source of water supply and provide new storage reservoirs for the Ahualoa service areas and the urban expansion areas mauka of the highway....plans to develop new ground water sources in Honokaa vicinity and discontinue using water from the Waimea system for the Ahualoa area."

The Plan identified the following needs in Hamakua:

- o Extend the water line from Kukaiau to Keehia
- o Extend Honokaa system toward Kukuihaele
- o Replace inadequate mains
- o Improve existing storage, transmission and distribution facilities
- o Develop Pauuilo Exploratory Well into a production well.

It is noted that the proposed project is not represented on this list. However, the *Hawai'i County Water Use and Development Plan* is now more than 12 years old and requires update. A more recent identification of needed improvements and facilities, which includes the proposed project, is found in the update of the *Hawai'i County General Plan* (http://www.hawaii-county.com/general_plan_rev/main.htm), which is in the final stages of review and is expected to be adopted in 2003 (see next section).

1.6.4 Hawai'i County General Plan

The *General Plan* for the County of Hawai'i is the document expressing the broad goals and policies for the long-range development of the Island of Hawai'i. The plan was adopted by ordinance in 1989. The *General Plan* is organized into thirteen elements, with policies, objectives, standards, and principles for each. There are also discussions of the specific applicability of each element to the nine judicial districts comprising the County of Hawai'i. Below are pertinent Goals, Objectives, Policies and Standards, and Courses of Action sections related to Water Systems Development, followed by a discussion of conformance. In addition, the most relevant sections of aspects of the General Plan are briefly discussed.

In recognition that the *General Plan* is currently in the final stages of a periodic update and is likely to be adopted soon, the following references include language from the revisions (Ibid address). Additions to the 1989 language are in bold and underlined, and deletions are bracketed.

1.6.4.1 General Plan and Water Systems

POLICIES

- o Water system improvements [and extensions] shall [promote] correlate with the County's desired land use development pattern.
- o All water systems shall be designed and built to Department of Water Supply standards.
- o Improve and replace inadequate systems.
- o Water sources shall be adequately protected to prevent depletion and contamination from natural and man-made occurrences or events.
- o Water system improvements should be first installed in areas [which] 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 [, or to further the expansion of the agricultural industry].
- o A [systematic program] coordinated effort by [the] County, State and private [interest] 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.
- o The fire prevention systems shall be coordinated with water distribution systems in order to ensure water supplies for fire protection purposes.
- o [The County shall consider the feasibility, desirability, and the attendant responsibilities of establishing] Develop and adopt standards for individual water catchment units.
- o Cooperate with the State Department of Health to develop standards and/or guidelines for the construction and use of rainwater catchment systems to minimize the intrusion of any chemical and microbiological contaminants.
- o Cooperate with appropriate State and Federal agencies and the private sector to develop, improve and expand agricultural water systems in appropriate areas on the island.
- o Promote the use of ground water sources to meet State Department of Health water quality standards.
- o Continue to participate in the United States Geological Survey's exploratory well drilling program.
- o Seek State and Federal funds to assist in financing projects to bring the County into compliance with the Safe Drinking Water Act.
- o Develop and adopt a water master plan that will consider water yield, present and future demand, alternative sources of water, guidelines and policies for the issuing of water commitments.
- o Expand programs to provide for agricultural irrigation water.

STANDARD

- o [Water] **Public and private water** systems shall meet the requirements of the Department of Water Supply and the Subdivision Control Code.

COURSES OF ACTION FOR HAMAKUA

- [o Extend the water line from Kukaiau to Keehia
- o Extend Honokaa system toward Kukuihaele
- o Replace inadequate mains
- o Improve existing storage, transmission and distribution facilities
- o Develop Paauilo Exploratory Well into a production well.]
- o **Continue to coordinate programs with State and Federal agencies to develop a well at Kukuihaele and Honokaa Hospital to the standards of the Department of Water Supply.**
- o **Replace old, sub-standard, or deteriorating lines and storage facilities.**
- o **Investigate groundwater sources in the Honokaa and Kukuihaele areas.**

Discussion: The proposed project is completely consistent with all elements of the General Plan dealing with water systems. In particular, it would correlate with the County's desired growth pattern by servicing areas already identified for urban and rural growth, with established needs and characteristics. The project would be designed and built to DWS standards. As discussed in Section 3.1.2 below, the project adequately protects the aquifer from depletion and contamination from natural and man-made sources. The project involves promotion of the use of ground water sources (as opposed to surface water) to meet State Department of Health water quality standards. Finally, Honokaa Well B is synonymous with the well at Honokaa Hospital identified in the General Plan.

1.6.4.2 Other Selected Elements of General Plan

ECONOMIC GOALS

- o [The County shall provide] **Provide** an economic environment [which] **that** allows new, expanded, or improved economic opportunities that are compatible with the County's **cultural**, natural and social environment.

ENVIRONMENTAL QUALITY POLICIES

- o [The County of Hawaii shall take] **Take** positive action to further maintain the quality of the environment [for residents both in the present and in the future].

ENVIRONMENTAL QUALITY STANDARDS

- o Pollution shall be prevented, abated, and controlled at levels [which] **that** will protect and preserve the public health and well being, through the enforcement of appropriate Federal, State and County standards.
- o [Environmental] **Incorporate** environmental quality controls [are to be incorporated] either as standards in appropriate ordinances or as conditions of approval.

HISTORIC SITES GOALS

- o Protect, **restore**, and enhance the sites, buildings, and objects of significant historical and cultural importance to Hawaii.

HISTORIC SITES POLICIES

- o [The County of Hawaii shall require] **Require** both public and private developers of land to provide [a] historical **and archaeological** [survey] **surveys and cultural assessments, where appropriate**, prior to the clearing or development of land when there are indications that the land under consideration has historical significance.
- o Public access to significant historic sites and objects shall be acquired[.], **where appropriate**.

AGRICULTURAL LAND GOALS

- o Identify, protect and maintain important agriculture lands on the island of Hawaii.
- o **Preserve the agricultural character of the island.**

FLOOD CONTROL AND DRAINAGE GOALS

- o Control pollution.
- o Prevent damage from inundation.
- o Reduce surface water and sediment runoff

FLOOD CONTROL AND DRAINAGE POLICIES

- o [All development] **Development**-generated runoff shall be disposed of in a manner acceptable to the Department of Public Works[.] **and in compliance with all State and Federal laws.**

FLOOD CONTROL AND DRAINAGE STANDARDS

- o Applicable standards and regulations of Chapter 27, "Flood Control," of the Hawaii County Code.
- o Applicable standards and regulations of the Federal Emergency Management Agency (FEMA).
- o Applicable standards and regulations of Chapter 10, "Erosion and Sedimentation Control," of the Hawaii County Code.

NATURAL BEAUTY GOALS

- o Protect, preserve and enhance the quality of areas endowed with natural beauty, including the quality of coastal scenic resources.
- o *Protect scenic vistas and view planes from becoming obstructed.*

NATURAL BEAUTY POLICIES

- o **Protect the views of areas endowed with natural beauty by carefully considering the effects of proposed construction during all land use reviews.**
- o **Do not allow incompatible construction in areas of natural beauty.**

NATURAL RESOURCES AND SHORELINES GOALS

- o Protect and conserve the natural resources of the County of Hawaii from undue exploitation, encroachment and damage.
- o Ensure that alterations to existing land forms and vegetation, except crops, and construction of structures cause minimum adverse effect to water resources, and scenic and recreational amenities and minimum danger of floods, landslides, erosion, siltation, or failure in the event of earthquake.

Discussion: The project is consistent with other aspects of the General Plan. It will encourage economic opportunities that are compatible with the County's cultural, natural and social environment, the quality of which will be maintained. Historic sites or agricultural lands will not be adversely impacted. The improvements will be properly sited on the property to avoid encroachment into the flood zone or any other adverse drainage impact. Finally, the natural beauty and natural resources of the Honokaa area will not be adversely affected in any way directly or indirectly by the proposed project.

2 ENVIRONMENTAL ASSESSMENT PROCESS

The project involves the use of State of Hawai'i funds and County of Hawai'i lands, and therefore requires compliance with Chapter 343, Hawai'i Revised Statutes (HRS), the Hawai'i Environmental Policy Act (HEPA). The State of Hawai'i, Department of Land and Natural Resources, Engineering, (DLNR) is the proposing agency for this Environmental Assessment (EA).

HEPA was enacted by the Hawai'i State Legislature to require State and County agencies to consider the environmental impacts of various actions as part of the decision-making process. Agencies are required to conduct an investigation and evaluation of alternatives as part of the environmental impact analysis process, prior to making decisions that may impact the environment. The implementing regulations for HEPA are contained in Title 11, Chapter 200, Hawai'i Administrative Rules (HAR).

This Environmental Assessment (EA) process was conducted in accordance with HEPA. According to HEPA and its implementing regulations, a Draft EA is prepared to document environmental conditions and impacts, to develop mitigation measures that avoid, minimize or compensate for adverse environmental impacts, and determine whether or not an action has significant impacts upon the environment. Impacts are evaluated for significance according to thirteen specific criteria as presented in HAR 11-200-12. If no significant impacts are expected, then a Final EA with a Finding of No Significant Impact (FONSI) may be issued. When the Draft EA determines that significant impacts are present, then a Notice of Intent is prepared and the Final EA facilitates preparation of an Environmental Impact Statement (EIS).

The environmental assessment process for this project includes consultation with agencies and organizations. Letters from these agencies are contained in Appendix 2.

Notice of the availability of the Draft EA was published by the Hawaii State Office of Environmental Quality Control (OEOC) in the Environmental Notice of 23 July 2003. This initiated a 30-day comment period during which the public was invited to respond to the Draft EA with comments or questions. Two comment letters were received. The letters and the responses to them are included in Appendix 2B. The Final EA has been revised to incorporate revisions based on issues discussed in these letters. Areas where substantive information has been added to Final EA are denoted by double underlines, as in this paragraph.

3 ENVIRONMENTAL SETTING AND IMPACTS

This section describes the existing social, economic, cultural, and environmental conditions surrounding the proposed project along with the probable impacts of the proposed action and mitigation measures designed to reduce or eliminate adverse environmental impacts. For many categories, the No Build Alternative would result in no impacts. Therefore, unless explicitly mentioned, discussion of impacts and mitigation relates to the Build Alternative only.

Basic Geographic Setting

The well is located on a 26,596-square foot property that has an existing DWS facility, the 0.3 million-gallon Honokaa Reservoir (Figs.1, 3). The County owned property has facilities located on a graded pad cut into the slope on land formerly used for agriculture. The elevation is about 1,334 feet above sea level. Annual rainfall in the area averages 70-100 inches. The neighborhood is a mixture of dispersed residences and agriculture, principally macadamia nuts. Honokaa Hospital lies 1,200 feet to the northeast, downslope. The deep gulch of an intermittent stream labeled "Honokaa Drainage No. 3" on flood maps cuts through the extreme western edge of the property.

3.1 Physical Environment

3.1.1 Surface Geology, Hazards, and Soils

Existing Environment, Impacts and Mitigation Measures

The Honokaa area is part of the lower slopes of Mauna Kea, an inactive volcano. Soil is a well-drained silty clay loam formed in volcanic ash, with a soil layer 4-6 feet deep, underlain by basalt. The terrain has a slope of 12-20 percent and moderate erosion hazard. The entire Big Island is subject to geologic hazards, especially lava flows and earthquakes. The project site is located in Lava Flow Hazard Zone 8 on a scale of ascending risk 9 to 1 (Heliker 1990:23). The low hazard risk is based on the fact that only a few percent of the surface has been covered by lava in the past 10,000 years. As such, there is a negligible risk of lava inundation over relatively short time scales.

In terms of seismic risk, the entire Island of Hawaii is rated Zone 4 Seismic Probability Rating (Uniform Building Code, Appendix Chapter 25, Section 2518). Zone 4 areas are at risk from major earthquake damage, especially to structures that are poorly designed or built.

In general, geologic conditions impose no constraints on the project, and no mitigation measures are expected to be required.

3.1.2 Subsurface Geology and Hydrology

Existing Environment

Hydrogeological Setting

The State Commission on Water Resources Management (CWRM) classification of aquifers locates this part of Hamakua within the Honokaa Aquifer System of the East Mauna Kea Hydrologic Sector, Code 80201 (Fig. 4). This coding refers to the Hawai'i Island (8), East Mauna Kea Aquifer Sector (02), and Aquifer System (01). The surface boundaries of the aquifer roughly follow major topographic ridges and encompass the towns of Honokaa, Paauhau, Ahualoa, Kapulena and Kukuihaele and the drainage basins of a number of streams. The surface drainage network has been extensively modified through a series of ditches constructed for sugar cane agriculture.

The characteristics of this aquifer are determined by the regional geology. Most of the mass of five volcanoes that form the island of Hawai'i is composed of permeable thin-bedded basaltic flows. Mauna Kea has a veneer of mostly thick-bedded and poorly permeable andesitic lavas. Intrusive formations are common, including numerous near-vertical dikes, which cut across lava flows and may impound large quantities of ground water. Volcanic ash deposits up to several feet thick that are buried by later lava flows act as confining structures for high altitude perched-water bodies in some places.

Precipitation that is not lost through evapotranspiration or through streams into the ocean percolates into the ground to collect in the aquifers under the island before slowly making its way to the sea. As streams in Hawai'i are generally flashy or even ephemeral, underground water is the most reliable source of water supply, because there is less daily or seasonal change in water tables. Some water is trapped between dikes or perched above confining ash layers as described above, but most water is maintained in the basal freshwater lens which "floats" on the salt-water permeated rock below. Due to the difference in densities, for every foot the lens extends above sea level it extends 40 feet below sea level, although the lower areas contain a zone of mixing. Basal water tables have inland gradients that can rise as much as four feet per mile in high rainfall areas.

The recharge area for the Honokaa Aquifer System is assumed to consist of essentially the surface area contained within the boundaries of the aquifer system. The extent of contribution from or leakage into adjacent aquifer systems is not known.

Current Estimated Sustainable Yield, Installed Capacity and Water Use

The sustainable yield of the Honokaa Aquifer System (80201) is estimated at 31.0 mgd (Source: Hawai'i State Commission on Water Resource Management [CWRM]).

CWRM maintains a database of wells that provides information on, among other aspects, the aquifer identity, user identity, installed capacity, chloride content, and function. The database does not provide information on current pumpage, which instead is kept in a separate database and is derived from reports from individual well operators. Because not all well operators report their use in a timely manner, pumpage data are often not complete or up to date. Because of security concerns after September 11, 2001, these databases are no longer accessible to the public and data must be requested from CWRM.

The database has a register of nine wells within the Honokaa Aquifer. Only four of the wells are currently active, although two more may come online within the next few years. The total installed capacity (i.e., the amount of water a well is capable of withdrawing at maximum pumpage rates) of the wells listed in the database is 3.312 mgd. Average pumpage from reporting wells is less than 2.0 mgd, which may slightly underestimate actual pumpage.

**Table 3-1
Wells in Honokaa Aquifer**

Well Number	Well Name	Well Owner	Installed Capacity (mgd)	Average Pumpage (mgd)
6235-01	Waimea Country Club	C C Otaka, Inc	0.720	nd
6331-01	Ahualoa Plant	U.S.G.S.	nd	nc;(1)
6426-01	Hamakua Sugar 3	Hamakua Sugar Co.	nd	na
6428-01	Honokaa A	State DLNR	nd	na
6528-01	Haina	Hawaii DWS	0.576	0.31
6528-02	Enserch 1	Encogen Hawaii	1.008	1.56 total for two wells
6528-03	Enserch 2	Hamakua Energy Partners	1.008	
6734-02	Jacob's	D & J Enterprises	nd	nc; (2)
6734-03	Kukuihaele Expl	Hawaii DWS	nd	nc; (3)
TOTAL			3.312	1.87

nd = no data; na = not active; nc = not complete. (1) Have until 2004 to complete. (2) Not yet drilled--permit expires 7/03. (3) Drilling was to begin in 1/02, but no Well Completion Report received.

Existing Water Quality

The Hawai'i DWS regularly conducts microbiological analysis and contracts for extensive chemical testing in order to comply with U.S. Environmental Protection Agency (EPA) and Hawai'i State standards. Table 3-2 depicts the contaminants tested for and the frequency of testing.

**Table 3-2
Summary of Current Water Quality Monitoring Requirements**

CONSTITUENT	SAMPLE LOCATION	SAMPLING FREQUENCY
Bacteriological	Distribution system	Monthly; number of samples dependent on population served within distribution system
Carbamate, Nitrate, Metals, Inorganic, THM / HAA5 VOC, SOC8, Glyphosate EDB / DBCP / TCP	Entry point to distribution AND/OR Well Head (Location is dependent on contaminant being sampled for. SDWB will specify.)	Quarterly.
Asbestos	Source/distribution along AC pipe	First 3-year compliance period of 9-year cycle
Nitrate EDB / DBCP / TCP Metals, SOC8, VOC	Entry point to distribution AND/OR Well Head (Location is dependent on contaminant being sampled for. SDWB will specify.)	Annually
Lead and copper	Customer taps	For systems that have passed, once every three years. For systems that have failed, then once every six months until system passes, then once every three years thereafter.
Reduced Monitoring for Populations <=3300: Metals / VOC (ALL Groundwater sources; ALL Populations) SOC8, EDB / DBCP / TCP Glyphosate, Carbamate Herbicides	Entry point to distribution AND/OR Well Head (Location is dependent on contaminant being sampled for. SDWB will specify.)	Once every 3 years (R1/I)
Reduced Monitoring for Populations >3300: SOC8, EDB / DBCP / TCP Glyphosate, Carbamate Herbicides	Entry point to distribution AND/OR Well Head (Location is dependent on contaminant being sampled for. SDWB will specify.)	Twice every 3 years.
Radionuclides	Source	Once every 5 years.

Source: Hawai'i County Department of Water Supply. SDWB = Hawai'i State Department of Health, Safe Drinking Water Branch.

Annual Water Quality reports from the Haina (Honokaa) system for the years 2000 and 2001 (see Appendix 4) indicate that the system was compliant with current drinking water standards. Specifically, no violations were recorded for radioactive, inorganic, organic or lead and copper contaminants, with all contaminants far below Maximum Contaminant Levels (MCLs).

Impacts and Mitigation Measures

Hydrologic Impacts

Results of well testing, which was conducted by Water Resource Associates, are contained in Appendix 3. Drilling tests indicated that Honokaa Well B has a 332 ft. thick layer of fresh water, extending from the water table at 42 feet above sea level to a depth of -290 ft. A 7-day constant rate test set at 300 gpm successfully concluded on October 7, 2002. Drawdown stabilized at approximately 71.0 feet after 1000 minutes of pumping and remained stable throughout the remainder of the 7-day test, indicating that the rate of recharge to the well equaled the rate of discharge (see Fig. 9 of App. 3 for graph of results). The chloride content of the well was also stable at values of 92-94 mg/L, temperature was 76-77 F and field pH measured 8.2 to 8.2. At the end of the test, recovery was essentially instantaneous, recovering 99% in 60 minutes. Based upon the pump test results, hydrologists concluded that Honokaa Well B is capable of producing potable water at a constant rate of 300 gpm. At this rate, drawdown is expected to stabilize at approximately 71.0 feet (-29 ft. msl) and chlorides are expected to range between 90 to 95 mg/L. Water temperature will be a steady 76-77 degrees F. Continuous use at a rate of 300 gpm would produce 0.432 mgd.

Based on an installed well capacity of about 3.312 mgd and a pumping rate of roughly 2.0 mgd, there would be no potential for the proposed well, with its maximum of 0.432 mgd, to cause pumpage to approach or exceed the aquifer's sustainable yield of 31 mgd. This would hold true even if a number of new wells are brought on line. Considering the current scale of usage and projected population numbers, it is unlikely that significant withdrawals relative to the aquifer's estimated sustainable yield would occur. However, as each well is developed, analysis of the installed capacity, sustainable yield of the aquifer, and hydrologic impacts will be undertaken in accordance with requirements of the State Commission of Water Resources Management. The long-term records of salinity, pumpage and water levels that will be maintained by DWS will assist in protecting the long-term sustainability of the aquifer.

There is also little potential to affect other wells. Honokaa Well A, which lies only 110 feet away and is not used for production, was monitored during pump tests. It experienced a drawdown of only 3.3 feet, indicating that drawdown will be highly concentrated in the area immediately surrounding Honokaa Well B, where no other wells are located.

Water Quality

The area near Honokaa Well "B" has few apparent sources of past or present potential contamination, other than agriculture and scattered residences. No landfills, wastewater treatment plants, and other major potential sources of contaminants are present nearby. It is important to note that the well taps an aquifer that lies more than 1,290 feet under the surface, reducing the risk of potential contamination from minor sources of surface pollutants. The nearest past or present major residential, commercial or industrial operations are approximately 1,500 feet downslope, at Honokaa Hospital, and 6,000 feet downslope, at the former Haina Mill, a site now used for power generation. No major source of contaminants is present within 1,500 feet.

The Underground Injection Control (UIC) line in Honokaa is located makai of Honokaa town (Fig. 6). As the well site and its recharge area is mauka of the main part of town, it is also mauka of the UIC line, where underlying aquifers are considered drinking water sources and injection wells may be prohibited and are subject to stringent permit requirements.

Considering the depth of the well and the lack of past or current potential sources of contamination, good water quality was expected. Water quality data from the exploratory well was tested for DLNR by Water Resource Associates in association with a mainland laboratory. The report, which is on file with DLNR and DWS, indicates that the water quality met the potable water source requirements of the Hawai'i State Department of Health. All organic and volatile compounds were non-detectable, and there were negative results for total and fecal coliform.

In this setting, water quality will likely remain high, and no mitigation measures other than standard periodic testing are required.

3.1.3 Floodplains and Surface Water Quality

Existing Environment

Floodplain status for the area near the Honokaa Reservoir has been determined by FEMA, the Federal Emergency Management Agency (Fig. 5). A portion of the property on which the reservoir sits is designated Zone AH, which is defined as a Special Flood Hazard Areas (SFHA) subject to inundation by 100-year shallow flooding – usually areas of ponding where average depths are between 1 and 3 feet. Base flood elevations derived from detailed hydraulic analyses are shown in this zone. This part of the parcel is steep and is not used for any current or proposed well or reservoir facilities. The remainder of the parcel, where all proposed activities would occur, is classified as Zone X, or Special Flood Hazard areas identified in the community

flood insurance study as areas of moderate or minimal hazard from the principal source of flood in the area.

Impacts and Mitigation Measures

All project activities will be restricted to areas of the property that are outside the designated Special Flood Hazard Area and no effect on floodplains will occur.

The project will add very minimally to the area of impermeable surface and will not adversely affect drainage. In any project, uncontrolled excess sediment from soil erosion during and after excavation and construction has the potential to impact natural watercourses, water quality and flooding potential. Contaminants associated with heavy equipment and other sources during construction may also impact receiving stream, ocean and ground water.

Provisions will be made during the construction grading and earthwork to minimize the potential for soil erosion and off-site sediment transport. A Pollution Control Plan and a Stormwater Pollution Prevention Plan will be implemented to ensure that the proposed improvements do not cause drainage or water quality impacts. Best Management Practices (BMPs) such as standard soil erosion and sediment control shall be implemented. These may include measures such as the following:

- Limiting the amount of surface area graded at any given time to reduce the area subject to potential erosion;
- Utilizing soil erosion protective materials such as mulch or geotextiles on areas where soils have a high potential for erosion until permanent provisions such as lawns and grasses can be developed;
- Planting vegetation as soon as grading operations permit to minimize the amount of time soils are exposed to possible erosion; and
- Building sedimentation basins to collect sediment which enters runoff waters.

The project will be regulated through review, revision and approval by the Hawai'i County Department of Public Works (DPW) to ensure compliance with standards related to storm runoff containment.

3.1.4 Climate and Air Quality

Existing Environment

The climate of the Honokaa area can be described as mild and semi-moist due to its location in the lowlands on the windward side of the island. Average annual rainfall in the area is 50-75 inches, with a moderate winter maximum. Winds are generally trades from the east-northeast, which are occasionally replaced by light and variable southerly "kona" winds, most often in winter (UH-Manoa, Dept. of Geography 1998).

Air quality in the project area, which is remote from urban land uses, is good, and there are no known air pollution problems. The only adverse influence is occasional dust from agricultural operations.

Impacts and Mitigation Measures

The proposed project will not produce any permanent substantial air quality impacts. Construction has the potential to produce very localized and temporary fugitive dust emissions. Homes are adjacent (although their position north of the reservoir means they are usually upwind). A dust control plan will be implemented for construction activities with potential to generate substantial dust. The elements of the plan may include some or all of the following:

- Watering of active work areas;
- Cleaning adjacent paved roads affected by construction;
- Covering of open-bodied trucks carrying soil or rock;
- Limiting area to be disturbed at any given time;
- Mulching or stabilizing disturbed inactive areas with geotextile; and
- Paving and landscaping of project areas as soon as practical in the construction schedule.

3.1.5 Noise and Scenic Value

Existing Environment

Noise levels on the site are very low and are derived mainly from the reservoir pump and adjacent residences and roadways. Sensitive noise receptors are present in the form of residences that are adjacent to the existing reservoir site.

The well site is between the existing reservoir and a dirt embankment, surrounded by ironwood trees, and lacks scenic value.

Impacts and Mitigation Measures

Construction will elevate noise levels during short periods over the course of several months. The Department of Health (DOH) will be consulted, and if appropriate, the contractor will be required to obtain a permit per Title 11, Chapter 46, HAR (Community Noise Control) prior to construction. DOH would review the proposed activity, location, equipment, project purpose, and timetable in order to decide upon conditions and mitigation measures, such as restriction of equipment type, maintenance requirements, restricted hours, and portable noise barriers.

As far as permanent impacts, the submersible pump will be located within the well, some 1,300 feet below the ground surface, and will be barely audible on the site. A fan located within the control building will also generate a very small amount of noise. The control building will also be equipped with a visible and audible alarm that is triggered during emergencies.

No adverse visual impacts would occur. All construction on the well site and supporting facilities will be in keeping with the existing water supply-oriented use of the site. The maximum height of structures will be approximately 14 feet, much lower (as well as less bulky) than the reservoir itself (see Fig. 3), and structures will not protrude into views of the coast or nearby roads.

3.1.6 Hazardous Substances

Existing Environment

The general area involved was historically fields for farming sugar cane and other crops. No known hazardous substances are present.

Impacts and Mitigation Measures

Water purification will involve disinfection with chlorine gas, which will be stored in two 150-pound cylinders within a fire-rated enclosure in the control building. The system will be designed with a manual switchover, and each cylinder will have an automatic shutoff. A chlorine gas monitoring and alarm system will be provided. The system will activate a fan to purge the chlorine gas from the enclosure. Chlorine is a hazardous substance that is inventoried through a Tier-2 Reporting Form, and this information is filed with State and County Civil Defense Agencies and the County Fire Department. The design is being coordinated the County of Hawai'i Fire Department.

Given the proper design and appropriate coordination with the Fire Department, as well as the extensive safety precautions for use of the chlorine, there will be negligible hazard to the public or the natural environment.

3.2 Biological Environment

Existing Terrestrial Environment, Impacts and Mitigation Measures

The reservoir pad was been graded and cleared of vegetation. Weedy annuals and shrubs are present on the perimeter, and a forest of alien trees is located mauka of the plot. The most common species are ironwood (*Casuarina equisetifolia*), jamaican vervain (*Stachytarpheta jamaicensis*), palm grass (*Setaria palmifolia*), various alien ferns, sourbush (*Pluchea odorata*), wedelia (*Wedelia trilobata*), eucalyptus (*Eucalyptus* sp.), avocado (*Persea americana*), and fireweed (*Erechtites hieracifolia*). No plants listed, or proposed for listing, as threatened or endangered by the U.S. Fish and Wildlife Service, were found within or near the site of the well or supporting facilities.

The alien vegetation in surrounding properties, which are used for residences and agriculture, provides habitat for alien bird species such as Japanese white-eye (*Zosterops japonica*) and cardinal (*Cardinalis cardinalis*). Mongooses (*Herpestes aureopunctatus*), feral cats (*Felis catus*), rats (*Rattus* spp.) and mice (*Mus musculus domesticus*) may also inhabit or use the area. No endangered or otherwise rare bird species were observed or would be expected in this lowland area. No trees or shrubs appropriate for nesting Hawaiian Hawks (*Buteo solitarius*) or roosting Hawaiian Hoary Bats (*Lasiurus cinereus semotus*) are present on the parcel or would be affected by project activities. These species may forage in the area, but would be unlikely to be impacted by any project activities. Similarly, certain native seabirds fly over the site, but it is unlikely that any with threatened or endangered status would find the site suitable habitat or be affected by activities that occur on the parcel.

Existing Aquatic Environment, Impacts and Mitigation Measures

The local natural drainage network consists of subparallel, flashy streams. An intermittent drainage channel labeled "Honokaa Drainage No. 3" is present directly adjacent to the well. The nearest named stream is Nienie Stream, about 2,000 feet to the west. The *Hawai'i Stream Assessment* (Hawai'i CWRM: 1990) inventoried the perennial streams of the project area, and included data on Nienie, Kahawili'ili'i and Kahaupu Streams in this area of Honokaa. Certain streams on the northeast coast of the Big Island contain native stream fauna, some of which are endangered. Several of the streams, notably Wailoa\Waipio, Waimanu, Honoli'i, Kolekole, and Hakalau, have been categorized as having "Outstanding Aquatic Resources" in the *Hawai'i Stream Assessment*, on the basis of having diverse native fauna or an abundance of certain native organisms. None of the streams in the project area so qualified, although some native organisms may be present.

There is a great elevational distance and no hydrologic connection between the essentially sea level aquifer tapped by the well and the local streambeds. The streams are perched 1,300 feet above sea level near the well and discharge into the ocean through steep incisions in the seacliffs.

No wetlands or anchialine pools are present in this area. Utilization of the aquifer that would be pumped by Honokaa Well "B." would not alter stream level flows or aquatic stream biology in any way.

Despite the extremely great flux of fresh groundwater into the coastal waters of Hamakua, steep bathymetry and rough seas induce almost instantaneous mixing of fresh and salt water. No effects on aquatic biology of coastal waters would be expected from the absence in this flux of the relatively minor quantity of water that would be withdrawn by the well.

3.3 Socioeconomic

3.3.1 Land Use, Social Factors and Community Identity

Existing Environment

The immediate project site is the mauka portion of Honokaa town. The area that would be served by the proposed project is the entire Honokaa-Ahualoa area. The well site is within the State Land use Agricultural District, and its County Zoning is Agricultural, minimum lot size 40 acres (A-40a). It is designated in the County General Plan Land Use Designation as Urban Expansion, and is not within the Special Management Area.

Table 3-3 shows the population and socioeconomic characteristics of both Honokaa and the Hamakua District. This area was hard hit by the closure of sugar plantations in the early 1990s, which involved the loss of more than 1,000 sugar industry-related jobs in East Hawai'i. Over 45,000 acres have been taken out of sugar production. A small portion has been utilized for other purposes, including truck farming, timber, cattle grazing, or various start-up, experimental or low capital requirement activities. Few of these efforts employ meaningful numbers of former sugar workers, and most of the former sugar cane acreage now lies fallow.

Honokaa, which was the principal sugar cane town on the coast, has retained its quaint atmosphere, which provides a foundation for the local tourist industry, a modest but growing sector of the economy. Although some new residents continue to be attracted to the area, Honokaa's basic demographic structure still strongly reflects its plantation roots, and it is essentially a microcosm of the island of Hawai'i as a whole (Table 3-3).

**Table 3-3
Selected Socioeconomic Characteristics**

CHARACTERISTIC	Hawai'i Island	Honokaa
Total Population	148,677	2,233
Percent Caucasian	31.5	25.0
Percent Asian	26.7	42.9
Percent Hawaiian	9.7	3.9
Percent Two or More Races	28.4	27.0
Median Age (Years)	38.6	40.2
Percent Under 18 Years	26.1	25.2
Percent Over 65 Years	13.5	21.6
Percent Households with Children	21.3	29.2
Average Household Size	2.75	2.88
Percent Housing Vacant	15.5	8.9

Source: U.S. Bureau of the Census. May 2001. *Profiles of General Demographic Characteristics, 2000 Census of Population and Housing, Hawai'i.* (U.S. Census Bureau Web Page).

Impacts and Mitigation Measures

No relocation of residences, businesses, community facilities, farms or other activities would occur because of the project. The project does not adversely affect kuleana. In the long-term, all direct impacts to the social environment may be regarded as beneficial, because it improves the quality, quantity, and reliability of potable water for residents and businesses. All water projects require consideration for the secondary effects of growth induction; this topic is covered in Section 3.4.

3.3.2 Public Services, Facilities and Utilities

Utilities

The well and supporting facilities will require electrical power. This is available currently at the site. The power demands of the well pump will be relatively small, and no adverse affect to the utility will occur.

Roadways

Access to all sites for construction and maintenance will be via existing roads. No adverse impacts to public roads will occur.

Police, Fire, Emergency Medical, Recreation, Schools, and other Public Facilities and Services

All such facilities and services are present in the town of Honokaa. No such facilities or services would be affected in any adverse way.

3.3.3 Historic Sites/Archaeological Resources

There appears to be little potential for the presence of or effect to significant historic sites on the reservoir/well site, as it has been completely graded and utilized for water supply functions for several decades. The Hawai'i State Historic Preservation Division (SHPD) has been contacted as part of the Environmental Assessment process to determine if this agency concurs with this evaluation.

3.3.4 Cultural Resources

Chapter 343, HRS, requires consideration of cultural impacts for projects subject to an Environmental Assessment. The purpose of this is to ensure that significant cultural features and uses are identified, and to provide information to address the constitutional duty of agencies of the State of Hawai'i to protect the reasonable exercise of customarily and traditionally exercised rights of native Hawaiians, to the extent feasible, in connection with activities requiring State or County permits.

In the case of the proposed project, it is important to reiterate that all ground disturbance will occur on a small portion of a 26,596-square foot plot of land that has been completely graded and utilized for water supply functions for several decades. The fenced site is hidden from public view and the project does not involve visual impacts. No streams, wetlands, or anchialine pools are fed or affected by the area of the aquifer that would be pumped by the project, and hydrological impacts upon these or any marine resources would be expected. No biological resources (e.g., valuable native or Polynesian gathering plants) are found on the reservoir site or would be expected to be impacted by project activities. Finally, as the project is basically intended to supplement the Haina Well and provide a more reliable source to Honokaa during droughts and periods of low supply, no secondary impacts that might result from induced growth are likely.

Accordingly, as no cultural features are present and none are likely to be impacted by the proposed project, formal cultural analysis is unnecessary for this project. The Draft EA has been distributed to groups knowledgeable in the area's resources to ensure that this conclusion is valid.

3.3.5 Agricultural Land

Existing Farming Operations and Value of Agricultural Land

Consultation of maps of important farmland from the U.S. Natural Resources Conservation Service (USNRCS) (as displayed in the Hawai'i State Geographic Information System) determined that the reservoir property, where the well is located, is land classified as Prime Agricultural Land *Agricultural Lands of Importance to the State of Hawai'i* (ALISH) map series. Although the reservoir parcel is almost completely converted to water utility use, macadamia nut farming is occurring in the immediate vicinity of the existing reservoir site.

Impacts and Mitigation Measures

No adverse impacts to farmland or farming would occur, because the well site has been converted for use by the water utility and no farming is taking place.

As discussed in Section 3.1.3, Best Management Practices will be employed during grading of the well site and access road and during construction of all improvements in order to minimize erosion or sedimentation and any adverse effects on adjacent land.

3.4 Growth-Inducing, Cumulative and Secondary Impacts

Growth-Inducing Impacts

Analysis of growth-inducing impacts examines the potential for a project to induce unplanned development, substantially accelerate planned development, encourage shifts in growth from other areas in the region, or intensify growth beyond the levels anticipated and planned for without the project. Provision of needed infrastructure such as roads, water supply, sewer facilities, etc., is often seen as growth-inducing. Of key importance is whether infrastructure fulfills existing demands/needs of planned growth, or whether it instead enables unplanned growth and/or diverts growth away from planned areas.

The proposed increase to the water supply is in response to a lack of reliable supply in the Honokaa service area. Water in the system will also be available for planned growth (i.e., as expressed in the Hawai'i County General Plan) within existing service areas. Water is a necessary condition for this planned growth, but it has not acted as a constraining factor. Regarding unplanned growth, it is important to note that when planning for service expansion, DWS has taken a conservative approach in defining service areas, in effect limiting them to areas that have appropriate planning and zoning approvals in place. As a result, DWS is servicing the orderly development of planned growth, and not inducing unplanned growth or accelerating planned growth.

Cumulative Impacts

Cumulative impacts result when implementation of several projects that individually have minor impacts combine to produce more severe impacts or conflicts among mitigation measures.

All adverse impacts of the current project related to most categories of effect, including hydrology, native species/habitat, wetlands, water quality, erosion, historic sites, and other areas of concern, are either non-existent or extremely restricted in geographic scale, negligible, and capable of mitigation through proper enforcement of permit conditions. There are thus no appreciable adverse impacts that might accumulate with those of other past, present and future actions to produce more severe impacts.

Secondary Impacts

Construction projects sometimes have the potential to induce secondary physical and social impacts that are only indirectly related to project. For example, construction of a new recreation facility can lead to changes in traffic patterns that produce impacts to noise and air quality for a previously unimpacted neighborhood. In this case, the proposed project's impacts are limited to direct impacts at the site itself, and there does not appear to be any potential for secondary impacts.

3.5 Required Permits and Approvals

Several permits and approvals would be required to implement this project. They are listed here under their granting agencies.

Hawai'i State Commission on Water Resources

- a. Well Construction Permit (obtained for test well)
- b. Pump Installation Permit

Hawai'i State Department of Health

- a. Preliminary Engineering Report

Hawai'i Planning Department

- a. Plan Approval

4 COMMENTS AND COORDINATION

4.1 Agencies and Organizations Contacted

The following agencies received a letter inviting their participation in the preparation of the Environmental Assessment.

County of Hawai'i

- Planning Department
- Police Department
- County Council

State of Hawai'i

- Department of Land and Natural Resources, Historic Preservation Division
- Hawai'i State Commission on Water Resource Management

The following organizations received a letter inviting their participation in the preparation of the Environmental Assessment:

- Sierra Club
- Waimea Outdoor Circle

Copies of correspondence from agencies with substantive comments during the preparation of the EA are included in Appendix 1A and are cited in appropriate sections of the text of this EA.

Notice of the availability of the Draft EA was published by the Hawaii State Office of Environmental Quality Control (OEQC) in the Environmental Notice of 23 July 2003. This initiated a 30-day comment period during which the public was invited to respond to the Draft EA with comments or questions. Two comment letters were received. The letters and the responses to them are included in Appendix 2B. The Final EA has been revised to incorporate revisions based on issues discussed in these letters. Areas where substantive information has been added to Final EA are denoted by double underlines, as in this paragraph.

5 LIST OF DOCUMENT PREPARERS

This Environmental Assessment was prepared for the State of Hawai'i, Department of Land and Natural Resources by Ron Terry, Ph.D., of Geometric Associates, with assistance from Okahara & Associates, the engineering contractor for the well project.

6 STATE OF HAWAII ENVIRONMENTAL ASSESSMENT FINDINGS

Section 11-200-12 of the State Administrative Rules sets forth the criteria by which the significance of environmental impacts shall be evaluated. The following discussion paraphrases these criteria individually and evaluates the project's relation to each.

1. *The project will not involve an irrevocable commitment or loss or destruction of any natural or cultural resources.* No natural resources will be irrevocably committed or lost. It is expected that as part of the EA process the State Historic Preservation Division will determine that no effect to historic sites will occur.
2. *The project will not curtail the range of beneficial uses of the environment.* No future beneficial use of the environment will be affected in any way by the proposed project. Sufficient water will remain, well within the sustainable yield of the aquifer, to promote other beneficial uses of groundwater in the Honokaa region.
3. *The project will not conflict with the State's long-term environmental policies.* The State's long term environmental policies are set forth in Chapter 344, HRS. The broad goals of this policy are to conserve natural resources and enhance the quality of life. A number of specific guidelines support these goals. No aspect of the proposed project conflicts with these guidelines. The project's goals of providing potable water to support adequate supply and orderly development of planned growth while conserving natural resources satisfies the State's environmental policies.
4. *The project will not substantially affect the economic or social welfare of the community or State.* The improvements will benefit the social and economic welfare of Hawai'i by improving the potable water supply system.
5. *The project does not substantially affect public health in any detrimental way.* No adverse effects to public health are anticipated. Public health will be benefitted by improving the potable water supply system.
6. *The project will not involve substantial secondary impacts, such as population changes or effects on public facilities.* No adverse secondary effects are expected. The project will not enable development, but will instead assure adequate supply to existing customers and serve planned growth.
7. *The project will not involve a substantial degradation of environmental quality.* The implementation of best management practices for all construction will ensure that the project will not degrade environmental quality in any substantial way.

Honokaa Well "B" Production Well

8. *The project will not substantially affect any rare, threatened or endangered species of flora or fauna or habitat.* No endangered species of flora or fauna are known to exist on the project site or would be affected in any way by the project.

9. *The project is not one which is individually limited but cumulatively may have considerable effect upon the environment or involves a commitment for larger actions.* Cumulative impacts result when implementation of several projects that individually have minor impacts combine to produce more severe impacts or conflicts among mitigation measures. All adverse impacts will either not occur or will be reduced to negligible levels through mitigation measures, and will therefore not tend to accumulate in relation to this or other projects.

10. *The project will not detrimentally affect air or water quality or ambient noise levels.* The project will have negligible effects in terms of water quality, air quality and noise.

11. *The project will not affect or will likely be damaged as a result of being located within an environmentally sensitive area such as flood plains, tsunami zones, erosion-prone areas, geologically hazardous lands, estuaries, fresh waters or coastal waters.* No floodplains, tsunami zones, geologically hazardous areas, or other such sensitive land is involved in the area planned for development.

12. *The project will not substantially affect scenic vistas and viewplanes identified in county or state plans or studies.* No protected viewplanes will be impacted by the project, which will have no adverse scenic effects.

13. *The project will not require substantial energy consumption.* Some, but not substantial, input of energy is required for the construction of the facilities and the operation of the pump.

For the reasons above, and after considering comments on the Draft EA, the State of Hawai'i, Department of Land and Natural Resource, has determined that the proposed project will not have any significant effect in the context of Chapter 343, Hawai'i Revised Statutes and section 11-200-12 of the State Administrative Rules, and has issued a Finding of No Significant Impact.

REFERENCES

- Hawai'i County Department of Water Supply (DWS). 1989. *Hawai'i County Water Use and Development Plan*. Prep. for DWS and Hawai'i State Commission on Water Resources Management by Megumi Kon, Inc., Hilo.
- Hawai'i County Department of Water Supply (DWS). 1991. *Hawai'i County Water Use and Development Plan, Plan Review Draft*. Prep. for DWS and Hawai'i State Commission on Water Resources Management by Megumi Kon, Inc., Hilo.
- Hawai'i State Department of Land and Natural Resources (DLNR). 1980. *State Water Resources Development Plan*. Honolulu.
- Hawai'i State Commission on Water Resources Management (CWRM). 1990. *Draft Hawai'i Stream Assessment: A Preliminary Appraisal of Hawai'i's Stream Resources*. Prep. for CWRM by Hawai'i Cooperative Park Service Unit. Honolulu: National Park Service.
- Hawai'i State Department of Business, Economic Development and Tourism (DBEDT). 1997. *Hawai'i State Data Book*. Honolulu: DBEDT
- Heliker, C. 1990. *Volcanic and Seismic Hazards on the Island of Hawaii*. Washington: U.S. GPO.
- Macdonald, G.A., A.T. Abbott, and F.L. Peterson. 1986. *Volcanoes in the Sea: The Geology of Hawai'i*. 2nd ed. Honolulu: University of Hawai'i Press.
- Sato, H.H. et al. 1973. *Soil Survey of Island of Hawaii, State of Hawaii*. Washington: U.S.D.A. Soil Conservation Service.
- U.S. Bureau of the Census. 2002. U.S. Census of Population, 2000. American Fact Finder web page (<http://factfinder/census.gov>)
- U.S. Fish and Wildlife Service (USFWS). 2000. *Threatened and endangered plants in Hawai'i*. Washington: GPO.
- University of Hawai'i at Hilo, Dept. of Geography. 1998. *Atlas of Hawai'i*. 3rd ed. Honolulu: University of Hawai'i Press.

HONOKAA WELL "B" PRODUCTION WELL

ENVIRONMENTAL ASSESSMENT

APPENDIX 1

FIGURES

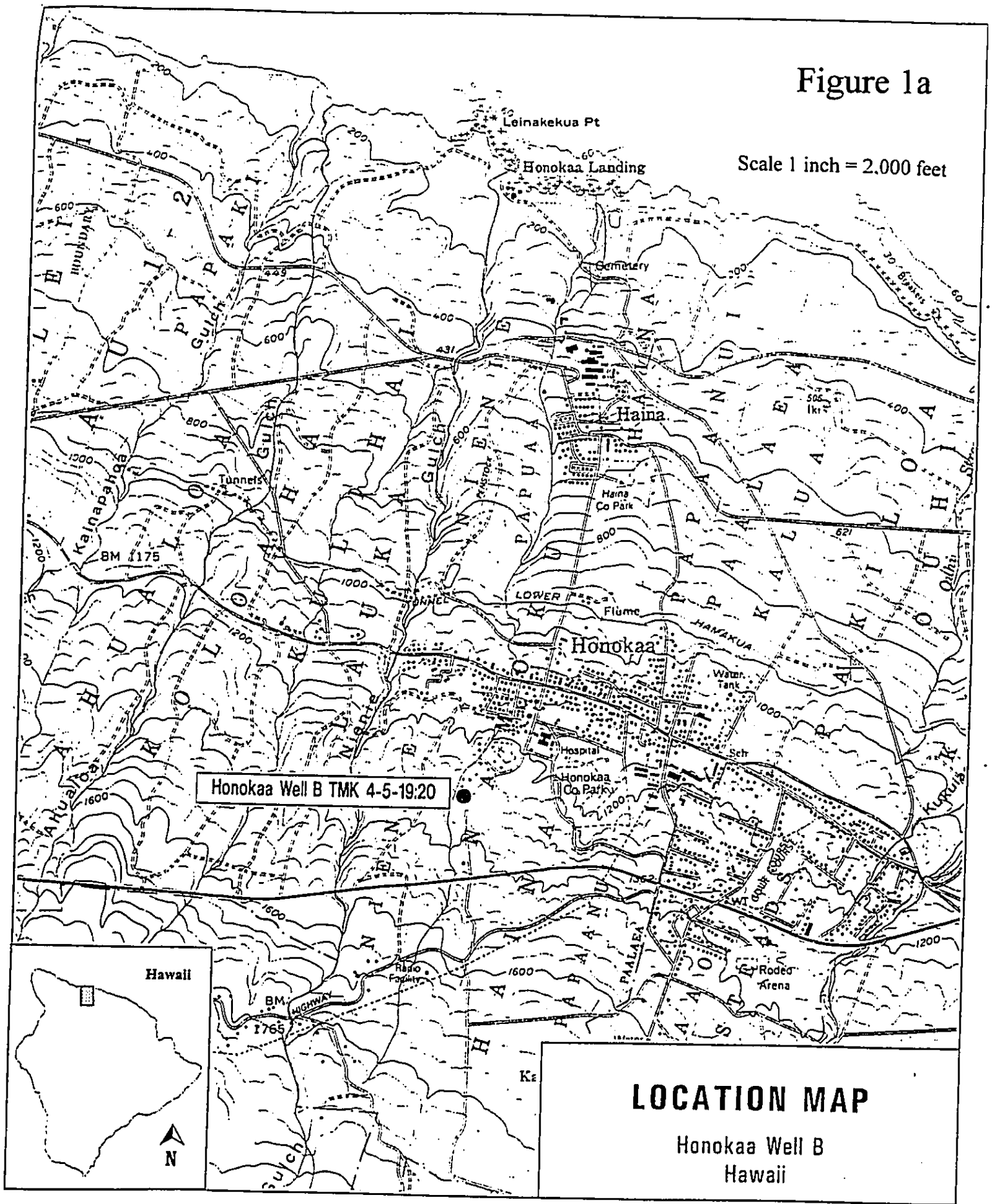


Figure 1

Figure 1b

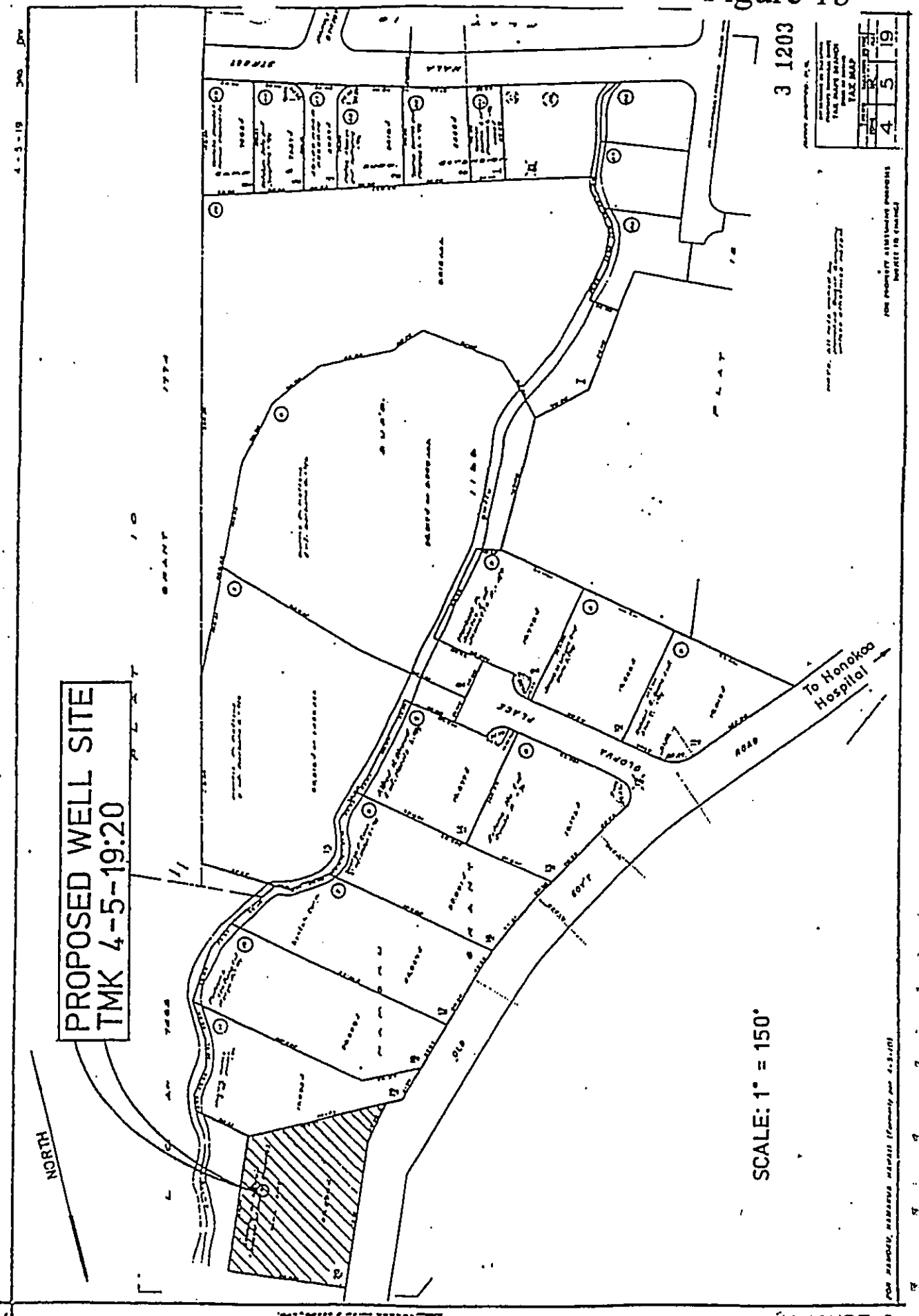
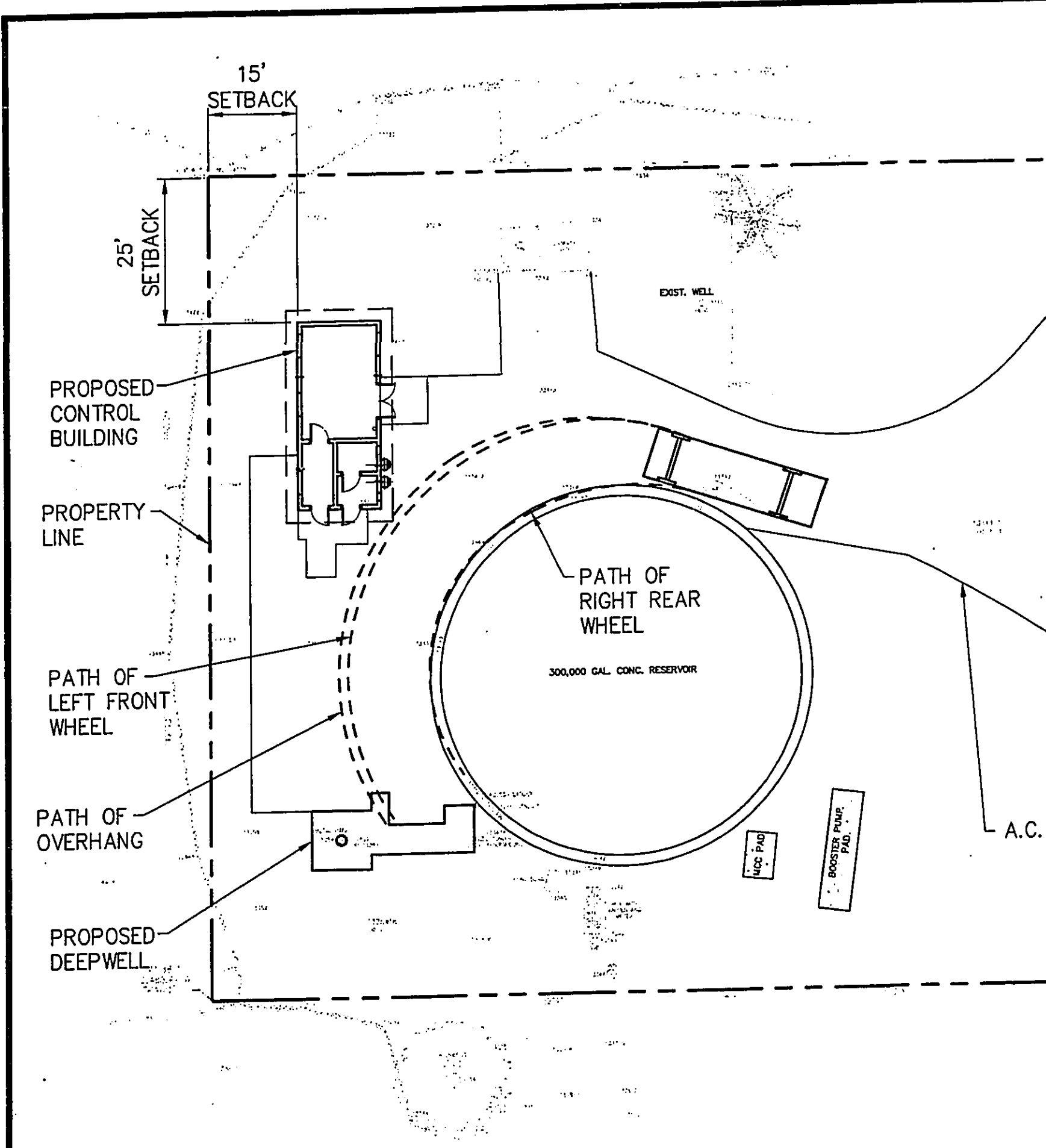


FIGURE 2



PROPOSED CONTROL BUILDING

PROPERTY LINE

PATH OF LEFT FRONT WHEEL

PATH OF OVERHANG

PROPOSED DEEPWELL

15' SETBACK

25' SETBACK

EXIST. WELL

PATH OF RIGHT REAR WHEEL

300,000 GAL. CONC. RESERVOIR

MIC PAD

BOOSTER PUMP PAD

A.C.

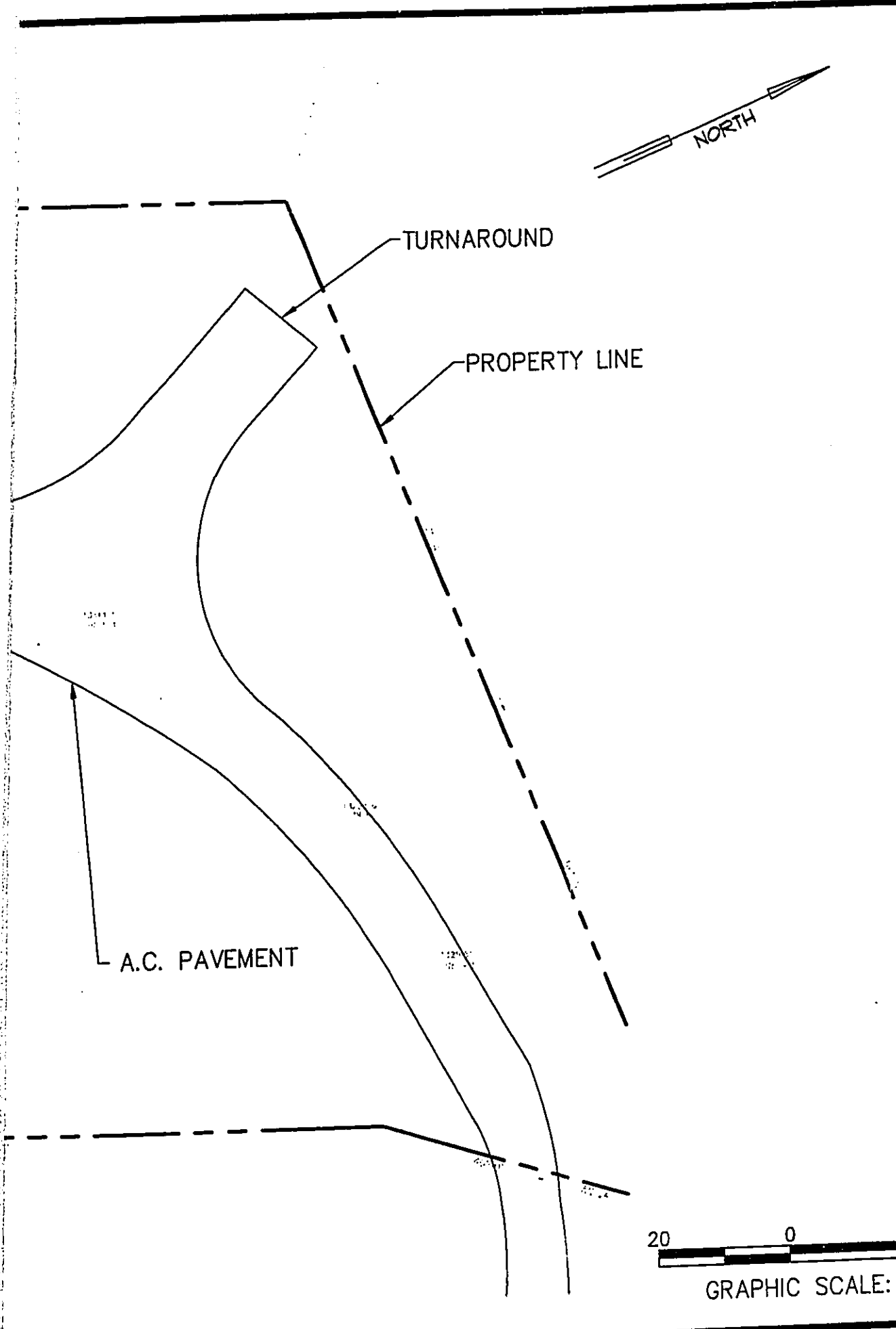
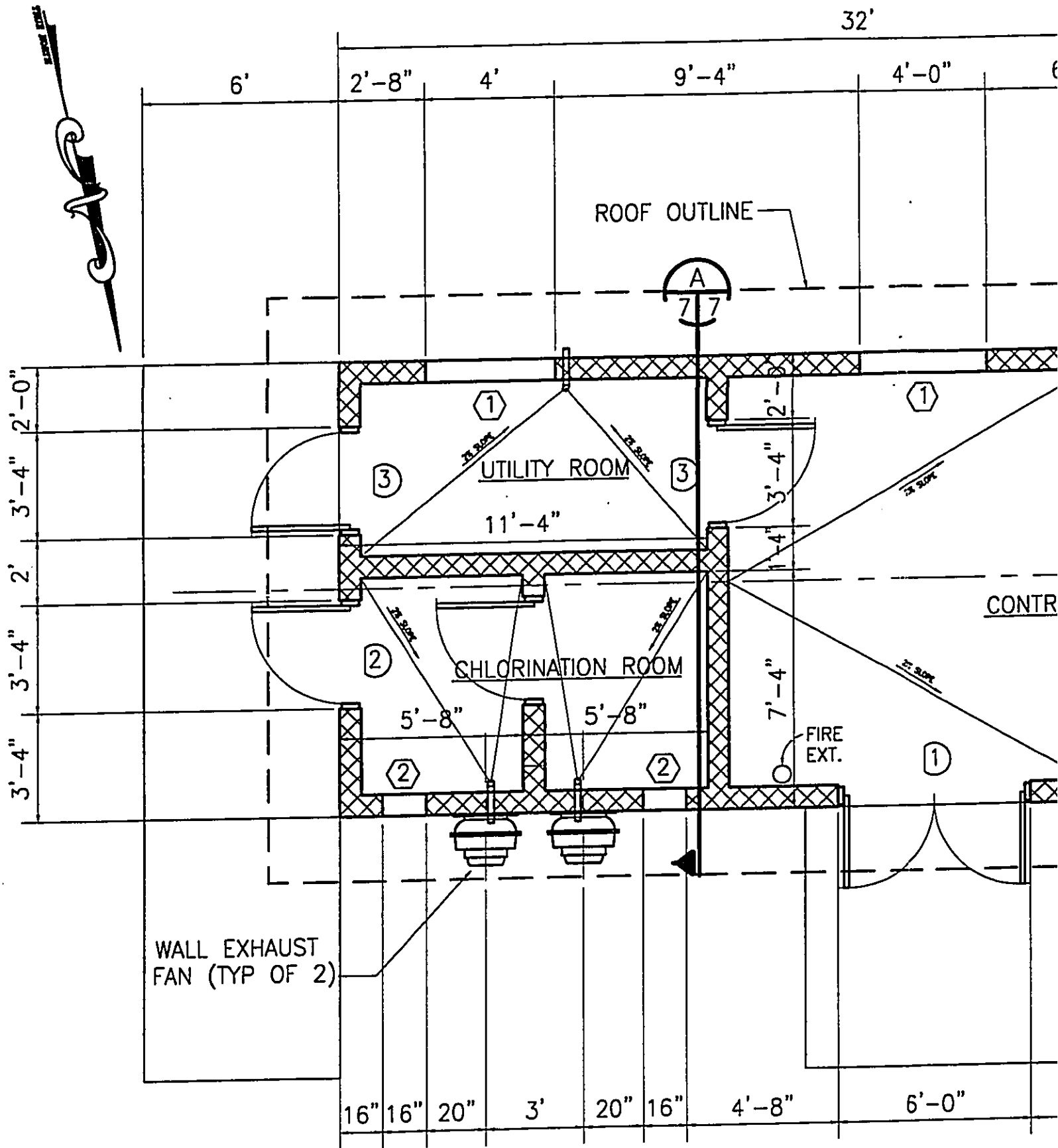


FIGURE	
DATE	5/22/03
TITLE	Figure 2a Site Plan - Layout
PROJECT	HONOKAA WELL DEVELOPMENT HONOKAA, ISLAND OF HAWAII

J:/202015SK1.DWG/1=48/5-20-03/XREFS=11X17BDR,FLOORPLN,FLRPLN-4/PLOTVIEW=SK-5



FLOOR PLAN

SCALE: 1/4" = 1'-0"

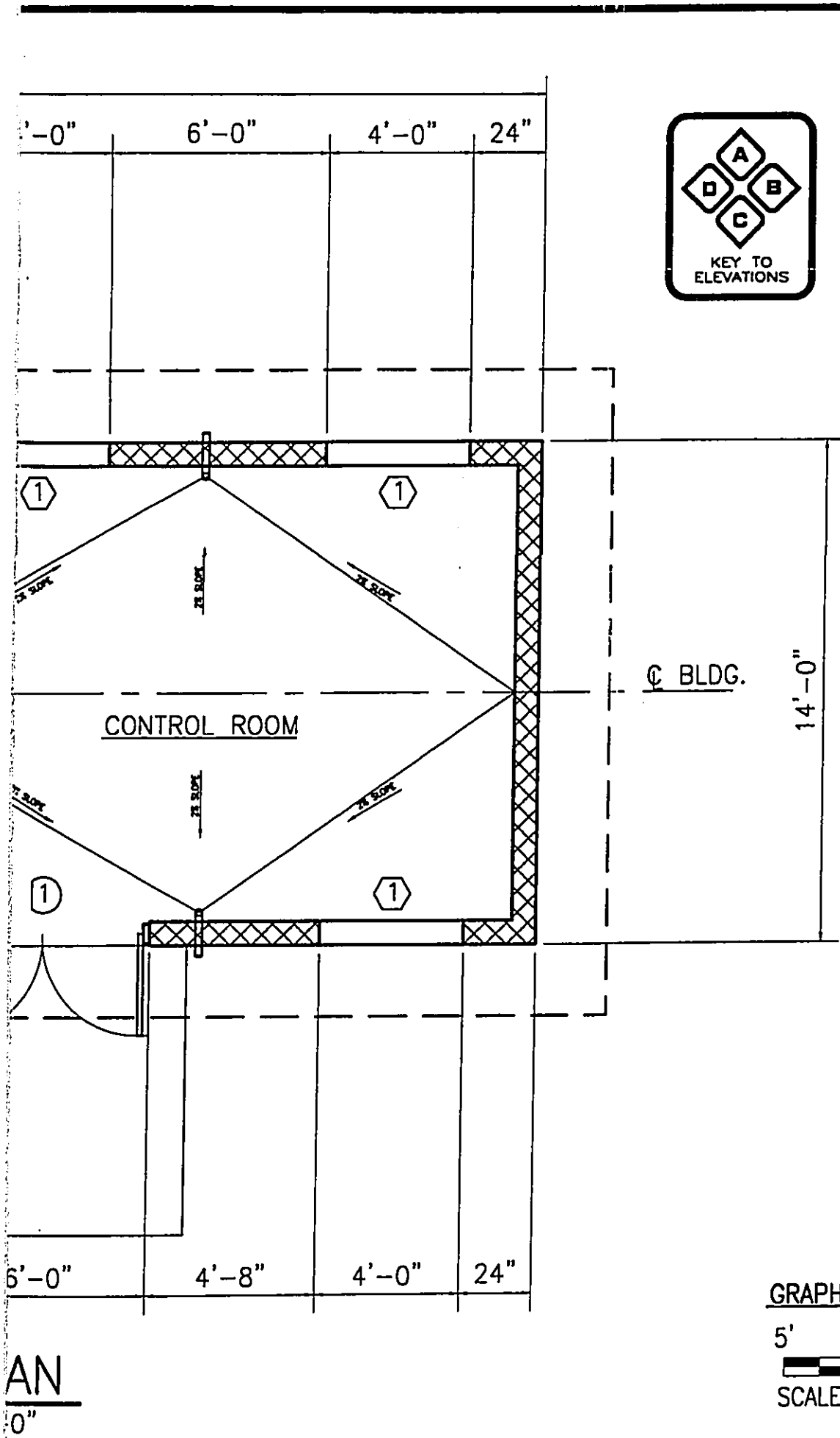


FIGURE	DATE
Figure 2b Site Plan - Floor Plan	6/3/03
PROJECT HONOKAA WELL DEVELOPMENT HONOKAA, ISLAND OF HAWAII	

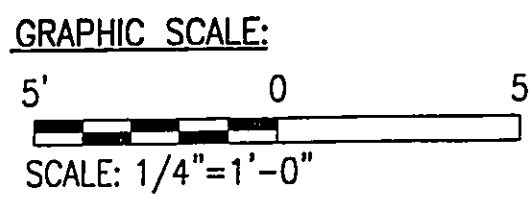
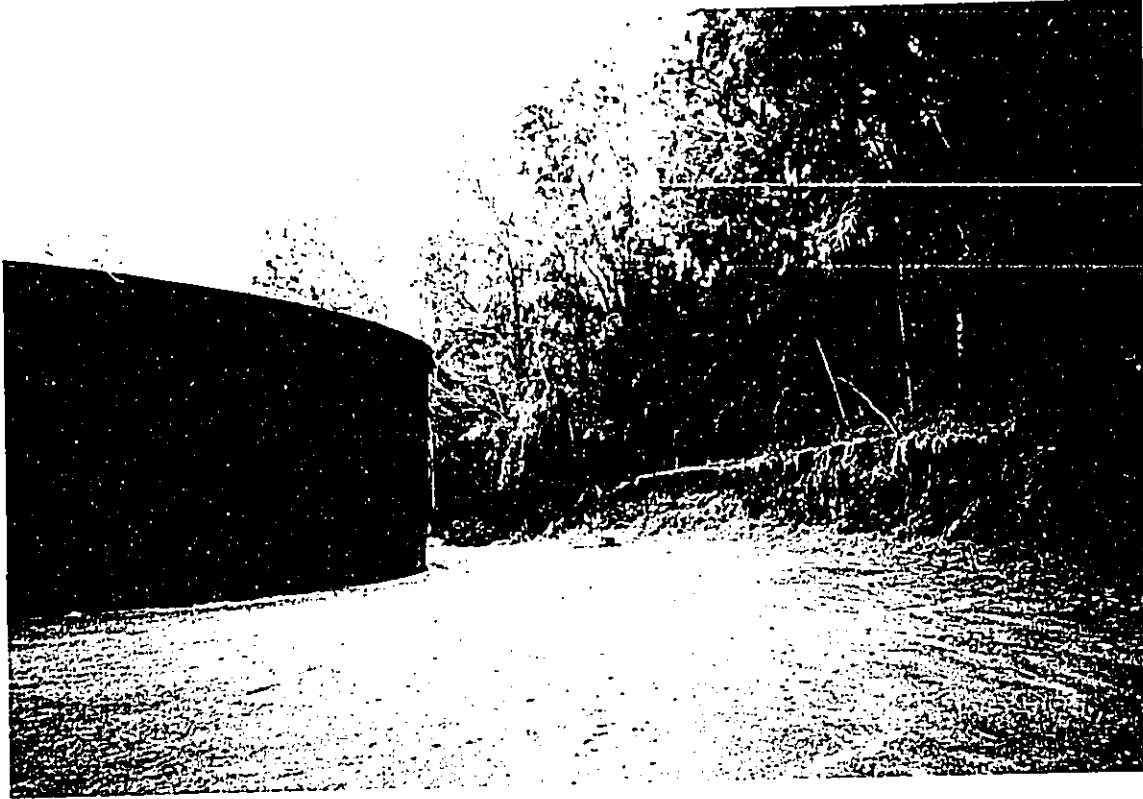


Figure 3

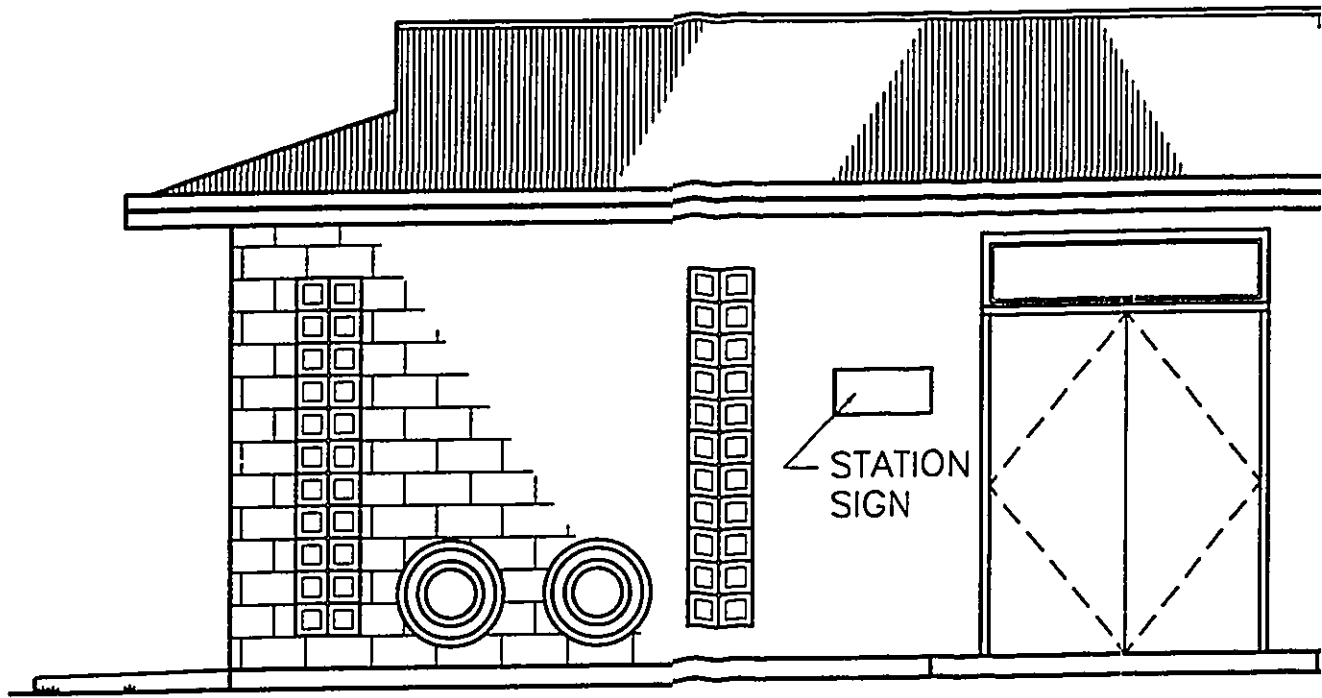


A. Mauka half of site, looking east, with water tank on left



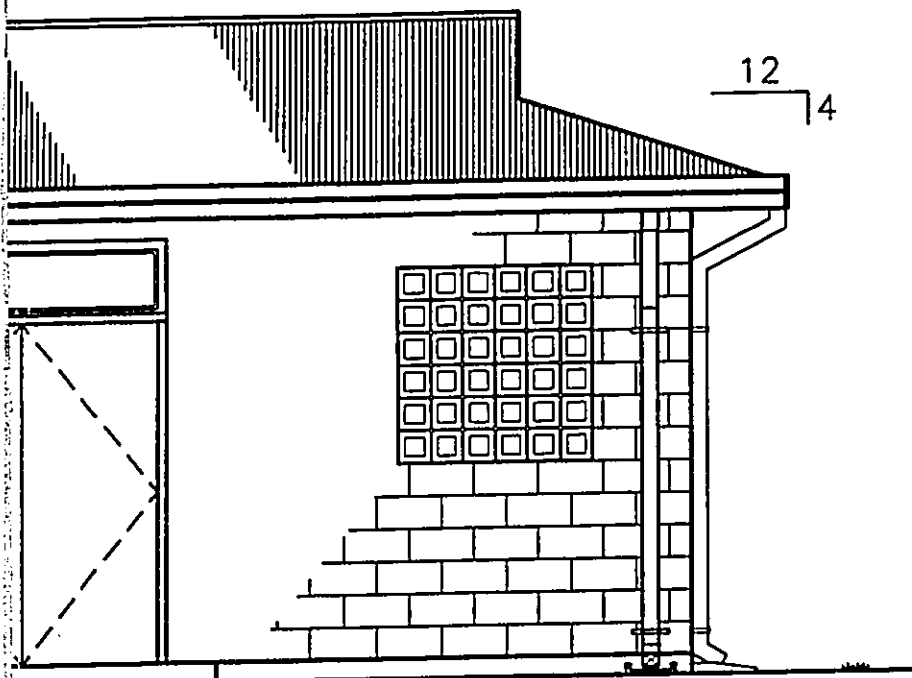
B. Driveway access road: view of site from road is blocked by trees

J1/202015SK1.DWG/1=48/6-3-03/XREFS=11X17BDR,ELEV-C/PLOTVIEW=SK-6



ELEVATION "C"

SCALE: 1/4" = 1'-0"



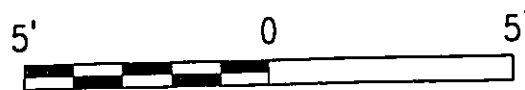
FIGURE

DATE
6/3/03

TITLE Figure 2c Site Plan - Typical Elevation

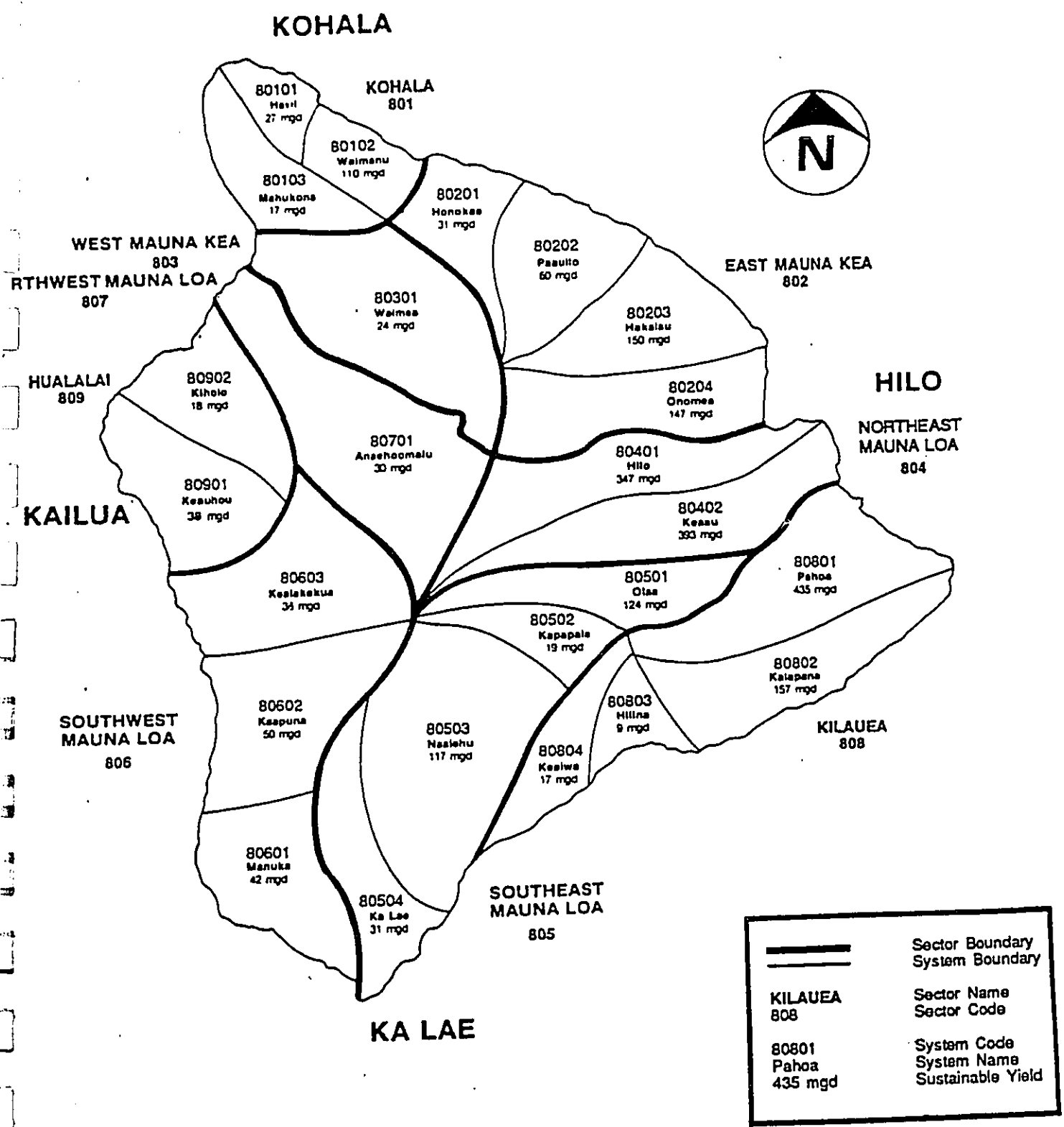
PROJECT HONOKAA WELL DEVELOPMENT
HONOKAA, ISLAND OF HAWAII

GRAPHIC SCALE:



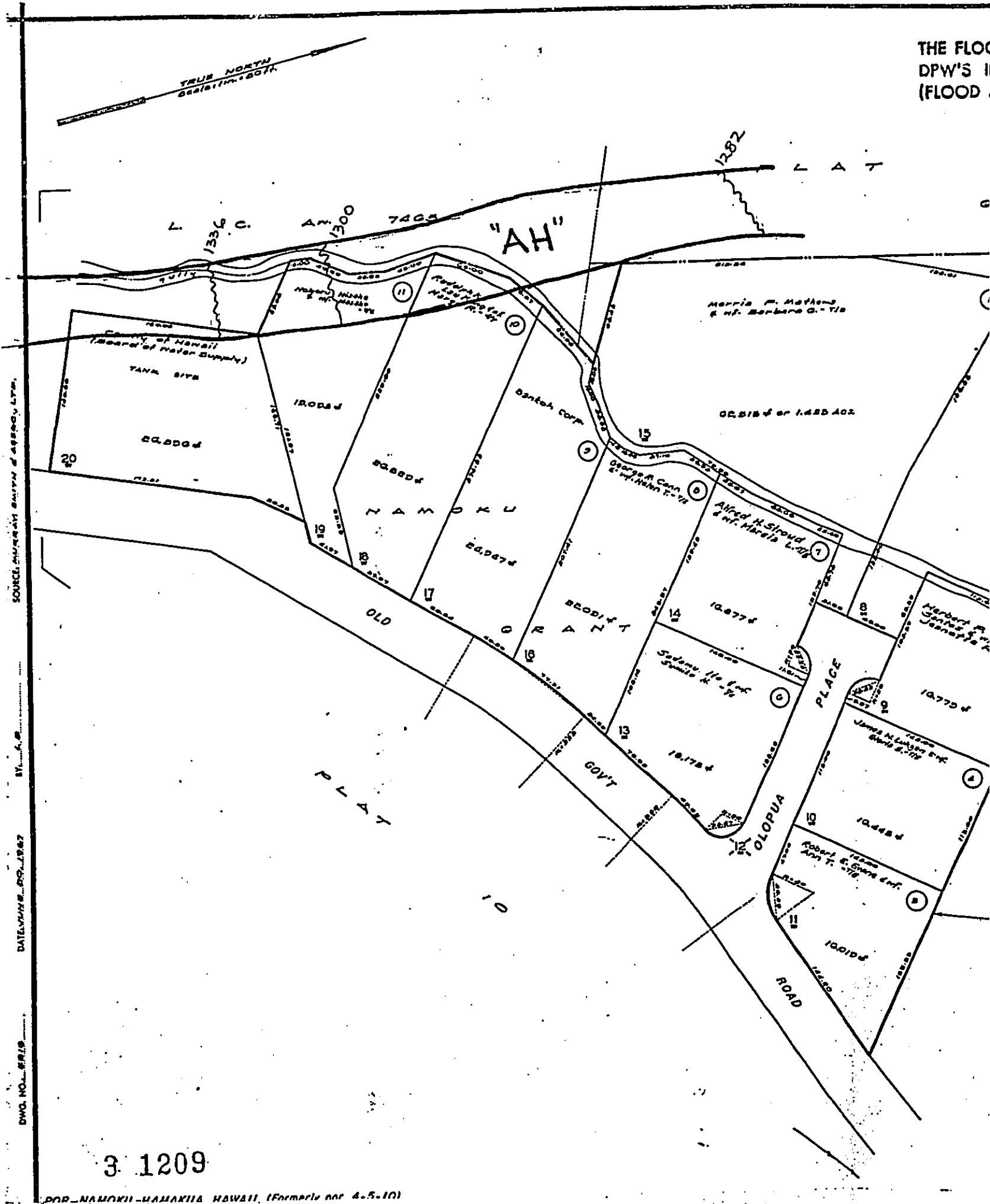
SCALE: 1/4" = 1'-0"

Figure 4



AQUIFER SECTORS AND SYSTEMS

THE FLOOD
DPW'S
(FLOOD



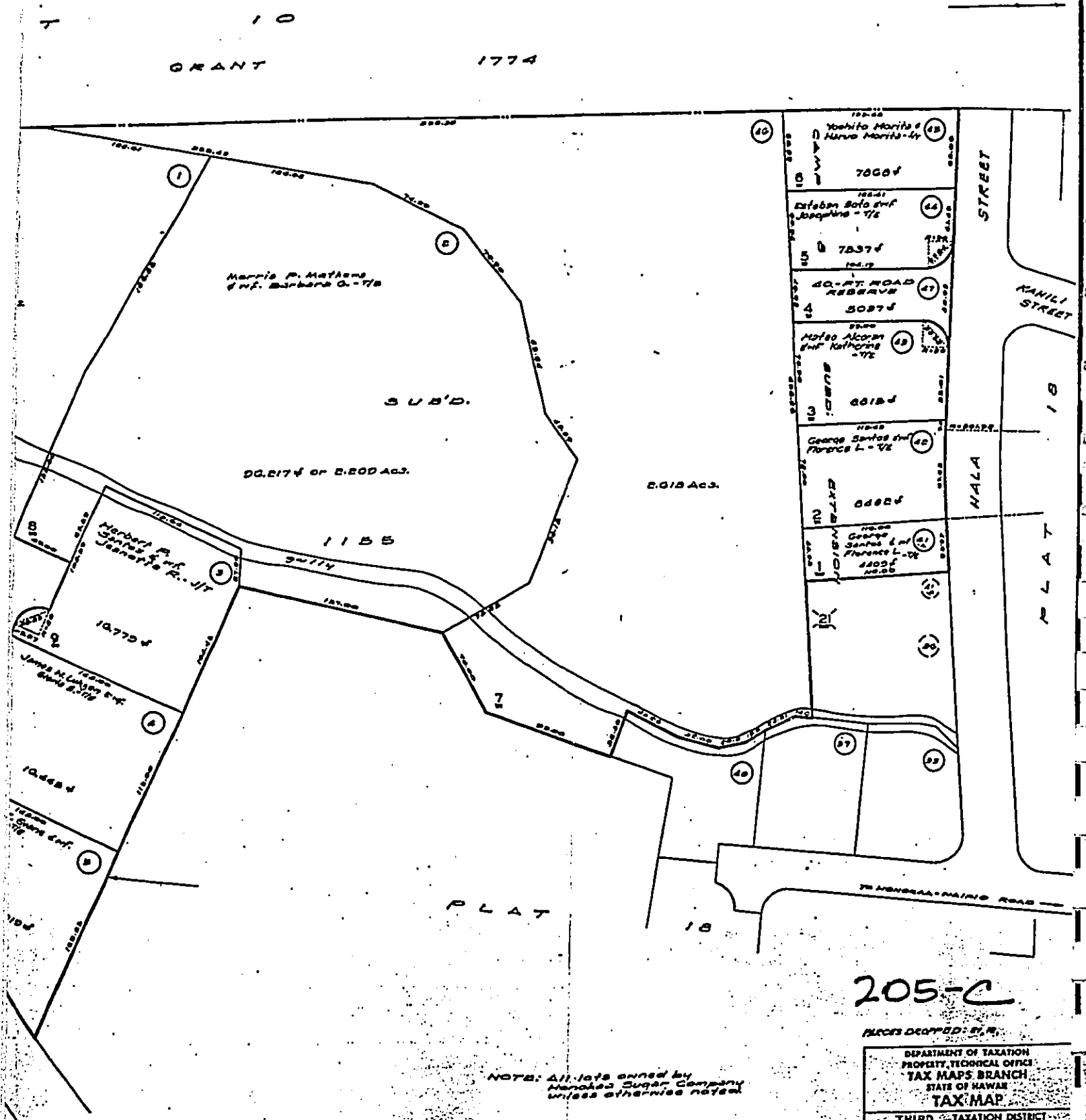
SOURCE: SURVEY MAP OF DPW, L.A.S. DATE: 11/18/67 BY: A.S. DWG. NO.: 1209

3. 1209

DPW - NANOKU - HAMAIIA HAWAII, (Formerly nos 4-5-10)

THE FLOOD ZONES SHOWN REPRESENT
 DPW'S INTERPRETATION OF THE HMAA
 (FLOOD MAPS) AS OF DEC. 10 2002

Figure 5 Floodplain Map



205-C

NOTE: All lots owned by
 Manoa Sugar Company
 unless otherwise noted

FOR PROPERTY ASSESSMENT PURPOSES
 SUBJECT TO CHANGE

DEPARTMENT OF TAXATION
 PROPERTY TECHNICAL OFFICE
 TAX MAPS BRANCH
 STATE OF HAWAII
 TAX MAP

THIRD TAXATION DISTRICT		
ZONE	SEC	PLAT
4	5	19

Island of Hawaii Underground Injection Control Areas

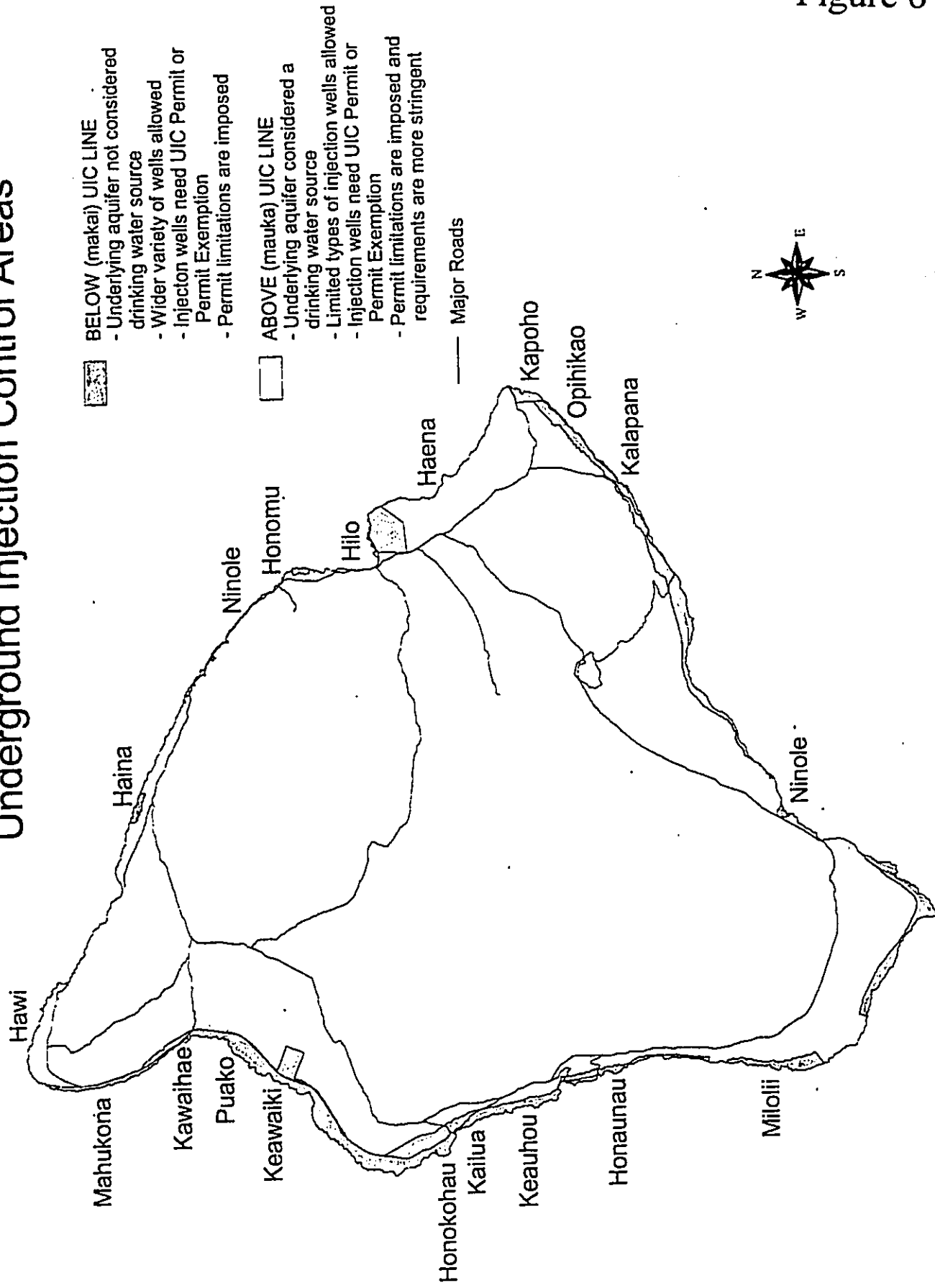
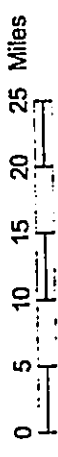


Figure 6



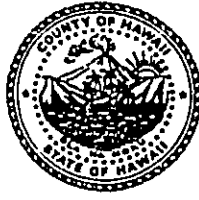
**HONOKAA WELL "B"
ENVIRONMENTAL ASSESSMENT**

APPENDIX 2

**AGENCY COORDINATION LETTERS
AND PUBLIC INVOLVEMENT**

Part A: Comments in Response to Pre-Consultation

Harry Kim
Mayor



Christopher J. Yuen
Director

Roy R. Takemoto
Deputy Director

County of Hawaii

PLANNING DEPARTMENT

101 Pauahi Street, Suite 3 • Hilo, Hawaii 96720-3043
(808) 961-8288 • Fax (808) 961-8742

December 11, 2002

Ron Terry, Ph.D.
GeoMetrician Associates, LLC
HC2 Box 9575
Keaau, HI 96749

Dear Mr. Terry:

Applicant: Department of Land and Natural Resources
Subject: Draft Environmental Assessment (DEA)
Convert Honokaa Region Exploratory Replacement Water Well B to Production Well
TMK: 4-5-19: 20 - Tank Site, Namoku Subd., Honokaa, Hamakua, Hawaii

This is to acknowledge receipt of your letter dated November 18, 2002 requesting out comments on the above-referenced DEA. According to the department's reference plat map, this lot is a designated tank site and its development history has been consistent with that use (e.g., previous approved project, Honokaa Well "A" (no. 6428-01), Final Plan Approval 2913 (March 1, 1994). Consequently, we have no comment on the special environmental conditions or impacts of this project, if any, insofar as the County's land use jurisdiction is concerned.

Zoning or Land Use Status

County Zoning:	Agricultural (A-40a)
State Land Use:	Urban
County General Plan Land Use Designation:	Urban Expansion
SMA (Special Management Area):	N/A

The proposal by the State government to convert water well "B" from exploratory to production status with eventual integration into the County water system to ensure an adequate water supply for the Honokaa area qualifies as a public use consistent with Zoning Code sec. 25-4-11(c). A public use is permitted in any zone district and requires Final Plan Approval from the Planning Director. Plan approval was also previously required and complied with for Honokaa Well "A," referred to above. A copy of the plan approval application is enclosed for this purpose.


Ron Terry, Ph.D.
GeoMetrician Associates, LLC
Page 2
December 11, 2002

This proposal is also consistent with the Hawaii County General Plan's water policy element because it identifies a source of additional water supply for development of future needs in a designated urban expansion zone. Furthermore, the General Plan's designated urban expansion land use is subject to the existing zoning on public use. Parcel 20 is not within the County's Special Management Area and therefore not subject to SMA review or compliance criteria.

- Plan Approval Application. Please submit one set of plans of this proposal with the PA application.
- Environmental Assessment. A copy of the draft is not required; however, please provide one copy of the Final EA for our records.
- Future Improvements to Water Tank Site. Since Parcel 20 is a designated tank site, generally, any improvements to the region's water system on this lot would constitute a permitted use and not require a land use permit or prior review.

Please discuss any questions on this matter with staff planner Earl Lucero at (808) 961-8288.

Sincerely,


CHRISTOPHER J. YUEN
Planning Director

EML:pak
P:\WpWin60\Ch343\DEAHonokaaReplacementWellB2002

Enclosure: Plan Approval Application

cc: Long Range Planning

APPLICATION FOR PLAN APPROVAL
COUNTY OF HAWAII
PLANNING DEPARTMENT

APPLICANT: _____

APPLICANT'S SIGNATURE: _____ DATE: _____

ADDRESS: _____

TELEPHONE NO.: _____

APPLICANT'S INTEREST, if not recorded owner: _____

RECORDED OWNER: _____

OWNER'S SIGNATURE: _____ DATE: _____

ADDRESS: _____

TELEPHONE NO.: _____

PROPOSED USE: _____

TAX MAP KEY: _____

STREET ADDRESS OF PROPERTY: _____

STATE LAND USE DISTRICT: _____ LAND AREA: _____

ZONING: _____

PURSUANT TO THE ZONING CODE AND THE PLANNING DEPARTMENT'S RULES OF PRACTICE AND PROCEDURE, THIS APPLICATION MUST BE ACCOMPANIED BY A SITE PLAN, DRAWN TO SCALE AND FULLY DIMENSIONED INDICATING CLEARLY THE FOLLOWING INFORMATION:

- (1) *The location and dimension of the building site;*
- (2) *The location, size, height, and use of all existing and proposed structures;*
- (3) *All yards and open spaces;*
- (4) *Location, height, and material of all fences and walls;*
- (5) *The standard of improvement and location, number, and size of spaces, arrangements and on-site circulation of all off-street parking and loading facilities including points of access thereto from adjoining streets;*
- (6) *The location, general nature, and type, and protection or shielding devices of all exterior lighting;*
- (7) *All proposed landscaping and planting;*
- (8) *All proposed street dedication and improvement, if any; and*
- (9) *Any other information required by the director.*

A certification of clearance (from the Director of Finance that the real property taxes and all other fees relating to the subject parcel(s) have been paid and that there are no outstanding delinquencies) shall accompany this Application.

THE PROJECT SHALL COMPLY WITH ALL REQUIREMENTS OF PERMITS/APPROVALS GRANTED BY THE PLANNING COMMISSION OR COUNTY COUNCIL.

- Harry Kim
Mayor



Lawrence K. Mahuna
Acting Police Chief

County of Hawaii
POLICE DEPARTMENT

349 Kapiolani Street • Hilo, Hawaii 96720-3998
(808) 935-3311 • Fax (808) 961-8869

December 2, 2002

Mr. Ron Terry, Ph.D.
Geometrician Associates, LLC
HC 2 Box 9575
Keaau, HI 96749

Dear Mr. Terry:

**SUBJECT: ENVIRONMENTAL ASSESSMENT
HONOKAA WELL B
TMK: 4-5-19:20**

This acknowledges your letter of November 18, 2002, requesting our comments on the above-referenced project.

Staff has reviewed the request and does not foresee any adverse effect to convert the exploratory well (Honokaa Well B) to a production well and integrated into the County water system.

Thank you for the opportunity to comment.

Sincerely,

LAWRENCE K. MAHUNA
ACTING POLICE CHIEF


THOMAS J. HICKCOX
ASSISTANT POLICE CHIEF
FIELD OPERATIONS BUREAU

EWR:lli

**HONOKAA WELL "B"
ENVIRONMENTAL ASSESSMENT**

APPENDIX 2

AGENCY COORDINATION LETTERS

AND PUBLIC INVOLVEMENT

Part B: Comments to Draft EA and Responses

LINDA LINGLE
GOVERNOR OF HAWAII



PETER T. YOUNG
CHAIRPERSON

MEREDITH J. CHING
CLAYTON W. DELA CRUZ
JAMES A. FRAZIER
CHIYOME L. FUKINO, M.D.
STEPHANIE A. WHALEN

ERNEST Y.W. LAU
DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

August 21, 2003

Mr. Ron Terry
GeoMetrician Associates
HC 2 Box 9575
Keeau, HI 96749

Dear Mr. Terry:

SUBJECT: Draft EA, Honokaa Well "B"

FILE NO.: 6428-02

Thank you for the opportunity to review the subject document. Our comments related to water resources are marked below.

In general, the CWRM strongly promotes the efficient use of our water resources through conservation measures and use of alternative non-potable water resources whenever available, feasible, and there are no harmful effects to the ecosystem. Also, the CWRM encourages the protection of water recharge areas, which are important for the maintenance of streams and the replenishment of aquifers.

- [] We recommend coordination with the county government to incorporate this project into the county's Water Use and Development Plan.
- [] We recommend coordination with the Engineering Division of the State Department of Land and Natural Resources to incorporate this project into the State Water Projects Plan.
- [] We are concerned about the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality.
- [] A Well Construction Permit and/or a Pump Installation Permit from the Commission would be required before ground water is developed as a source of supply for the project.
- [] The proposed water supply source for the project is located in a designated water management area, and a Water Use Permit from the Commission would be required prior to use of this source.
- [] Groundwater withdrawals from this project may affect streamflows, which may require an instream flow standard amendment.

Mr. Ron Terry
Page 2
August 21, 2003

- We are concerned about the potential for degradation of instream uses from development on highly erodible slopes adjacent to streams within or near the project. We recommend that approvals for this project be conditioned upon a review by the corresponding county's Building Department and the developer's acceptance of any resulting requirements related to erosion control.
- If the proposed project includes construction of a stream diversion, the project may require a stream diversion works permit and amend the instream flow standard for the affected stream(s).
- If the proposed project alters the bed and banks of a stream channel, the project may require a stream channel alteration permit.
- OTHER:
A Pump Installation Permit will need to be obtained prior to installing a permanent pump. Additionally, we have not yet received a Well Completion Report Part I for this well, which is also a prerequisite to obtaining a Pump Installation Permit.

If there are any questions, please contact Ryan Imata at 587-0255.

Sincerely,


ERNEST Y.W. LAU
Deputy Director

RI:ss

geometrician
ASSOCIATES, LLC
integrating geographic science and planning

September 16, 2003

Ernest Y. W. Lau, Deputy Director
Commission on Water Resource Management
Hawaii Department of Land and Natural Resources
P.O. Box 621
Honolulu HI 96809

Dear Mr. Lau:

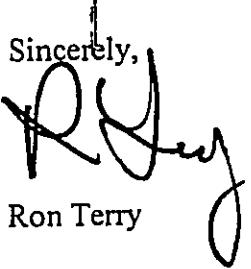
**Subject: Comment Letter to Draft Environmental Assessment, Honokaa Well
"B" Production Well Draft Environmental Assessment TMK: (3rd):
4-5-19:20**

This letter responds to your letter of August 21, 2003, concerning the Draft EA. As the author of the EA, I offer the following point-by-point responses to your individual comments.

1. *Pump Installation Permit.* The need for this permit is noted in Section 3.5 of the Draft EA.
2. *Well Completion Report.* The proposing agency has been informed of the fact that your agency has not yet received this report.

Thank you for your review of the project and the EA.

Sincerely,


Ron Terry

LINDA LINGLE
GOVERNOR OF HAWAII



GENEVIEVE SALMONSON
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186
E-mail: oeqc@health.state.hi.us

August 22, 2003

Hiram Young
Department of Land and Natural Resources, State of Hawai'i
P.O. Box 621
Honolulu, Hawai'i 96809

Ron Terry, Ph.D.
H.C. 2, Box 9575
Keaau, Hawai'i 96813-2830

Dear Mr. Young and Dr. Terry:

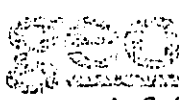
We have reviewed the July 2003, draft environmental assessment entitled "Honoka'a Well B Production Well" located at Tax Map Key (3rd) 4-5-19, parcel 20, in Honoka'a, in the judicial district of Hamakua. We offer the following comment for your consideration and response.

1. SUSTAINABLE BUILDING GUIDELINES, GLASSPHALT, AND NATIVE PLANTS IN LANDSCAPING: We ask that you consider the use of glassphalt for roadway paving and native plants in your landscaping for the facility. Please consider reviewing the Environmental Council's Sustainable Building Guidelines. These documents are available on the Internet at <http://www.state.hi.us/health/oeqc/index.html>.

Again we thank you for the opportunity to comment. If there are any questions, please call me or Leslie Segundo at (808) 586-4185.

Sincerely,

Genevieve Salmonson
GENEVIEVE SALMONSON
Director

 **metrician**
ASSOCIATES, LLC
integrating geographic science and planning

September 16, 2003

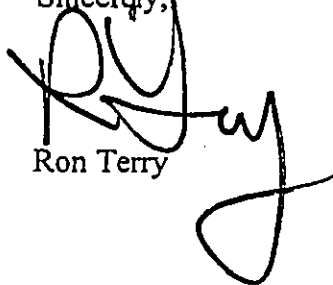
Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu HI 96813

Dear Ms. Salmonson:

**Subject: Comment Letter to Draft Environmental Assessment, Honokaa Well
"B" Production Well Draft Environmental Assessment TMK: (3rd):
4-5-19:20**

This letter responds to your letter of August 22, 2003, concerning the Draft EA in which you offered for our consideration and response the sustainable building guidelines. The proposing agency has been informed of the availability of the guidelines as well as the environmental advisability of incorporating appropriate items from this list in construction bid contracts. Thank you for your review of the project and the EA.

Sincerely,


Ron Terry

HONOKAA WELL "B" PRODUCTION WELL

ENVIRONMENTAL ASSESSMENT

APPENDIX 3

WELL REPORT

RESULTS OF DEEPENING & TESTING

**HONOKAA WELL B (6428-02)
Honokaa, Hawaii**

Prepared for

**ENGINEERING BRANCH, LAND DIVISION
Department of Land and Natural Resources**

**WATER RESOURCE ASSOCIATES
1188 Bishop Street, Suite 1708
Honolulu, Hawaii 96813**

Honolulu, Hawaii
October 2002

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INTRODUCTION	1
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Fecal and Total Coliform Analysis

RESULTS OF DEEPENING AND TESTING HONOKAA WELL B (6428-02), HAWAII

INTRODUCTION

Honokaa Well B is located in a tank-site property owned by the Hawaii Department of Water Supply. The well lies on the northern slopes of Mauna Kea Volcano, approximately two miles inland from the coast at Honokaa Landing (see Figure 1). Honokaa Well B presumably taps the Hamakua basaltic formation of Mauna Kea Volcano and lies within the Honokaa Aquifer System of the East Mauna Kea Hydrologic Sector, which has an estimated sustainable yield of 31 mgd. The well lies in a coastal rain belt having a median annual rainfall of 75 to 100 inches per year.

In December 1996, Honokaa Well B was drilled as a 12-inch open hole, initially to a depth of 1520 ft. (-186 ft., msl) and subsequently to a depth of 1580 (-246 ft., msl) by Waieli Drilling Co. One-hour pumping tests at 270 gpm showed a slight improvement in drawdown from 85.0 ft. to 76.5 ft. for the respective depths (see Figure 2). However, the yield of the open hole remained very low, with specific capacity improving slightly from 3.18 to 3.50 gpm per foot of drawdown. Consequently, the well was capped and left unused.

Subsequently in July 2001, under a separate contract, Honokaa Well B was deepened an additional 220 ft. to a depth of 1800 ft. (-466 ft., msl) and pump tested by Roscoe Moss Hawaii/ Beylik Drilling Co.

GEOLOGIC RESULTS

The video log of the pilot hole showed an overall rounded, compact borehole in basaltic lavas. There were occasional tight, minor fractures, but no major openings, cracks or aa clinker layers indicative of high permeability. The drill cuttings were predominantly gray and of silt to sand size (see Log of Drill Cuttings). Some cuttings were reddish-brown with small spherical vesicles, suggesting cinder material. Overall, the cuttings did not indicate any permeable zones, except in the bottom 100 ft. of the pilot hole.

HYDROLOGIC RESULTS

During the progress of cleaning and drilling the pilot hole, bottom-hole water samples were obtained by the driller at successive intervals of depth and tested in the lab for chloride content. The test results are graphically presented in Figure 3, Titration-Based Salinity Profile.

Figure 3 shows that Honokaa Well B has a 332 ft. thick layer of fresh water, extending from the water table at 42 ft., msl, to a depth of -290 ft., msl. The upper two-thirds of this layer has a chloride content of 70 to 80 mg/L and at the bottom (-290 ft., msl) a chloride content of 100 mg/L.

Below the fresh water layer, the chloride content of the well increases abruptly to a range of 180 to 212 mg/L (see Figure 3). After the pilot hole was completed to the contract depth of 1800 ft. (-466 ft., msl) and bailed cleaned, the Commission on Water Resource Management ran a conductance and temperature log of the aquifer (see Figures 4 and 5, respectively). The conductance log was converted to a salinity profile (see Figure 4). Figure 4 differs from Figure 3 in that the 200 mg/L chloride water from the bottom of the pilot hole had become mixed with the upper fresh water during bailing and cleaning of the pilot hole. Consequently, the chloride content at the top of the aquifer measured 130 mg/L.

Figure 5, based upon the Water Commission's temperature log, shows that Honokaa Well B has a positive temperature gradient with depth, ranging from 74.5 degrees Fahrenheit at the water table (at 42 ft., msl) to 80.5 degrees Fahrenheit at the bottom depth of 1754 ft. (-420 ft., msl).

In summary, deepening the 12" pilot hole between the depths of 1580 ft. (-246 ft., msl) and 1800 ft. (-466 ft., msl) confirmed the occurrence of low permeability basalts containing higher-than-normal chloride water that does not correspond with the well's head of 42 ft. and an unexpected positive temperature gradient that reaches 80.5 degrees Fahrenheit at the bottom of the hole.

AS-BUILT DESCRIPTION OF WELL

The objective of well completion was to develop a new potable well source capable of pumping a minimum of 300 gpm. Based upon the data gathered from deepening the 12" pilot hole to a depth of 1800 ft. (-466 ft., msl), it was decided to ream the pilot hole to 22" diameter

and case the well with 14" diameter solid casing to a depth of 1310 ft. (+24 ft., msl) and 270 ft. of "Ful Flo" shutter screen casing to a depth of 1580 ft. (-246 ft., msl). The solid casing section of the well was grouted from approximately 1304 ft. to the surface, using two cement baskets and leaving the perforated casing section of the well with an open annular space. The pilot hole was cleared of drill cuttings to a depth of 20 ft. below the casing, to a depth of 1600 ft. (-266 ft., msl). An as-built section of the well is shown in Figure 6.

STEP-DRAWDOWN TEST

On September 4, 2002, a step drawdown test was performed at pumping rates ranging from 100 gpm to 300 gpm, with corresponding one-hour drawdowns ranging from 26.31 feet to 75.40 feet. The results looked promising in that after pumping for 2 hours at 300 gpm, the drawdown appeared somewhat stabilized (see Figure 7, Step-Drawdown Curve). Based upon the step test data, the specific capacity of the well ranged from 4.7 gpm per foot of drawdown at 200 gpm to 3.9 gpm per foot of drawdown at 300 gpm. Based upon the Pumping Rate vs Drawdown Curve in Figure 8 the specific capacity of the well will diminish to 3.5 gpm per foot if pumped at a rate of 350 gpm. In other words, a 50 gpm increase in pumping rate will result in a 25 ft. increase in drawdown, or a drawdown of 100 ft.

CONSTANT RATE TEST

Based upon the step test data, the constant rate test was set at 300 gpm and successfully concluded on October 7, 2002 after 7 days of continuous pumping. The test record and graphical plot of the drawdown data (Figure 9) are included in this report.

The drawdown in Well B stabilized at approximately 71.0 ft. after 1000 minutes of pumping and remained stable throughout the remainder of the 7-day test, indicating that the rate of recharge to the well equaled the rate of discharge (see Figure 9). Drawdown was measured using an airline assembly because oil in the monitor tube prevented measurement with an electrical probe.

The chloride content of the well was stable, as evidenced by the hourly field measurements of electrical conductivity ranging between 430 and 450 microSiemens per centimeter and by the laboratory-titrated chloride values of 92 to 94 mg/L of water samples taken twice a day (see Constant Rate Test Record).

The temperature of the pumped water measured 76 to 77 degrees Fahrenheit and the field pH measured 8.2 and 8.3.

RECOVERY TEST

At the end of the 7-day test, the recovery of drawdown in Honokaa Well B was essentially instantaneous, recovering 99% in 60 minutes.

EFFECT ON HONOKAA WELL A

Existing Honokaa Well A, located 110 ft. northwest of Honokaa Well B within the County tank site, was used as an observation well before, during, and after the 7-day constant rate test. A data logger was installed and arbitrarily set to a datum of 12.00 ft., the approximate head measured by others. The data logger was set to record water level at 20-minute intervals.

The water level data is presented graphically in Figure 10. As can be seen in Figure 10, the drawdown in Well A stabilized at approximately 3.3 ft. (12.0 - 8.7). Thus, pumping Honokaa Well B at a constant rate of 300 gpm resulted in an aquifer drawdown of only 3.3 ft. at a distance of 110 ft. from Well B.

WATER QUALITY

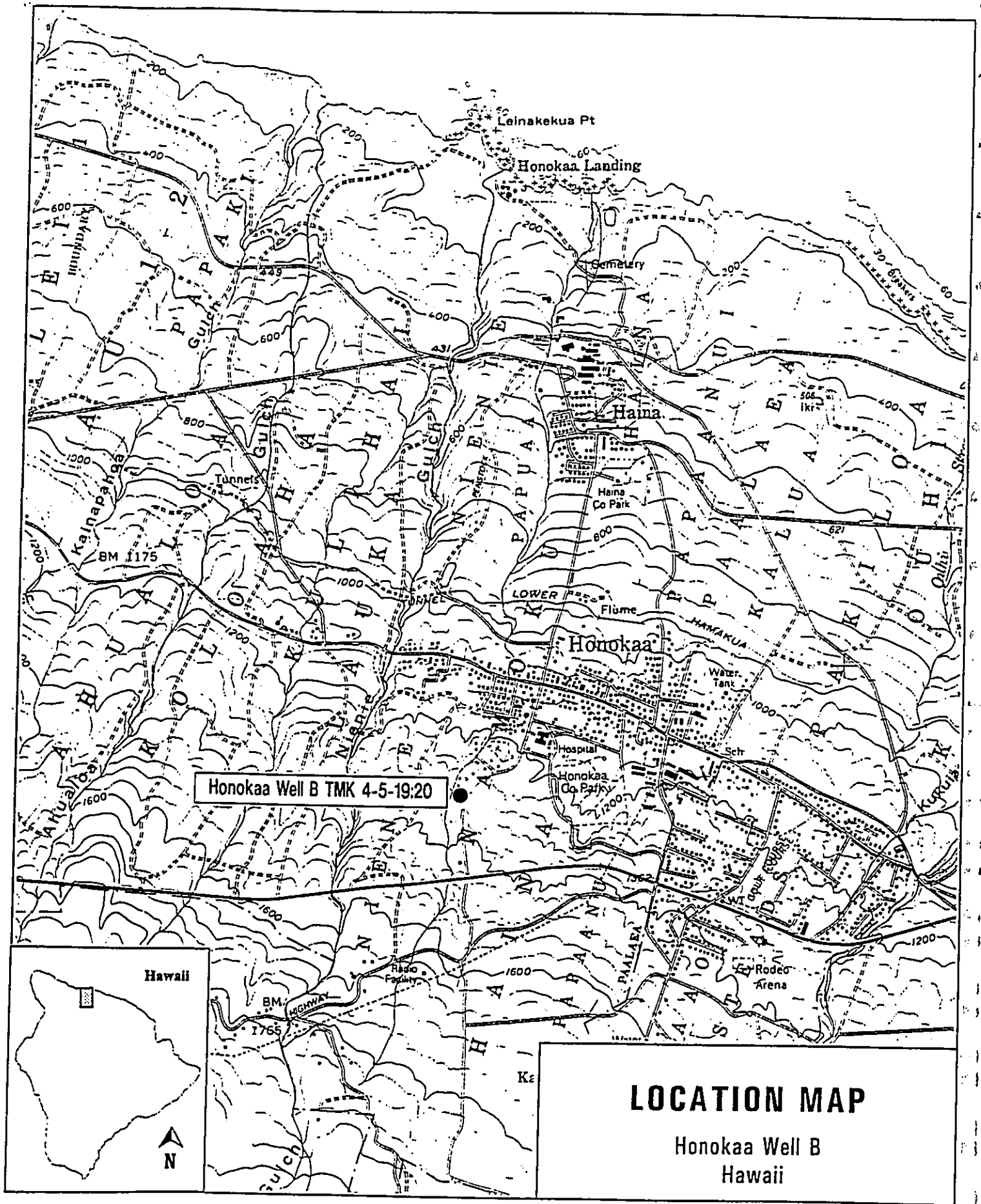
Approximately 20 hrs. after the start of the 7-day test, water samples were collected from Honokaa Well B for certified laboratory testing of water quality, as required by the Department of Health for new potable water sources. The laboratory report was not available at this writing. However, the fecal and total coliform results, which were negative, are included in this report.

CONCLUSIONS

Based upon the pumping test results, it is concluded that Honokaa Well B is capable of producing potable water at a 24/7 rate of 300 gpm. At this rate, drawdown is expected to stabilize at approximately 71.0 ft. (-29 ft., msl) and chlorides are expected to range between 90 to 95 mg/L. Water temperature will be steady at 76 to 77 degrees Fahrenheit.

PERMANENT PUMP RECOMMENDATION

The recommended permanent pump capacity for Honokaa Well B is 300 gpm. The intake should be set at an elevation of approximately -90 ft., msl. The airline assembly and/or 1-1/2" diameter monitor tube to be used to measure drawdown should be set so that a maximum of 100 ft. of drawdown can be measured.



LOCATION MAP

Honokaa Well B
Hawaii

Figure 1

ONE-HR. PUMPING TESTS (December 1996)
 Honokaa Well B - 12" Open Hole

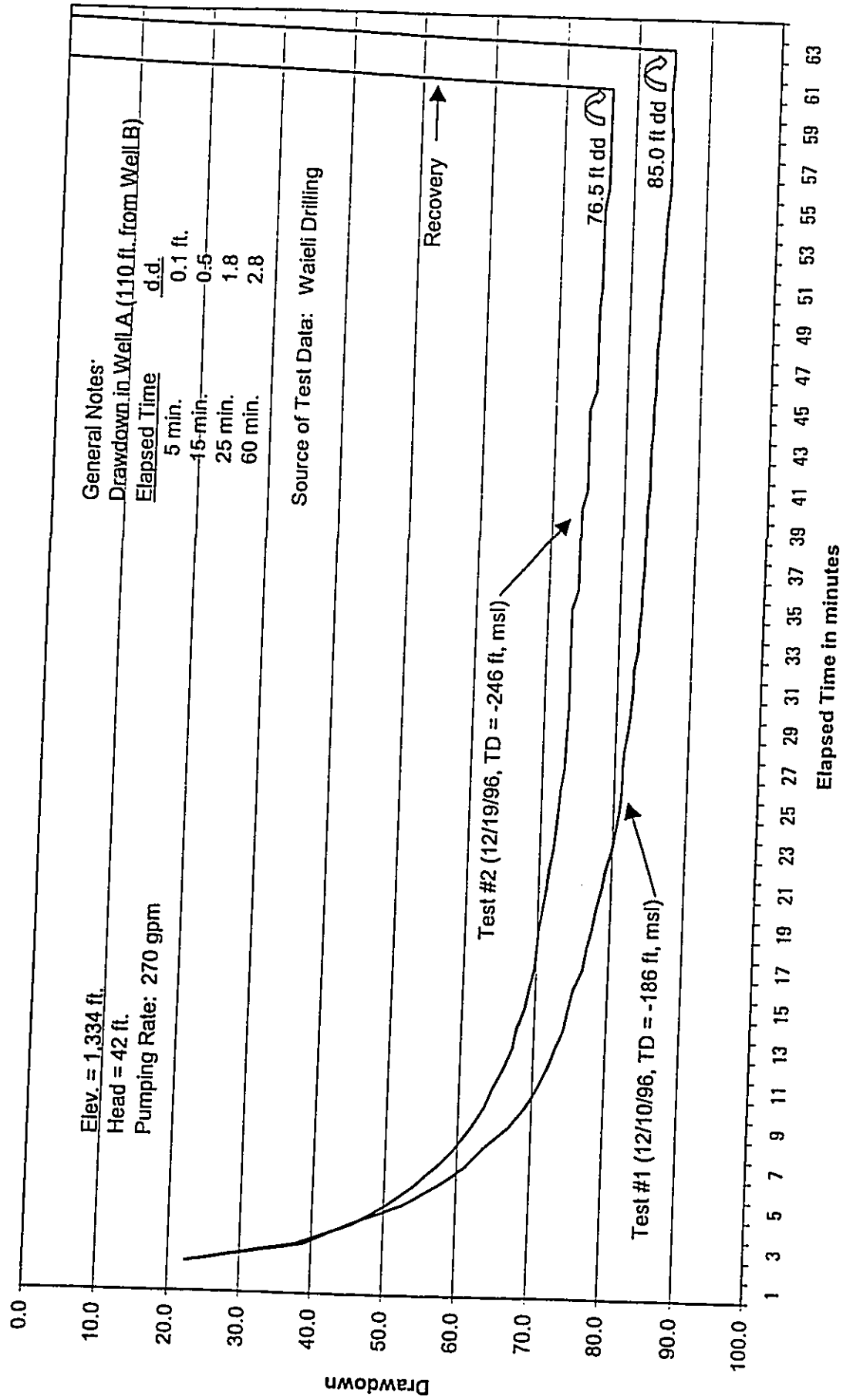


Figure 2

TITRATION-BASED SALINITY PROFILE
12" Pilot Hole, Honokaa Well B (6428-02)
Job No. G94CH10A, Hawaii

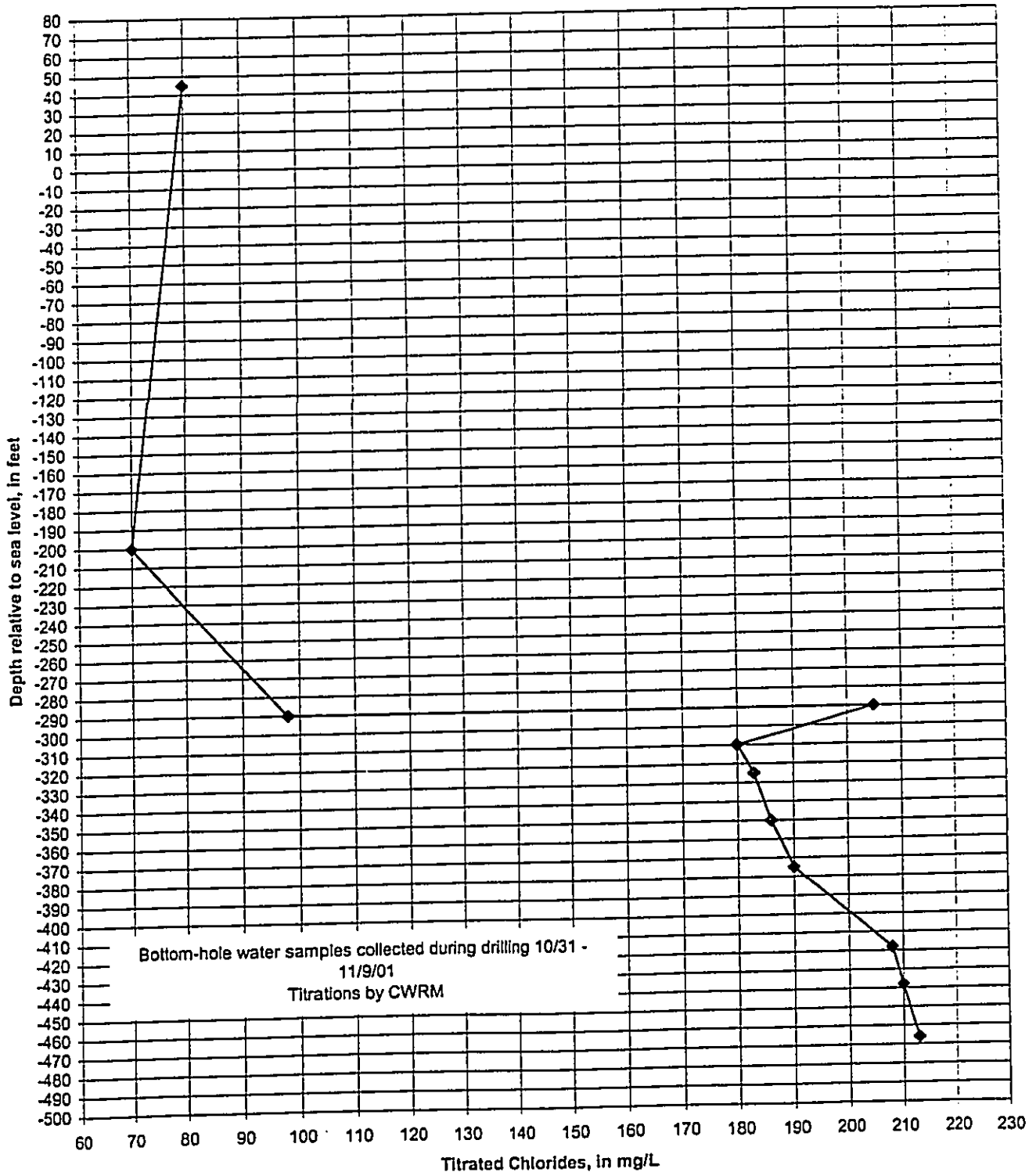


Figure 3

CONDUCTANCE-BASED SALINITY PROFILE
 12" Pilot Hole, Honokaa Well B (6428-02)
 Job No. G94CH10A, Hawaii

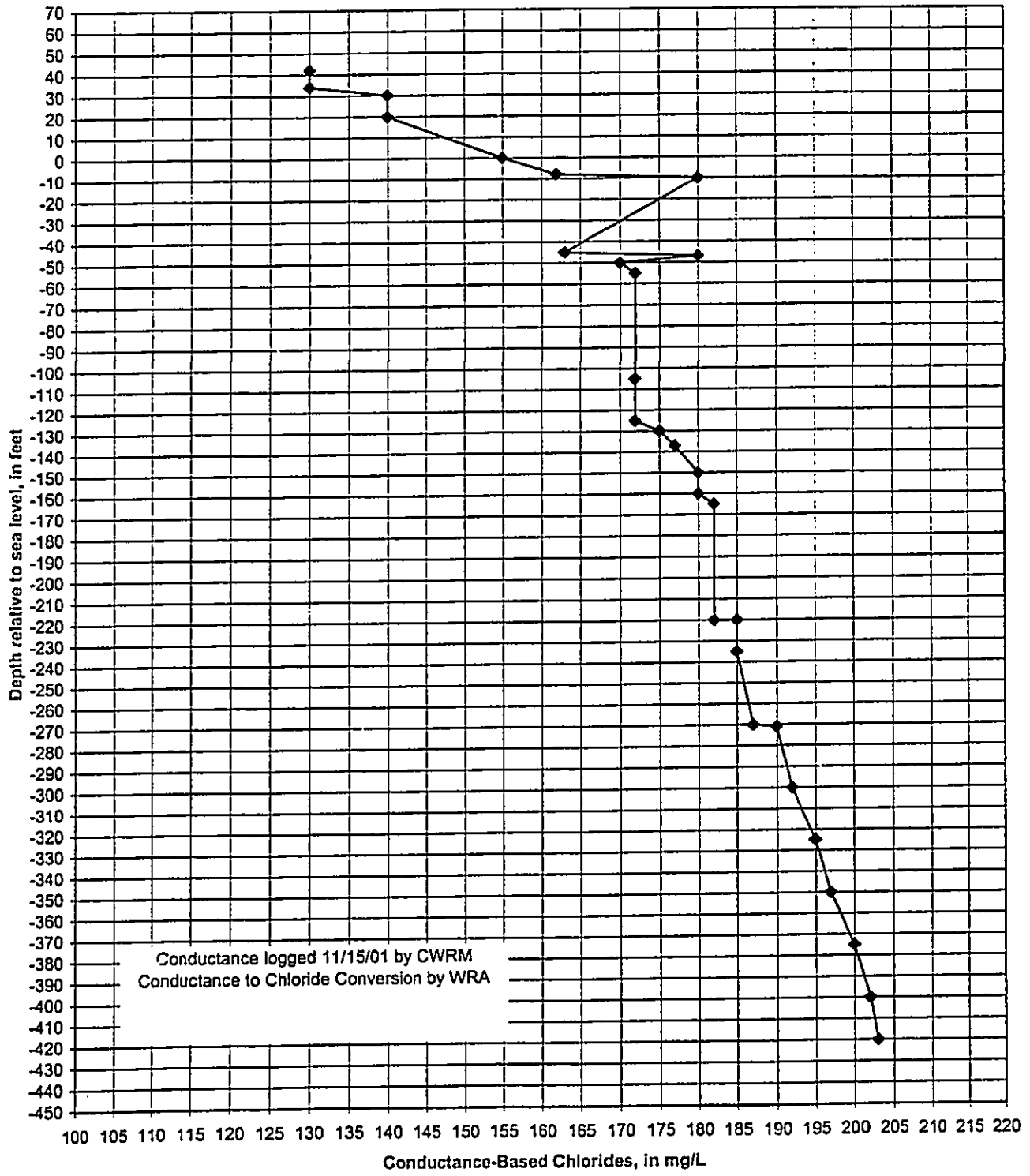


Figure 4

TEMPERATURE LOG
Honokaa Well B (6428-02)

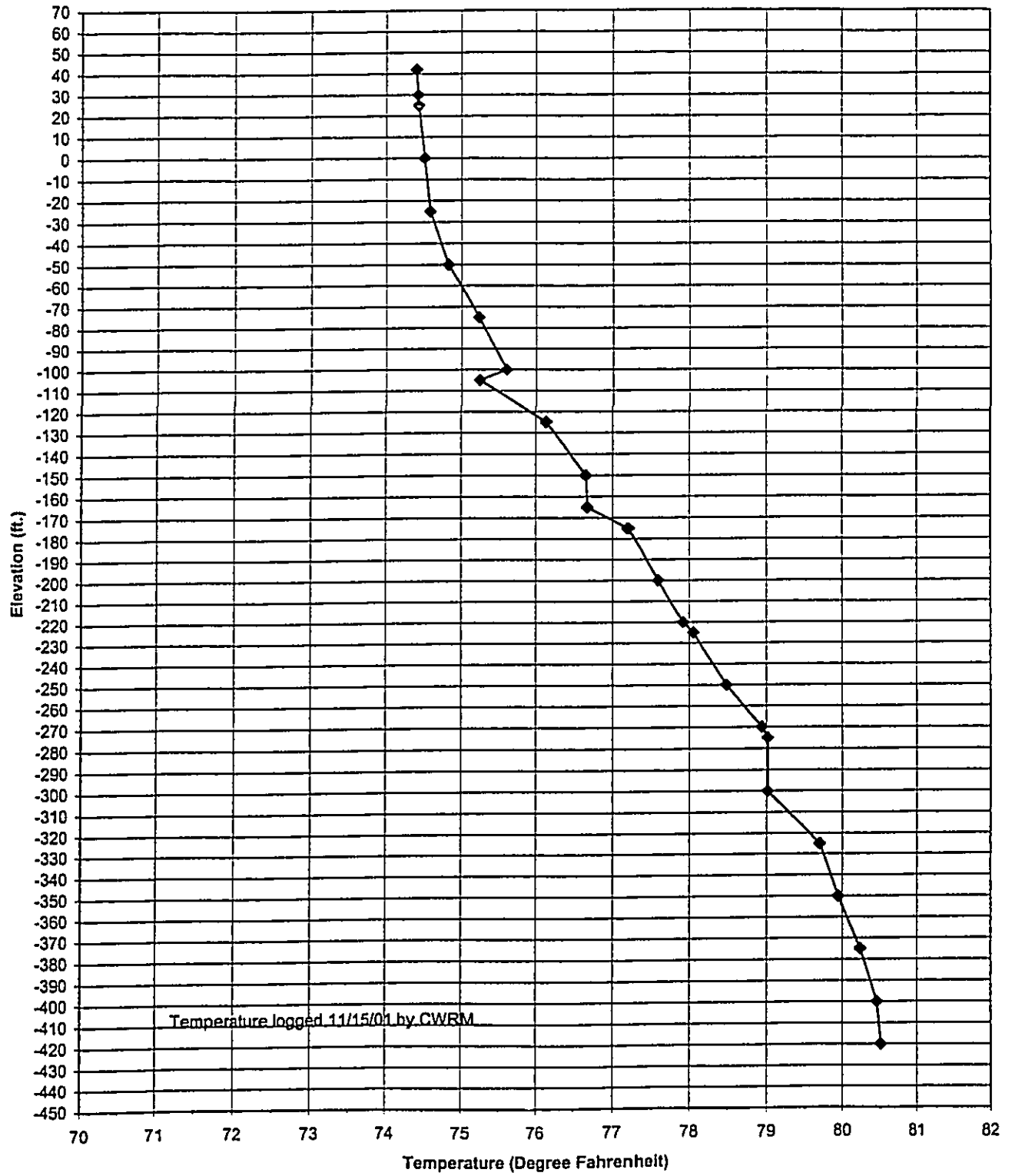
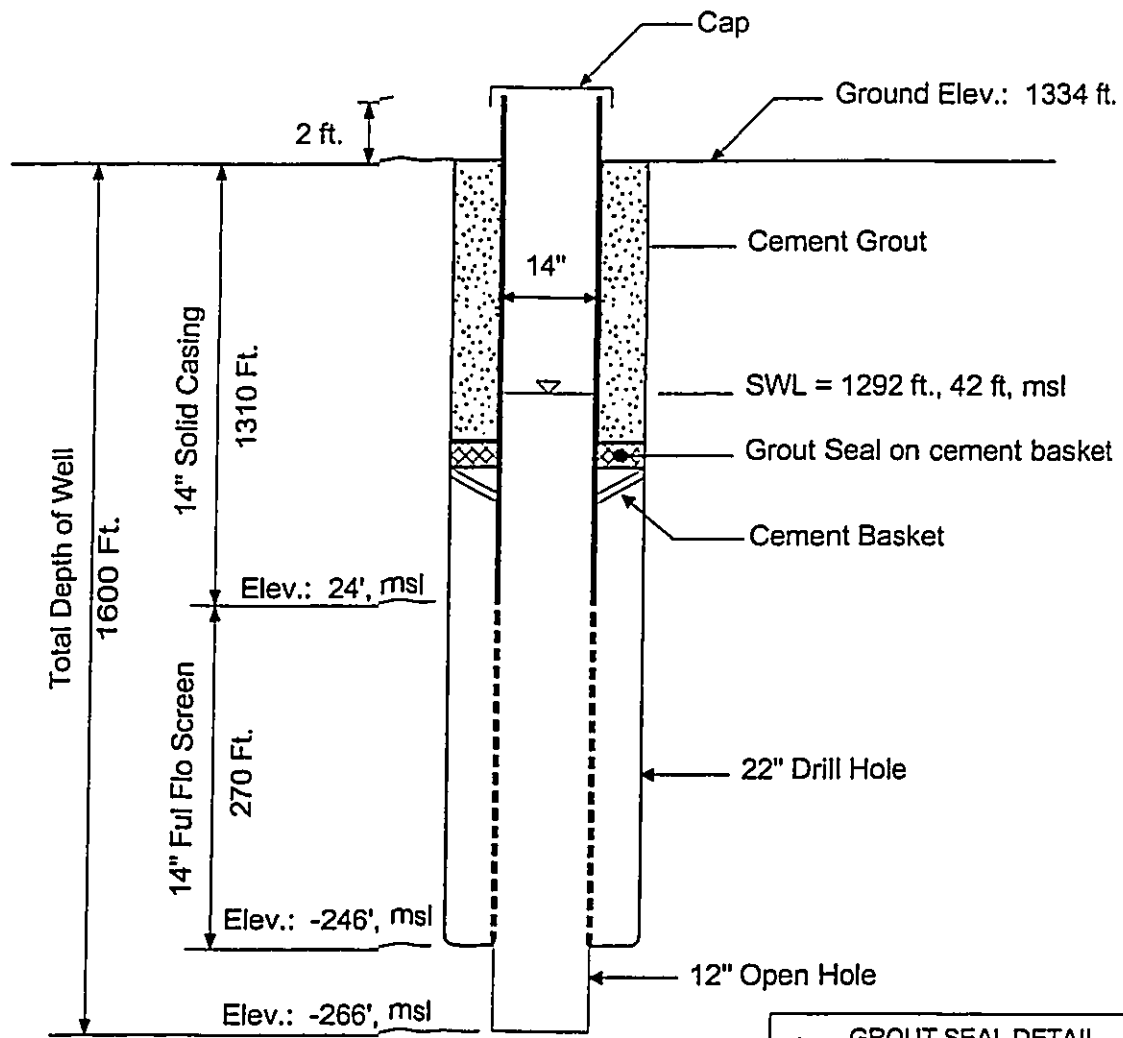


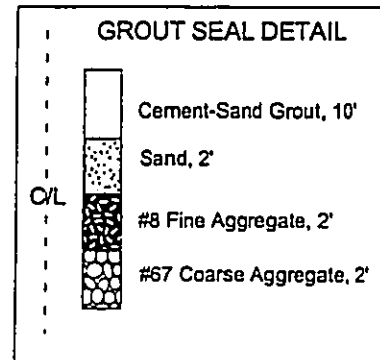
Figure 5

HONOKAA WELL B (6428-02)
Honokaa, Hawaii

As Built Section



NOT TO SCALE

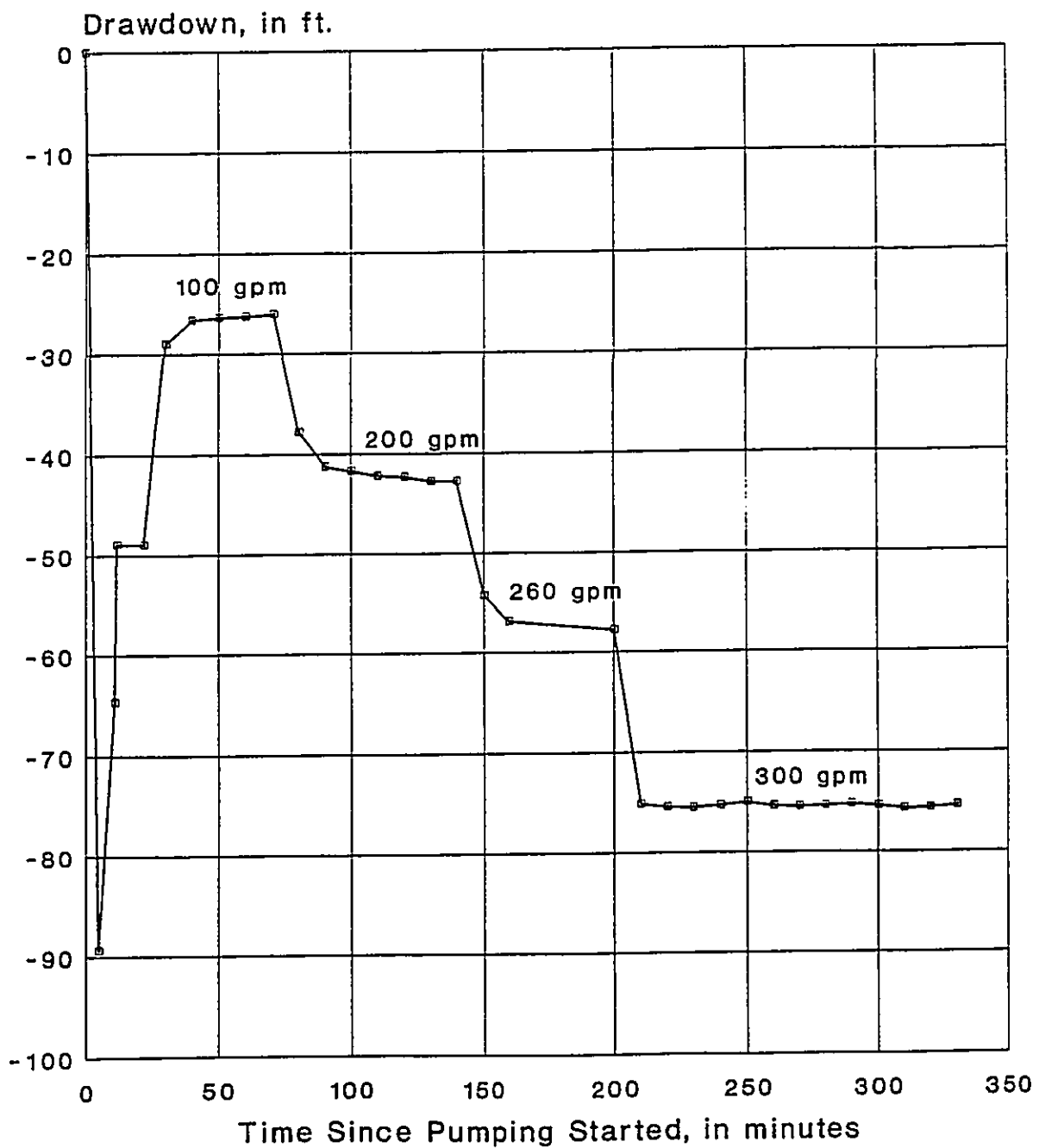


Water Resource Associates
136Asbuilt

Figure 6

STEP-DRAWDOWN CURVE

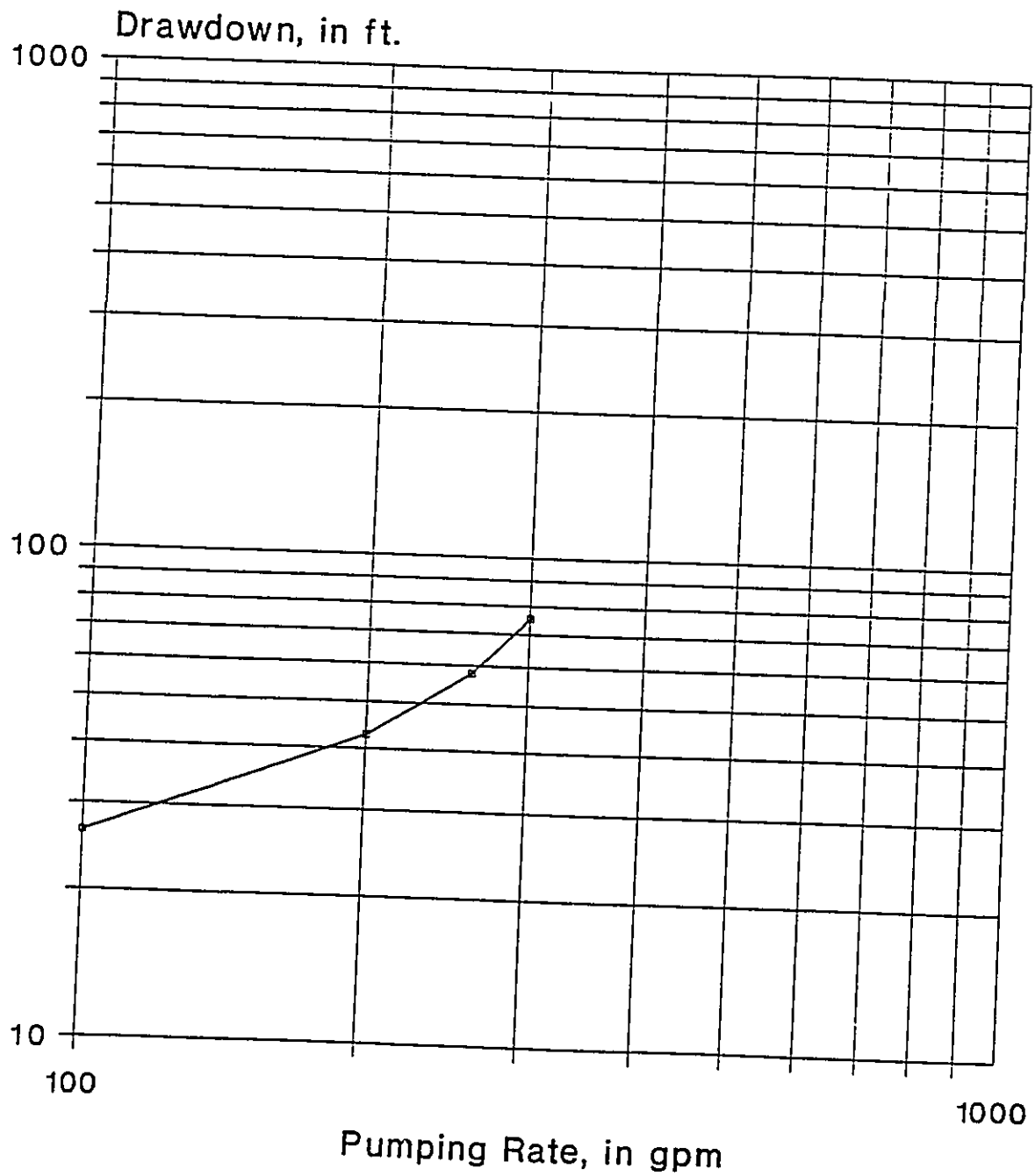
Honokaa Well B (6428-02), Hawaii
Date of Test: Sept. 4, 2002



Water Resource Associates
136\SDC1

Figure 7

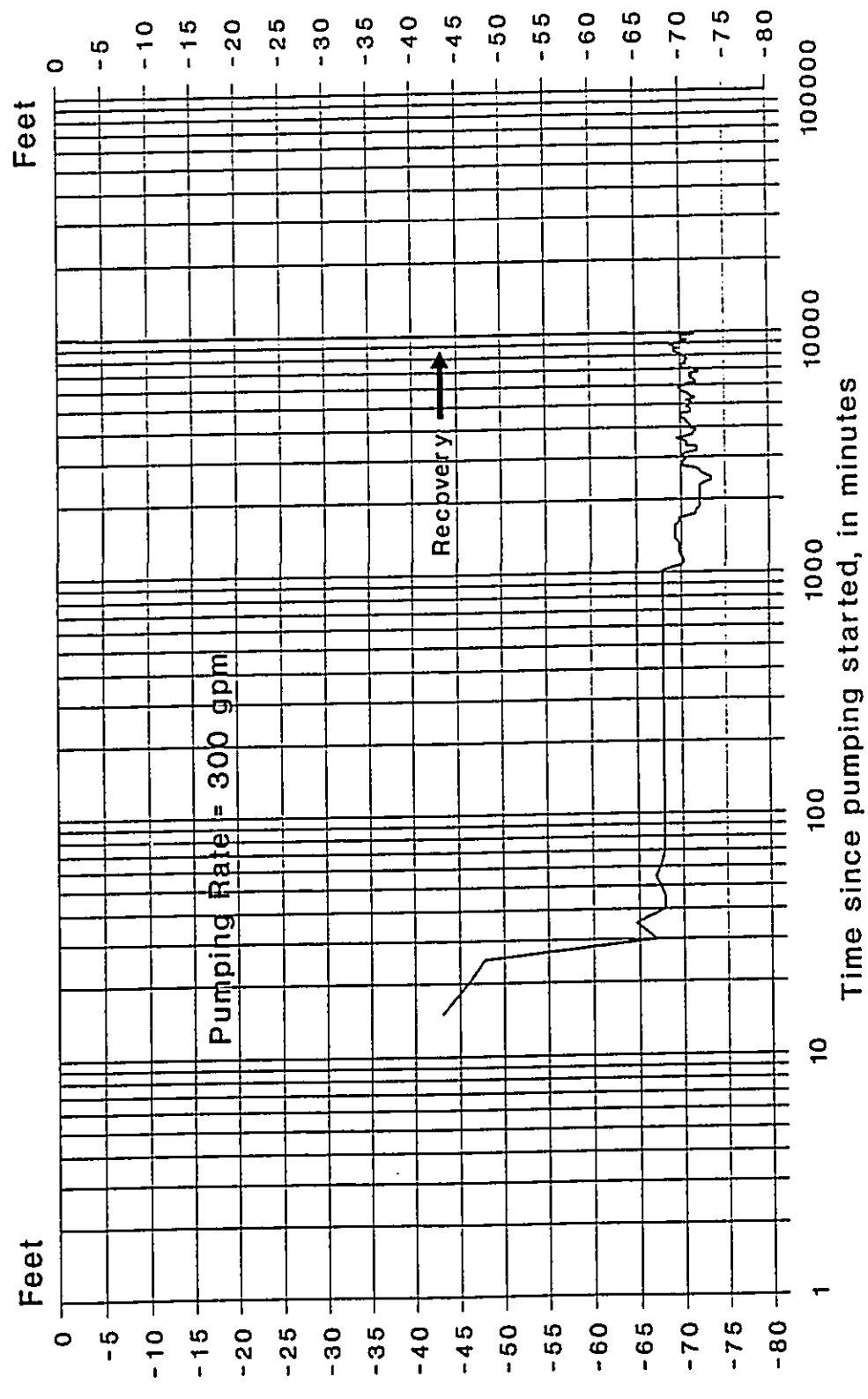
PUMPING RATE-vs-DRAWDOWN CURVE
Honokaa Well B (6428-02), Hawaii
Step Test 1: Sept 4, 2002, T.D.=1600 ft.



Water Resource Associates
136prdt

Figure 8

TIME-DRAWDOWN CURVE
Honokaa Well B (6428-02), Hawaii
C.R. Test: Sep. 30 - Oct. 7, 2002



Water Resource Associates
1367Bct

Figure 9

**WATER LEVEL IN HONOKAA WELL A (Logged @20 min. Intervals)
During 7-Day C.R. Test of Honokaa Well B @300 gpm**

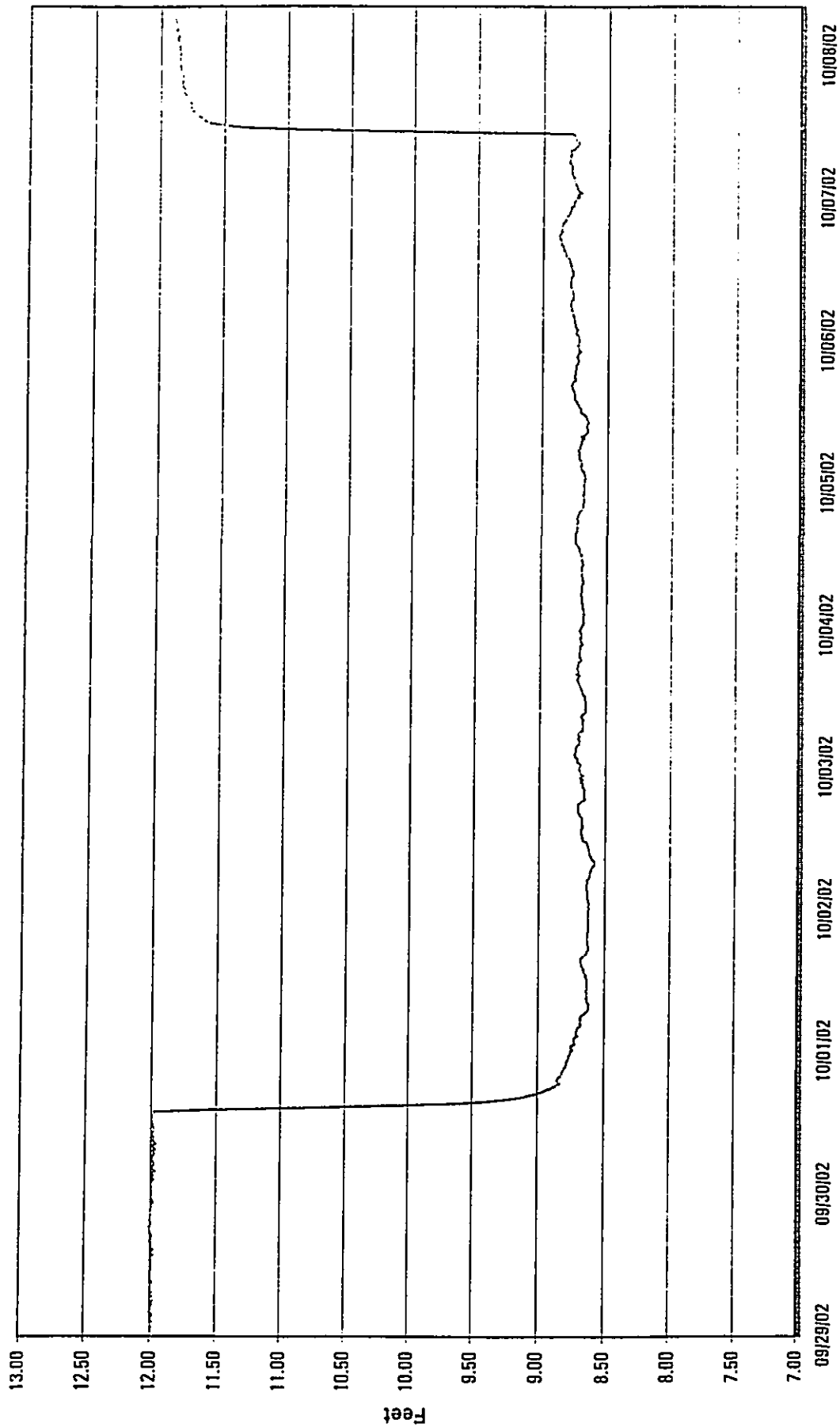


Figure 10

LOG OF DRILL CUTTINGS
 Honokaa Well B (6428-02)
 12" Pilot Hole by Beylik
 Gr. El. = 1334 ft.

<u>Depth Below Gr. Surface (feet)</u>	<u>Depth Below Sea Level (feet)</u>	
1575 - 1580	241 - 246	GRAY DENSE BASALT: With some reddish brn. Cuttings up to 1/2".
1580 - 1592	246 - 258	GRAY BASALT: Mixed with reddish brn pieces. Tiny spherical and non-spherical vesicles, some coated with white minerals. Cuttings up to 1/4" size.
1592 - 1602	258 - 268	Same as above, but cuttings up to 1/8" size.
1602 - 1612	268 - 278	GRAY BASALT: Same as 1580-1592. Cuttings up to 1/4" size.
1612 - 1622	278 - 288	GRAY BASALT: Same as 1602-1612.
1622 - 1632	288 - 298	GRAY BASALT: Same as 1602-1612.
1632 - 1642	298 - 308	GRAY DENSE BASALT: Some reddish brn pieces, some fine vesicles. Cuttings up to 1/4" size.
1642 - 1652	308 - 318	Same as above, but cuttings up to 1/8" size.
1652 - 1662	318 - 328	GRAY BASALT: Cuttings silt- to fine-sand size.
1662 - 1672	328 - 338	GRAY BASALT: Same as 1632-1652. Cuttings medium-sand size.
1672 - 1682	338 - 348	GRAY BASALT: Cuttings silt- to fine-sand size.
1682 - 1692	348 - 358	GRAY BASALT: Cuttings silt- to fine-sand size.
1692 - 1702	358 - 368	GRAY BASALT: Some reddish brn. One 1/4" piece cindery with small spherical vesicles. A few highly vesicular, pumice-like pieces. Cuttings fine-sand size.
1702 - 1712	368 - 378	GRAY BASALT: Mostly med. sand size.
1712 - 1722	378 - 388	GRAY BASALT: Mixed w/some brn-reddish brn pcs., some whitish minerals and non-spher. vesicles. <1/8" size.

Log of Drill Cuttings
 Honokaa Well B, 12" Pilot Hole

<u>Depth Below Gr.Surface (feet)</u>	<u>Depth Below Sea Level (feet)</u>	
1722 - 1732	388 - 398	GRAY BASALT: Same as above
1732 - 1742	398 - 408	(missing)
1742 - 1752	408 - 418	GRAY BASALT: Mixed w/some brn pcs, whitish minerals. Mostly med. sand size.
1752 - 1757	418 - 423	GRAY BASALT: Mixed w/brn pcs and whitish min., <1/8" size.
1757 - 1762	423 - 428	GRAY BASALT: Med. sand size.
1762 - 1772	428 - 438	GRAY BASALT: Coarse sand size.
1772 - 1782	438 - 448	GRAY BASALT: Fine sand size w/some pcs 1/8" size.
1782 - 1792	448 - 458	DARK GRAY-REDD BRN CINDERS(?): Some glassy pcs, mostly fine sand size.
1792 - 1800	458 - 466	GRAY BASALT: Some redd. brn and whitish pcs, fine sand size.

T.D.

STEP-DRAWDOWN TEST RECORD

Test No. 1
September 4, 2002

Well Name: Honokaa B
Project: DLNR

State Well No.: 6428-02
Island: Hawaii

DEPTH (Below Ground Surface):

14" Solid Csg: 1310' Perforated Csg: 1580'
Total Depth: 1580'
Depth to Water: 1292"

ELEVATIONS (Mean Sea Level):

Ground Surface: 1334 ft.
Top of Casing: _____ ft. Rotary Table: _____ ft.
Bot. of Solid Csg: 24', msl Bot. of Perf. Csg: -246', msl
Bot. of Well: -246', msl Static Water Level: 42', msl

*Remarks: Measured 10/18/01

TEST PUMP:

Type: Line Shaft Intake Elev: -91', msl

Manometer Pressure Gage Elect. Probe

DISCHARGE MEASUREMENT: Flowmeter Other _____

Begin Meter: 846275 gals x 100

PRESENT AT TEST: Dan Lum, Derrick Morreira

End Meter:

Elapsed Time (min.)	Date & Time	Pumping Rate (gpm)	Airline Reading (psi)	DTW Reading (feet)	Observed Drawdown (feet)	Sample No.	Chlorides (mg/L)	Temp. (°F)	Cond. (µmhos 25°C)
	9/4/02								
	9:40 am	0		1302.38					
		0	51.2						
		0	51.2	1302.38	0				
0	10:00	START PUMP - ADJUST RATE #1 to 100 gpm							
5	10:05		12.5		89.40				
11	10:11		23.2		64.68				
12	10:12		30.0		48.97				
22	10:22		30.0		48.97				
30	10:30	108		1331.40	29.02			76.5	400
40	10:40	105	40.5	1328.90	26.66			78.0	420
50	10:50	105	41.0	1328.79	26.41				
60	11:00	100	41.0	1328.69	26.31			79.5	440
70	11:10	100	40.5	1328.48	26.1	1		79.9	
		ADJUST RATE #2 to 200 gpm							
80	11:20	200	36.5	1340.18	37.8			79.9	430
90	11:30	200	34.0	1343.62	41.24			79.9	430
100	11:40	200	34.0	1344.11	41.73			79.0	420
110	11:50	200	33.9	1344.56	42.18			79.0	420
120	12:00 N	200	33.8	1344.68	42.30			79.0	430

Step-Drawdown Test Record (Cont'd)

Well Name: Honokaa B

State Well No. 6428-02

Test No. 1

Elapsed Time (min.)	Date & Time	Pumping Rate (gpm)	Airline Reading (psi)	DTW Reading (feet)	Observed Drawdown (feet)	Sample No.	Chlorides (mg/L)	Temp. (°F)	Cond. (µmhos 25°C)
	9/4/02								
130	12:10 pm	200	33.8	1345.16	42.78			79.0	420
140	12:20	200	33.5	1345.15	42.77			79.0	410
ADJUST RATE #3 to 270 gpm									
150	12:30	267	29.0	1356.66	54.28			79.0	420
160	12:40	262	28.0	1359.31	56.93			79.0	410
170	12:50	261	27.9	1359.99				78.9	410
180	1:00	260	27.9	1360.05				78.9	410
190	1:10	260	27.9	1359.90				78.9	410
200	1:20	260	27.9	1360.18	57.80	2	81		
ADJUST RATE #4 to 300 gpm									
210	1:30	300	20.5	1377.51	75.13				
220	1:40	301	20.5	1377.82	75.44				
230	1:50	301	20.5	1377.90	75.52				
240	2:00	303	20.5	1377.68	75.30				
250	2:10	298	20.5	1377.38	75.00				
260	2:20	305	20.5	1377.78	75.40				
270	2:30	305	20.5	1377.82	75.44				
280	2:40	304	20.5	1377.75	75.37				
290	2:50	305	20.5	1377.59	75.21				
300	3:00	304	20.5	1377.75	75.37				
310	3:10	300	20.5	1378.04	75.66				
320	3:20	300	20.5	1377.98	75.60				
330	3:30	300	20.5	1377.77	75.39				
STOP PUMP - RECOVERY									

CONSTANT RATE TEST RECORD

Test No. 1
September 30, 2002

Well Name Honokaa B
Project DLNR

State Well No. 6428-02
Island Hawaii

DEPTH (Below Ground Surface):

14" Solid Csg: 1310' Perforated Csg: 1580'

Total Depth: 1580'

Depth to Water: 1292' *

*Remarks: Measured on 10/18/01

ELEVATIONS (Mean Sea Level):

Ground Surface: 1334 ft.

Top of Casing: _____ ft. Rotary Table: _____ ft.

Bot. of Solid Csg: 24' msl Bot. of Perf. Csg: -246' msl

Bot. of Well: -246' msl Static Water Level: 42' msl

TEST PUMP:

Type: Line shaft Intake Elev: -91' msl

DRAWDOWN MEASUREMENT:

Manometer Pressure Gage Elect. Probe

DISCHARGE MEASUREMENT: Flowmeter Other _____

Begin Meter: 84,714,200 gals.

End Meter: 87,699,600 gals.

PRESENT AT TEST: Dan Lum, Derrick Moreira

Avg. Rate - 300 gpm

Elapsed Time (min.)	Date & Time	Pumping Rate (gpm)	Airline Reading (psi)	DTW Reading (feet)	Observed Drawdown (feet)	Sample No.	Chlorides (mg/L)	Temp. (°F)	Cond. (µmhos 25°C)
	9/30/02								
-30		0	50.0		0	--	--	--	--
-20		0		1305.40	0	--	--	--	--
-5		0	48.60		0	--	--	--	--
0	2:00 pm		START PUMP - ADJUST TO CONSTANT RATE 300 gpm						
5									
10									
15	2:15	300	30.00		42.97				
20	2:20	292	28.70		45.97				
25	2:25		27.90		47.82				
30	2:30	300	19.60		66.99				
35	2:35	300	20.60	(pH = 8.2)	64.68				430
40	2:40	300	19.20		67.91				410
45	2:45	300	19.20		67.91				410
50	2:50	300	19.40		67.45				
55	2:55	300	19.60		66.99				410
60	3:00	300	19.40		67.45	1	100		410*/432**
70	3:10	300	19.20		67.91				
80	3:20	300	19.20		67.91				
90	3:30 pm	300	19.20		67.91				

Constant Rate Test Record (Cont'd)

Well Name: Honokaa B State Well No. 6428-02

Test No. 1

Elapsed Time (min.)	Date & Time	Pumping Rate (gpm)	Airline Reading (psi)	DTW Reading (feet)	Observed Drawdown (feet)	Sample No.	Chlorides (mg/L)	Temp. (°F)	Cond. (µmhos 25°C)
	9/30/02								
105	3:45 pm	300	19.20		67.91				
120	4:00	300	19.20		67.91				430
150	4:30	300	19.20		67.91				
180	5:00	300	19.20		67.91				430
210	5:30	300	19.20		67.91				430
240	6:00	300	19.20		67.91				430
270	6:30	300	19.20		67.91				
300	7:00	300	19.20		67.91				420
330	7:30	300	19.20		67.91				430
360	8:00	300	19.20		67.91	2	97		420*/436**
390	8:30	300	19.20		67.91				430
420	9:00	300	19.20		67.91				430
450	9:30	300	19.20		67.91				420
480	10:00	300	19.20		67.91				430
510	10:30	300	19.20		67.91				430
540	11:00	300	19.20		67.91				430
570	11:30	300	19.20		67.91				430
	10/1/02								
630	12:30 am	300	19.20		67.91				440
660	1:00	300	19.20		67.91				440
720	2:00	300	19.20		67.91				430
780	3:00	300	19.20		67.91				440
840	4:00	300	19.20		67.91				440
900	5:00	300	19.20		67.91				430
960	6:00	300	19.20		67.91				440
1020	7:00	300	19.20		67.91				440
1080	8:00	300	18.20		70.22	3	94		440*/420**
1140	9:00	300	18.20		70.22				430
1200	10:00	300	18.40		69.76				440
1260	11:00 am	300	18.40		69.76				430

Constant Rate Test Record (Cont'd)

Well Name: Honokaa B State Well No. 6428-02

Test No. 1

Elapsed Time (min.)	Date & Time	Pumping Rate (gpm)	Airline Reading (psi)	DTW Reading (feet)	Observed Drawdown (feet)	Sample No.	Chlorides (mg/L)	Temp. (°F)	Cond. (µmhos 25°C)
	10/1/02								
1320	12:00 N	300	18.40		69.76				430
1380	1:00 pm	300	18.60		69.30				410
1440	2:00	300	18.60		69.30				430
1500	3:00	300	18.60		69.30				410
1560	4:00	300	18.60		69.30				430
1620	5:00	300	18.40		69.76				430
1680	6:00	300	18.40		69.76				420
1740	7:00	300	17.60		71.61				440
1800	8:00	300	17.60		71.61	4	92		440*/429**
1860	9:00	300	17.40		72.07				430
1920	10:00	300	17.40		72.07				440
1980	11:00	300	17.40		72.07				440
2040	12:00 M	300	17.40		72.07				430
	10/2/02								
2100	1:00 am	300	17.40		72.07				430
2160	2:00	300	17.40		72.07				430
2220	3:00	300	17.40		72.07				440
2280	4:00	300	17.40		72.07				440
2340	5:00	300	17.20		72.53				440
2400	6:00	300	16.80		73.46				450
2460	7:00	300	16.80		73.46				450
2520	8:00	300	17.00	(pH = 8.3)	73.00	5	92	76	450*/411**
2580	9:00	300	17.30		72.30			77	440
2640	10:00	300	17.40		72.07				440
2700	11:00	300	17.60		71.61				430
2760	12:00 N	300	18.20		70.22				430
2820	1:00 pm	300	18.20		70.22				420
2880	2:00	300	18.20		70.22				430
2940	3:00	300	18.00		70.69				420
3000	4:00 pm	300	18.20		70.22				420

Constant Rate Test Record (Cont'd)

Test No. 1

Well Name: Honokaa B State Well No. 6428-02

Elapsed Time (min.)	Date & Time	Pumping Rate (gpm)	Airline Reading (psi)	DTW Reading (feet)	Observed Drawdown (feet)	Sample No.	Chlorides (mg/L)	Temp. (°F)	Cond. (µmhos 25°C)
	10/2/02								
3060	5:00 pm	300	18.20		70.22				420
3120	6:00	300	18.00		70.69				430
3180	7:00	300	17.50		71.84				430
3240	8:00	300	17.50		71.84	6	92		430* 430**
3300	9:00	300	17.50		71.84				440
3360	10:00	300	18.00		70.69				440
3420	11:00	300	18.00		70.69				430
3480	12:00 M	300	18.00		70.69				440
	10/3/02								
3540	1:00 am	300	18.20		70.22				440
3600	2:00	300	18.50		69.53				440
3660	3:00	300	18.00		70.69				430
3720	4:00	300	17.70		71.38				440
3780	5:00	300	17.70		71.38				440
3840	6:00	300	17.60		71.61				440
3900	7:00	300	17.50		71.84				450
3960	8:00	300	17.80		71.15	7	94		440* 427**
4020	9:00	300	17.80		71.15				440
4080	10:00	300	17.80		71.15				420
4140	11:00	300	17.90		70.92				440
4200	12:00 N	300	18.00		70.69				420
4260	1:00 pm	300	18.00		70.69				420
4320	2:00	300	18.10		70.46				410
4380	3:00	300	18.20		70.22				420
4440	4:00	300	18.30		70.00				420
4500	5:00	300	18.30		70.00				430
4560	6:00	300	18.20		70.22				420
4620	7:00	300	17.80		71.15				420
4680	8:00	300	17.80		71.15	8	93		440* 423**
4740	9:00 pm	300	17.80		71.15				430

Constant Rate Test Record (Cont'd)

Test No. 1

Well Name: Honokaa B State Well No. 6428-02

Elapsed Time (min.)	Date & Time	Pumping Rate (gpm)	Airline Reading (psi)	DTW Reading (feet)	Observed Drawdown (feet)	Sample No.	Chlorides (mg/L)	Temp. (°F)	Cond. (µmhos 25°C)
	10/3/02								
4800	10:00 pm	300	17.80		71.15				430
4860	11:00	300	18.00		70.69				440
4920	12:00 M	300	17.90		70.92				430
	10/4/02								
4980	1:00 am	300	17.80		71.15				440
5040	2:00	300	17.80		71.15				430
5100	3:00	300	17.70		71.38				440
5160	4:00	300	18.00		70.69				440
5220	5:00	300	17.90		70.92				440
5280	6:00		17.60		71.61				440
5340	7:00	300	17.60		71.61				440
5400	8:00	300	17.80		71.15	9	83		440*/393**
5460	9:00	300	17.90		70.92				430
5520	10:00	300	17.90		70.92				430
5580	11:00	300	18.00		70.69				430
5640	12:00 N	300	18.20		70.22				430
5700	1:00 pm	300	18.20		70.22				430
5760	2:00	300	18.30		70.00				420
5820	3:00	300	18.40		69.76				430
5880	4:00	300	18.40		69.76				420
5940	5:00	300	18.20		70.22				430
6000	6:00	300	18.00		70.69				430
6060	7:00	300	18.00		70.69				430
6120	8:00	300	17.80		71.15	10	92		440*/424**
6180	9:00	300	17.50		71.84				440
6240	10:00	300	17.60		71.61				440
6300	11:00	300	17.60		71.61				440
6360	12:00 M	300	17.70		71.38				440
	10/5/02								
6420	1:00 am	300	17.80		71.15				430

Constant Rate Test Record (Cont'd)

Well Name: Honokaa B State Well No. 6428-02

Test No. 1

Elapsed Time (min.)	Date & Time	Pumping Rate (gpm)	Airline Reading (psi)	DTW Reading (feet)	Observed Drawdown (feet)	Sample No.	Chlorides (mg/L)	Temp. (°F)	Cond. (µmhos 25°C)
	10/5/02								
6480	2:00 am	300	17.80		71.15				430
6540	3:00	300	17.70 ?		71.38				440
6600	4:00	300	17.80		71.15				440
6660	5:00	300	17.80		71.15				450
6720	6:00	300	17.80		71.15				440
6780	7:00	300	17.40		72.07				440
6840	8:00	300	17.60		71.61	11	91		440*1423**
6900	9:00	300	17.40		72.07				440
6960	10:00	300	17.40		72.07				440
7020	11:00	300	17.50		71.84				440
7080	12:00 N	300	18.20		70.22				430
7140	1:00 pm	300	18.20		70.22				440
7200	2:00	300	18.20		70.22				440
7260	3:00	300	18.30		70.00				440
7320	4:00	300	18.30		70.00				440
7380	5:00	300	18.00		70.69				440
7440	6:00	300	18.00		70.69				430
7500	7:00	300	18.00		70.69				430
7560	8:00	300	18.10		70.46	12	93		440*1431**
7620	9:00	300	18.00		70.69				440
7680	10:00	300	17.90		70.92				440
7740	11:00	300	18.00		70.69				440
7800	12:00 M	300	18.00		70.69				440
	10/6/02								
7860	1:00 am	300	18.00		70.69				440
7920	2:00	300	18.10		70.46				450
7980	3:00	300	18.20		70.22				450
8040	4:00	300	18.20		70.22				450
8100	5:00	300	18.30		70.00				450
8160	6:00 am	300	18.40		69.76				450

Constant Rate Test Record (Cont'd)

Well Name: Honokaa B State Well No. 6428-02

Test No. 1

Elapsed Time (min.)	Date & Time	Pumping Rate (gpm)	Airline Reading (psi)	DTW Reading (feet)	Observed Drawdown (feet)	Sample No.	Chlorides (mg/L)	Temp. (°F)	Cond. (µmhos 25°C)
	10/6/02								
8220	7:00 am	300	18.40		69.76				450
8280	8:00	300	18.60		69.30	13	90		440* 416**
8340	9:00	300	18.60		69.30				440
8400	10:00	300	18.60		69.30				440
8460	11:00	300	18.60		69.30				440
8520	12:00 N	300	18.40		69.76				440
8580	1:00 pm	300	18.40		69.76				440
8640	2:00	300	18.60		69.30				440
8700	3:00	300	18.60		69.30				440
8760	4:00	300	18.60		69.30				440
8820	5:00	300	18.80		68.84				440
8880	6:00	300	18.80		68.84				440
8940	7:00	300	18.60		69.30				450
9000	8:00	300	18.40		69.76	14	94		450* 421**
9060	9:00	300	18.30		70.00				450
9120	10:00	300	18.20		70.22				440
9180	11:00	300	18.10		70.46				440
9240	12:00 M	300	17.90		70.92				430
	10/7/02								
9300	1:00 am	300	18.00		70.69				440
9360	2:00	300	18.10		70.46				440
9420	3:00	300	18.20		70.22				450
9480	4:00	300	18.20		70.22				450
9540	5:00	300	18.20		70.22				450
9600	6:00	300	18.30		70.00				450
9660	7:00	300	18.20		70.22				450
9720	8:00	300	17.90		70.92	15	88		440* 419**
9780	9:00	300	17.60		71.61				440
9840	10:00	300	17.90		70.92				450
9895	10:55 am	300	18.20		70.22				440

Constant Rate Test Record (Cont'd)

Well Name: Honokaa B State Well No. 6428-02

Test No. 1

Elapsed Time (min.)	Date & Time	Pumping Rate (gpm)	Airline Reading (psi)	DTW Reading (feet)	Observed Drawdown (feet)	Sample No.	Chlorides (mg/L)	Temp. (°F)	Cond. (µmhos 25°C)
	10/7/02								
9900	11:00 am	STOP PUMP - RECOVERY							
9905	11:05	0	26.00		68.38				
9910	11:10		30.50		41.81				
9915	11:15		33.50		34.88				
9920	11:20		34.90		31.65				
9925	11:25		38.10		24.26				
9930	11:30		40.00		19.87				
9935	11:35		43.00		12.94				
9940	11:40		44.00		10.63				
9945	11:45		45.90		6.24				
9950	11:50		47.10		3.46				
9955	11:55		48.00		1.39				
9960	12:00 N		48.30		0.69				
9965	12:05 pm		48.30		0.69				
9970	12:10		48.30		0.69				
9975	12:15		48.30		0.69				
9980	12:20		48.30		0.69				
9985	12:25		48.30		0.69				
10005	12:50		48.40		0.46				
10020	1:05		48.40		0.46				
10045	1:30		48.50		0.23				
10105	2:30		48.50		0.23				
10135	3:00 pm		48.50		0.23				
	10/8/02								
11155	8:00 am		48.50		0.23				



Food Quality Lab

3375 Koapaka St.
Suite G-314
Honolulu, Hawaii 96819
Phone (808) 535-6066
Fax (808) 535-6069

For: Water Resource Associates
1188 Bishop St. #1708
Honolulu, HI 96813
Attn: Dan Lum

Case No. 2
Received: 10-02-02 @ 14:13
Analyzed: 10-02-02 @ 14:30
Completed: 10-06-02 @ 13:30

Lab No.	Sample	Total Coliform MPN/100mL	Fecal Coliform MPN/100mL			
2	Water Sample Honokaa Well B 10-02-02 09:40 Sampled by: Dan Lum Methods: SMWW 20 Total Coliform: 9221 B, MDL= 2/100ml Fecal Coliform: 9221 E, MDL= 2/100 mL Analyzed by: Becky Boatman	< 2	< 2			

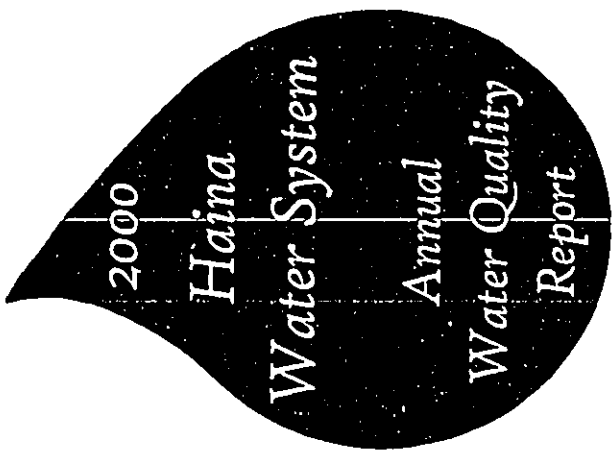
Approved by:

W. M. Linder
10-10-02

HONOKAA WELL "B" PRODUCTION WELL
ENVIRONMENTAL ASSESSMENT

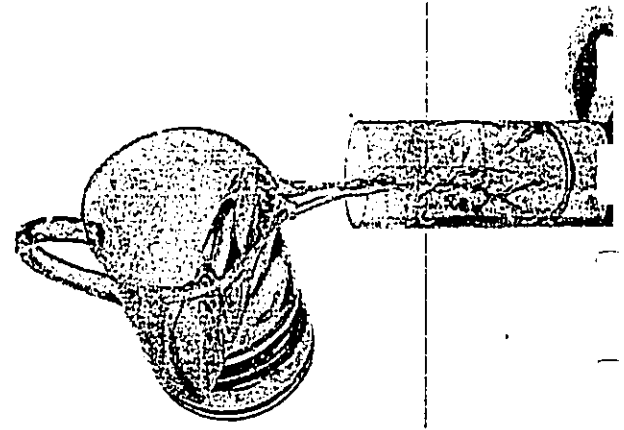
APPENDIX 4

ANNUAL WATER QUALITY REPORTS,
HAINA SYSTEM, YEARS 2000 AND 2001



County of Hawaii Department of Water Supply

Department of Water Supply
345 Kekuanaoa Street, Suite #20
Hilo, Hawaii 96720



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... *Water brings progress...*

Yes it is. Last year, as in years past, your tap water met all U.S. Environmental Protection Agency (EPA) and State drinking water health standards. The Department of Water Supply vigilantly safeguards its water supplies and once again we are proud to report that your system has never violated a maximum contaminant level or any other water quality standard.

Why are there contaminants in my drinking water?

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline 1-(800) 426-4791. If you have any questions regarding this Water Quality Report, call Keith Okamoto, P.E., at 961-8670.

Do I need to take special precautions?

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline at 1-(800) 426-4791.

How can I get involved?

The Water Board meets the fourth Tuesday of every month. Call for the time and location of the meeting.

You Can Contact Us at the Following Numbers:

Administration/Finance/General.....	(808) 961-8050
Billing/Customer Service.....	(808) 961-8060
Engineering.....	(808) 961-8070
Emergencies & Field Operations.....	(808) 961-8790
Water Quality.....	(808) 961-8670

NO COPY RETURNED

Yes it is. Last year, as in years past, your tap water met all U.S. Environmental Protection Agency (EPA) and State drinking water health standards. The Department of Water Supply vigilantly safeguards its water supplies and once again we are proud to report that your system has never violated a maximum contaminant level or any other water quality standard.

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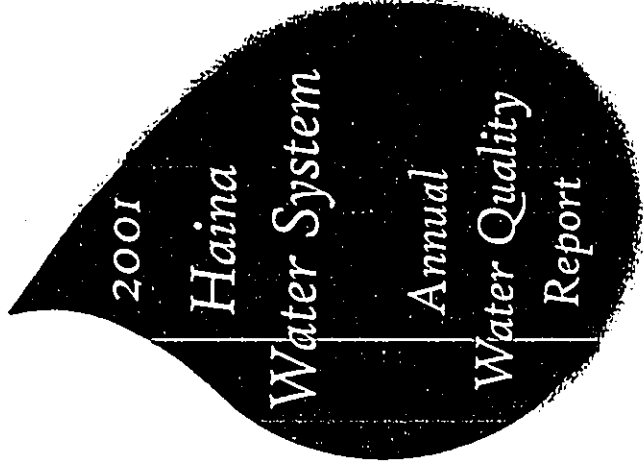
How can I get involved?

The Water Board meets the fourth Tuesday of every month. Call for the time and location of the meeting.

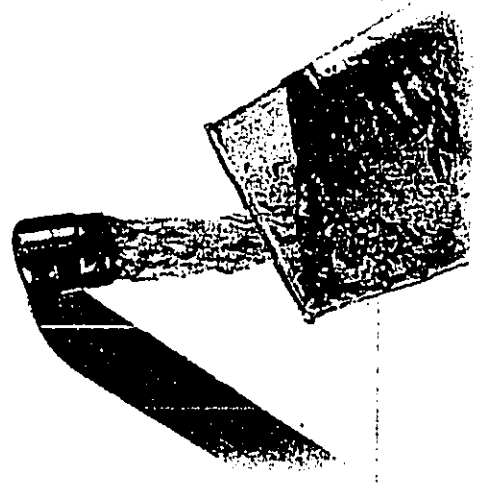
You Can Contact Us at the Following Numbers:

Administration/Finance/General	(808) 961-8050
Billing/Customer Service	(808) 961-8060
Engineering	(808) 961-8070
Emergencies & Field Operations	(808) 961-8790
Water Quality	(808) 961-8670

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County of Hawaii
**Department of
Water Supply**



.. Water brings progress...

Department of Water Supply
745 Kekuaaoa Street, Suite #20
Hilo, Hawaii 96720



The table below lists the drinking water contaminants that we detected during the calendar year of this report. The presence of contaminants in the water does not necessarily indicate that the water poses a health risk. Unless otherwise noted, the data presented in this table is from testing done in the calendar year of the report. The EPA or the State requires us to monitor for certain contaminants less than once per year because the concentrations of these contaminants do not change frequently. Some of our data, though representative, are more than one year old.

Regulated Contaminants		Haina Well	
Contaminant	MCLG	Maximum Contaminant Level Goal (MCLG)	Violation
Radioactive Contaminants			
*EPA considers 50 pCi/l to be the level of concern for beta particles.			
Inorganic Contaminants			
Nitrate (ppm)	10	0.82	0.82 - 0.82
Organic Contaminants			
Atrazine (ppb)	3	0.285	0.24 - 0.31

Lead and Copper Rule Compliance		Haina Water System	
Contaminant	AL	MCLG	Found
Copper (ppm)	1.3	0.05	0.15
*Typical Source of Contaminant: Corrosion of household plumbing systems, natural deposits, leaching from wood preservatives.			

Key definitions of terms used in this report

- MCLG** = Maximum Contaminant Level Goal. The level of a contaminant in drinking water below which there is no known or expected risk for health. MCLGs allow for a margin of safety.
- MCL** = Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
- ppm** = Parts per million. One ppm corresponds to a single penny in \$10,000 or about one minute in two years.
- ppb** = Parts per billion. One ppb corresponds to a single penny in \$10,000,000 or about one minute in two thousand years.
- pCi/l** = Picocuries per liter.
- AL** = Action Level. The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.
- n/a** = Not applicable.

Where does my water come from?

The only source of water for the Haina Water System is the Haina Well (see map for location), which is a groundwater source.

Sources of drinking water

- The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.
- Contaminants that may be present in source water include:
- Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
 - Inorganic contaminants, such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
 - Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.
 - Organic chemical contaminants, including synthetic and volatile organic chemicals, which are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.
 - Radioactive contaminants, which can be naturally-occurring or be the result of oil and gas production and mining activities.
- In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

