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DEPARTMENT OF WATER SUPPLY

COUNTY OF MAUI

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OFFICE OF ENVIRONMENTAL
QUALITY CONTROL

November 9, 1999

Ms. Genevieve Salmonson
Director
State of Hawaii
Office of Environmental Quality Control
235 South Beratania Street, Suite 702
Honolulu, Hawaii 96813

RE: FINDING OF NO SIGNIFICANT IMPACT (FONSI) FOR KANOA WELL
NOS. 1 AND 2, TMK: 3-2-001:003 POR, WAIHEE, MAUI, HAWAII

Dear Ms. Salmonson:

The Department of Water Supply has reviewed the comments received during the 30-day public comment period, which began on September 23, 1999. The agency has determined that this project will not have significant environmental effects and has issued a FONSI. Please publish this notice in the November 23, 1999, OEQC Environmental Notice.

We have enclosed a completed OEQC Publication Form and four copies of the final EA. Should you have any questions, please call our Engineering Division at 808-270-7835, or Mr. Rory Frampton of Chris Hart & Partners at 808-242-1955.

Sincerely,

David R. Craddick
Director

Cc: Mr. Herbert Kogasaka, DWS Engineering Div.
Mr. Carl Takumi, Takumi Engineering, Inc.
Mr. Rory Frampton, Chris Hart & Partners

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1999-11-23-MA-PEA-Kanoa Well
Nos. 1 and 2

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FINAL
ENVIRONMENTAL ASSESSMENT

~~North Waihee Water Source Development~~

Kanoa Well Nos. 1 and 2

(Project No. 97-023)

Waihee, Maui, Hawaii
TMK 3-2-01:por.3



NOVEMBER 1999

FINAL ENVIRONMENTAL ASSESSMENT

North Waihee Water Source Development Kanoa Well Nos.1 & 2 (Project No. 97-023)

Waihee, Maui, Hawaii
TMK 3-2-01:por.3

Prepared for:

County of Maui
Department of Water Supply
200 South High Street
Wailuku, Maui, Hawaii 96793

Engineering Consultant:

C. Takumi Engineering, Inc.
18 Central Avenue
Wailuku, Maui, Hawaii 96793

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NOVEMBER 1999

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I. INTRODUCTION

A. IDENTIFICATION OF THE PROPOSING/ACCEPTING AUTHORITY AND CONSULTANTS

Proposing Agency/Accepting Authority:

County of Maui
Department of Water Supply
200 South High Street
Wailuku, Maui, Hawaii 96793

Engineering Consultant:

C. Takumi Engineering, Inc.
18 Central Avenue
Wailuku, Hawaii 96793

Planning Consultant:

Chris Hart & Partners
Landscape Architecture and Planning
1955 Main Street, Suite 200
Wailuku, Hawaii 96793

B. OVERVIEW OF THE REQUEST

The County of Maui Department of Water Supply (DWS) is proposing the development of two wells in Waihee, Maui, Hawaii (TMK 3-2-01: por. 03) (See Figure 1 and 2). The project will involve the well development and pump installation for Kanoa Well Nos. 1 and 2 (previously known as Waihee Well Nos. 4 and 3, respectively).

DWS prepared and processed a Final Environmental Assessment (EA) for the Waihee Wells and Transmission line in March 1994 (Michael T. Munekiyo Consulting, 1994). The 1994 Final EA document examined the activation of Waihee Well Nos. 1 and 2, installation of a new 500,000-gallon water tank, construction of approximately 4.26 miles of underground transmission line, and the drilling of Kupaa Well No. 1 and Kanoa Well No. 1. (This project is now collectively referred to as the North Waihee Water Source Project.) The particular focus of the 1994 Final EA document was the activation of Well Sites 1 and 2 and the construction of the 4.26 miles of transmission line, including the Waihee Stream crossing, and connection to the Central Maui Water System. Development of Kupaa Well No. 1 and Kanoa Well No. 1 were discussed, however, at the time the actual sites had not been chosen and thus the specific impacts could not be assessed. Thereafter, the DWS prepared and processed a Final Environmental Assessment (EA) to assess the potential impacts associated with the exploratory drilling of Kupaa Well No. 1 and Kanoa Well No. 1 (Chris Hart & Partners, 1997).

Well pumping and water quality test results from Kanoa Well No. 1 have been completed and results support well development and pump installation at the proposed capacities. Kanoa Well No. 2 is proposed within the same general vicinity as Kanoa Well No. 1.

The purpose of this Draft EA is to assess the potential impacts associated with the well development of Kanoa Well Nos. 1 and 2.

C. BACKGROUND INFORMATION

The Central Maui Water System receives its water from the Iao Aquifer System, which has an assigned sustainable yield of 20 mgd. However, demand from Central Maui has already reached this sustainable yield and threatens to exceed it in the next few years. As such, the DWS has initiated the North Waihee Water Source Development Project as a means to relieve stress on the Iao Aquifer System by providing additional source and transmission systems. Preliminary testing and monitoring indicates that the North Waihee Aquifer can adequately supplement the Iao System.

The North Waihee Aquifer System is defined as the region extending northward from Waihee Valley to Kahakuloa Valley. Testing has indicated that the Waihee Aquifer is quasi-independent from the Iao Aquifer System and that the direction and flow of the Iao Aquifer is toward and across Waihee Valley (Mink and Yuen, Inc., 1997). It has been estimated that the entire North Waihee Aquifer could supply the Central Maui Water System with an additional average annual yield of 8 mgd (Mink and Yuen Inc., 1997).

The North Waihee Water Source Development Project presently comprises 5 wells, associated transmission lines, pumps, electrical buildings, and related improvements. North Waihee Wells Nos. 1 and 2 (State Well No. 5631-02 & 5631-03, respectively) and transmission lines to the Central Maui Water System were placed into operation in 1999 and have a pumping capacity of 1.5 mgd each. The DWS is in the process of developing Kupaa Well No. 1 (State Well No. 5731-03). Kanoa Well No. 1 (State Well No. 5731-02) had exploratory drilling and water quality testing conducted in 1999 and is currently proposed for development along with Kanoa Well No. 2 (State Well No. 5731-04), which is in the same general vicinity as Kanoa Well No. 1. The following 5 wells comprise the DWS's North Waihee Water Source Project:

WELL	STATUS	PUMPING CAPACITY	AVE. DAILY USE
North Waihee Wells 1 and 2 (State Well Nos. 5631-02, 03)	Developed	3.0 mgd	1.980 mgd
Kanoa Well Nos. 1 and 2 (State Well Nos. 5731-02, 04)	Currently Proposed	3.4 mgd (proposed)	2.244 mgd
Kupaa Well (State Well No. 5731-03)	Future Development	1.7 mgd (proposed)	1.122 mgd
TOTAL		8.2 MGD	5.4 MGD

According to the State Commission on Water Resource Management (Commission), the pump tests for the Kanoa Well No. 1 and Kupaa Well No. 1 wells indicate that the average pump capacity will not exceed 1.15 mgd. Commission staff will base their pump installation approval upon an assessment of expected results from simultaneous pumping from all wells in the area.

Several private wells also exist within the North Waihee Aquifer System. These wells include:

WELL	STATUS	PUMPING CAPACITY
Marino Well A and B (State Well Nos. 5631-04, 05)	Developed	Unknown
Mendes Well (State Well No. 5731-01)	Developed	144,000 gpd
Unknown (State Well No. 5832-01)	Developed	Unknown
Kahakuloa Acres (State Well No. 5832-02)	Developed	Unknown
Kahakuloa Acres / Wailena State Well No. 5832-03)	Developed	288,000 gpd

The Marino and Mendez Wells are small residential wells. The Kahakuloa and Wailena wells are used for residential and irrigation purposes. Current water use in the area has been limited due to limited development in the region. The North Waihee Aquifer has not been designated as a water management area; as such, the Commission on Water Resource Management has not established controls on the use of this water.

The North Waihee Water Source Development Project is being implemented to develop new sources of water to meet the needs of future development in the Central Maui Service Area.

D. DESCRIPTION OF PROPOSED ACTION

The DWS is proposing the development of Kanoa Well Nos. 1 and 2. Kanoa Well No. 1 is located mauka (west) of Kahekili Highway, approximately 100 feet inland from the existing Kanoa monitoring well and at an approximate elevation of 310 feet above mean sea level. Kanoa Well No. 2 is situated approximately 600 feet to the southwest of Kanoa Well No. 1, adjacent to the existing access road for the North Waihee Reservoir, at an approximate elevation of 275 feet above mean sea level. (See Figures 1 and 2).

Development of Kanoa Well No. 1 will consist of clearing, grubbing, grading, installation of a pump and related electrical controls, construction of a small electrical building, piping, fencing, and related work. The proposed electrical building will house the electrical equipment for the pump motor controls, well level, SCADA equipment and other appliances (See Figure 4a). The well has been drilled 359 feet below ground surface or about 50 feet below mean sea level. The water surface elevation of the basal aquifer is at elevation 7.93 feet.

Kanoa Well No. 2 will be developed in the same manner as Kanoa Well No. 1, but will also support a chlorination facility that will be attached to the proposed electrical building. The chlorination facility will be used to disinfect water from both wells and will be built slab on grade with asphalt shingle roofing (See Figure 4b). Kanoa Well No. 2 will be drilled approximately 330 feet below ground surface or about 50 feet below mean sea level.

The pumping facility for each site will have the following specifications:

Pump Type:	Deepwell Submersible
Pump Rating:	1,200 gpm @ 450' TDH
Motor:	Submersible, 200 HP, 1750 RPM
Power Supply:	480 volt, 3 phase, 60 Hz
Piping:	Ductile Iron
Appurtenances:	Check Valve, Air and Vacuum Valve
Flow Tubes:	Cast Iron with a bronze liner with transmitters and receivers

A 12-inch transmission water line is planned to transport water approximately 800 feet from Kanoa Well No. 1 along the existing access route to an existing 24-inch transmission waterline where the water will be transported to the existing 1.0 MG North Waihee Reservoir. Water developed from Kanoa Well No. 2 will also be transported to the North Waihee Reservoir via the existing 24-inch waterline (See Figure 2). Water from the proposed wells will be used to service the Department of Water Supply's Central Maui Water System.

Each respective site will be cleared, grubbed, and graded. The adjacent slopes will be grassed, and access roads and well sites will be paved. Installation of transmission water lines, construction of accessory buildings, and pump installation and related piping will be required at each site. Electrical and telemetry equipment will also be installed at each site while disinfection equipment is proposed for just the Kanoa Well No. 2 site. Each site will be fenced.

Electrical power will be obtained from the Maui Electric Company. A generator will be located at the chlorination facility (Kanoa Well No. 2) and will be automatically activated during power outages.

The Maui County Board of Water Supply will provide funding for the project. Operation and maintenance will be the responsibility of the Department of Water Supply. It is estimated that the cost of the proposed improvements will be approximately \$1.74 million (C. Takumi Engineering, Inc.). The design and operation of both wells will be in conformance with the "Water System Standards," Department of Water Supply, County of Maui, 1985 (C. Takumi Engineering, Inc., 1999).

Access to Kanoa Well No. 1 will be via a paved driveway that traverses an existing access easement over undeveloped pasture owned by Wailuku Agribusiness Co. The access easement is on slightly sloping lands that are relatively easy to access.

Access to Kanoa Well No. 2 will be via the existing paved roadway that services the North Waihee Reservoir.

II. EXISTING ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION MEASURES

A. PHYSICAL ENVIRONMENT

1. Orientation/Land Use Data

Tax Map Key:	(2) 3-2-001:003 (portion)
State Land Use Classification:	Agricultural
County Zoning:	Agricultural
Wailuku/Kahului Community Plan:	Agricultural
Flood Zone:	C

The proposed wells are located on the northern slopes of the West Maui Mountains north of the village of Waihee on the Island of Maui (See Figure 1). Each respective well is located on a one-acre perpetual easement mauka of Kahekili Highway at approximate 310 feet (Kanoa 1) and 275 feet (Kanoa 2) above mean sea level. The proposed wells are approximately 2,000 feet from the ocean and the nearest adjacent structure is over 1,000 feet east of each well.

2. Existing Land Uses for the Subject Property

Kanoa Well No. 1 is located within an area that was previously cleared during the well drilling phase. The surrounding area is pastureland and is presently covered with various grass, weeds, and shrubs. An existing monitoring well, Kanoa, is located approximately 100 feet east (makai) of the existing well site. The subject property has been used in recent times for agricultural pursuits, principally the grazing of cattle and horses.

The proposed Kanoa Well No. 2 site is located adjacent to the existing North Waihee Reservoir access road in an area that was previously cleared for installation of electrical transmission lines. Grazing of cattle and horses has been the predominant land use for the last several decades.

Kanoa Well Nos. 1 and 2 each maintain an easement area of approximately 1-acre, but only a small portion of each respective site will be impacted by the proposed developments (See Figure 4).

Analysis. The proposed wells, and appurtenant facilities, are located within a sparsely populated and largely undeveloped area that is buffered by pasturelands, gullies, and

hills. Only a small portion of each site will be affected by the short-term activities associated with the proposed project, i.e. grading, grubbing, drilling, and other construction related activities. A majority of each site will be retained in open space while the electrical and electrical/chlorification buildings will be small one-story structures, approximately 500 sq. ft. and 1,600 sq. ft., respectively. Access to each site will be provided via a paved driveway with parking provided on-site. Thus, it is not anticipated that the proposed action will have a significant impact upon existing land uses at the sites or in the project area.

3. Surrounding Land Uses

The well sites, which are located approximately five (5) miles north of the urbanized region of Wailuku Town, are surrounded by an area that is characterized by a open pastoral setting, comprised of various agricultural settlements interspersed with low density residential uses (See Figure 5).

Specific uses surrounding the sites include the following:

Kanoa Well No. 1

- North: Vacant undeveloped lands in pastoral use. Further north are the Kahakuloa Homesteads.
- South: Vacant undeveloped lands in pastoral use. Further south is the town of Waihee.
- East (Makai): Across Kahekili Highway, additional lands in pastoral use and further east is the rugged shoreline.
- West (Mauka): Vacant undeveloped lands in pastoral use. Further west is the West Maui Forest Reserve.

Kanoa Well No. 2

- North: Vacant undeveloped lands in pastoral use. Further north is Kanoa Well No. 1 and further beyond are the Kahakuloa Homesteads.
- South: Vacant undeveloped lands in pastoral use. Further south is the DWS reservoir and booster pump site and beyond is the town of Waihee.
- East (Makai): Across Kahekili Highway, additional lands in pastoral use and further east is the rugged shoreline.
- West (Mauka): Vacant undeveloped lands in pastoral use. Further west is the West Maui Forest Reserve.

Analysis. As noted above, each site maintains an area of approximately 1-acre, but only a small portion of each site will be affected by the wells. A significant majority of each site will be retained in open space while the electrical and electrical/chlorification buildings will be small one-story structures. Access to each site will be provided via a paved driveway with parking provided on-site. The short-term activities associated with drilling and construction, are not anticipated to have a significant impact upon land uses in the vicinity of the project.

4. Climate

Located on the coastal uplands of the West Maui Mountains, Waihee's climatic pattern is heavily influenced by the northeasterly tradewinds as is typical of windward areas in the Hawaiian Islands. In the absence of the tradewinds, diurnal heating and cooling of the Island produces onshore sea breezes during the day and offshore land breezes at night. The average annual rainfall at the well sites is approximately 30 to 40 inches, with showers usually more frequent during the night and early morning. Average temperatures range from lows in the mid 60's to highs in the mid 80's.

The proposed wells will have no effect upon existing climatic conditions.

5. Topography

The topography of the surrounding area is characterized as having slopes cut by numerous erosional gullies and established drainage patterns. The elevation at Kanoa Well No. 1 is approximately 311 feet above mean sea level while the elevation at Kanoa Well No. 2 is approximately 350 feet above mean sea level. The topography slopes in a mauka-makai direction with the slopes around 20%. There does not appear to be any significant topographical constraints within the areas proposed for the wells.

Analysis. Development of each respective site will be implemented using best management practices and steps will be taken to avoid permanent changes to topographical features in the vicinity of the well sites. At the Kanoa No. 1 site a natural swale lies north of the site and will be used to dispose of storm runoff generated by the site. Access provided to each site will be via a paved driveway and the disturbed area around the project sites will be to minimize runoff and erosion during periods of heavy rain. As such, once completed, the proposed project is not anticipated to have a significant impact upon topographical features of the surrounding area.

6. Soils

The soil type specific to Kanoa Well Nos. 1 and 2 is Rough Broken land (rRR). rRR soils consist of very steep land broken by numerous intermittent drainage channels. Runoff is rapid and geologic erosion is active. The proposed wells will not have a significant effect upon existing soils at the site or those that surround the site.

7. Flood and Tsunami Hazard

Kanoa Well No. 1 and 2 lie within Flood Zone C, an area of minimal flood and tsunami hazard, as determined by the Flood Insurance Rate Map for this region. A Drainage and Erosion Control Plan conforming to the Maui County Grading Permit requirements will be prepared to mitigate local flooding and erosion during construction.

The proposed project will have no effect upon the existing flood or tsunami areas.

8. Aquifer Unit Status

Sustainable Yield: The North Waihee Aquifer System is defined as the region extending northward from Waihee Valley to Kahakuloa Valley (See Figure 3). However, the basal aquifer may be disrupted near Makamakaole Valley by massive Honolua dikes. The sustainable yield for the entire North Waihee Aquifer is estimated at 8 mgd and the estimated sustainable yield for the area between Waihee and Makamakaole will be less. The proposed wells will aid in determining the aquifer conditions and sustainable yield for the North Waihee Aquifer System.

Current pump capacity: The Board of Water Supply, by agreement with Wailuku Agribusiness Co., Inc. has lots or perpetual easements for the development of 5 well fields within Wailuku Agribusiness Company properties between Waihee Stream and Kupaa Gulch. North Waihee Wells 1 & 2 are in well field one; Kanoa Well Nos. 1 and 2 are proposed for development and are within well fields 2 and 3, respectively; Kupaa Well is part of well field 5 is in the early design/development planning stages.

Current pump capacity in the North Waihee Aquifer consists of the North Waihee Wells 1 and 2 with a combined pumping capacity of 3 mgd. Private well use is limited and consists of the Mendes Well (State Well No. 5731-01), a small residential well; the Wailena well (State Well No. 5832-03), a residential subdivision well at Wailena; and, the Marino Well (State Well No. 5631-04), a small residential subdivision well. The lack of development in the area has kept pumpage of these wells to a minimum. The Commission on Water Resource Management has no record of the current water use totals.

Current and pending installed capacity: The two existing North Waihee Wells have a pumping capacity of 3 mgd. The Mendes well is too small for either the quality or quantity of its pumpage to be affected. The well at Wailena was drilled and successfully tested at 200 gpm. Pumping from the proposed sites should not affect the Wailena Well because of its distance from the proposed wells. The Marino Well has a 100 gpm pump.

Kupaa Well is currently being developed and will have a pumping capacity of 1.7 mgd. Once on line, Kanoa Well Nos. 1 and 2 will have a combined pumping capacity of 3.4 mgd. Thus, total pumping capacity from the North Waihee Aquifer will be just over 8.2 mgd. It is not anticipated that the pumps will run simultaneously, nor continuously,

except under emergency conditions. Average daily pumping is expected to be about 16 hours per day, which would produce an average daily yield of approximately 5.4 mgd, depending upon demand.

Authorized water use by the Commission on Water Resource Management: The Commission on Water Resource Management has not designated The North Waihee Aquifer as a water management area; therefore, authorized water use controls have not been implemented by the Commission.

9. Contamination Analysis and Vulnerability Assessment

The recharge area estimated for the Waihee Aquifer is about 12 square miles between the Waihee and Kahakuloa Valleys. The proposed wells are located within an agriculturally zoned area that has predominantly been used for rangeland. No known pesticides have been used on the property for decades. There are no known sources of agricultural and industrial pollutant sources in the area that would affect the source. Agricultural and conservation zoning within the recharge area limits future land use options and restricts population growth in the area. Conservation zoning requires that permits be obtained prior to urban or agricultural uses being conducted. There are no feedlots, sanitary landfills, or public dumps within the aquifer recharge area. The limited residential development that exists is serviced by individual wastewater disposal systems.

Water quality samples taken from the North Waihee Wells 1 and 2, Kupaa Well, and Kanoa Well 1 during well pumping testing confirms that the subject water is free of pesticides and other contaminants. The only anticipated source of contamination is biological; thus, water treatment to mitigate potential contamination will consist of disinfection (C. Takumi Engineering, Inc., 1999). The space around the well casing will be grouted from just above the aquifer level to ground surface to prevent surface waters from entering the well.

10. Hydrologic Impact Analysis

The North Waihee Aquifer System is defined as the region extending northward from Waihee Valley to Kahakuloa Valley. Testing has indicated that the Waihee Aquifer is quasi-independent from the Ioa Aquifer System and that the direction and flow of the Ioa Aquifer is toward and across Waihee Valley (Mink and Yuen, Inc., 1997). It has been estimated that the entire North Waihee Aquifer could supply the Central Maui Water System with an additional average annual yield of 8 mgd (Mink and Yuen Inc., 1997). As discussed, water quality samples taken from the North Waihee Aquifer System confirms that the subject water is free of pesticides and other contaminants. The proposed wells will be developed in strict accordance with the Department of Land and Natural Resources, Commission on Water Resource Management, "Hawaii Well Construction & Pump Installation Standards" to insure that the proposed action does not result in pollutants penetrating the aquifer. In addition, average daily pumping is

anticipated to be approximately 5.4 mgd, depending upon demand, but will not exceed the systems sustainable yield. Thus, the proposed action should not significantly impact ground water resources.

Streams: There are no perennial streams in close proximity to the well sites. The nearest perennial streams are Waihee and Makamakaole.

Makamakaole stream flows on the Honolua formation and nowhere does it intersect the Wailuku formation, which is the aquifer proposed for development. Pumping in the Wailuku formation will have no effect on the Makamakaole stream flow. The stream is located approximately 3,500 feet away from the proposed wells.

Except for the mouth of Waihee Stream, the water table in the aquifer lies below the invert of the Waihee stream channel. Any effect on stream flow will be very small and not likely to be measurable. The stream is about 4,000 feet distant from the proposed wells.

Wetlands: A large wetland occurs in the headwater region of Makamakaole Stream, and a smaller wetland occurs at the mouth of Waihee Stream.

The Makamakaole wetlands extend irregularly over a distance of about 2.5 miles from Eke crater toward the sea and range in elevation from 4,500 feet above MSL to 2,800 feet above MSL. They lie on the Honolua formation and are sustained by perched water in the formation. There is no hydraulic continuity between these wetlands and the Wailuku formation. They will not be affected by pumping in the Wailuku aquifer. The lowest reach of the wetlands is two miles from the proposed wells.

The wetlands at the mouth of Waihee Stream are a mile away from the proposed wells. A reduction in head in the Wailuku aquifer may diminish seepage into the wetlands but probably not enough to be detectable. The wetlands are in valley fill alluvium and are sustained mostly by seepage from Waihee Stream.

11. Watershed and Land Use Analysis

As noted, the Central Maui Water System receives its water from the Iao Aquifer System, which has an assigned sustainable yield of 20 mgd. However, demand from Central Maui has already reached the system's sustainable yield and threatens to exceed it within the next few years. As such, the DWS has initiated the North Waihee Water Source Development Project as a means to relieve stress on the Iao Aquifer System by providing additional source and transmission systems. Preliminary testing and monitoring indicates that the North Waihee Aquifer can adequately supplement the Iao System with an average daily sustainable yield of 8 mgd.

The Central Maui Water System services the communities of Wailuku/Kahului, Waikapu, Maalaea, Kihei/Makena, Waiehu, Waihee, Spreckelsville, Paia/Kuau, Kihei and Puunene (See Figure 6). This region comprises the majority of the County's

economic activity, and maintained a resident population of approximately 49,750 persons in 1990, about 54% of the Island of Maui's resident population.

The Department of Water Supply estimates that year 2010 demand within the Central Maui Water System will range from 27 mgd to 29 mgd depending upon the method of forecast (Per conversation with DWS). The "Historical Trend" method, utilized by the DWS in the Water Use and Development Plan, uses a linear extrapolation of 0.5 mgd/year, which equates to a forecasted water use of 17.1 mgd in 1995. The 1995 water consumption reported in the Annual Report for Fiscal Years 1994, 1995, Board of Water Supply, County of Maui for the Wailuku District averaged nearly 18.7 mgd, or a 8.5% deviation. Using the linear extrapolation of 0.5 mgd/year, the estimated water use in 1997 was 18.1 mgd. Comparatively, the water consumption reported by the Annual Report for Fiscal Year 1997, Board of Water Supply, County of Maui, averaged 19.3 mgd, or a 6.6% deviation (C. Takumi Engineering, Inc., 1999).

The future requirements of service as forecasted above are based upon a mix of residential, commercial, institutional and other needs of the community. The Community Plans for the Kihei-Makena, Wailuku-Kahului, and Paia-Haiku regions are the primary planning documents adopted by the County to assess and zone potential growth areas within the Central Maui Water System. The DWS is charged with the responsibility of providing a sufficient water supply for the area. Potential growth and future requirements may vary due to changes in the Community Plans, economy, and population changes.

The following table summarizes projected water demand relative to existing and proposed supply for the year 2010.

Aquifer	Demand/Supply
Iao Aquifer	20 mgd
North Waihee Aquifer	8 mgd
Iao Tunnel	1.5 mgd
Wastewater Reuse	1.2 mgd
Retrofit and Conservation	.50 mgd
Total Supply	31.2 mgd
Projected Demand*	29 mgd
Net Surplus/Deficit	2.2 mgd

* Conservative estimate of projected water demand.

12. Flora and Fauna

The exploratory well sites are situated within the pastoral setting of Waihee. Natural environmental features, such as plant and animal life, therefore, are reflective of this pastoral setting. Existing vegetation at the actual well sites is non-existent due to previous clearing for well drilling and access way construction. There are no rare, endangered or threatened species of plants at the well sites.

Animal life in the vicinity similarly reflects the pastoral setting of the region. Avifauna typically found within Waihee's pastoral area include the common myna, several species of dove, cardinal, house finch, and house sparrow. Mammals common to this area include cats, dogs, rodents, and mongoose.

There are no known significant habitats of rare, endangered or threatened species of flora and fauna located at the exploratory well sites. Therefore, the proposed wells will not have an adverse impact upon the flora or fauna found in the area.

13. Air Quality

Waihee's constant exposure to tradewinds creates a clean air environment. There are no point sources of airborne emissions in the immediate vicinity of the exploratory well sites, and the air quality at the sites is considered good.

Air quality impacts attributed to the development of each well and appurtenant facilities could include dust generated by short-term drilling and construction-related activities. Mitigation measures for dust control, such as regular watering and sprinkling, will be implemented as needed to minimize wind-blown emissions. The pumps utilized during drilling will be diesel driven and may produce diesel fumes which could impact local air conditions. Permanent pumps will be electrical and will produce no air emissions. During drilling, the DWS will adhere to the State Department of Health's rules and requirements for air emission controls regarding this issue. As such, the proposed wells are not anticipated to be detrimental to local air quality.

14. Noise Characteristics

Background noise at the well sites is natural, except for intermittent noise generated by vehicles on Kahekili Highway.

It is anticipated that drilling related activities may impact noise levels, however, the nearest potentially sensitive receptor site is a dwelling located more than 1000 feet to the east. This distance will mitigate potential noise impacts. In addition, in order to minimize noise related impacts, the applicant proposes to limit drilling activities to normal daylight working hours and adhere to the State Department of Health's noise regulations for drilling equipment. Once completed, it is anticipated that the wells will not have an adverse impact upon existing noise characteristics.

15. Visual Resources

The well sites are located on the mauka side of Kahekili Highway. Scenic resources within proximity to the well sites include views of the nearby shoreline, open space natural drainage ways (gulch areas), and views of Haleakala's northshore.

Once completed, the wells will be at or near grade. The proposed single-story accessory structures are minimal in mass and bulk and are permitted within the State and County

Agricultural Districts. As such, the proposed project is not anticipated to have an adverse affect upon scenic resources.

16. Archaeological/Historical Resources

An Archaeological Reconnaissance Surface Survey was conducted for Kanoa No. 2 on July 6, 1993, (Michael T. Munekiyo Consulting, 1994) and for Kanoa Well No. 1 on March 27, 1997. SEE APPENDIX A - ARCHAEOLOGICAL RECONNAISSANCE SURFACE SURVEY.

The Archaeological Reconnaissance Surface Survey conducted in 1993 examined a 300/1000 ft-long alignment (Transect "B") extending upslope within the immediate area of Kanoa Well No. 2. The study states that "nothing of archaeological or historical value was observed in this transect" (Michael T. Munekiyo, 1994).

At Kanoa Well No. 1 a rock feature was noted within 300 feet of the existing monitoring well.

The March 1997 Reconnaissance Surface Survey recommended the following:

Kanoa Well No. 1

- 1) Limited subsurface testing at the inventory level should be undertaken if the permanent well will be placed beyond the area previously cleared for the existing Kanoa monitoring well.
- 2) Monitoring of the initial placement of the permanent well should be undertaken. Care must be utilized in order to avoid the adjacent areas covered with trees. The possibility exists that 1 or more indigenous sites are contained in the densely wooded areas.

Kanoa Well No. 1 was not to be located beyond the area previously cleared for the existing Kanoa monitoring well. The adjacent areas, which are covered with trees, were not to be affected or altered. Agricultural activities continuing since the late historic period have extensively affected the areas proposed for both of the wells. Recent clearing for the Kanoa Well No. 1 site and the Reservoir access road has already disturbed the existing project sites. As such, the proposed project is not anticipated to have an impact upon archaeological or historical features.

B. SOCIO-ECONOMIC ENVIRONMENT

1. Population and Economy

The population of the County of Maui has exhibited relatively strong growth over the past decade with the year 2000 population estimated to be 124,562, an approximate 24% increase over the 1990 population of 100,504 (County of Maui Data Book, 1996-97). Growth in the County is expected to continue, with resident population to the year 2005 and 2010, estimated to be 134,064 and 140,060, respectively.

The Wailuku-Kahului region is the island's center of commerce, including a wide range of commercial, service, professional, and governmental activities. The large agricultural tracts of lands that encompass the region, mainly owned by Hawaiian Commercial & Sugar and Wailuku Agribusiness Company, are also a vital part of the region's economy.

The Central Maui Water System services both the residential and commercial areas of Central Maui, including Paia and South Maui, which are expected to continue to grow. The growth rate of these regions continues to place additional stress on the Iao Aquifer System, which is currently at or near its sustainable yield. The North Waihee Water Source Development Project is intended to relieve stress on the Iao Aquifer System by providing additional source and transmission systems. The wells are intended to provide additional alternatives to service the region's population and economic centers.

C. PUBLIC SERVICES

1. Recreational Facilities

The well sites are in close proximity to numerous recreational opportunities, including Maui War Memorial Complex, Maui Zoological and Botanical Gardens, Waihee Beach Park, and Waiehu Golf Course. In addition, there are numerous ocean related activities near by.

The subject wells will not impact existing recreational facilities.

2. Police and Fire Protection

Police protection for the region is provided by the County Police Department headquartered at the Wailuku station approximately six (6) miles away. The Central Maui Patrol includes approximately 100 full time personnel.

The County Department of Fire Control's Wailuku Station and Kahului Station provide fire prevention, suppression, and protection services.

The proposed project is not anticipated to affect police or fire protection.

3. Solid Waste

The County of Maui provides weekly solid waste collection services to residential properties in the area. Drilling will produce residual crushed rock and soil materials. These materials will be spread out evenly at the drilling sites. After completion of the wells, there will be no long-term generation of solid waste products. Therefore, the project will have no impact upon solid waste services.

4. Health Care

Medical facilities are located approximately six (6) miles from the well sites at Maui Memorial Hospital and at various private practices and clinics in Kahului and Wailuku.

The exploratory wells are not anticipated to have an impact upon medical services in terms of service area.

5. Schools

Public schools that serve residents in the Waihee area include Waihee Elementary School, Grades K-5; Maui Waena Intermediate, Grades 6-8; and Maui High School, Grades 10-12.

The exploratory wells are not anticipated to have an impact upon the region's public school system.

D. INFRASTRUCTURE

1. Roadways

Access to the proposed wells is off of Kahekili Highway, a two-lane State highway that provides access from Central Maui to Kahakuloa and further on to Kapalua.

No roadway improvements are proposed as part of the project. In the short-term, during the construction phase, the project may involve a relatively insignificant increase in traffic levels for the region. However, once completed, the wells will have no impact upon local traffic conditions.

2. Wastewater

Wastewater disposal in the Waihee community is accommodated via cesspools or individual wastewater treatment systems such as septic tanks. There are no existing County or private wastewater collection and treatment facilities in this area.

The proposed wells will not have any impact upon the County's wastewater system.

3. Water

As noted in the background section, the Central Maui Water System receives its water from the Iao Aquifer System, which has an assigned sustainable yield of 20 mgd. However, the demand from Central Maui has already reached this sustainable yield and threatens to exceed it in the next few years (Mink and Yuen Inc., 1997). As such, the DWS has initiated the North Waihee Water Source Development Project as a means to relieve stress on the Iao Aquifer System by providing additional source and transmission systems. Preliminary testing and monitoring of the North Waihee Aquifer has indicated that it can adequately supplement the Iao System. It has been estimated that the North Waihee Aquifer project could supply the Central Maui Water System with an additional average yield of 8 mgd.

DWS has completed construction of the transmission lines to connect North Waihee Well Nos. 1 and 2 to the Central Maui Water System. Kupaa Well No. 1 is now in the design/development-planning phase. As part of the County's North Waihee Water Source Project, Kanoa Well Nos. 1 and 2 will provide alternate sources of water for the Central Maui Water System, and as such, should have a beneficial impact upon the Iao Aquifer System by minimizing the potential for over pumping. In addition, the proposed wells will provide valuable data regarding the long-term sustainable yield potential from the North Waihee Aquifer.

4. Drainage

Storm-water runoff generated at the well sites percolates into the ground or sheet flows across the sites from the high points to the low points and eventually into adjacent gulches.

The proposed action involves minimal land alteration activities and will not significantly alter drainage patterns in the area.

Normal erosion control measures during construction should be adequate to control soil loss from the well sites. These measures include the following:

- Leave natural vegetation undisturbed in areas not needed for immediate construction;
- Use sprinklers to control dust; and
- Water down any disturbed areas after drilling activity has ceased for the day and during weekends and holidays.

In addition, access roads to each site will be paved and surrounding vegetation planted to mitigate runoff and erosion during periods of heavy rain. As such, the subject wells are not anticipated to have an adverse affect upon the existing hydrologic conditions, adjoining or downstream properties, or coastal waters.

III. RELATIONSHIP TO GOVERNMENTAL PLANS, POLICIES, AND CONTROLS

A. STATE LAND USE DISTRICT

Chapter 205, Hawaii Revised Statutes, relating to the Land Use Commission, establishes the four major land use districts in which all lands in the State are placed. These districts are designated "Urban", "Rural", "Agricultural" and "Conservation". The subject parcel is within the "Agricultural" District. The proposed project is permitted within the "Agricultural" District.

B. MAUI COUNTY GENERAL PLAN

The Maui County General Plan (1990 Update) sets forth broad objectives and policies to help guide the long-range development of the County. As stated in the Maui County Charter, "The purpose of the General Plan is to recognize and state the major problems and opportunities concerning the needs and the development of the County and the social, economic and environmental effects of such development and set forth the desired sequence, patterns and characteristics of future development."

The proposed action is in keeping with the following General Plan Objective and Policies:

Objective:

To supply an adequate supply of potable and irrigation water to meet the needs of Maui County's Residents.

Policy:

Support the improvement of water transmission systems to those areas that historically experience critical water supply problems provided the improvements are consistent with the water priorities and the County's Water Use Development Plan provisions for the applicable community plan area.

Policy:

Seek new sources of water by exploration in conjunction with other government agencies.

C. WAILUKU-KAHULUI COMMUNITY PLAN

The well sites are located in the Wailuku-Kahului Community Plan region, one of nine Community Plan regions established in the County of Maui. Planning for each region is guided by the respective Community Plans, which are designed to implement the Maui

County General Plan. Each Community Plan contains recommendations and standards that guide the sequencing, patterns, and characteristics of future development in the region.

The well sites are designated "Agricultural" by the Wailuku-Kahului Community Plan Land Use Map. The proposed project is consistent with the "Agricultural" designation.

Approval of the proposed request would be consistent with the Wailuku-Kahului Community Plan by addressing the following objectives:

- Coordinate water system improvement plans with growth rates to ensure adequate supply and a program to replace deteriorating portions of the distribution system. Future growth should be phased to be in concert with the service capacity of the water system.

IV. LIST OF ALTERNATIVES

The Department of Water Supply (Department) has studied alternative means of water supply, i.e. surface water treatment and desalinization. Groundwater development remains the most viable alternative for potable water due to the high cost associated with meeting new surface water treatment rules promulgated by the Safe Drinking Water Act, and as experienced during the course of operating several surface water treatment plants currently in use. The Department has also promoted water conservation, wastewater reuse, and non-potable water use.

Wastewater Reuse: The County of Maui has long initiated wastewater reuse measures in the Central Maui Water Service Area. Presently, wastewater reuse is used for irrigation at The Silversword Golf Course, Kalama Park, Kihei Fire Station and Kihei Library, Haleakala Ranch, Dekalb Seed Corn Project, Kihei Waste Water Treatment Plant, Kahului Wastewater Treatment Plant, and for dust control.

Catchment: Rainfall catchment is not a viable alternative in the dry central Maui area where long dry periods occur during the summer.

Conservation: The Department of Water Supply and the County of Maui have already initiated programs to promote conservation measures. The use of low flow fixtures is required by County ordinance for all new construction and renovations. In addition, the Department of Water Supply is engaged in promoting a xeriscape program, leak detection and repair program, and a low flow fixture retrofit program.

Non-potable Sources: Many central Maui parks and golf courses have their own irrigation wells that use predominantly non potable (brackish) water. Sugar growing, the primary agricultural crop in Central Maui, is supported by long developed surface water and non potable water sources.

Despite the active pursuit of the alternatives listed above, the Department needs to initiate additional source development in order to relieve the stress on the Iao Aquifer and to accommodate increased demand for water.

V. OTHER REQUIRED PERMITS AND APPROVALS

In order to proceed with the proposed action, DWS will need approval of a Pump Installation Permit from the Commission on Water Resource Management.

VI. ENVIRONMENTAL ASSESSMENT SIGNIFICANCE CRITERIA

In accordance with Title 11, Department of Health, Chapter 200 and Subchapter 6, Section 11-200-12, Environmental Impact Statement Rules, and based on the detailed analyses contained within this document, the following conclusions are supported:

1. The proposed action will *not* result in an irrevocable commitment to loss or destruction of natural or cultural resources.

Analysis. Development of the proposed wells will involve a relatively small area within each respective one-acre site. The proposed sites have been used for cattle grazing for several decades and the proposed action will not affect this use. In addition, the proposed action will relieve stress on the Iao Aquifer System by providing additional source and transmission systems. It is not anticipated that the pumps will run simultaneously, nor continuously, except under emergency conditions. Average daily pumping from current, proposed, and future wells is expected to be about 16 hours, which would produce an average daily yield of approximately 5.4 mgd, depending upon demand. The estimated sustainable yield from the North Waihe'e Aquifer system is 8.0 mgd.

2. The proposed action will *not* curtail the range of beneficial uses of the environment.

Analysis. The minimal scope of the proposed action should not have a significant impact upon existing or future land uses in the area. The proposed wells are a permitted use within the State and County Agricultural Districts. As discussed, water drawn from the wells will be used to service the Central Maui Water System, which serves the eastern slopes of the West Maui Mountains, the Central isthmus of Maui, and the lower western slopes of Haleakala. The water will be available to existing and future residential, commercial, and agricultural users.

3. The proposed action will *not* conflict with State or County long-term environmental policies and goals as expressed in Chapter 344, HRS.

Analysis. As noted, the purpose of the proposed action is to relieve stress currently being placed upon the Iao Aquifer System and to meet projected demand for residential, commercial, industrial, and agricultural water uses. The proposed wells will obtain all

required permits prior to construction and will comply with all required State and County water quality standards.

4. The proposed action will *not* substantially affect the economic or social welfare and activities of the community, county or state.

Analysis. The Iao Aquifer System is the primary source of water for Central Maui residents. Unfortunately, the system is now being pumped at or near its sustainable yield. The proposed action will benefit the County of Maui by providing an alternative source of water to supplement the Central Maui Water System; thereby, relieving stress currently being placed upon the Iao Aquifer System, while accommodating future water demand.

5. The proposed action will *not* substantially affect public health.

Analysis. The proposed wells will be owned and operated by the Department of Water Supply. As noted previously, water samples taken from North Waihee Wells during well testing indicated that disinfection is the only necessary treatment for the water. All applicable State Safe Drinking Water Regulations will be strictly adhered to.

6. The proposed action will *not* result in substantial secondary impacts.

Analysis. The proposed wells will be developed in strict accordance with the Department of Land and Natural Resources, Commission on Water Resource Management, "Hawaii Well Construction & Pump Installation Standards." As noted, the purpose of the wells is to provide an alternative source of water for the County's Central Maui Water System; thereby, relieving stress currently being placed upon the Iao Aquifer System. The water will be available to existing and future residential, commercial, and agricultural users. In addition, development of the wells will also provide valuable information regarding the condition of the aquifer system.

7. The proposed action will *not* involve substantial degradation of environmental quality.

Analysis. The recharge area for the Waihee Aquifer System is about 12 square miles between the Waihee and Kahakuloa Valleys. Presently, there are no known sources of agricultural and industrial pollutant sources in the area that would affect the source. Water quality samples have indicated the North Waihee Aquifer System is free of contaminants. The proposed wells will be developed in strict accordance with the Department of Land and Natural Resources, Commission on Water Resource Management, "Hawaii Well Construction & Pump Installation Standards" to insure that the proposed action does not result in pollutants penetrating the aquifer. In addition, average daily pumping is anticipated

to be approximately 5.4 mgd, depending upon demand, but will not exceed the systems sustainable yield.

8. The proposed project will not produce cumulative impacts and does *not* have considerable effect upon the environment or involve a commitment for larger actions.

Analysis. As noted, the proposed wells will be utilized to supplement the Central Maui Water System, which serves the eastern slopes of the West Maui Mountains, the central isthmus of Maui, and the lower western slopes of Haleakala and includes the communities of Wailuku/Kahului, Waikapu, Maalaea, Kihei/Makena, Waichu, Waihee, Spreckelsville, Paia/Kuau, Kihei, Maalaea, and Puunene. The proposed wells are necessary to relieve stress being placed upon the Iao Aquifer System, which is being pumped near its sustainable yield, and to accommodate increasing demand arising from projected population growth.

9. The proposed project will *not* affect a rare, threatened, or endangered species, or its habitat.

Analysis. The proposed well sites are located on pasturelands. Natural environmental features, such as plant and animal life, therefore, are reflective of this pastoral setting. Existing vegetation within the well sites include various weeds, grasses, and shrubs. There are no rare, endangered, or threatened species of plants or animal life at the well sites.

10. The proposed action will *not* substantially or adversely affect air and water quality or ambient noise levels.

Analysis. As discussed, the proposed wells will be developed in strict accordance with the Department of Land and Natural Resources, Commission on Water Resource Management, "Hawaii Well Construction & Pump Installation Standards" to insure that the proposed wells do not result in pollutants penetrating the aquifer. In addition, average daily pumping is anticipated to be approximately 5.4 mgd, depending upon demand, but will not exceed the systems sustainable yield. Surface water resources will not be impacted since there are no perennial streams in close proximity to the well sites. The discharge water from the well tests will be transported and discharged into nearby drainage gulches and will avoid any perennial streams. Inasmuch as there are no surface streams that traverse or border the well sites, the proposed exploratory wells are not anticipated to produce any long-term affect upon the region's surface waters. As noted previously, there are not anticipated to be any adverse air or ambient noise level impacts.

11. The proposed action will *not* substantially affect or be subject to damage by being located in an environmentally sensitive area, such as flood plain, shoreline, tsunami zone, erosion-prone areas, estuary, fresh waters, geologically hazardous land or coastal waters.

Analysis. The proposed wells lie within Flood Zone C, an area of minimal flood and tsunami hazard, as determined by the Flood Insurance Rate Map for this region. A Drainage

and Erosion Control Plan conforming to the Maui County Grading Permit requirements will be prepared to mitigate local flooding and erosion during construction. The proposed project will have no effect upon the existing flood or tsunami areas.

12. The proposed action will *not* substantially affect scenic vistas or view planes identified in county or state plans or studies.

Analysis. The proposed wells will be situated approximately 650 feet mauka (west) of Kahekili Highway and will not create a significant impact to adjacent property owners or to vehicles traveling along Kahekili Highway. Thus, visual resources will not be significantly affected.

13. The proposed action will *not* require substantial energy consumption.

Analysis. Electric pumps will be utilized in the proposed wells. It is not anticipated that these pumps will require substantial energy consumption.

VI. FINDINGS AND CONCLUSIONS

The North Waihee Water Source Development Project is intended to relieve stress on the Iao Aquifer System by providing additional source and transmission systems. The development of Kanoa Well Nos. 1 and 2 will provide additional alternatives to service the region's population and economic centers.

Development of Kanoa Well Nos. 1 and 2 will require clearing, grubbing, grading, installation of pumps, and construction of electrical buildings, fencing and related work. The short-term impacts associated with these activities are not anticipated to have a significant impact upon existing land uses at the sites or in the region.

The project is not anticipated to have any adverse impacts upon any existing environmental features such as flora and fauna, topography, soils, or air quality. The project is not anticipated to have an impact upon archaeological or historical features.

The proposed project will not have an adverse impact upon existing socio-economic conditions nor will it have an adverse effect upon existing public services or infrastructure.

Therefore, as a result of the findings of this report, the proposed project is not anticipated to have any significant environmental impacts and it is anticipated that a "Finding of No Significant Impact" (FONSI) will be made by DWS.

VII. AGENCIES CONTACTED DURING THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT

County of Maui

- Department of Water Supply
- Department of Planning

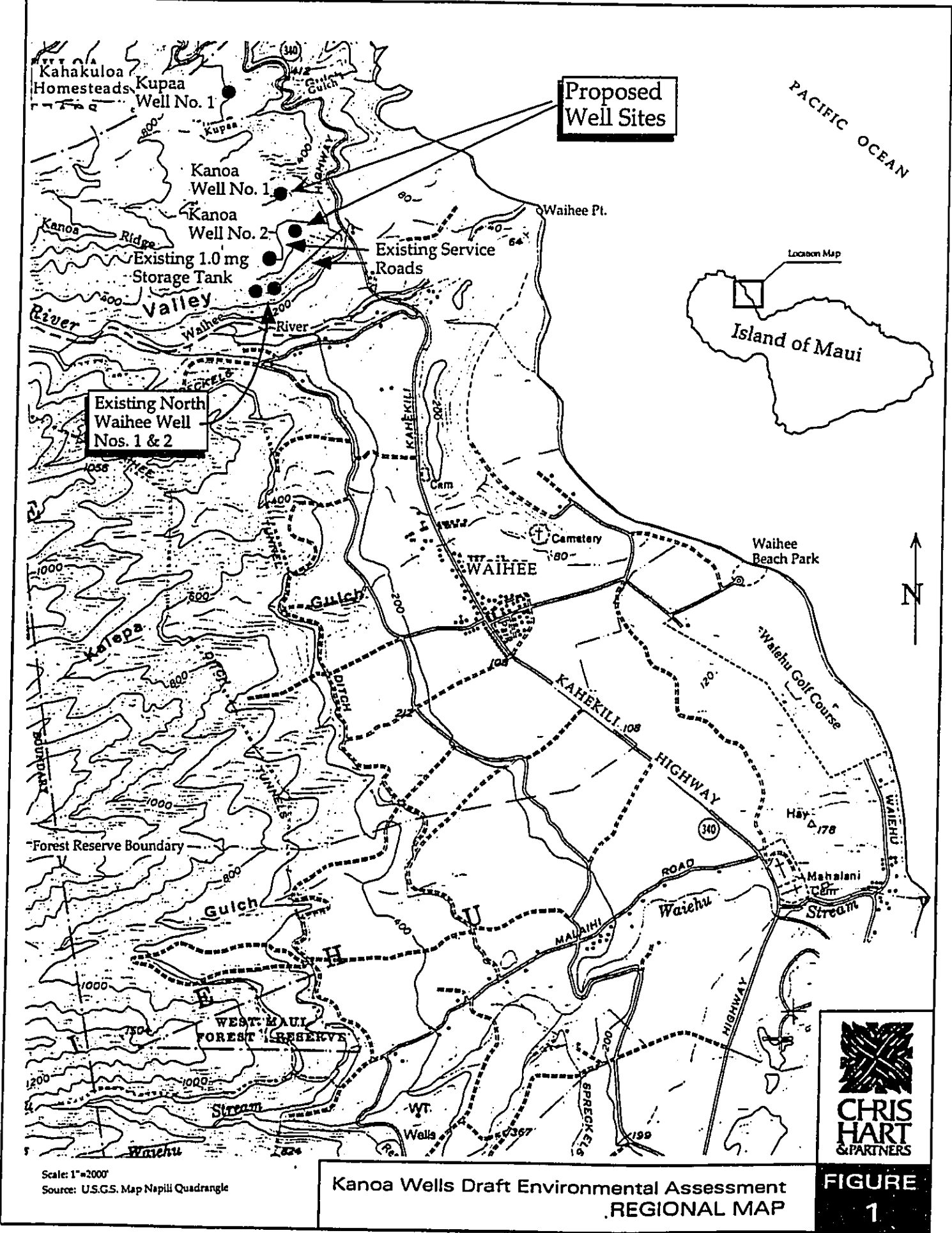
Private/Public Individual

- Wailuku Agribusiness Co., Inc.

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- Wilson, Okamoto and Associates, Maui Community Plan Update, Land Use Technical Study, June 1992.

FIGURES



Kanoa Wells Draft Environmental Assessment
REGIONAL MAP

FIGURE
1

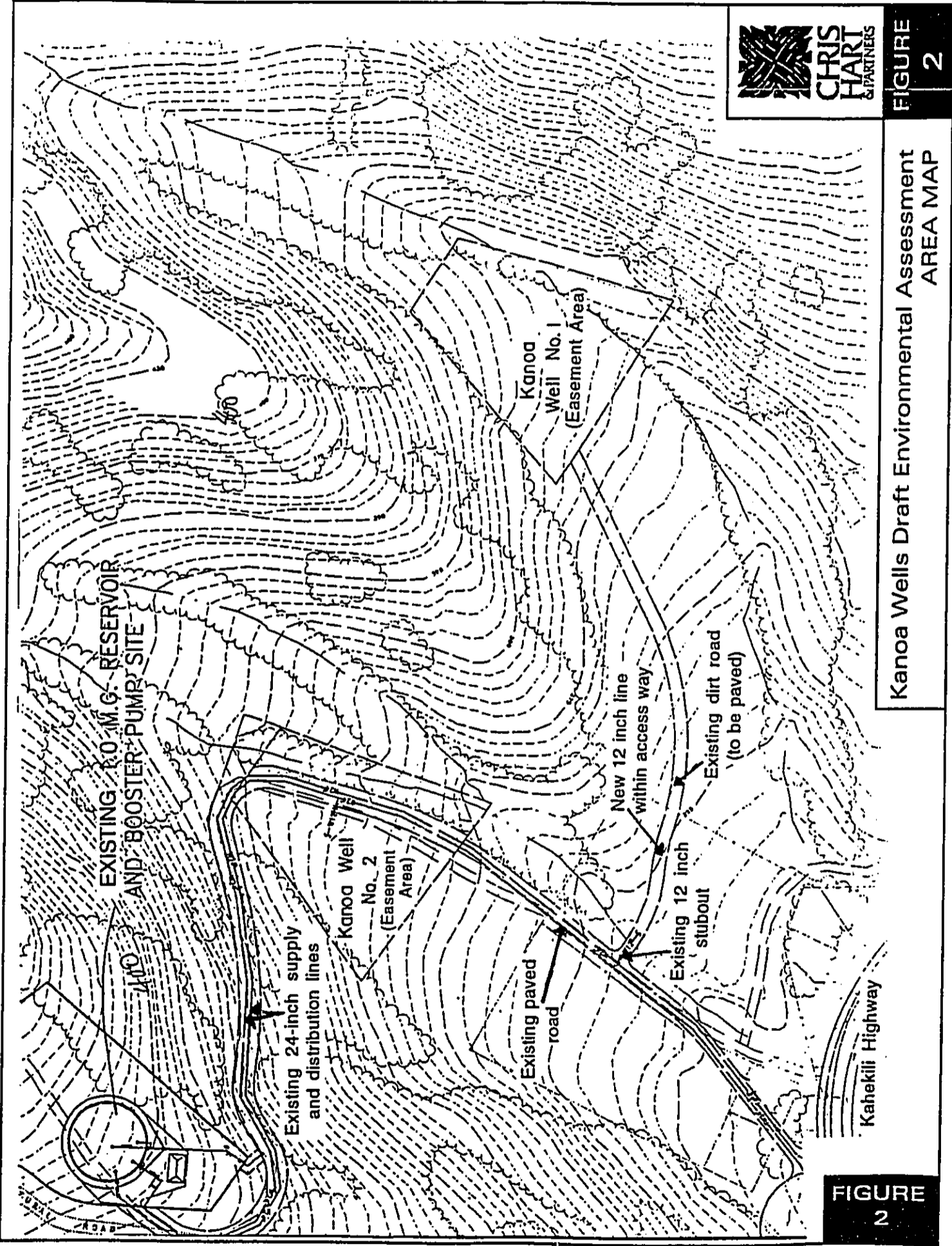


FIGURE 2

Kanoa Wells Draft Environmental Assessment AREA MAP

FIGURE 2

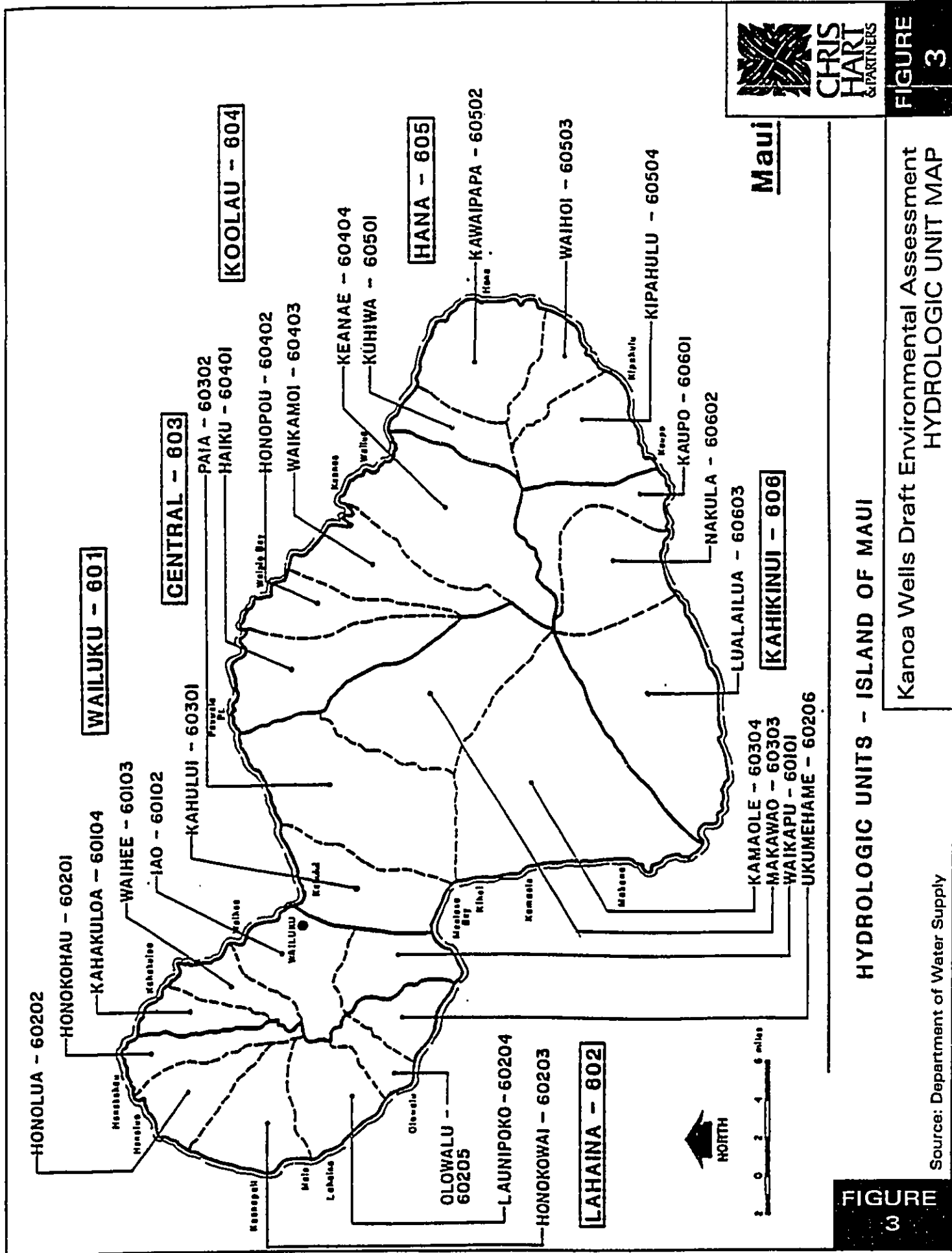


FIGURE 3

HYDROLOGIC UNITS - ISLAND OF MAUI

Kanoa Wells Draft Environmental Assessment
HYDROLOGIC UNIT MAP

FIGURE 3

Source: Department of Water Supply

Maui

259.97

NOA WELL SITE No. 1
EASEMENT "D"
AREA = 1.00 Acres

EXISTING KANOA MONITOR WELL



3' 00"

250.00

PROPOSED ACCESS ROAD

PROPOSED 12" W.L.

DIRT ROAD

259.97

EXISTING 20' WIDE EASEMENT

DIRT

ROAD



Kanoa Wells Nos. 1&2 Draft Environmental Assessment
KANOA 1 WELL - SITE PLAN

FIGURE 4A

PROPOSED ELEC. HHG W/ TRANSFORMER

256° 13' 55"

259.97

KANOVA WELL SITE No.
EASEMENT "D"
AREA = 1.00 Acres

KANOVA WELL 1

EXISTING KANOVA MONIT

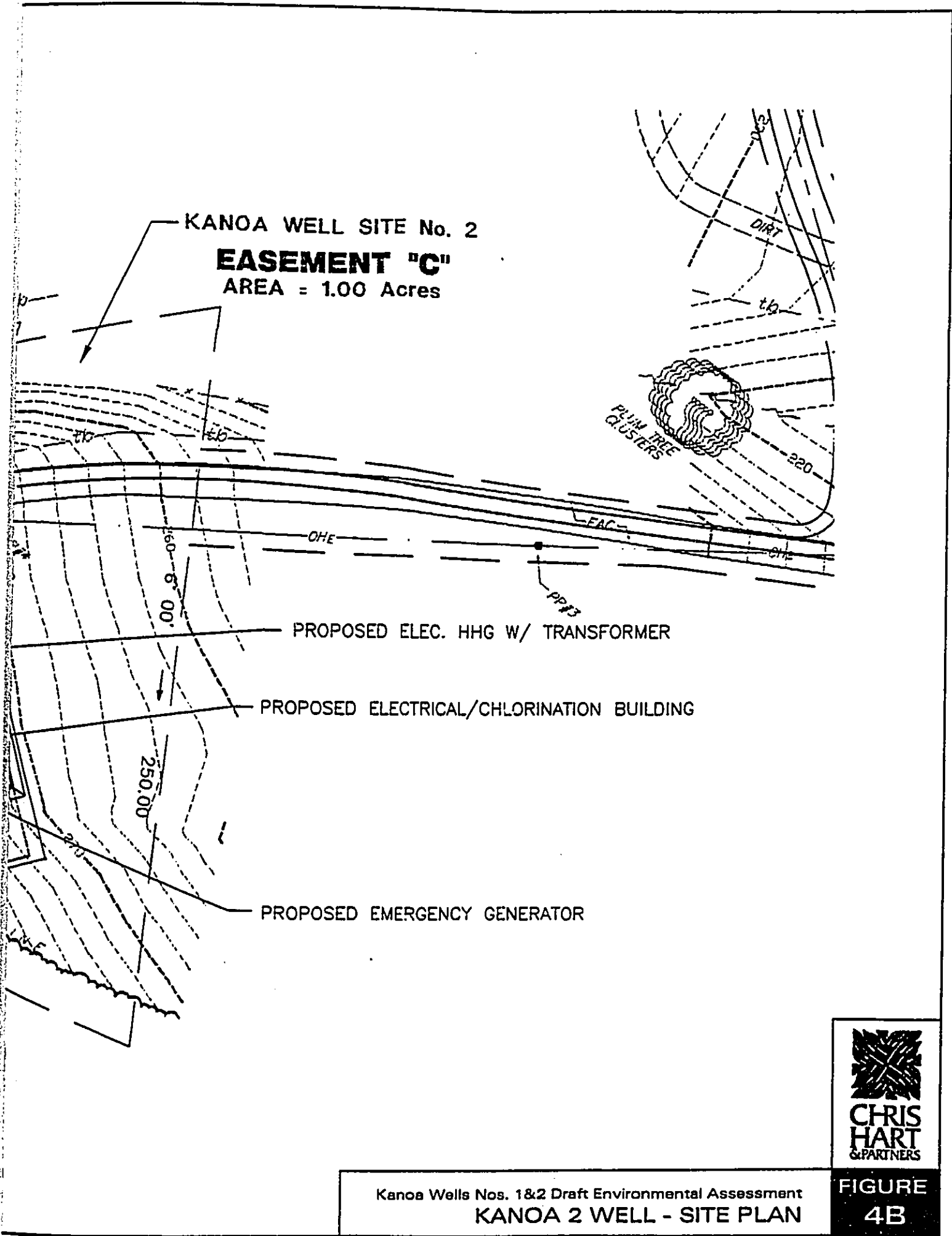
PROPOSED ELECTRICAL BUILDING

TREE LINE

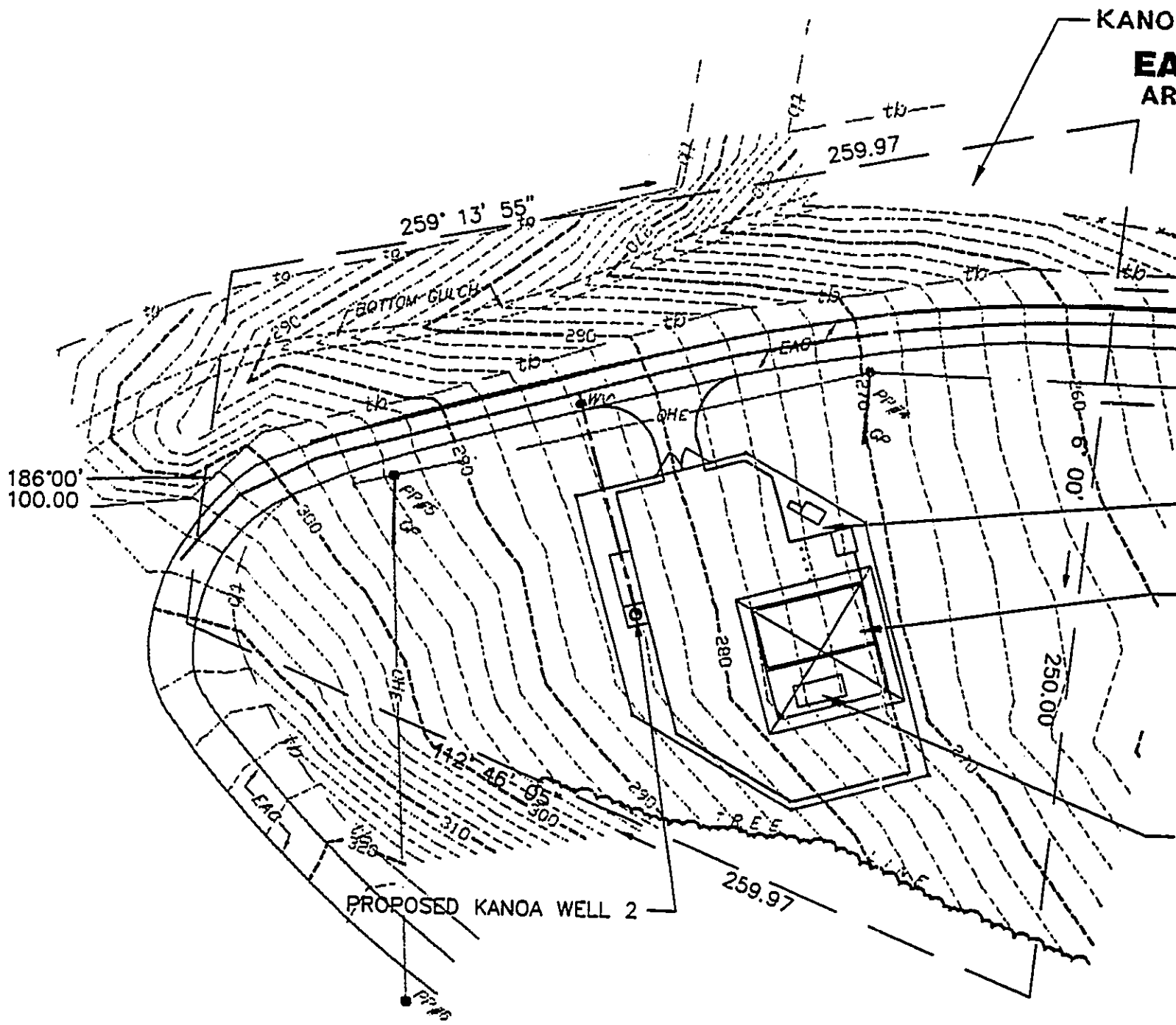
109° 46' 05"

259.97

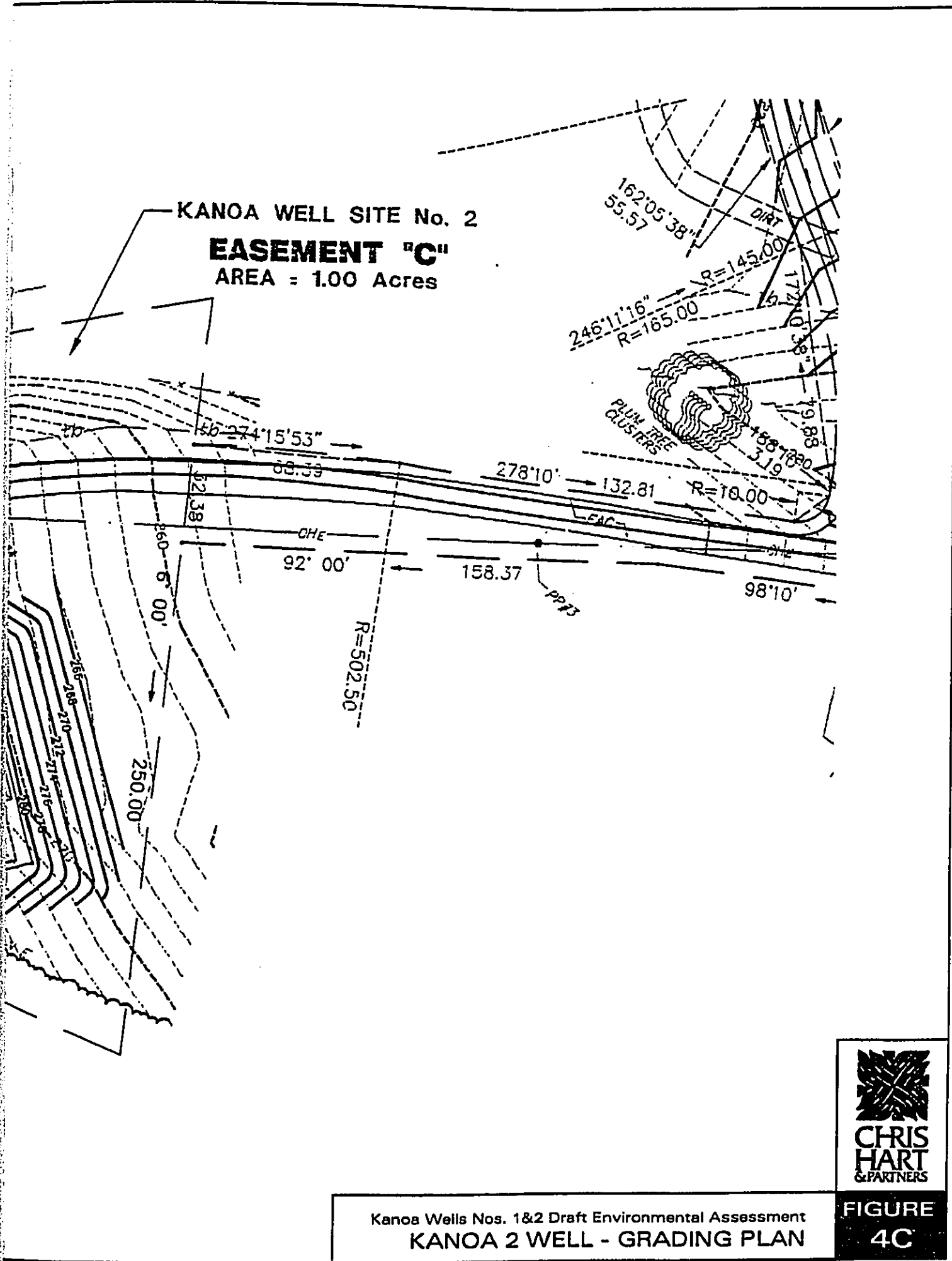
EXISTING



TRUE NORTH
Scale: 1" = 40'



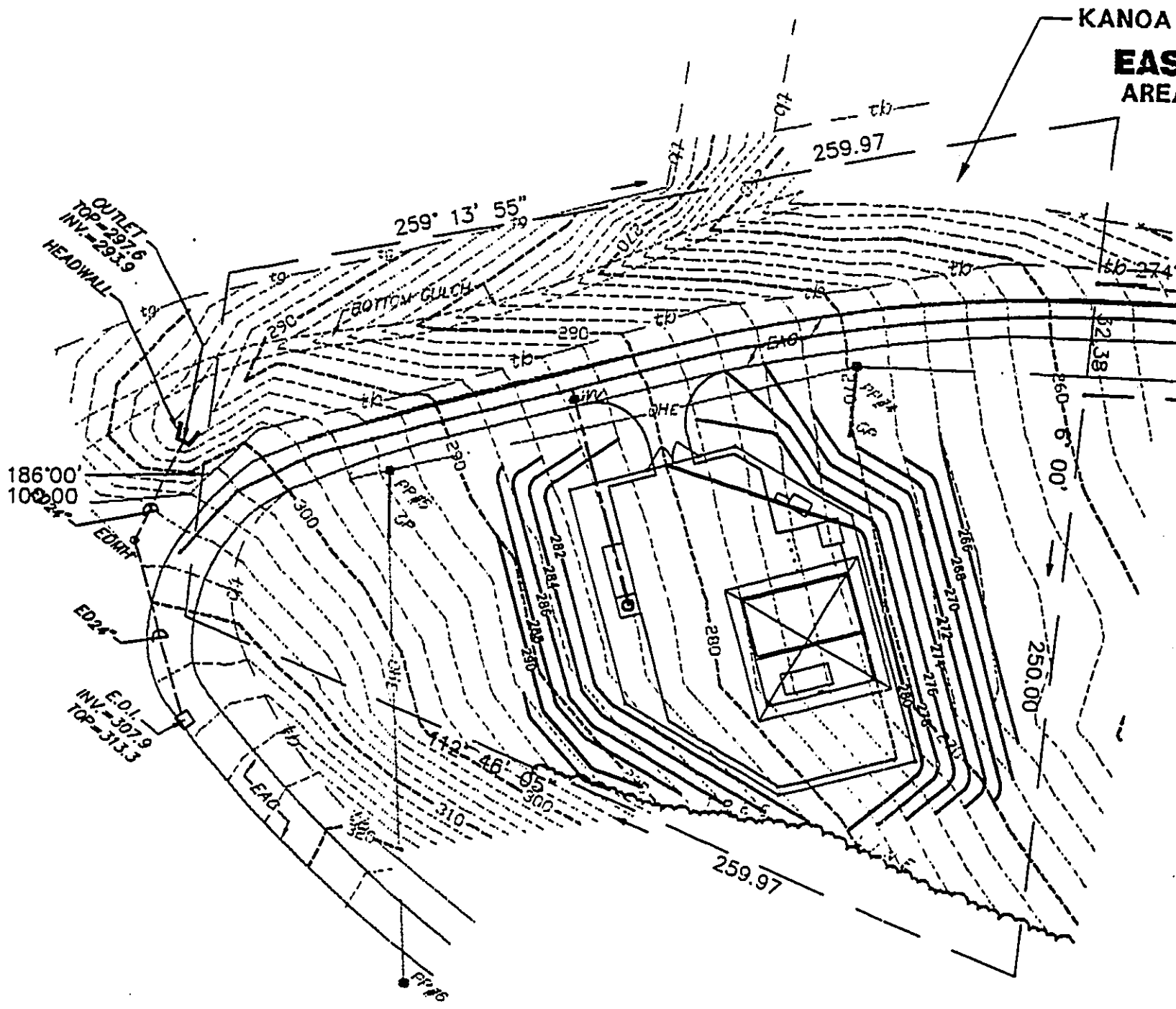
Source: C. Takumi Engineering, Inc.

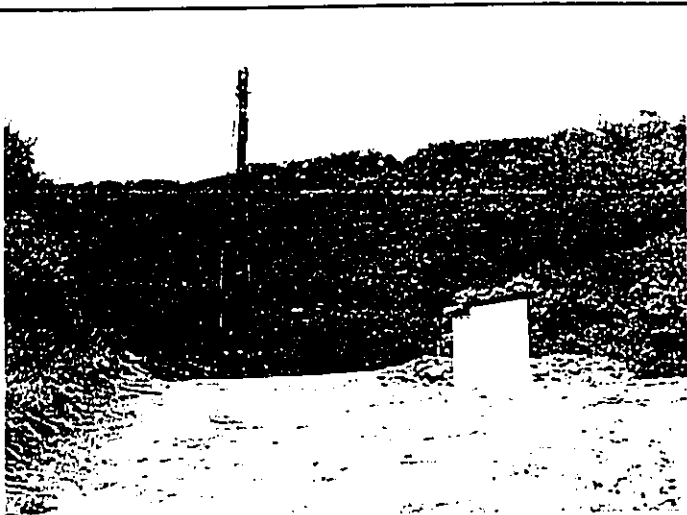


Kanoa Wells Nos. 1&2 Draft Environmental Assessment
KANOA 2 WELL - GRADING PLAN

**FIGURE
4C**

TRUE NORTH
Scale: 1" = 40'

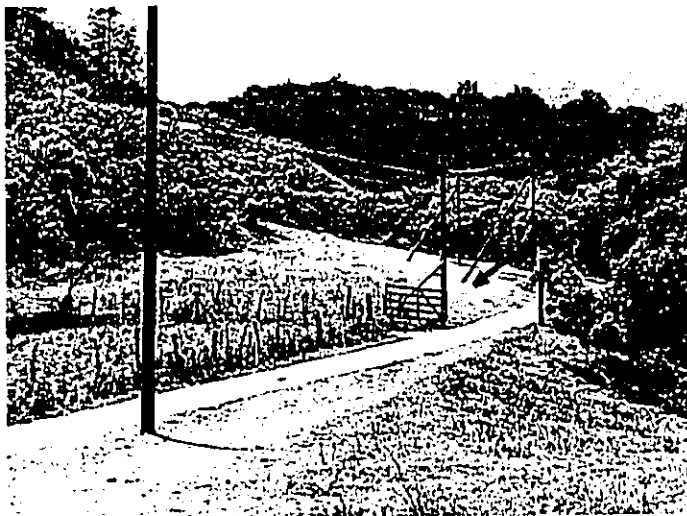




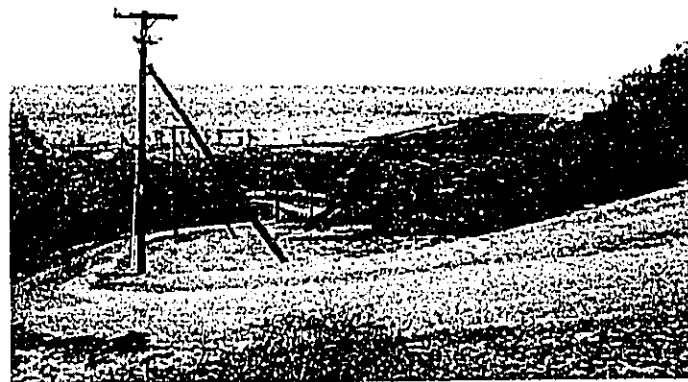
Kanoa 1 Site



Kanoa 1 Access Road



Kanoa 2 Site (mauka view)



Kanoa 2 Site (makai view)

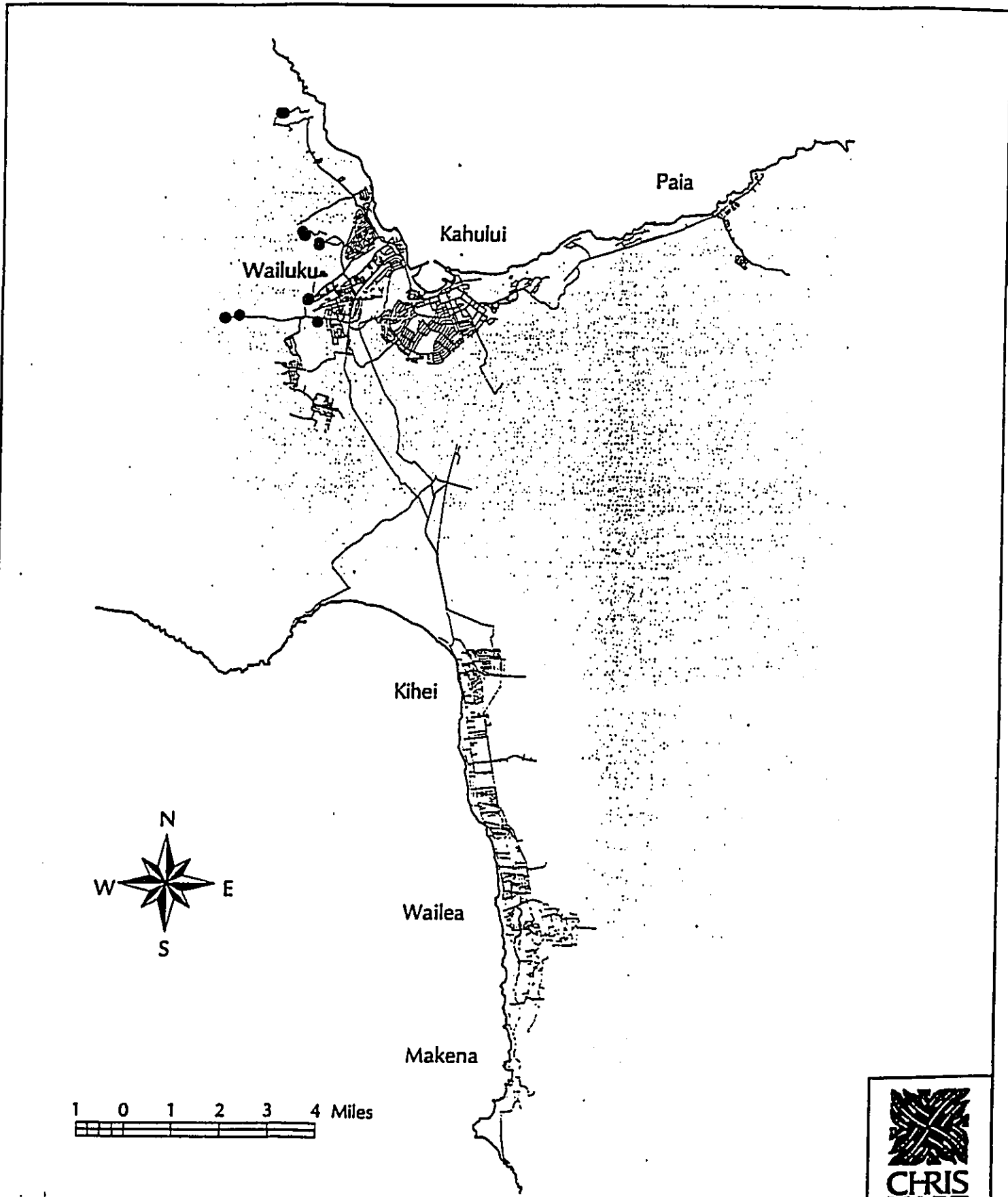


Example of a completed well

Kanoa Wells Draft Environmental Assessment
SITE PHOTOS



FIGURE
5



Source: Department of Water Supply

Kaono Wells Draft Environmental Assessment
CENTRAL MAUI WATER SYSTEM MAP



FIGURE 6

APPENDIX - A
Archaeological Reconnaissance Surface Survey

XAMANЕК RESEARCHES
P.O. BOX 131
PUKALANI, MAUI, HI 96788
Phone/FAX: 572-8900

C. Takumi Engineering, Inc.
18 Central Avenue
Wailuku, HI 96793-1724
FAX: 249-0311

Attn: Carl Takumi

31 March 1997

SUBJECT: Letter report on a reconnaissance surface survey for a proposed exploratory well (Kupa'a Well No. 1) and an existing monitoring well (Kanoa Well No. 1) site in the North Waihe'e Water Source Development, Phases 6 & 7, Waihe'e, Island of Maui. (TMK: 03-02-01: 03) [Note: Proposed water transmission line easement not finalized.]

An archaeological reconnaissance surface survey was conducted for C. Takumi Engineering, Inc. by Xamanek Researches on 27 March 1997. An earlier field visit was made on 25 March 1997 with Mr. Wade Shimabukuro of C. Takumi Engineering, Inc. to view the study area. The survey was undertaken in order to assess the presence of cultural resources at 2 proposed wells (Kanoa Well No. 1 and Kupa'a Well No. 1) that will eventually feed into the North Waihe'e Water Transmission system.

The first proposed well project (Kanoa Well No. 1) will be located c. 30 to 50 m. from an existing monitoring well. The present monitoring well rests at c. 300 ft. AMSL and the proposed well will likely be situated at a higher elevation. Vegetation in the general vicinity consists of pasture grasses and annual weeds in the low lying areas with moderately dense tree growth covering the surrounding slopes. At least two native plant species observed growing on the slopes include *kukui* (*Aleurites moluccana*) and *'ulei* (*Osteomeles anthvllidofolia*). Kanoa Well No. 1 will not be placed on the slopes where a probable rock feature was noted within c. 100 m. of the existing monitoring well.

The second proposed well project (Kupa'a Well No. 1) will be located in a pasture likely between 630 to 640 ft. AMSL. Two possible areas were inspected (A and B) in this pasture. At location A (c. 635 ft. AMSL), the surface was vegetated with pasture grasses and alien weed species. There was no surface evidence of significant material culture remains in the immediate vicinity. However, a likely site remnant was observed c. 100 m. to the north. It consisted of stacked basalt cobbles and small boulders. A portion of it appears to have been bulldozed in the past. At location B (c. 550 ft. AMSL) the surface was also vegetated with pasture grasses and alien weed species. This second possible location (less favored than A) is near the north boundary of the parcel. A possible site remnant lies at this location. It was covered with lantana and consists of

roughly stacked rocks. Portions of this feature may have been pushed by a bulldozer. No other surface evidence of material culture remains was observed in area B.

Both of the proposed well sites are in relatively open locations. The Kanoa Well No. 1 site will be located in pasture land within 30 to 50 m. of the present monitoring well and away from thick vegetation and the 1 probable rock feature in the vicinity of the existing monitoring well. The exploratory Kupa'a Well No. 1 will likely be drilled at area A in open pasture land. Location B is less favorable and may contain a site remnant. Both Kanoa Well No. 1 and Kupa'a Well No. 1 will eventually feed into the North Waihe'e Water Transmission Line project. Kupa'a Well No. 1 will need to be tested before water transmission line design can be finalized. The following recommendations are based on the results of the reconnaissance surface survey.

Kanoa Well No. 1

1. Limited subsurface testing at the inventory level should be undertaken if the permanent well will be placed beyond the area previously cleared for the existing monitoring well.
2. Monitoring of the initial placement of the permanent Kanoa Well No. 1 should be undertaken. Care must be utilized in order to avoid the adjacent areas covered with trees. The possibility exists that 1 or more indigenous sites are contained in the densely wooded areas.

Kupa'a Well No. 1

1. Area A is the recommended location for this exploratory well. This portion of the pasture appears to have been bulldozed in the past and has a low probability of containing subsurface cultural materials. Area B may contain a site remnant.
2. Work at the inventory level is recommended for Area B if it is chosen for the exploratory well.

Future pipeline trench pathways

1. An archaeological inventory survey is recommended for future transmission lines associated with both Kanoa Well No. 1 and Kupa'a Well No. 1.

Please contact us if you have any questions about this letter report.

Sincerely,



Erik Fredericksen

c. Sara Collins, SHPD

APPENDIX – B

The North Waihee Aquifer: An Additional Water Source for Central Maui

THE NORTH WAIHEE AQUIFER
AN ADDITIONAL WATER SUPPLY SOURCE FOR CENTRAL MAUI

John F. Mink
Mink and Yuen, Inc.

April 10, 1997

Introduction

The Iao Aquifer System, which for managerial purposes is defined as the region between Waikapu Valley and Waihee Valley, has satisfactorily supplied Central Maui with drinking water since the Mokuhaui wells were drilled more than 30 years ago. The aquifer system is large with an assigned sustainable yield of 20 mgd, but demand has already reached this level and threatens to substantially exceed it in the next few years. New sources of drinking water are needed to meet increasing demand.

As the exploitation of the Iao Aquifer was undergoing considerable expansion with the drilling of the Waiehu Heights and Waiehu wells in the late 1970s and the early 1980s, it became evident that additional sources needed to be located and put on line a decade or so in the future. The region north of Waihee Valley was considered a prime

candidate for groundwater production, but at first most attention was given to developing groundwater in East Maui. The East Maui initiative has been delayed, however, by the discovery of pesticides in newly drilled wells and by legal challenges, leaving the North Waihee groundwater resource as the obvious choice for timely additional development.

Construction of a pipeline connecting North Waihee with the Central Maui distribution network is underway, and two potential production wells are in place. The North Waihee Aquifer will be developed in phases, the first of which incorporates the existing wells and the drilling of two new wells. Details of future phases will depend on the behavior of the aquifer in response to pumping following completion of the first phase.

Relationship Between Iao and North Waihee Aquifer Systems

After it was recognized that production from the Iao Aquifer System would not be able to match the increasing demand in Central Maui, attention turned to the region north of Waihee Valley as a prospective source of additional groundwater. In 1980 Dan Lum, then hydrologist with the State Department of Water and Land Development (DOWALD), suggested that exploratory drilling be attempted on the slope of the ridge

just north of the Waihee River to test whether the area was an extension of the Iao Aquifer System or could be treated as an independent groundwater province. About at the same time Stephen Bowles, consulting hydrologist, recommended essentially the same course of action. Subsequently John F. Mink was retained by C. Brewer Co., owner of the land, to locate drilling sites and design a drilling and testing program.

Two wells were drilled in 1981 and the groundwater data compared with the original premise that if North Waihee was an uninterrupted extension of the Iao Aquifer System, the head should be at least 15 feet, based on the head at Test Hole A-1 located 4000 feet across the valley to the south, and the corollary that if the head were 5 feet or less, the aquifer would be independent of the Iao System. In fact, the head at the exploratory wells was about 10 feet while the head at Test Hole A-1 was nearly 20 feet. This relationship suggested that the Iao Aquifer System was hydraulically connected to North Waihee but that Waihee Valley behaved as a low permeability impediment to hydraulic continuity. The lack of response of groundwater levels at Test Hole A-1 to pumping at the North Waihee wells further suggested that North Waihee could be treated as a quasi-independent aquifer

system.

The connection between the Iao and North Waihee Aquifer Systems, as well as the dampening effect on hydraulic continuity exercised by the low permeability associated with the alluvium and weathered zone in Waihee Valley, is indicated by comparing the continuous head records at Test Hole A-1 and North Waihee Well 1. The head trace for the test hole is synchronous with that at North Waihee but higher by about 7 feet. If the normal groundwater gradient in basal aquifers of the shield basalts characteristic of every island in Hawaii governed flow, the difference in head would be less than 1 foot. The exaggerated difference is a result of head loss as the groundwater moves through the valley. Global hydraulic conductivity in the valley is at least two magnitudes less than in the unweathered basalt aquifer. A derivation based on Darcy's law indicates that the global hydraulic conductivity of the impediment is about 25 ft./day compared with normal basalt conductivity of 1500 ft./day.

Knowledge of the hydrogeology of both the Iao and North Waihee Aquifer Systems is insufficient to unequivocally establish the pattern of groundwater flow in and from the

aquifers. However, assuming that the general direction of groundwater flow in the Iao Aquifer is toward and across Waihee Valley, the North Waihee System would then be recharged by excess groundwater from Iao as well as by recharge from the high rainfall region north of Waihee Valley. As a result, the sustainable yield of the North Waihee System is substantial. Its magnitude, now estimated to be 8 mgd, will be more accurately determined after an operational record of pumping is established. The sustainable yield refers to the entire North Waihee Aquifer System, which extends from Waihee Valley north to Kahakuloa Valley.

Hydrogeology of the North Waihee Aquifer System

In the Iao Aquifer System the basal aquifer in the Wailuku basalt formation is covered by a caprock of sediments extending to approximately 8000 feet inland of the coast. The inland boundary of the basal aquifer is the rift zone lying about 12,000 feet from the coast and approximately parallel to it. Heads are high in the aquifer because the low permeability of the caprock sediments prevent easy discharge of the groundwater.

This sedimentary blanket, which north of Iao Valley is more

than 1200 feet deep at the coast, is truncated at Waihee Valley. North of Waihee the volcanic rock formations reach to the coast; if a sedimentary blanket exists, it lies below sea level and does not play a role in the North Waihee hydrogeology. The absence of sediments north of Waihee Valley suggests that the sector to the south was displaced downward as a result of faulting, and that the fault itself is along what is now Waihee Valley. South of Iao Valley the deep sediments continue beyond Waikapu, but are absent where the Isthmus terminates. The faulted block, therefore, is a wedge truncated on the north at Waihee Valley and ending in the south where the isthmus sediments abut the basalt bedrock.

Although a sedimentary caprock does not exist in the North Waihee Aquifer System, nevertheless north of Waihee Valley a caprock composed of a volcanic formation resists drainage from the basal lens into the sea. The formation constituting the aquifer is the Wailuku basalt, a highly permeable medium equivalent to other premium aquifers such as the Koolau basalt of Oahu in its water bearing properties. In the region between Waihee Valley and Waiolai Gulch, and perhaps beyond to Wailena Gulch, the Wailuku basalt is covered by the Honolua formation, a low permeability combination of

andesite and trachyte in which even lower permeability soil and ash layers are stratified. The Honolua averages about 100 feet in thickness and completely caps the Wailuku basalt to the coast and out to sea. This formation behaves as a caprock in the region where the proposed additional groundwater development is to take place. Figure 1 illustrates the geology of the region.

The Honolua formation is a pale tan to gray to white rock, massive and dense with platy cleavage. Individual andesite layers average about 40 feet thick, and trachyte layers are as much as 150 feet thick. In contrast, the primitive basalt of the Wailuku formation is piled in layers normally 10 feet or less thick throughout which many highly permeable clinker layers occur. A weak unconformity separates the Wailuku from the overlying Honolua, but the volcanism that produced these rocks was continuous, though eruptions were less frequent during the extrusion of the Honolua formation. Nowhere in West Maui is the Honolua exploited as an aquifer.

For convenience in classification and management, the North Waihee Aquifer System is defined as the region extending northward from Waihee Valley to Kahakuloa Valley. The basal portion may be disrupted near Makamakaole Valley by massive

Honolua dikes that connect the trachyte eruptive centers at Puu Kukui and Eke at the crest of the West Maui Mountains with trachyte bulbous domes near the coast, such as Puu Olai (Figure 1). Inland the basal sector ends at the rift zone which is about at and parallel to the Forest Reserve boundary 7000 feet from the coast. In the entire North Waihee Aquifer System the sustainable yield is estimated as 8 mgd; between Waihee and Makamakaole it is less.

North Waihee Wells 1 and 2: Drilling and Testing

In 1981 C. Brewer Co. had two wells drilled in its property on the north bank of Waihee Valley. The wells are located about 500 feet from the axis of the valley and 5200 feet inland from the valley mouth at Waihee Point. The purpose of drilling was exploratory, to determine aquifer characteristics, ground water levels and quality, but the wells were constructed and completed for use as production wells. The locations of wells in the North Waihee Aquifer System is given in Figure 2.

The wells were located to avoid a deep section of valley fill sediments. They were driven from elevation 280 feet through 100 feet of talus into the the Wailuku basalt. The Honolua formation is missing at this level on the slope of

the ridge. The initial head was 9 to 10 feet, which was higher than expected if the aquifer were independent of the Iao Aquifer System to the south yet lower if it were connected. At the time the head at Test Hole A-1, 4000 feet to the south in the Iao Aquifer, was 20 feet during periods of low to no pumping at the Mokuahu and Waiehu wells.

Each well was drilled to 105 feet below sea level (BSL) and fitted with 16 inch diameter blank casing to 5 feet BSL, and screen between 5 and 25 feet BSL. The remaining 80 feet was left open.

The pump test in 1982 employed North Waihee 2 as the pumping well and North Waihee 1 as an observation well. The wells are on a line parallel to the valley, 176 feet apart. A continuous 48 hour test at a rate of 1700 gpm (2.45 mgd) was performed. Analysis of the test results determined the transmissivity of the aquifer as 325,000 sq.ft./day and the storage coefficient as .25. Salinity of the pumped water was very low and constant at 15 mg/l chloride. No effect on the head at Test Hole A-1 could be detected, nor were any boundary effects indicated by the drawdown curve.

The test proved the occurrence of a substantial groundwater

resource north of Waihee Valley, and the results implied that the connection with the Iao Aquifer System was weak. The wells were capped. Interest in them flagged because draft in the Iao Aquifer System was still significantly less than the assigned sustainable yield.

Interest was rekindled in 1989 when Iao pumpage began to approach sustainable yield. A longer test with expanded data collection opportunities was designed. An observation well was drilled in Kanoa Valley about 2000 feet north of the North Waihee wells and equipped with a continuous water level recorder. An existing small diameter well in Wailena, 13,500 feet north of the North Waihee wells, was also equipped with a continuous water level recorder. The Wailena well had been drilled in 1987. Test Hole A-1 and North Waihee Well 1 also had continuous water level recorders. North Waihee 2 was selected as the pumping well. Another well in the region, the Mendes well (Figure 2), was not available for measurements. This well has a 4 inch diameter casing and is fitted with a 5 HP pump capable of yielding 20 to 30 gpm. It is infrequently pumped.

Ground elevation at the Kanoa observation well is 305 feet. The drilling log places the Honolulu/Wailuku contact at depth

248 feet (57 feet ASL). The initial head was 12.4 feet. The Wailena well ground surface is at 608 feet, and the well lies at the inland turn of the road nearly on the axis of the valley. The Honolulu formation is absent in Wailena, and the well penetrated only the Wailuku basalt. The initial head at completion of drilling in 1987 was 6.4 feet while just before commencement of the test it was 6.6 feet. At the start of the test head in North Waihee 1 was 11.5 feet and in North Waihee 2 it was 10.7 feet. At Test Hole A-1 in the Iao Aquifer System the head was 18.1 feet. Heads at Kanoa and North Waihee were inconsistent with a flow net that would have groundwater passing northward from Waihee Valley toward Makamakaole as might be interpreted if flow crossed Waihee Valley from Iao to North Waihee.

The pump test lasted four days, from May 15 to May 19, 1989. The average rate of pumping over the 96 hours was 2400 gpm (3.46 mgd). Drawdown in North Waihee 2, the pumping well, stabilized at 5.5 feet, and in North Waihee 1, 176 feet away, it reached 0.7 feet. At the Kanoa observation well drawdown peaked at 0.4 feet. Tidal efficiency at Kanoa is high because the well lies just 2000 feet from the coast, and the range and distribution of drawdowns on the chart reflected this efficiency. At Wailena and Test Hole A-1 no

change in head attributable to the pumping could be detected. The drawdown curves for North Waihee 1 and Kanoa did not indicate the presence of flow boundaries.

The test results were evaluated both graphically and by computer program to yield values for the fundamental aquifer properties of transmissivity and storage coefficient (effective porosity). At North Waihee 1 transmissivity computed from drawdown data was 320,000 sq.ft./day and storage coefficient .30, about the same as that determined for the 1982 test. The Kanoa data was not as easily interpreted because of the imposition of the tidal signal on the drawdown values. Transmissivity fell between 260,000 and 334,000 sq.ft./day and storage coefficient between .013 and .034. The transmissivity values are consistent with those obtained at North Waihee 1, but the storage coefficient values are a magnitude lower. At the North Waihee wells the computed storage coefficients may represent local phenomena, whereas the values determined at Kanoa may reflect a regional characteristic. For planning the arrangement of a well field the smaller storage coefficient is likely to be more realistic than the larger one. In the Pearl Harbor region of Southern Oahu, for example, where the Koolau formation resembles the Wailuku basalt the regional storage

coefficient is about .05.

For predictive purposes a transmissivity of 325,000 sq.ft./day and coefficient of storage of .05 will be employed. The transmissivity is representative of a highly permeable aquifer having a substantial depth of fresh water flow. Assuming a hydraulic conductivity of 1500 ft./day, which is a value typical of primitive basalts like the Wailuku formation, and accepting the Ghyben-Herzberg relationship that depth below sea level to the 50 percent sea water isochlor is 40 times the head, the thickness of the fresh water core is calculated as 217 feet and that of the upper limb of the transition zone as $40 \cdot h - 217$ (e.g. for a 10 feet head the upper limb would be 183 feet thick). The calculated thickness of the fresh water core is further constrained by the assumption that the groundwater flow contributing to transmissivity is restricted to this zone. These assumptions lead to approximate, not accurate, estimates of zonation in the basal lens. Nevertheless it is clear that the fresh water core is thick because even under the intense stress of pumping 3.46 mgd from a single well the salinity of the pumped water did not increase.

Proposed Development of the North Waihee Aquifer

The first phase of the North Waihee groundwater development program calls for activation of the two existing North Waihee wells and drilling two new wells. The existing wells were completed to construction standards meeting both the Department of Health and Commission on Water Resources Management recommendations. One of the new wells, Kupaa 1, will be located at an elevation of approximately 575 feet near the C. Brewer Co. property boundary line on a slope inland of Kahekili Highway. The other, Kanoa 1, will be drilled about 75 to 100 feet inland of the existing Kanoa monitor well.

The North Waihee wells are 16 inch diameter (casing) and bottom at 105 feet BSL. The new wells also will be completed as 16 inch diameter wells after testing proves acceptable production capability. However, the first stage in the drilling protocol for the new wells will consist of a pilot hole driven to 50 feet BSL into which a pump can be lowered for a preliminary test. An option will be included to drill deeper in 25 feet increments if results of the preliminary test fail to predict adequate production.

General specifications and the drilling protocol for the two

new wells are as follows.

1. Drill pilot hole to depth 50 feet BSL.
2. Conduct preliminary pump test in open hole; duration two hours or less.
3. Option to deepen drilling in 25 feet increments if preliminary tests fail to show sufficient production capability.
4. At selected depth, ream boring so it can hold 16 inch diameter casing while allowing for a 3 inch annular space for grouting.
5. Conduct another preliminary test of a few hours duration.
6. Select length of blank casing on basis of preliminary tests.
7. Screen is optional; at most, 10 to 20 feet of screen, the remainder of boring open hole.
8. Grout to water table, which is expected to lie about 10 feet above sea level.

Although the North Waihee 2 well was tested for a continuous run of 96 hours at 3.46 mgd, this rate is about twice that allowable for a production well. Upon reviewing the results of the pumping tests of 1982 and 1989, the preliminary recommendation was to fit the wells with 2 mgd (1390 gpm) pumps. This recommendation envisioned a single well field

comprising two wells in the North Waihee Aquifer. Expansion to more than two wells justifies a more prudent recommendation of 1.5 mgd (1040 gpm) per well. The new wells will be tested to determine whether a 1.5 mgd pump would be appropriate, but final pump size will depend on the results of the long term continuous test.

Total well capacity will be 6.0 mgd if each of the four wells is fitted with a 1.5 mgd pump. A scenario in which one of the existing North Waihee wells serves as an inactive stand-by but the other three wells are producers, and assuming that a peaking factor of 1.5 times average output is exercised for the three active wells, average production will total 3.0 mgd. If the capacity of the inactive well is included, the average output will be 4.0 mgd. Whether or not the North Waihee Aquifer between the C. Brewer Co. property line and Waihee Valley can sustain an average yield of 4.0 mgd is not predictable until a record of the effects of pumping operations on water levels and the quality of the pumped water accumulates.

The proposed location of Kupaa 1 is 1000 feet from the Mendes well and 2 miles south of the new Wailena well. At the time of testing the Wailena well had a 4 inch diameter

casing. In 1994 a new well with 6 inch diameter casing was drilled and successfully tested at 200 gpm. Pumping at Kupaa and Kanoa should not affect the Wailena well because of its distance from the proposed wells. The capacity of the Mendes well is too small for either the quality or quantity of its pumpage to be affected.

Figure 1
NORTH WAIHEE
 (Waihee Valley to Kaha Kuloa Valley)
 Scale: 1" = 1 mile.

□ Existing Wells
 ○ Proposed Wells

Geology

Ra; Qd: Recent alluvium and dunes

Pa: Old alluvium

Th: Honolulu formation

Tw: Wailuku formation

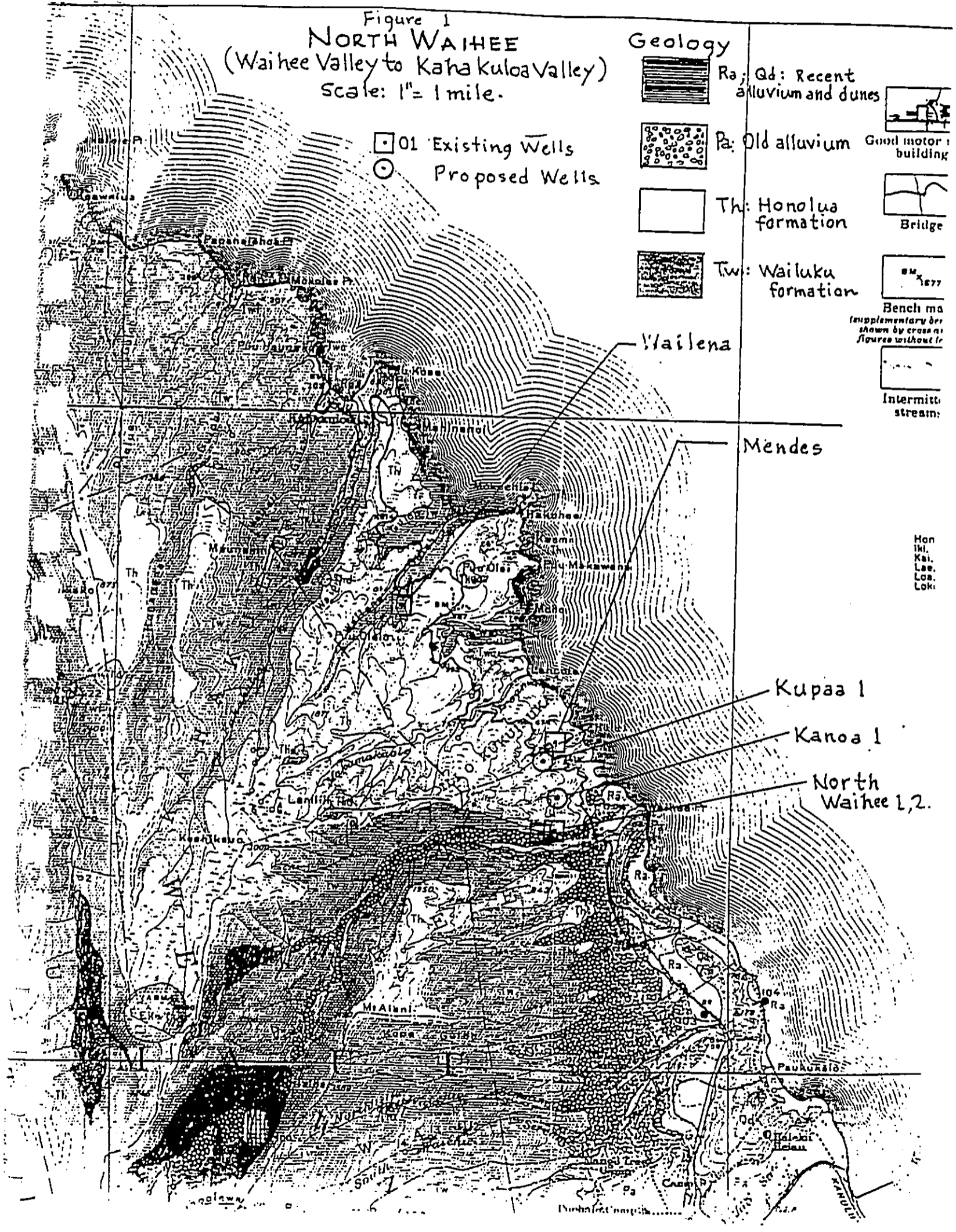
Good motor building

Bridge

Bench mark
 (supplementary bearings shown by crosses at source without it)

Intermittent stream

Hon
 Kai.
 Lee.
 Loa.
 Lohi.



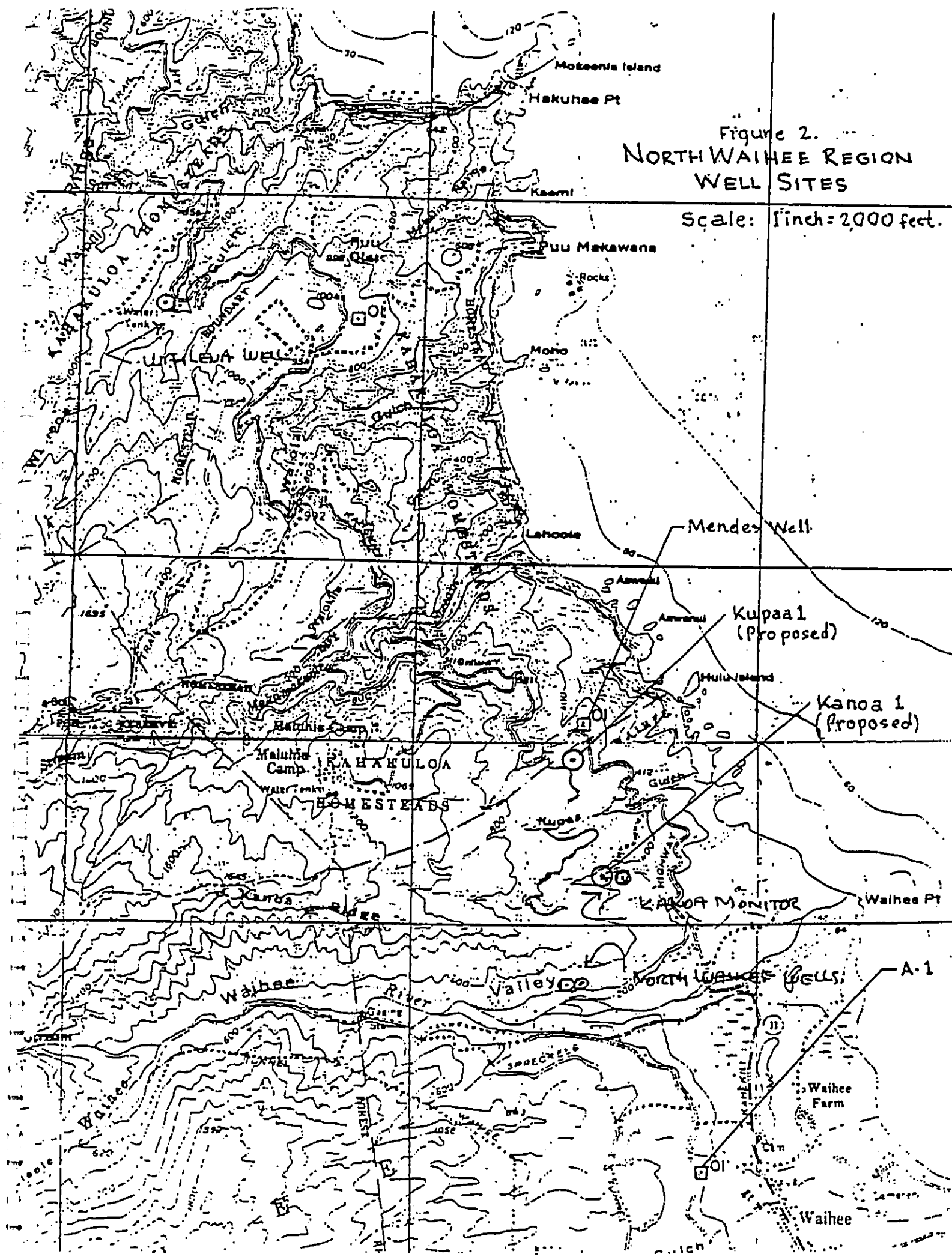


Figure 2.
**NORTH WAIHEE REGION
 WELL SITES**

Scale: 1 inch = 2000 feet.

APPENDIX - C
DRAFT EA COMMENT LETTERS
AND RESPONCES

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

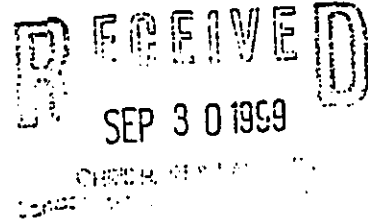


STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809
September 24, 1999

TIMOTHY E. JOHNS
CHAIRPERSON

BRUCE S. ANDERSON
ROBERT G. GIRALDO
BRIAN C. NISHIDA
DAVID A. NOBRIGA
HERBERT M. RICHARDS, JR.

LINNEL T. NISHIOKA
DEPUTY DIRECTOR



Mr. Michael J. Summers
Chris Hart and Partners
1955 Main Street, Suite 200
Wailuku, Hawaii 96793

Dear Mr. Summers:

SUBJECT: Kanoa Wells 1 & 2 (Well Nos. 5731-02 & 04), Draft Environmental Assessment

FILE NO.: 97-023

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 Land 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.
- We recommend that no development take place affecting highly erodible slopes which drain into streams within or adjacent to the project.
- 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:

1) Please be advised of our naming convention for these wells to avoid confusion. The original North Waihe'e Water Source Development Plan called for four wells, which originally were anticipated to be in the same general vicinity. The first two wells were alternatively known simply as "Waihe'e Wells" 1 & 2, very similar to nearby private wells (Waihe'e Tunnels 1 & 2, Well Nos. 5434-01 & 02; and "Waihe'e" (Marino) Wells, of which there may be two or three, Well Nos. 5631-04, for which we have drilling information, and Well Nos. 5631-05 and/or 06, for which permits have expired without any well completion information). It became apparent that the North Waihe'e site could only support two wells, and not at the original hoped-for capacity. Two new sites were identified, which are now called Kanoa #1 and Kupaa #1 (Well Nos. 5731-02 & 03), rather than their original designations as North Waihe'e 3 & 4. Subsequently, Maui Board of Water Supply has applied for and received a permit approval for the construction of a second Kanoa Well (Kanoa #2, Well No. 5731-04).

2) The pump tests for the Kanoa #1 and Kupaa #1 Wells indicate that the appropriate pump capacity will not exceed 1.15 mgd. Our staff will base our pump installation approval upon an assessment of expected results from simultaneous pumping from all wells in the area.

If there are any questions, please contact Charley Ice at 587-0251.

Sincerely,

LINNEL T. NISHIOKA
Deputy Director

Cl:ss



1949 - 1999: Celebrating 50 Years of Service

DEPARTMENT OF WATER SUPPLY

COUNTY OF MAUI

P.O. BOX 1109

WAILUKU, MAUI, HAWAII 96793-6109

TELEPHONE (808) 270-7816 • FAX (808) 270-7833

November 9, 1999

Ms. Linnel T. Nishioka
Deputy Director
State of Hawaii
Department of Land and Natural Resources
Commission on Water Resource Management
P.O. Box 621
Honolulu, Hawaii 96809

RE: Kanoa Wells 1 & 2, Draft Environmental Assessment (Well Nos. 5731-02 & 04)

Dear Ms. Nishioka,

Thank you very much for your comments dated September 24, 1999, regarding the above-referenced Draft Environmental Assessment.

We have incorporated your comments regarding State Well Nos. and pumping capacity at Kanoa Well No. 1 and Kupaa Well No. 1 into the Final Environmental Assessment for the reader's clarification.

Should you have any questions, Please call our Engineering Division at 808- 270-7835, or Mr. Rory Frampton of Chris Hart & Partners at 808-242-1955.

Sincerely,

David R. Craddick
Director

Cc: Mr. Herbert Kogasaka, DWS Engineering Div.
Mr. Carl Takumi, Takumi Engineering, Inc.
Mr. Rory Frampton, Chris Hart & Partners

"By Water All Things Find Life"

BENJAMIN J. CAYETANO
GOVERNOR



COPY

GENEVIEVE SALMONSON
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4186
FACSIMILE (808) 586-4188

October 22, 1999

Mr. David Craddick, Director
Department of Water Supply
County of Maui
200 South High Street
Wailuku, Hawaii 96793

OCT 22 1999

Dear Mr. Craddick:

Subject: Draft Environmental Assessment for the North Waihee
Water Source Development, Kanoa Well Nos. 1 and 2, Maui

Thank you for the opportunity to review the subject document. We have the following comments and questions.

1. Please provide data on the anticipated depth of the wells and the water surface elevation of the basal aquifer.
2. In some instances, a well is developed by private financing, the transfer of public lands to government or private developers, or in return for a water allocation credit to supply an urban development. The EA should include a full discussion of any institutional, financial or land use arrangements or commitments related to developing the well and delivering water to end users.

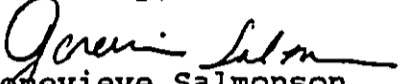
These arrangements may include the formation of public utility companies and subsequent rate-setting, the establishment of county water commitments, the co-funding of state or county water system development, an executive order or other set-aside of state lands, and purchase of land or easements by public entities.

Any or all of these arrangements and all permits or governmental approvals required to fulfill these commitments should be listed.

Mr. Craddick
Page 2

If you have any questions please call Jeyan Thirugnanam at 586-4185.

Sincerely,


Genevieve Salmonson
Director

c: Chris Hart and Partners



1949 - 1999: Celebrating 50 Years of Service

DEPARTMENT OF WATER SUPPLY

COUNTY OF MAUI

P.O. BOX 1109

WAILUKU, MAUI, HAWAII 96793-6109

TELEPHONE (808) 270-7816 • FAX (808) 270-7833

November 9, 1999

Ms. Genevieve Salmonson
Director
State of Hawaii
Office of Environmental Quality Control
235 South Beratania Street, Suite 702
Honolulu, Hawaii 96813

RE: Draft Environmental Assessment for the North Waihee Water Source
Development Project, Kanoa Well Nos. 1 and 2

Dear Ms. Salmonson:

Thank you very much for your comments dated October 26, 1999, regarding the above-referenced Draft Environmental Assessment.

1. Anticipated well depth and depth of groundwater.

Kanoa Well No. 1 -- The well is situated at approximately 310 feet above mean sea level (msl) and has been drilled 359 feet below ground surface, or about 50 feet below msl. The water surface elevation of the basal aquifer is at elevation 7.93 feet above msl.

Kanoa Well No. 2 -- The well is situated at approximately 275 feet above msl and will be drilled approximately 325 feet below ground surface, or about 50 feet below msl.

2. Institutional, financial, or land use arrangements.

The Board of Water Supply, County of Maui, will finance both wells. Upon completion, the Maui County Department of Water Supply will operate and

"By Water All Things Find Life"

Ms. Genevieve Salmonson
November 9, 1999
Page 2

maintain the facilities. There will be no water allocation credits, institutional, financial, or land use arrangements or commitments related to developing the wells and delivering water to end-users. The landowner is Wailuku Agribusiness, Inc. and the Board of Water Supply has a perpetual easement for the wells and their appurtenances.

Should you have any questions, Please call our Engineering Division at 808- 270-7835, or Mr. Rory Frampton of Chris Hart & Partners at 808-242-1955.

Sincerely,



David R. Craddick
Director

Cc: Mr. Herbert Kogasaka, DWS Engineering Div.
Mr. Carl Takumi, Takumi Engineering, Inc.
Mr. Rory Frampton, Chris Hart & Partners

JAMES "KIMO" APANA
Mayor

JOHN E. MIN
Director

CLAYTON I. YOSHIDA
Deputy Director



COUNTY OF MAUI
DEPARTMENT OF PLANNING

October 12, 1999

OCT 14 1999

Mr. Michael Summers
Chris Hart & Partners
1955 Main Street, Suite 200
Wailuku, Hawaii 96793

Dear Mr. Summers:

RE: Draft Environmental Assessment (DEA) for the North Waihee
Water Source Development Kanowa Well Nos. 1 and 2

Thank you for the opportunity to comment on this DEA. We have reviewed the document and have no comments to offer at this time.

If you have any questions, please contact Mr. William Spence, Staff Planner, of this office at 270-7735.

Very truly yours,

A handwritten signature in black ink, appearing to read "John E. Min".

JOHN E. MIN
Planning Director

JEM:WRS:cmb

c: Clayton Yoshida, AICP, Deputy Director of Planning
William Spence, Staff Planner
General File
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