

**BOARD OF WATER SUPPLY**

CITY AND COUNTY OF HONOLULU  
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*Waipahu Wells II  
Addition*

JEREMY HARRIS, Mayor  
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MAURICE H. YAMASATO, Vice Chairman  
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JONATHAN K. SHIMADA, PhD  
BARBARA KIM STANTON

RECEIVED

March 7, 1997

'97 MAR 12 P12:10  
RAYMOND H. SATO  
Manager and Chief Engineer

OFFICE OF ENVIRONMENTAL  
QUALITY CONTROL

Mr. Gary Gill, Director  
Office of Environmental Quality Control  
235 South Beretania Street, #702  
Honolulu, Hawaii 96813

Dear Mr. Gill:

Subject: Finding of No Significant Impact for the Board of Water Supply's Proposed  
Waipahu Wells II Addition, Waipahu, Oahu, TMK: 9-4-07: 37

The Board of Water Supply has reviewed the comments received during the public comment period which began on September 23, 1996. We have determined that the environmental impacts of this project have been adequately addressed as discussed in the final environmental assessment (EA) and are therefore, issuing a finding of no significant impact. We request that our proposed exploratory well project be published as finding of no significant impact in the next Office of Environmental Quality Control (OEQC) Bulletin.

Attached are the completed OEQC bulletin publication form and four copies of the final EA for your review.

If you have any questions, please contact Barry Usagawa at 527-5235.

Very truly yours,

  
RAYMOND H. SATO  
Manager and Chief Engineer

Attachments

cc: George Yuen and Associates, Inc.

1997-03-23-0A-FFA-Waipahu Wells II  
Addition

MAR 23 1997  
FILE COPY

**Environmental Assessment**

**Proposed Exploratory Well - Waipahu Wells II Addition**

**Waipahu, Oahu, Hawaii**

**TMK: 9-4-07:37**

*Prepared for:*

**Honolulu Board of Water Supply**

**Honolulu, Hawaii**

*Prepared by:*

**George A.L. Yuen & Associates, Inc.**

**100 North Beretania Street, Suite 303**

**Honolulu, Hawaii**

**February 1997**

**Environmental Assessment**  
**Proposed Exploratory Well - Waipahu Wells II Addition**  
**Waipahu, Oahu, Hawaii**  
**TMK: 9-4-07:37**

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**Honolulu Board of Water Supply**  
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**February 1997**

## Table of Contents

	Page
I. Authority	2
II. Proposing Agency	2
III. Description of the Proposed Project	2
IV. Permits and Approvals Required	4
V. Purpose of Project	5
VI. Description of the Affected Environment	6
VII. Archaeological Considerations	7
VIII. Flora-Fauna	7
IX. Flood Hazards	8
X. Earthquake Hazards	8
XI. Potential Environmental Impacts and Mitigative Measures	9
A. Noise and Dust Control	9
B. Traffic Congestion	10
C. Effect on Landscaping	10
D. Drainage and Flooding	11
E. Hydrologic Considerations	11
1. Sustainable Yield	14
XII. Alternatives to Proposed Project	14
A. No Action	15
B. Other Sources	15
C. Alternate Sources	15
D. Conservation	15

	Page
XIII. Findings and Determinations	16
XIV. References	17
APPENDIX A. Individuals and Agencies Consulted in Preparing this Assessment	18
APPENDIX B. Individuals and Agencies Receiving Copies of the Draft Environmental Assessment for Comments	19
APPENDIX C. Comments and Responses to the Draft Environmental Assessment	20
APPENDIX D. Effect of Waipahu Wells II on Waialeale Spring Flow	21
APPENDIX E. Site Plan From Preliminary Engineering Report, Well #3 (State Well No. 2400-08)	22
APPENDIX F. Water Quality Data - Waipahu Wells II	23

**List of Figures**

	Page
1. Location Map for Waipahu Wells II Addition	24
2. Map of Existing Wells in Area, Waikele Springs and West Loch	25
3. Site Plan for Waipahu Wells II Addition	26
4. Land Use Map in the Waipahu Wells II Area	27
5. Photographs of facilities and landscaping in Waipahu Wells II Station	28
6. Photographs of facilities and landscaping in Waipahu Wells II Station	29
7. Well Cross Section - Waipahu Wells II	30
8. Photographs of area around Waipahu Wells II	31

**I. Authority**

This environmental assessment is for the proposed drilling, casing, and testing of an exploratory well located within the existing Board of Water Supply (BWS) Waipahu Wells II property in Waipahu, Oahu, Hawaii. The assessment is prepared in accordance with Chapter 343, Hawaii Revised Statutes (HRS). Any project proposing the use of State of Hawaii or county lands or funds must comply with Chapter 343, HRS.

**II. Proposing Agency**

The proposing agency for this project is the Honolulu BWS, City and County of Honolulu.

**III. Description of the Proposed Project**

This project involves the drilling of an exploratory water production well located within the grounds of the BWS's existing Waipahu Wells II facility (TMK: 9-4-07:37) at an elevation of approximately 210 feet (see Figure 1 - Location Map). Figure 2 shows the project and other wells in the area. Ownership of the property is with the BWS. The proposed location of the new well is shown in the north-eastern corner of the property. Figure 3 is a plan view of the existing well, pumping, storage and treatment system. Figure 4

shows the site of the proposed well on the Land Use Map. Figures 5 and 6 show photographs of the landscaping and facilities at the Waipahu II site.

The overall diameter of the well is 18 inches with a 14 inch casing and a 2 inch grout-filled annulus. The total depth of the well is about 360 feet with a casing length of about 250 feet. This will leave an uncased bore of about 110 feet. The well is expected to yield 1.5 million gallons per day (mgd). Figure 7 is an approximate cross section of the well.

The time required for well drilling, installation of the casing, and test pumping will be about six months. Estimated cost of the project is \$200,000.

The roadway to the existing well site will be used for part of the access road to the project site. A temporary access road will be used for the remainder of the access to the new well site. If test pumping results are favorable, a permanent road will be built to serve as access to the new well. In addition, if the pump tests are favorable, the Waipahu Wells II addition will be integrated into the existing municipal potable water system. Installation of the permanent pumps, pipelines, and necessary electrical and mechanical control devices is expected to take up to an additional ten months, at an additional cost of \$1,200,000.

The proposed well addition, if exploratory pump testing results are successful, will be operated with three existing 1.5 mgd wells at the BWS's existing Waipahu Wells II facility.

For production of 1.5 mgd, four additional Granular Activated Carbon (GAC) contactors at a capital cost of about \$2 million will be required. The contactors remove target contaminants Ethylene Dibromide (EDB) and 1,2,3 Trichloropropane (TCP) from groundwater supplies used for potable water. EDB and TCP have been detected in the existing wells at the Waipahu II site. Water quality tests during the test pumping of the exploratory well will verify the water treatment requirements. Operating costs of up to

\$50-\$75,000 per year can be expected. The BWS anticipates operating four 1.5 mgd wells, assuming test pumping results are favorable. Based on that probability, the questions of the capacity of the existing control building and space for the additional GAC contactors must be considered. Another item for consideration would be the possibility of using aeration methods rather than GAC for decontamination. The former could result in significant savings in capital and operating costs, however, there are also drawbacks such as air pollution, sanitary control of the water supply and loss of pump head.

#### IV. Permits and Approvals Required

1. Well Construction Permit from the State Commission on Water Resource Management (CWRM).
2. Water Use Permit from CWRM.
3. Pump Installation Permit from CWRM.
4. Noise Permit from the Noise and Radiation Branch, State DOH.
5. Well Completion Report to CWRM.
6. Approval of an 11-200-29 engineering report by the Safe Drinking Water Branch, State DOH.
7. Discharge of effluent from well test pumping into the municipal storm sewer from the Department of Public Works.

V. Purpose of Project

The project is part of the County's water use and development plan to meet increasing water needs in the leeward area, particularly demands in the general vicinity of the project. Designated growth areas such as Central Oahu and Ewa will benefit from this project. Water from this project is part of the low service water system which could be used to support the second city of Kapolei or be transported to Honolulu via the existing 42 inch main transmission system.

The two major development plan districts to benefit from the Waipahu Well II Addition would be the Central Oahu and Ewa districts. Projected population growth and water demand in these districts are as follows:

<u>Central Oahu District</u>	<u>1995</u>	<u>2010</u>	<u>15-yr % increase</u>
M-K population served	117,329	132,425	12.9
Water demand (mgd)	16.64	18.78	12.9
<u>Ewa District</u>			
M-K population served	53,353	120,576	126
Water demand (mgd)	15.00	33.89	126

\* Figures from Oahu Water Management Plan.

The major growth will occur in the Ewa District where the Secondary Urban Center is being planned.

The Waipahu Wells II Addition is a proposed BWS well project within the Waipahu-Waiawa Sector of the Pearl Harbor Groundwater Management Area. If the tests for the quantity and quality of the groundwater from the well addition prove to be successful, the BWS intends to convert this well into a production well and integrate it into the BWS's Oahu potable water source, storage, and transmission system. The

Waipahu Wells II Addition, if converted to a production well, is expected to be able to yield about 1.5 mgd of potable water.

#### VI. Description of the Affected Environment

The well site is situated in the property in which the BWS's existing Waipahu Wells II facility is located. It is also adjacent to the 1.0 million gallon Waipahu Reservoir No.2 site. The area around the well site is the Waikele development zoned as urban in the State Land Use District. Under city zoning, it is classified as R-5.

The Waipahu II site is on the mauka-ewa corner of Lumiaina and Kukula Streets. The site accommodates three wells, a 1.0 million gallon concrete reservoir, four GAC contactors, a backwash water tank, a control building, and three booster pumps. The grounds are completely fenced with an access gate at the corner of Kukula Street. The two street frontages are planted with tall trees partially concealing the facility.

The parcel of land immediately mauka of the site is presently unused and is overlain by an assortment of grasses, shrubbery and bare soil. To the east, single family homes front Kukula Street. A public park occupies the parcel on the west side and is bordered by duplex housing on two sides. West of the park, the Park Glen development occupies the land. Kukula Street continues south of Lumiaina Street opposite Waipahu II. Figure 8 shows two photos of the area around the Waipahu II station.

Temperatures in the area range from 65 degrees F to 85 degrees F. Average rainfall is about 30 inches per year.

Waikele stream is approximately a half-mile away to the West. Drainage is through existing catch basins which connect to the City's drainage system. Water drained from the site would outfall into the Waikele Stream.

#### VII. Archaeological Considerations

The proposed well will be located in an area which is the site of an existing BWS facility. According to BWS records, grading of the site did not uncover anything of historical or archaeological significance. The State Historic Preservation Division also has no record of the presence of historical remains at the site due to the extensive agricultural activity of the Oahu Sugar Co.

However, if well drilling or roadway construction should uncover any archaeological remains, construction will cease and the State Historic Preservation Division would immediately be contacted.

#### VIII. Flora - Fauna

The proposed well is located within an area previously developed and landscaped by the BWS. Planted on the site are wiliwili trees almost exclusively. A few hibiscus plants are found near the fence line. Clyde Imada, a botanist with the Bishop Museum, feels that none of the trees or plants are endangered species. This has been confirmed by botanist Winona Char. During construction, care will be taken to protect all trees and plants against damage.

Dr. Dan Polhemus, biologist with the Bishop Museum-Smithsonian Institute, believes that it is unlikely that any rare or endangered species of animal life is inhabiting the site. Animals probably living in the area are

common to the Hawaiian Islands. Typical of these are geckos, rats, and mongooses. A few small feral animals may also be found. Amphibians such as toads and frogs may be found. In the opinion of Dr. Robert Pyle, an ornithologist with the Bishop Museum, common birds which may frequent the site are doves, mynahs, cardinals, white eyes, bulbuls, finches and pigeons. None of these is endangered or native to the islands. The birds may be disturbed if the drilling operations were 50 yards or so away, but they would not be adversely affected and will return after drilling stops. According to Dr. Pyle, the area is not frequented by seabirds or wetland birds.

The U.S. Fish and Wildlife Service does not anticipate direct adverse impacts to fish and wildlife because the well is within previously disturbed agricultural lands.

#### IX. Flood Hazards

The City and County of Honolulu Flood Insurance Map shows that the well site is located within flood zone "D". This classification means that flood hazards in the area have not been determined. However, the existing Waipahu Wells II facility is part of the master planned Waikele development where adequate drainage systems were installed.

#### X. Earthquake Hazards

Under the Uniform Building Code (UBC), the island of Oahu is designated as Seismic Zone 1, which in a scale from 1 to 4, is the zone with the lowest potential for ground motion created by seismic events. The UBC establishes minimum design criteria for structures to resist the effects of seismic ground motion, in accordance with the standards for the seismic zone in which the structure is to be built. In the interest of public health and safety, the BWS has adopted the standards for Seismic Zone 3 for all of its structures.

All structures that will be built as part of this project will be designed and built in accordance with the UBC standards for Seismic Zone 3.

#### **XI. Potential Environmental Impacts and Mitigative Measures**

Potential environmental impacts will be short-term and confined primarily to noise, effluent discharge, and dust problems associated with construction of a short access road and drilling and test pumping of the well. These problems will be intermittent and will last about six months which is the duration of the project.

Test pumping of the well will be done in two phases. After the well has been properly cleaned out, the yield-drawdown pump test is run. This test consists of pumping at increasing rates to determine the drawdown. Upon completion of this phase, which should be completed within a few hours, the long-term sustained pump test is run. From the data in the yield-drawdown pump test, a sustained pumping rate is determined. The well is pumped at the sustained rate for a period of five to seven days. Pumps, rates and water levels are monitored throughout the test period.

Pump test water will be discharged into the City's storm drain system for which the Board of Water Supply has obtained a blanket general permit. The test pumping effluent discharge permit can be obtained through the Storm Water Quality Section of the Department of Public Works (ph: 527-6105).

##### **A. Noise and Dust Control**

Although the contractor will be required to observe all laws, ordinances, and regulations regarding noise and dust control, there is a possibility that minor nuisances may emerge. These would be temporary and not too serious because the closest residence is located about 300 feet from the well site.

To mitigate the effects of the construction activities, dust control measures, such as water sprinkling and dust screens, will be implemented by the contractor to reduce dust levels, as necessary. Further, the contractor will properly maintain its internal combustion equipment to minimize exhaust emissions, and will comply with the Hawaii Department of Health (DOH) Rules, Title 11, Chapter 59 and 60, regarding pollution control.

Contractors will comply with all of the conditions of the required noise permit. Mufflers will be required for all construction equipment. All noise attenuating equipment will be maintained in proper operation condition and will be repaired or replaced as needed. Drilling operations will be restricted to the hours of 7:30 a.m. to 3:30 p.m. on weekdays and will not include holidays.

To reduce pump noise levels during the test pumping, a surface pump may be installed with mutes, or a submersible pump, which will reduce noise considerably, may be installed. If the test pumping is successful, and permanent pumps are installed, a surface pump with mutes may be installed, or a submersible pump may be installed to reduced noise levels to less than the regulatory limit. The three existing wells are equipped with lineshaft deep well pumps with no mutes.

#### **B. Traffic Congestion**

Traffic congestion may result only when the drilling rig is moved into the work area from Lumiaina Street. This is normal operation for the drilling contractor who is aware of the precautionary measures to be observed.

#### **C. Effect on Landscaping**

Landscaping on the well site may be temporarily affected but restoration and new plantings will be done by the BWS. Visual impact will be minimized with the existing screening landscaping.

**D. Drainage and Flooding**

Historically, no flooding has been noted by Board of Water Supply employees and staff members. The site is not flood prone because it is on gently sloping high ground with no flood retention terrain features close by. The two street frontages have adequately designed and constructed storm drainage systems and can pass surface runoff to lower areas to the east, south and west. Waikele Stream, about one-half mile to the west is the major surface drain in this area.

During the well drilling operations, the drilling contractor must meet all City and County requirements for disposing of any water entering the storm drain system. This also applies to disposing of pump test water. In addition, the contractor must use the best management practices including settling basins, sand bags, berms, and filters to assure that the drainage of water from the operations will not degrade the receiving water below the standard set by the State Department of Health.

Test pumping will be allowed only during periods of dry weather to prevent overload of the existing drainage system.

**E. Hydrologic Considerations**

The Waipahu II station falls within the Waipahu Aquifer System as originally defined in the Pearl Harbor Aquifer Sector. However, because groundwater flow is continuous between the Waiawa and Waipahu Systems, the State Commission on Water Resources Management (CWRM) has combined both into a single management system, the Waipahu-Waiawa Aquifer System. The remaining system in the Koolau portion of the Pearl Harbor Sector is the Waimalu Aquifer System. It also is hydraulically continuous with the Waiawa System but is retained by CWRM as a separate management area. The Pearl Harbor systems were originally created to simplify management decision-making and not because they were hydraulically separate. The entire Koolau basalt region of the Pearl Harbor Sector is actually a single aquifer.

The basal lenses in the Koolau formation of southern Oahu are considered by investigators at the U.S. Geological Survey and elsewhere to extend as hydraulically continuous aquifers from the Diamond Head Rift zone in the Honolulu District westward to the Koolau/Waianae unconformity that roughly follows and parallels Kunia Road. The northern boundary is the Wahiawa High level aquifer and the northeast boundary is the rift zone in the Koolau mountain range. The caprock of the coastal plain covers the aquifers at the southern, seaward boundary.

Hydraulic continuity exists throughout the extent of the aquifers from Diamond Head to the Koolau/Waianae unconformity, although it is muted by sediments in deep valley fills in Honolulu and to a lesser degree in the Pearl Harbor district. The effect of sedimentary valley fills is most notable in the "isopiestic" areas of Honolulu where heads appear to fall abruptly across Manoa, Nuuanu, Kalihi and Moanalua Valleys. However, these apparently abrupt changes are also evidence of the hydraulic gradient driving groundwater westward that does not discharge over the edge of the caprock or seep into it.

In the Pearl Harbor region the effect of valley fills is not as apparent as in Honolulu. Under static conditions the groundwater potentials are smoothly continuous and are accompanied by flow vectors directed towards the Pearl Harbor springs discharge fronts.

The proposed well will be drilled within the existing Waipahu II site, which already has three wells. It will be about 150 feet from the nearest well and 240 feet from the furthest. The new well will be equipped with a 1.5 mgd pump, as are the three existing wells, and will give the station a total installed capacity of 6 mgd. Average daily pumpage will be 2.64 mgd if the BWS's coefficient of 0.44 is applied to the total capacity. The coefficient is based on daily pumping time of 16 hours and a peaking factor of 1.5 times the average demand. The BWS standard requires additional pumping capacity for higher use periods and to supplement fire flows.

All of the wells in the Waipahu Aquifer System exploit the basal lens in the Koolau basalt. Aquifer parameters are extremely favorable for pumping, heads are high and groundwater flux is large. Regional hydraulic conductivity averages about 1500 ft/day, effective porosity is .05 to .10, regional storage head at Waipahu is about 18 feet, and natural flux in the three aquifer systems (Waimalu, Waiawa and Waipahu) totals 206 mgd (see CWRM Report R-78, 1988, Review and Re-Evaluation of Groundwater Conditions in the Pearl Harbor Groundwater Control Area, Oahu, Hawaii).

Favorable aquifer characteristics will limit the drawdown imposed on the existing three wells due to pumping of the new well. Additional drawdown added to each well would be about 0.22 feet under the most extreme conditions of the well pumping 1.5 mgd continuously for 1000 days. For the well pumping at an average rate of 0.66 mgd (.44 x 1.5 mgd) the added drawdown would be less than 0.1 feet. These values are calculated from the simplified drawdown equation:

$$s = (Q/4T) * \ln\{(2.25Tt)/(r^2S)\}$$

in which s is drawdown (ft), T is transmissivity (hydraulic conductivity \* depth of flow = 1500\*18\*40 = 1,080,000 sq.ft/day), t is time (1000 days), r is distance between wells (ft) and S is storage coefficient (.10).

The Waipahu II well field is 1500 feet directly east of Waikele Stream. The stream at this location is 60 to 70 feet above sea level and therefore does not intersect the basal lens, in which the local head is about 18 feet, to allow seepage into the stream channel. Lower in Waikele Valley, starting about at the H-1 Freeway crossing, springs drain into the stream. Pumping at Waipahu II may affect these springs but not measurably so.\* Springs also break out in the lowland plain between Waipio Peninsula and Waipahu town. Spring flow is the flux remaining downgradient of pumping and other discharge centers.

\* See Appendix D

### 1. Sustainable Yield

The sustainable yield of the Pearl Harbor Systems has not been re-evaluated by the Commission on Water Resources Management since the demise of sugar cane cultivation several years ago. During the time Oahu Sugar Company was active, recharge of the aquifers by irrigation return water had to be factored into the computation of sustainable yield. In the absence of sugar cane's return irrigation, the sustainable yield values employed by CWRM now should be reduced, but this reduction is counter balanced by the large scale cessation of pumpage for irrigation.

However, the possible recharge of the aquifer due to diversified agriculture irrigation must still be considered. Current groundwater production for diversified agriculture and golf courses in the Waipahu-Waiawa Aquifer Systems is only 2.3 mgd, a small fraction of the agricultural allocation of 62 mgd. Unless agricultural demand increases dramatically, an unlikely prospect, the agricultural allocations considered during the next four year review as required by the State Water Code will be drastically reduced as a result of non-use. The goal of the Board of Water Supply is to locate and construct a well in anticipation of the release of water now allocated for agriculture.

Figure 2 indicates the location of the BWS wells, proposed Waipahu II addition and Waipahu IV exploratory wells, approximate location of Waikele Springs, and West Loch of Pearl Harbor, and a number of Oahu Sugar Co. wells located a half mile south of the Waipahu Wells II site.

## XII. Alternatives to Proposed Project

Alternatives to the proposed project include:

1. No action. Abandoning the proposed project.
2. Seeking other sources.
3. Resorting to alternative methods of water production.
4. Conservation

**A. No action**

Abandoning the project may force the BWS to limit new water services to the surrounding areas and possibly to other areas, directly or indirectly. This is contrary to the Board's long-range program of water development and service for planned urban growth wherever environmentally and cost effectively feasible.

**B. Other Sources**

Obtaining water from another source is possible but may not be feasible. The siting of exploratory wells is based on hydrologic studies of all available sources and an evaluation of the cost and effectiveness of the distribution system required. Development of water from the proposed well would be permissible utilizing the BWS bulk allocation from the Waipahu-Waiawa aquifer or if the CWRM reallocates supplies from amongst other permittees to the BWS due to non use.

**C. Alternate Sources**

Desalination and recovery of surface water are possible alternatives but their feasibility is still questionable because of high costs. Other alternatives are still in the research stage and their potential contributions to the total water supply are uncertain at this time. Indirect alternatives such as the treatment of sewage effluent for irrigation and using the potable water now being used for irrigation for municipal use, is possible except for the high cost of treatment, cost of distributing the treated water to points of use, and the BWS's concern of contamination of the potable groundwater aquifer. These questions must be resolved before the use of treated sewage effluent can be a viable alternative for irrigation.

**D. Conservation**

BWS is actively promoting conservation measures to extend our limited potable groundwater supplies as long as possible. With time, technological innovation will reduce capital and operation and maintenance costs of alternative sources. BWS conservation measures include: dual water systems, low flow fixtures, drought tolerant landscaping, public education, inverted block water rates, leak detection and water audits.

Conservation is expected to reduce per capita water demand by 10 percent. Although very significant, the limited quantities saved by conservation does not substitute for continual water source development.

### XIII. Findings and Determinations

1. There are no known historic or archaeological sites in the area.
2. There are no known endangered species of flora or fauna in the area.
3. There are no significant environmental impacts resulting from the project.
4. Dust, noise, effluent discharge, and minimal traffic problems may be expected, but they would only be temporary and controllable.
5. Operation of the well would have no measurable negative impact on Waikole Springs or wells in the general vicinity.

In summary, the proposed project will utilize the grounds of the existing facility more fully to provide additional source capacity to meet the needs of a rapidly growing area. It will not involve any irreversible commitment to loss or destruction of any natural or cultural resource nor will it result in any environmental degradation. There are no serious or long-term detrimental effects on public health and welfare as it relates to dust, noise, air quality, and water quality. The project will result in additional source capacity at an existing facility with minimal environmental effects. With mitigation, the benefits resulting from this project will far outweigh these effects.

In view of the above, it is determined that the proposed project will not have a significant effect on the environment and that an Environmental Impact Statement is not required under Chapter 343, Hawaii Revised Statutes.

#### XIV. References

1. Stearns, H.T. and Vaksvik, K.N., Geology and Ground-Water Resources of the Island of Oahu, Hawaii, (Honolulu, Hawaii, 1935).
2. Final Environmental Assessment, Waipahu Wells III Station, Board of Water Supply, City and County of Honolulu, 1995.
3. Uniform Building Code, 1988 edition.
4. Review and Re-evaluation of Groundwater Conditions in the Pearl Harbor Groundwater Central Area, Oahu, Hawaii, prepared by George A.L. Yuen & Associates, Inc., February 20, 1988.
5. The State of Hawaii Data Book, A Statistical Abstract, 1991, Department of Business, Economic Development and Tourism, Honolulu, Hawaii.
6. The State of Hawaii Data Book, A Statistical Abstract, 1994, Department of Business, Economic Development and Tourism, Honolulu, Hawaii.

APPENDIX A. Individuals and Agencies Consulted in Preparing this Assessment

The following individuals and agencies were Consulted during the preparation of the draft environmental assessment for this project:

Scot Muraoka	BWS Environmental Section
Chester Lao	BWS Geology/Hydrology Section
Tracy Runnels	Roscoc-Moss Hawaii, Inc.
Toni Hahn	Bishop Museum
George Kuo	BWS, Long-Range Planning Section
Clyde Imada	Bishop Museum
Elaine Jourdane	DLNR Archaeologist
Bert Kuioka	BWS, Planning Branch
Staff Member	State Land Use Commission
Staff Member	City Department of Land Utilization
Dr. Robert Pyle	Bishop Museum
Dr. Dan Polhemus	Bishop Museum-Smithsonian Institute
Winona Char	Char & Associates
Barry Usagawa	BWS, Long Range Planning Section
Cliff Jamile	BWS, Plant Operations Division
Glenn Takeshita	BWS, Chemistry Lab

APPENDIX B. Individuals and Agencies Receiving Copies of the Draft Environmental Assessment  
for Comments

**FEDERAL AGENCIES**

1. Department of the Interior  
Fish and Wildlife Service
2. Department of the Interior  
Geological Survey
3. Department of Agriculture  
Natural Resources Conservation Service
4. U.S. Army Corp of Engineers

**STATE AGENCIES**

1. Department of Accounting and General Services
2. Department of Health
3. Department of Land and Natural Resources
4. University of Hawaii at Manoa  
Environmental Center
5. Department of Transportation
6. Office of Environmental Quality Control ✓

**CITY AND COUNTY OF HONOLULU AGENCIES**

1. Department of Land Utilization
2. Planning Department ✓
3. Department of Public Works
4. Department of Wastewater Management
5. Department of Transportation Services

**OTHER GROUPS/ORGANIZATIONS**

1. Waipahu Neighborhood Board No. 22
2. City Councilperson Rene Mansho
3. Senator Cal Kawamoto  
Nineteenth Senatorial District
4. Representative Nestor Garcia  
Thirty Seventh Representative District

APPENDIX C. Comments and Responses to the Draft Environmental Assessment



REPLY TO  
ATTENTION OF

DEPARTMENT OF THE ARMY  
PACIFIC OCEAN DIVISION, CORPS OF ENGINEERS  
FORT SHAFTER, HAWAII 96858-5440

October 1, 1996

Planning and Operations Division

Mr. John Chang  
George A. L. Yuen and Associates  
100 North Beretania Street, Suite 303  
Honolulu, Hawaii 96817

Dear Mr. Chang:

Thank you for the opportunity to review and comment on the Draft Environmental Assessment (DEA) for the Waipahu Wells II Project, Oahu (TMK 9-4-7: 37). The following comments are provided pursuant to Corps of Engineers authorities to disseminate flood hazard information under the Flood Control Act of 1960 and to issue Department of the Army (DA) permits under the Clean Water Act; the Rivers and Harbors Act of 1899; and the Marine Protection, Research and Sanctuaries Act:

a. Based on the information provided, a DA permit will not be required for the project. Please contact our Regulatory Section at 438-9258 for further information and refer to file number 960000374.

b. The flood hazard information provided on page 8 of the DEA is correct.

Sincerely,

*Lawrence O. Muraoka*

Lawrence O. Muraoka, P.E.  
Acting Chief, Planning  
and Operations Division

20A1

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU



COPY

December 4, 1996

Mr. Lawrence O. Muraoka, P.E.  
Acting Chief, Planning and Operations Division  
Department of the Army  
Pacific Ocean Division, Corps of Engineers  
Fort Shafter, Hawaii 96858-5440

Dear Mr. Muraoka:

Subject: Your Letter of October 1, 1996 Regarding the Draft Environmental Assessment for the Proposed Waipahu Wells II Addition, Oahu (TMK: 9-4-7: 37)

Thank you for reviewing the Draft Environmental Assessment (DEA) for the proposed Waipahu Wells II Addition project.

We acknowledge that a Department of the Army permit is not required and that the flood hazard information provided in the DEA is correct.

If you have any questions, please contact Barry Usagawa at 527-5235.

Very truly yours,

RAYMOND H. SATO  
Manager and Chief Engineer

cc: George Yuen, George Yuen and Associates, Inc.

BENJAMIN J. CAYETANO  
GOVERNOR



SAM CALLEJO  
COMPTROLLER

MARY PATRICIA WATERHOUSE  
DEPUTY COMPTROLLER

STATE OF HAWAII  
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES  
P O BOX 119, HONOLULU, HAWAII 96810

LETTER NO (P) 1585.6

OUT 2 1996

Mr. John Chang  
George A. L. Yuen and Associates  
100 North Beretania Street, Suite 303  
Honolulu, Hawaii 96817

Dear Mr. Chang:

Subject: Waipahu Wells II Addition  
Waipahu, Hawaii  
Draft Environmental Assessment

Thank you for the opportunity to comment on the subject action. We have no comments to offer and would have no objection to a negative declaration being filed for this project.

If there are any questions, please contact Mr. Ralph Yukumoto of the Planning Branch at 586-0488.

Very truly yours,

  
GORDON MATSUOKA  
State Public Works Engineer

RY:jk

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU



COPY

December 4, 1996

Mr. Gordon Matsuoka  
State Public Works Engineer  
Department of Accounting  
and General Services  
State of Hawaii  
P. O. Box 119  
Honolulu, Hawaii 96810

Dear Mr. Matsuoka:

Subject: Your Letter of October 2, 1996 Regarding the Draft Environmental Assessment for the Proposed Waipahu Wells II Addition, Oahu (TMK: 9-4-7: 37)

Thank you for reviewing the Draft Environmental Assessment for the proposed Waipahu Wells II Addition project.

We acknowledge that you have no objections to the proposed project.

If you have any questions, please contact Barry Usagawa at 527-5235.

Very truly yours,

For RAYMOND H. SATO  
Manager and Chief Engineer

cc: George Yuen, George Yuen and Associates, Inc.

BENJAMIN J. CAYETANO  
GOVERNOR OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF HEALTH  
P.O. BOX 3378  
HONOLULU, HAWAII 96801

In reply, please refer to:

November 18, 1996

96-160/epo

Mr. John Chang  
George A.L. Yuen and Associates, Inc.  
100 North Beretania Street, Suite 303  
Honolulu, Hawaii 96817

Dear Mr. Chang:

Subject: Draft Environmental Assessment  
Proposed Exploratory Well, Waipahu Wells II Addition  
Waipahu, Oahu  
TMK: 9-4-07: 37

Thank you for allowing us to review and comment on the proposed project. We have the following comments to offer:

Noise Concerns

1. Drilling activities must comply with the provisions of Hawaii Administrative Rules, Chapter 11-46, "Community Noise Control."
  - a. The contractor must obtain a noise permit if noise levels from drilling activities are expected to exceed the allowable levels of the rules.
  - b. The contractor must comply with the requirements as specified in the rules and the conditions issued with the permit.
2. Sound levels emanating from test pumps or permanent pumps must be attenuated to comply with the provisions of Hawaii Administrative Rules, Chapter 11-46, "Community Noise Control."

Should there be any questions on this matter, please call Mr. Jerry Haruno, Environmental Health Program Manager, Noise, Radiation and Indoor Air Quality Branch at 586-4701.

Sincerely,

A handwritten signature in cursive script, appearing to read "Bruce S. Anderson".

BRUCE S. ANDERSON, Ph.D.  
Deputy Director of Environmental Health

c: NR&IAQ Branch

20C1

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU



COPY

December 4, 1996

Bruce S. Anderson, Ph.D.  
Deputy Director of Environmental Health  
Department of Health  
State of Hawaii  
P. O. Box 3378  
Honolulu, Hawaii 96801

Dear Dr. Anderson:

Subject: Your Letter of November 18, 1996 Regarding the Draft Environmental Assessment for the Proposed Waipahu Wells II Addition, Oahu (TMK: 9-4-7: 37)

Thank you for reviewing the Draft Environmental Assessment for the proposed Waipahu Wells II Addition project.

We acknowledge that the proposed project must comply with the provisions of the Hawaii Administrative Rules (HAR), Chapter 11-46, "Community Noise Control", which includes obtaining a noise permit if noise levels exceed the allowable levels of the HAR.

If you have any questions, please contact Barry Usagawa at 527-5235.

Very truly yours,

RAYMOND H. SATO  
For Manager and Chief Engineer

cc: George Yuen, George Yuen and Associates, Inc.

Mr. John Chang  
Page 2

drill and test water to preclude any sediment loading and the degrading of the receiving waters in West Loch, Pearl Harbor. The following mitigation measure should be taken to minimize erosion and siltation during drilling, casing and testing operations:

1. Site work be scheduled for periods of minimal rainfall;
2. Use of some type of trapment (settling basins or tanks) to remove sediments before disposing of the drill and test water into the City's storm drain system; and
3. Petroleum products from heavy vehicles and equipment operation should be prevented from falling, blowing, or leaching into the aquatic environment.

Thank you for the opportunity to review the Draft Environmental Assessment. We have no further comments to offer at this time. Should you have any questions, please contact Patti Miyashiro at 587-0430 of our Land Division.

Aloha,

*Michael D. Wilson*  
for MICHAEL D. WILSON

c: Oahu Land Board Member  
Member at Large

BENJAMIN J. CAYETANO  
GOVERNOR OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
P.O. BOX 621  
HONOLULU, HAWAII 96809

NOV 26 1996

MICHAEL D. WILSON  
CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES

DEPUTY  
GILBERT S. COLOMA-AGARAN

AQUACULTURE DEVELOPMENT  
PROGRAM  
AQUATIC RESOURCES  
BOATING AND OCEAN RECREATION  
CONSERVATION AND  
ENVIRONMENTAL AFFAIRS  
CONSERVATION AND  
RESOURCES ENFORCEMENT  
CONVEYANCES  
FORESTRY AND WILDLIFE  
HISTORIC PRESERVATION  
LAND MANAGEMENT  
STATE PARKS  
WATER AND LAND DEVELOPMENT  
WATER RESOURCE MANAGEMENT

Ref.:LD-PEM

Mr. John Chang  
George A.L. Yuen and Associates  
100 North Beretania Street, Suite 303  
Honolulu, Hawaii 96817

File No. PM-96-027

Dear Mr. Chang:

Subject: Request for Comments - Draft Environmental Assessment, Waipahu Wells II  
Addition, Tax Map Key:9-4-07:37

The following are additional comments regarding the subject Draft Environmental Assessment prepared for the above project:

Commission on Water Resource Management

In general the Commission on Water Resource Management (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 offer the following comments related to water resources:

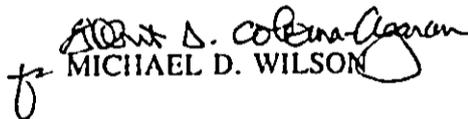
1. We recommend coordination with the County Government to incorporate this project into the County's Water Use and Development Plan.
2. A Well Construction Permit and a Pump Installation Permit from the CWRM would be required before ground water is developed as a source of supply for the project.
3. The proposed water supply source for the project is located in a designated water management area, and a Water Use Permit from the CWRM would be required prior to use of this source.
4. In reviewing the Draft Environment Assessment we have noted the following:
  - a. Page 4 of the Draft Environmental Assessment correctly identifies the permits

and approvals required under Chapter 174C: 1) well construction permit, 2) pump installation permit, 3) water use permit (if a change in the existing use granting is proposed), and 4) well completion report.

- b. On October 7, 1995, Honolulu Board of Water Supply submitted an application for exploratory well construction for the Waipahu Wells II addition. The application is still under review for completeness.
- c. Page 5 states that the project is part of the County's water use and development plan. However, the project is not listed under the Six-Year Capital Improvements Program in the December 1995 draft of the water use and development plan.
- d. On Page 12, the water management area is referred to as the Waiawa-Waipahu Aquifer System. The correct name is the Waipahu-Waiawa Aquifer System.
- e. On Page 13 states that 1) there are three existing wells at Waipahu Wells II site, with capacities of 1.5 mgd each and 2) the average daily pumpage for the station will be 2.64 mgd if the BWS's coefficient of 0.44 is applied to the total capacity (6 mgd). Our records shows only two wells in the existing battery (Well Nos. 2400-05 & 06) and at present, the Waipahu Wells II sources is allocated 2.1 mgd. The water use permit must be modified to allow for additional withdrawal above 2.1 mgd (12-month moving average).
- f. On Page 14 paragraph 2 states "pumping at Waipahu II Wells may affect these springs but not measurably so." The EA should clarify what is meant by the term "measurable" and how it was concluded that the springs may be affected. Calculations using theoretical models on specific springs (e.g. Pump 8) might be used as an example.
- h. The statements regarding sustainable yield that begins on page 14 through page 16 are not endorsed by the CWRM. Pearl Harbor sustainable yields are presently under study by the CWRM.

Thank you for the opportunity to review the Draft Environmental Assessment. We have no further comments to offer at this time. Should you have any questions, please contact Patti Miyashiro at 587-0430 of our Land Division.

Aloha,

  
MICHAEL D. WILSON

c: Oahu Land Board Member  
Member at Large



COPY

January 7, 1997

Mr. Michael D. Wilson, Chairperson  
Department of Land and Natural Resources  
State of Hawaii  
P. O. Box 621  
Honolulu, Hawaii 96809

Dear Mr. Wilson:

Subject: Your Letter of October 24, 1996 Regarding the Draft Environmental Assessment for the Proposed Waipahu Wells II Addition, Oahu (TMK: 9-4-7: 37)

Thank you for reviewing the Draft Environmental Assessment for the proposed Waipahu Wells II Addition project.

We provide the following response to your comments:

1. Historic Preservation Division:

We acknowledge that the proposed project will have "no effect" on any historic sites.

2. Division of Aquatic Resources (DAR):

DAR does not expect this project to have significant adverse impacts on aquatic resource values in the project area. Best management practices will be implemented during construction to minimize potential pollution of Waikele Stream and any receiving waters. The BWS proposes to undertake mitigative measures such as the use of filters and oil absorptive material to ensure that sediment and petroleum products will be prevented from entering the storm drain system. The site work is very minimal because the existing well site is already graded and landscaped. It is expected that the bulk of the construction work on the site will be completed during the drier summer months of 1997. A permit to discharge effluent into the municipal storm sewer will be obtained from the Department of Public Works prior to the occurrence of any discharges.

If you have any questions, please contact Barry Usagawa at 527-5235.

Very truly yours,

RAYMOND H. SATO  
Manager and Chief Engineer

✓cc: George Yuen, George Yuen and Associates

BENJAMIN J. CAYETANO  
GOVERNOR



KAZU HAYASHIDA  
DIRECTOR

DEPUTY DIRECTORS  
JERRY M. MATSUDA  
GLENN M. OKIMOTO

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
869 PUNCHBOWL STREET  
HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO:  
STP 8.7555

September 23, 1996

Mr. George A.L. Yuen, President  
George A.L. Yuen and Associates, Inc.  
100 North Beretania Street, Suite 303  
Honolulu, Hawaii 96817

Attention: Mr. John Chang

Dear Mr. Yuen:

Subject: Waipahu Wells II Addition  
Draft Environmental Assessment  
TMK: 9-4-07: 37

Thank you for your letter of September 18, 1996.

The proposed development will not impact our State transportation facilities.

We appreciate the opportunity to provide comments.

Very truly yours,

A handwritten signature in cursive script, appearing to read "Kazu Hayashida".

KAZU HAYASHIDA  
Director of Transportation

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU



COPY

December 4, 1996

Mr. Kazu Hayashida  
Director of Transportation  
Department of Transportation  
State of Hawaii  
869 Punchbowl Street  
Honolulu, Hawaii 96813-5097

Dear Mr. Hayashida:

Subject: Your Letter of September 23, 1996 Regarding the Draft Environmental Assessment for the Proposed Waipahu Wells II Addition, Oahu (TMK: 9-4-7: 37)

Thank you for reviewing the Draft Environmental Assessment for the proposed Waipahu Wells II Addition project.

We acknowledge that the proposed project will not impact any State transportation facilities.

If you have any questions, please contact Barry Usagawa at 527-5235.

Very truly yours,

For RAYMOND H. SATO  
Manager and Chief Engineer

cc: George Yuen, George Yuen and Associates, Inc.

BENJAMIN J. CAYETANO  
GOVERNOR



GARY GILL  
DIRECTOR

STATE OF HAWAII  
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

220 SOUTH KING STREET  
FOURTH FLOOR  
HONOLULU, HAWAII 96813  
TELEPHONE (808) 586-4185  
FACSIMILE (808) 586-4186

October 10, 1996

Raymond H. Sato, Manager and Chief Engineer  
City and County of Honolulu, Board of Water Supply  
630 South Beretania Street  
Honolulu, Hawaii 96843

Dear Mr. Sato:

Subject: Draft EA for the Proposed Waipahu Wells II Addition

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

1. If the exploratory well test results are satisfactory, a new environmental assessment (EA) should be prepared before converting the exploratory well into a production well. The new EA should: 1) include results obtained from the various tests; and 2) disclose the impacts associated with supporting production facilities such as permanent pumps, transmissions lines, and storage tanks.
2. The EA mentions that aeration methods may be used to remove Ethylene Dibromide (EDB) and 1,2,3 Trichloropropane (TCP) from groundwater supplies used for potable water. How effective is aeration in removing EDB and TCP? Please compare the cost/benefit of using aeration versus carbon filters?
3. What are the cumulative impacts of this project when added to BWS's Waipahu IV Well, DHCD's Kunia II Well, the Ewa Plains Water Development Corporation's water system and other future water projects in the Pearl Harbor Koolau Aquifer.

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

Sincerely,

A handwritten signature in cursive script, appearing to read "Gary Gill".

Gary Gill  
Director

c: George Yuen & Assoc.

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU  
10 SOUTH BERETANIA STREET  
HONOLULU, HAWAII 96813  
PHONE (808) 527-6180  
FAX (808) 533-2714



December 5, 1996

JEREMY HARRIS, Mayor  
WALTER O. WATSON, JR., Chairman  
MAURICE H. YAMASATO, Vice Chairman  
KAZU HAYASHIDA  
MELISSA Y. J. LUM  
FORREST C. MURPHY  
KENNETH E. SPRAGUE  
BARBARA KIM STANTON  
RAYMOND H. SATO  
Manager and Chief Engineer

RECEIVED  
'96 DEC 11 11:02  
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

Mr. Gary Gill, Director  
State of Hawaii  
Office of Environmental Quality Control  
220 South King Street, Fourth Floor  
Honolulu, Hawaii 96813

Dear Mr. Gill:

Subject: Your Letter of October 10, 1996 Regarding the Draft Environmental Assessment for the Proposed Waipahu Wells II Addition, Oahu, (TMK: 9-4-78: 37)

Thank you for reviewing the Draft Environmental Assessment (EA) for the proposed Waipahu Wells II Addition project.

We provide the following comments to your concerns:

1. We do not intend to conduct another EA for the production well addition to the existing well station. The exploratory and possible production phases of this project are minimal and predictable and are therefore consolidated. The water quality data for the proposed well will be similar to the water quality of the other three wells which are within close proximity. The water quality data of the adjacent wells can be included in the EA. The piping and treatment renovation work is appurtenant and accessory to the existing well station and is also covered in Chapter 11-200(8). In this case, expending limited public funds to prepare two separate EA's is not necessary.
2. Aeration is an acceptable alternative treatment process to carbon filters. However, the State Department of Health remains concerned of the transfer of the contaminants, EDB and TCP, from one medium (water) to another (air). Carbon filters are more cost effective than aeration when accounting for the air scrubbers to remove pesticides from the air, the potential health hazards to the adjacent residences and the necessity of another set of booster pumps to repressurize the treated water for distribution.

20F2



Mr. Gary Gill  
Page 2  
December 5, 1996

3. There are minimal cumulative impacts of the adjacent wells on the basal aquifer. There is available sustainable yield, which is the safe yield that can be withdrawn without detrimental effects to the aquifer. The water use permit must be approved by the Commission on Water Resource Management after an aquifer wide assessment of existing and proposed permitted uses. The cumulative benefit is that additional water source capacity will be made available for the island's growth in the Ewa and Central Oahu areas. These directed growth areas relieve the growth pressures in the rural areas of Windward and North Shore.

If you have any questions, please contact Barry Usagawa at 527-5235.

Very truly yours,

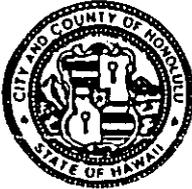
  
RAYMOND H. SATO  
Manager and Chief Engineer

cc: George Yuen, George Yuen and Associates, Inc.

20F3

DEPARTMENT OF LAND UTILIZATION  
**CITY AND COUNTY OF HONOLULU**

650 SOUTH KING STREET  
HONOLULU, HAWAII 96813 • (808) 523-4432



JEREMY HARRIS  
MAYOR

PATRICK T. ONISHI  
DIRECTOR

LORETTA K.C. CHEE  
DEPUTY DIRECTOR

96-06220 (ASK)

October 23, 1996

Mr. John Chang  
George A.L. Yuen and Associates  
100 North Beretania Street, Suite 303  
Honolulu, Hawaii 96817

Dear Mr. Chang:

Special Management Area Review

Tax Map Key : 9-4-07: 37  
Type of Project: Drilling of an exploratory water  
production well at the Waipahu Wells II  
facility

The proposed project on the referenced tax map key has been reviewed. We find that it:

- Is not within the Special Management Area.
- Is within the Special Management Area, but is not defined as "development" and is therefore, exempt (Section 25-1.3 [2][ ], Chapter 25, Revised Ordinances of Honolulu).

Should you have any questions, please contact the Environmental Review Branch at 523-4077.

Very truly yours,

A handwritten signature in cursive script, appearing to read "Patrick T. Onishi".  
PATRICK T. ONISHI  
Director of Land Utilization

PTO:am

g:96-06220.ask

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU



COPY

December 4, 1996

TO: PATRICK T. ONISHI, DIRECTOR  
DEPARTMENT OF LAND UTILIZATION

FROM: For RAYMOND H. SATO, MANAGER AND CHIEF ENGINEER  
BOARD OF WATER SUPPLY 

SUBJECT: YOUR MEMORANDUM OF OCTOBER 23, 1996 REGARDING THE DRAFT  
ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED WAIPAHU WELLS II  
ADDITION, TMK: 9-4-07: 037

Thank you for reviewing the Draft Environmental Assessment for the proposed Waipahu Wells II Addition project.

We acknowledge that the proposed project is not within the Special Management Area.

If you have any questions, please contact Barry Usagawa at 527-5235.

cc: George Yuen, George Yuen and Associates, Inc.

PLANNING DEPARTMENT  
**CITY AND COUNTY OF HONOLULU**

650 SOUTH KING STREET  
HONOLULU, HAWAII 96813

JEREMY HARRIS  
MAYOR



CHERYL D. SOON  
CHIEF PLANNING OFFICER

CAROLL TAKAHASHI  
DEPUTY CHIEF PLANNING OFFICER

ET 9/96-1937

October 17, 1996

Mr. John Chang  
George A.L. Yuen and Associates  
100 North Beretania Street, Suite 303  
Honolulu, Hawaii 96817

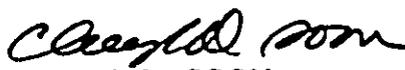
Dear Mr. Chang:

Draft Environmental Assessment  
Waipahu Wells II Addition, TMK 9-4-07: 37

We have reviewed the Draft Environmental Assessment (DEA) for the subject project and offer the following comments:

- The Waipahu Wells II site is designated public/quasi-public on the Central Oahu Development Plan Land Use Map. The existing wells/reservoir operation is consistent with this designation.
- An amendment to the Central Oahu Development Plan Public Facilities map would be required for the project when the proposed well is converted from an exploratory well to a production well.
- We concur with your determination of an anticipated negative declaration.

Thank you for the opportunity to comment. Should you have any questions, please contact Eugene Takahashi of our staff at 527-6022.

  
CHERYL D. SOON  
Chief Planning Officer

CDS:lh

cc: OEQC  
BWS

2011

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU



COPY

December 4, 1996

TO: CHERYL D. SOON, CHIEF PLANNING OFFICER  
PLANNING DEPARTMENT

FROM: For RAYMOND H. SATO, MANAGER AND CHIEF ENGINEER  
BOARD OF WATER SUPPLY 

SUBJECT: YOUR MEMORANDUM OF OCTOBER 17, 1996 REGARDING THE DRAFT  
ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED WAIPAHU WELLS II  
ADDITION, TMK: 9-4-07: 037

Thank you for reviewing the Draft Environmental Assessment for the proposed Waipahu Wells II Addition project.

We provide the following comments to your concerns:

1. We understand that the subject site is currently designated as public/quasi-public on the Central Oahu Development Plan Land Use Map and that the proposed project is consistent with this designation.
2. We will request an amendment to the Central Oahu Development Plan Public Facilities map when the proposed well is converted from an exploratory well to a production well.
3. We acknowledge that you concur with our determination of an anticipated negative declaration for the proposed project.

If you have any questions, please contact Barry Usagawa at 527-5235.

cc: George Yuen, George Yuen and Associates, Inc.

20H2

DEPARTMENT OF PUBLIC WORKS  
**CITY AND COUNTY OF HONOLULU**

650 SOUTH KING STREET, 11TH FLOOR • HONOLULU, HAWAII 96813  
PHONE: (808) 523-4341 • FAX: (808) 527-5857



JEREMY HARRIS  
MAYOR

KENNETH E. SPRAGUE  
DIRECTOR AND CHIEF ENGINEER

DARWIN J. HAMAMOTO  
DEPUTY DIRECTOR

ENV 96-229

September 23, 1996

Mr. John Chang  
George A.L. Yuen & Associates, Inc.  
100 North Beretania Street, Suite 303  
Honolulu, Hawaii 96817

Dear Mr. Chang:

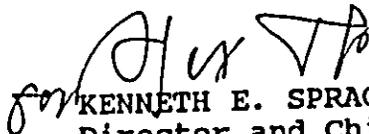
Subject: Draft Environmental Assessment (DEA)  
Waipahu Wells II Addition  
TMK: 9-4-07: 37

We have reviewed the subject DEA and have the following comment:

The DEA should address best management practices (BMPS)  
during construction.

Should you have any questions, please contact Mr. Alex Ho,  
Environmental Engineer, at 523-4150.

Very truly yours,

  
KENNETH E. SPRAGUE  
Director and Chief Engineer

BOARD OF WATER SUPPLY  
CITY AND COUNTY OF HONOLULU



COPY

December 4, 1996

TO: KENNETH E. SPRAGUE, DIRECTOR  
DEPARTMENT OF PUBLIC WORKS

FROM: RAYMOND H. SATO, MANAGER AND CHIEF ENGINEER  
BOARD OF WATER SUPPLY 

SUBJECT: YOUR MEMORANDUM OF SEPTEMBER 23, 1996 REGARDING THE DRAFT  
ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED WAIPAHU WELLS II  
ADDITION, TMK: 9-4-07: 037

Thank you for reviewing the Draft Environmental Assessment for the proposed Waipahu Wells II Addition project.

Best management practices will be implemented during the test pumping of the exploratory well to minimize potential pollution of receiving waters.

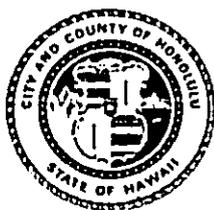
If you have any questions, please contact Barry Usagawa at 527-5235.

cc: George Yuen, George Yuen and Associates, Inc.

20J2

DEPARTMENT OF WASTEWATER MANAGEMENT  
**CITY AND COUNTY OF HONOLULU**

650 SOUTH KING STREET, 3RD FLOOR • HONOLULU, HAWAII 96813  
PHONE: (808) 527-6663 • FAX: (808) 527-6675



JEREMY HARRIS  
MAYOR

FELIX B. LIMTIACO, P.E.  
DIRECTOR

CHERYL K. OKUMA SEPE, E.S.C.  
DEPUTY DIRECTOR

In reply refer to:  
WCC 96-104

September 27, 1996

Mr. John Chang  
George A. L. Yuen and Associates  
100 North Beretania Street, Suite 303  
Honolulu, Hawaii 96817

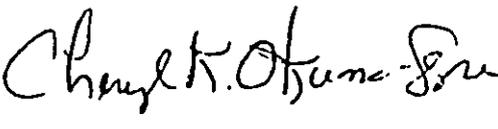
Dear Mr. Chang:

Subject: **Draft Environmental Assessment**  
**Waipahu Wells II Addition**  
**TMK: 9-4-007; 037**

We have no objection to the construction of the Waipahu Wells II Addition for the Board of Water Supply. It does not affect the municipal sewer system.

If you have any questions, please contact Ms. Tessa Yuen of the Service Control Branch at 523-4956.

Very truly yours,

  
FELIX B. LIMTIACO  
Director

20K1

BOARD OF WATER SUPPLY

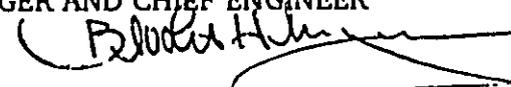
CITY AND COUNTY OF HONOLULU



COPY

December 4, 1996

TO: FELIX B. LIMTIACO, DIRECTOR  
DEPARTMENT OF WASTEWATER MANAGEMENT

FROM: For RAYMOND H. SATO, MANAGER AND CHIEF ENGINEER  
BOARD OF WATER SUPPLY 

SUBJECT: YOUR MEMORANDUM OF SEPTEMBER 27, 1996 REGARDING THE DRAFT  
ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED WAIPAHU WELLS II  
ADDITION, TMK: 9-4-07: 037

Thank you for reviewing the Draft Environmental Assessment for the proposed Waipahu Wells II Addition project.

We acknowledge that you have no objections to the proposed project as it will not affect the municipal sewer system.

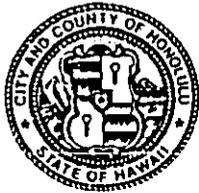
If you have any questions, please contact Barry Usagawa at 527-5235.

cc: George Yuen, George Yuen and Associates, Inc.

20K2

DEPARTMENT OF TRANSPORTATION SERVICES  
**CITY AND COUNTY OF HONOLULU**

PACIFIC PARK PLAZA  
711 KAPIOLANI BOULEVARD, SUITE 1200  
HONOLULU, HAWAII 96813



JEREMY HARRIS  
MAYOR

CHARLES O SWANSON  
DIRECTOR

October 23, 1996

9/96-04334R

Mr. John Chang  
George A. L. Yuen and Associates, Inc.  
100 North Beretania Street, Suite 303  
Honolulu, Hawaii 96817

Dear Mr. Chang:

Subject: Waipahu Wells II Addition

In response to the September 18, 1996 letter from Mr. George A. L. Yuen, the draft environmental assessment for the subject project was reviewed. We have no objections or comments regarding the transportation or traffic impacts of this project.

Should you have any questions regarding this matter, please contact Faith Miyamoto of the Transportation System Planning Division at 527-6976.

Respectfully,

*for*   
CHARLES O. SWANSON  
Director

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU



COPY

December 4, 1996

TO: CHARLES O. SWANSON, DIRECTOR  
DEPARTMENT OF TRANSPORTATION SERVICES

FROM: For RAYMOND H. SATO, MANAGER AND CHIEF ENGINEER  
BOARD OF WATER SUPPLY 

SUBJECT: YOUR MEMORANDUM OF OCTOBER 23, 1996 REGARDING THE DRAFT  
ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED WAIPAHU WELLS II  
ADDITION, TMK: 9-4-07: 037

Thank you for reviewing the Draft Environmental Assessment for the proposed Waipahu Wells II Addition project.

We acknowledge that you have no objections to the proposed project.

If you have any questions, please contact Barry Usagawa at 527-5235.

cc: George Yuen, George Yuen and Associates, Inc.

20L2

APPENDIX D. Effect of Waipahu Wells II on Waikele Springs Flow

In the Koolau aquifer of the Pearl Harbor basin, leakage to the springs is driven by head. Higher heads result in higher spring flows, lower heads in less spring flow. In this sense, every well in the Koolau aquifer of southern Oahu theoretically diminishes spring flow.

The Waikele Spring flow at the current head of 18 feet is approximately 13 mgd. The least unequivocal value of Waikele Spring flow related to a known stable head is a measurement taken in 1958 during a sugar strike when all plantation pumps were shut down. At that time the base flow of Waikele Stream, the equivalent of Waikele Spring flow was 17 mgd while the local head was 23 feet. Thus, for a linear correlation, the ratio 17/23 yields a flow of 0.739 mgd for every foot of head.

The truncated Theis equation can be employed to estimate the hydraulic drawdown at Waikele Springs due to draft at Waipahu Wells II. In the equation:

$$s = (Q/4\pi T) * \ln \{2.25Tv/(r^2S)\}$$

s is the drawdown (ft) at distance r (ft). Waipahu Wells II is about 4,000 ft from Pump 8.  
Q is the pumping (cu ft/day) (mgd x 134,000)  
T is transmissivity (sq ft/day) (18 x 40 x 1500)  
t is time (days) (10,000 for steady state)  
S is the storage coefficient (0.10)

Using the values shown, the estimated drawdown (s) at Pump 8 is 0.25 feet. The equivalent flow loss at pump 8 is 0.18 mgd [0.25 x .739], or about one percent.

At flow levels exceeding 10 mgd, detection of a flow reduction as low as 0.2 mgd is unlikely under prevailing conditions. In addition, this reduction will occur after decades of continuous operation of Waipahu II at the rated capacity.

# CORRECTION

THE PRECEDING DOCUMENT(S) HAS  
BEEN REPHOTOGRAPHED TO ASSURE  
LEGIBILITY  
SEE FRAME(S)  
IMMEDIATELY FOLLOWING

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APPENDIX E. New Well and Well Pump No. 3



APPENDIX F. Water Quality Data Waipahu Wells II, Well #3 (Referred To By AECO'S As Waikele Well #3)



# AECOS

970 N. Kalaheo Avenue, Suite C300 • Kailua, Hawaii 96754  
Telephone: (808) 254-5884

CLIENT: Akinaka & Associates, Ltd.  
250 N. Beretania St., Ste. 300  
Honolulu, HI 96817  
ATTENTION: Henry Morita

FILE No.: 457  
REPORT DATE: 11/08/96  
PAGE: 1 of 4

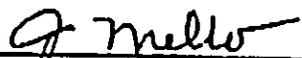
## REPORT OF ANALYTICAL RESULTS

SAMPLE TYPE: potable water  
DATE SAMPLED: 10/01/96

AECOS LOG No.: 9924  
DATE RECEIVED: 10/01/96

ANALYTE	Units	Det. Limit	MCL	Method	Waikole Well #3	Analysis Date/ ID
Total Coliform	P/A	---	Absence	SM 9222 A,B	Present	10/01/96 mo
Fecal Coliform	P/A	---	Absence	SM 9222 A,B	Absent	10/01/96 mo
Turbidity	NTU	0.1	0.5/1	EPA 180.1	0.20	10/01/96 ys
pH	---	---	6.5-8.5	EPA 150.2	7.45	10/01/96 ys
Conductivity	µmhos/cm	1	---	EPA 120.1	365	10/02/96 me
Temperature	°C	---	---	EPA 170.1	23.0	10/01/96 jr
Fluoride	mg/L	0.1	4	SM4500F	0.17	10/14/96 ML
Nitrate	mg N/L	0.001	10	EPA 353.2	3.92	10/02/96 dh
Nitrite	mg N/L	0.001	1	EPA 353.2	<0.001	10/02/96 dh
Cyanide	mg/L	0.025	200	SM 4500 CN-F	<0.025	10/11/96 ML
Alkalinity	mg/L	4	250	EPA 310.1	92	10/02/96 me
Calcium	mg/L	0.04	---	EPA 215.1	11.9	10/30/96 dh
Antimony	mg/L	0.001	0.006	EPA 200.9	<0.001	10/07/96 dh
Arsenic	mg/L	0.001	0.05	EPA 200.9	<0.001	10/18/96 dh
Barium	mg/L	0.002	2	EPA 200.9	0.004	10/03/96 dh

MCL = Maximum Contaminant Level  
† = analytical sensitivity.

  
J. Mello, Laboratory Director

CLIENT: Akinaka & Associates, Ltd.  
 250 N. Beretania St., Ste. 300  
 Honolulu, HI 96817  
 ATTENTION: Henry Morita

FILE No.: 457  
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 PAGE: 2 of 4

LOG No.: 9924

ANALYTE	Units	Det. Limit	MCL	Method	Waikole Well #3	Analysis Date/ ID
Beryllium	mg/l.	0.0002	0.004	EPA 200.9	<0.0002	10/03/96 dh
Cadmium	mg/l.	0.0001	0.005	EPA 200.9	<0.0001	10/23/96 dh
Chromium	mg/L	0.0005	0.1	EPA 200.9	0.002	10/04/96 dh
Copper	mg/L	0.01	1.3 *	EPA 220.1	<0.01	10/30/96 dh
Lead	mg/L	0.001	0.015 *	EPA 200.9	<0.001	10/25/96 dh
Mercury	mg/L	0.0002	0.002	EPA 245.1	<0.0002	10/11/96 ML
Nickel	mg/L	0.001	0.100	EPA 200.9	<0.001	10/04/96 dh
Selenium	mg/L	0.001	0.05	EPA 200.9	<0.001	10/18/96 dh
Thallium	mg/L	0.001	0.002	EPA 200.9	<0.001	10/22/96 dh
<b>EPA Method 504</b>						
DBCP (Dibromo-chloropropane)	mg/L	0.00001	0.00004	EPA 504	0.00001	10/16/96 ML
EDB (Ethylene Dibromide)	mg/L	0.00001	0.00004	EPA 504	0.00002	10/16/96 ML
<b>EPA Method 508</b>						
Alachlor	mg/l.	0.00005	0.002	EPA 508	<0.00005	10/04/96 ML
Chlordane	mg/L	0.0001	0.002	EPA 508	<0.0001	10/04/96 ML
Endrin	mg/L	0.00001	0.0002	EPA 508	<0.00001	10/04/96 ML
Heptachlor	mg/L	0.00001	0.0004	EPA 508	<0.00001	10/04/96 ML
Heptachlor Epoxide	mg/L	0.00001	0.0002	EPA 508	<0.00001	10/04/96 ML
Lindane	mg/L	0.00001	0.0002	EPA 508	<0.00001	10/04/96 ML
Methoxychlor	mg/L	0.00005	0.04	EPA 508	<0.00005	10/04/96 ML
PCB's	mg/L	0.0001	0.0005	EPA 508	<0.0001	10/04/96 ML
Toxaphene	mg/L	0.0005	0.003	EPA 508	<0.0005	10/04/96 ML
<b>EPA Method 515.1</b>						
2,4-D	mg/L	0.0001	0.07	EPA 515.1	<0.0001	10/08/96 ML

\* = Action Level

MCL = Maximum Contaminant Level

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 PAGE: 3 of 4

LOG No.: 9924

ANALYTE ♂	Units	Det. Limit	MCL	Method	Waikale Well #3	Anal. Date/ID
Pentachlorophenol	mg/L	0.00004	0.001	EPA 515.1	<0.00004	10/08/96 ML
2,4,5-TP	mg/L	0.0002	0.05	EPA 515.1	<0.0002	10/08/96 ML
Dalapon	mg/L	0.001	0.2	EPA 515.1	<0.001	10/08/96 ML
Dinoseb	mg/L	0.0002	0.007	EPA 515.1	<0.0002	10/08/96 ML
Picloram	mg/L	0.0001	0.5	EPA 515.1	<0.0001	10/08/96 ML
<b>EPA Method 524.2</b>						
Benzene	mg/L	0.0005	0.005	EPA 524.2	<0.0005	10/09/96 ML
Carbon Tetrachloride	mg/L	0.0005	0.005	EPA 524.2	<0.0005	10/09/96 ML
Chlorobenzene	mg/L	0.0005	0.1	EPA 524.2	<0.0005	10/09/96 ML
ortho-Dichlorobenzene	mg/L	0.0005	0.6	EPA 524.2	<0.0005	10/09/96 ML
para-Dichlorobenzene	mg/L	0.0005	0.075	EPA 524.2	<0.0005	10/09/96 ML
1,2-Dichloroethane	mg/L	0.0005	0.005	EPA 524.2	<0.0005	10/09/96 ML
1,1-Dichloroethylene	mg/L	0.0005	0.007	EPA 524.2	<0.0005	10/09/96 ML
cis-1,2-Dichloroethylene	mg/L	0.0005	0.07	EPA 524.2	<0.0005	10/09/96 ML
trans-1,2-Dichloroethylene	mg/L	0.0005	0.1	EPA 524.2	<0.0005	10/09/96 ML
Dichloromethane	mg/L	0.0005	0.1	EPA 524.2	<0.0005	10/09/96 ML
DCP (1,2-Dichloropropane)	mg/L	0.0005	0.005	EPA 524.2	<0.0005	10/09/96 ML
Ethylbenzene	mg/L	0.0005	0.7	EPA 524.2	<0.0005	10/09/96 ML
Styrene	mg/L	0.0005	0.1	EPA 524.2	<0.0005	10/09/96 ML
Tetrachloroethylene	mg/L	0.0005	0.005	EPA 524.2	<0.0005	10/09/96 ML
Toluene	mg/L	0.0005	1	EPA 524.2	<0.0005	10/09/96 ML
1,1,1-Trichloroethane	mg/L	0.0005	0.2	EPA 524.2	<0.0005	10/09/96 ML
1,1,2-Trichloroethane	mg/L	0.0005	0.2	EPA 524.2	<0.0005	10/09/96 ML
1,2,4-Trichlorobenzene	mg/L	0.0005	0.2	EPA 524.2	<0.0005	10/09/96 ML

MCL = Maximum Contaminant Level

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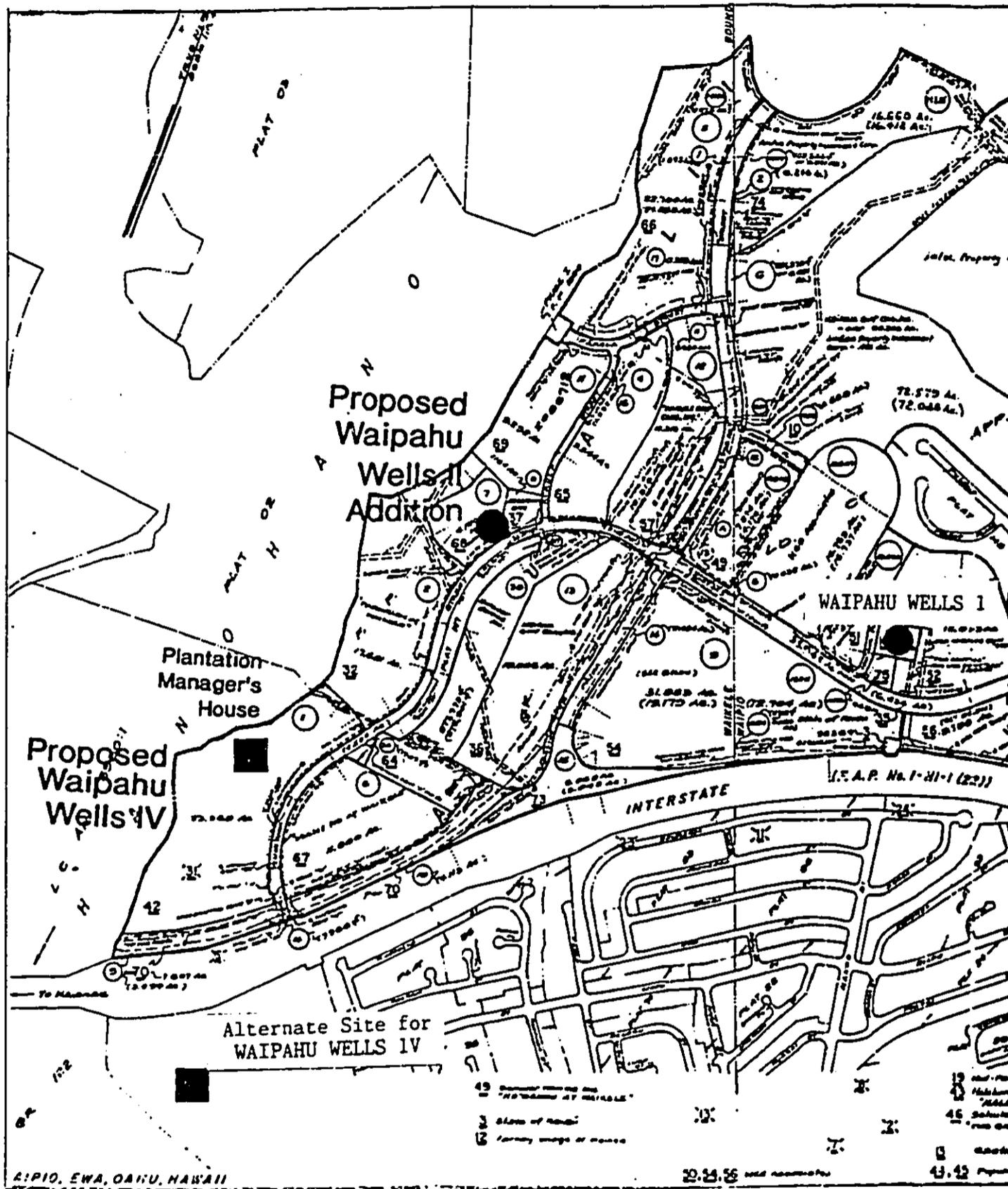
LOG No.: 9924

ANALYTE 0	Units	Det. Limit	MCL	Method	Waikole Well #3	Analysis Date/ ID
Trichloroethylene	mg/L	0.0005	0.005	EPA 524.2	<0.0005	10/09/96 ML
TCP (1,2,3-Trichloropropane)	mg/L	0.0005	0.0008	EPA 524.2	<0.0005	10/09/96 ML
Vinyl Chloride	mg/L	0.0003	0.002	EPA 524.2	<0.0003	10/09/96 ML
Xylenes (Total)	mg/L	0.0005	10	EPA 524.2	<0.0005	10/09/96 ML
<b>EPA Method 525.2</b>						
Atrazine	mg/L	0.00005	0.003	EPA 525.2	<0.00005	10/09/96 ML
Benzo (A) Pyrene	mg/L	0.00002	0.07	EPA 525.2	<0.00002	10/09/96 ML
Di(ethylhexyl)-Adipate	mg/L	0.0006	0.4	EPA 525.2	<0.0006	10/09/96 ML
Di(ethylhexyl)-Phthalate	mg/L	0.0006	0.05	EPA 525.2	<0.0006	10/09/96 ML
Hexachlorobenzene	mg/L	0.00005	0.001	EPA 525.2	<0.00005	10/09/96 ML
Hexachlorocyclopentadiene	mg/L	0.00005	0.05	EPA 525.2	<0.00005	10/09/96 ML
Simazine	mg/L	0.00005	0.004	EPA 525.2	<0.00005	10/09/96 ML
<b>EPA Method 531.1</b>						
Aldicarb	mg/L	0.0005	0.003	EPA 531.1	<0.0005	10/05/96 ML
Aldicarb Sulfone	mg/L	0.0008	0.002	EPA 531.1	<0.0008	10/09/96 ML
Aldicarb Sulfoxide	mg/L	0.0005	0.004	EPA 531.1	<0.0005	10/09/96 ML
Carbofuran	mg/L	0.0009	0.04	EPA 531.1	<0.0009	10/09/96 ML
Oxamyl	mg/L	0.002	0.2	EPA 531.1	<0.002	10/09/96 ML
<b>EPA Method 547</b>						
Glyphosate	mg/L	0.006	0.7	EPA 547	‡	
<b>EPA Method 548.1</b>						
Endothall	mg/L	0.005	0.1	EPA 548.1	<0.005	10/07/96 ML
<b>EPA Method 549.1</b>						
Diquat	mg/L	0.0004	0.02	EPA 549.1	<0.0004	10/07/96 ML
<b>EPA Method 1613</b>						
Dioxin	pg/L	0.61	30	EPA 1613	<0.61	10/11/96 ML

MCL = Maximum Contaminant Level  
 ‡ sample not collected.

**FIGURES 1 THROUGH 8**

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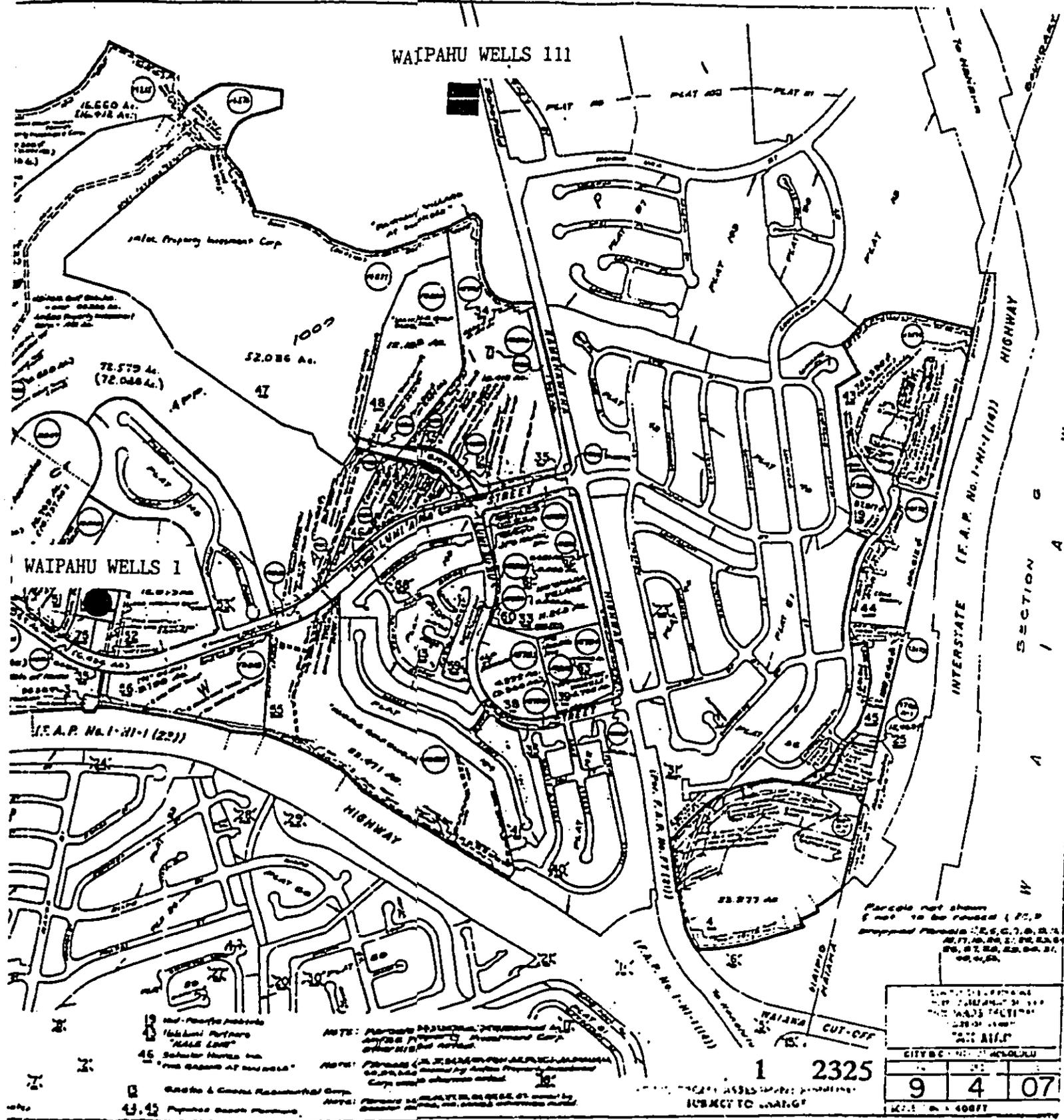


Figure 1 - Location Map  
Scale: 1" = 850' (approx)

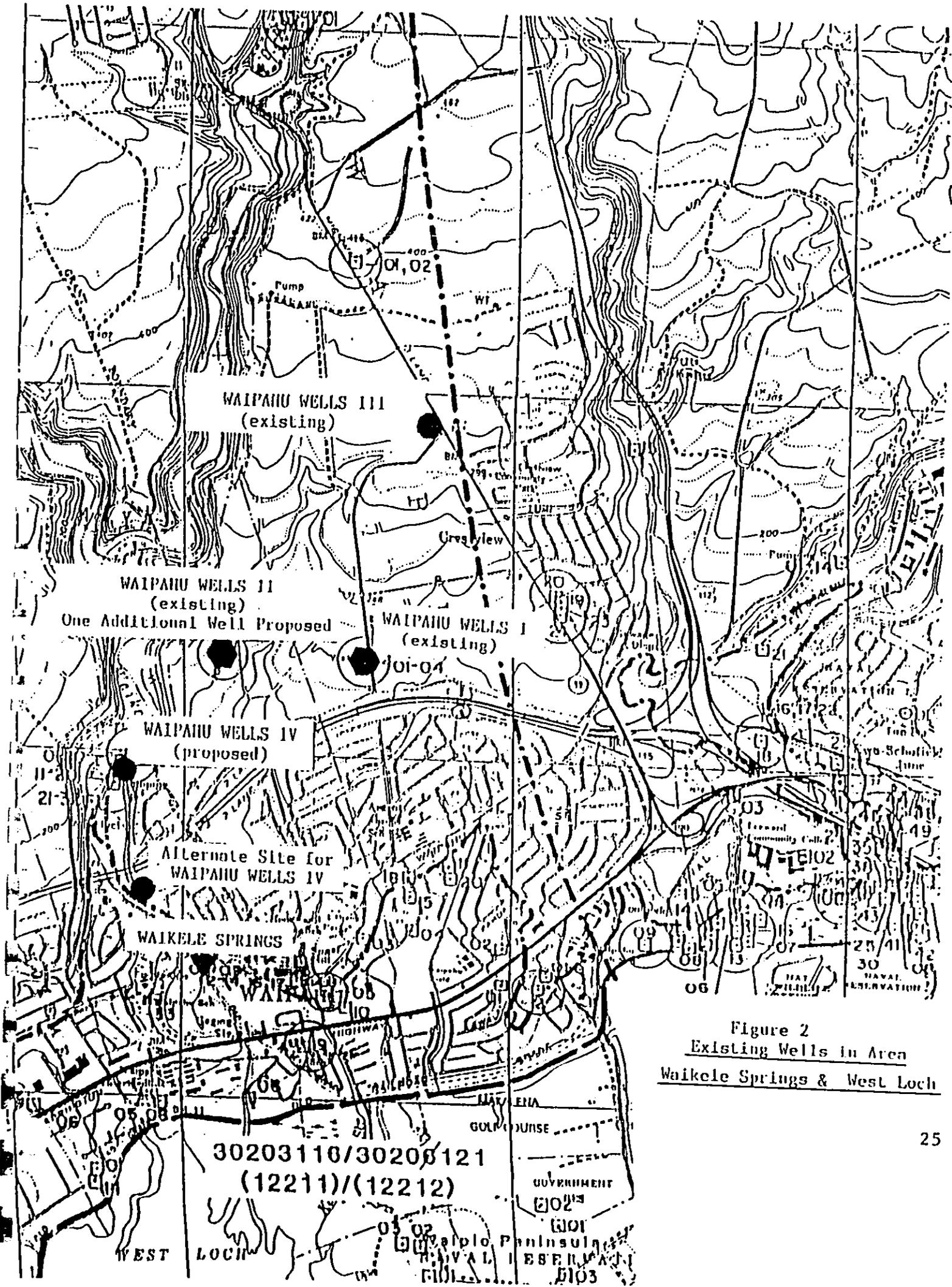


Figure 2  
 Existing Wells in Area  
 Waikale Springs & West Loch

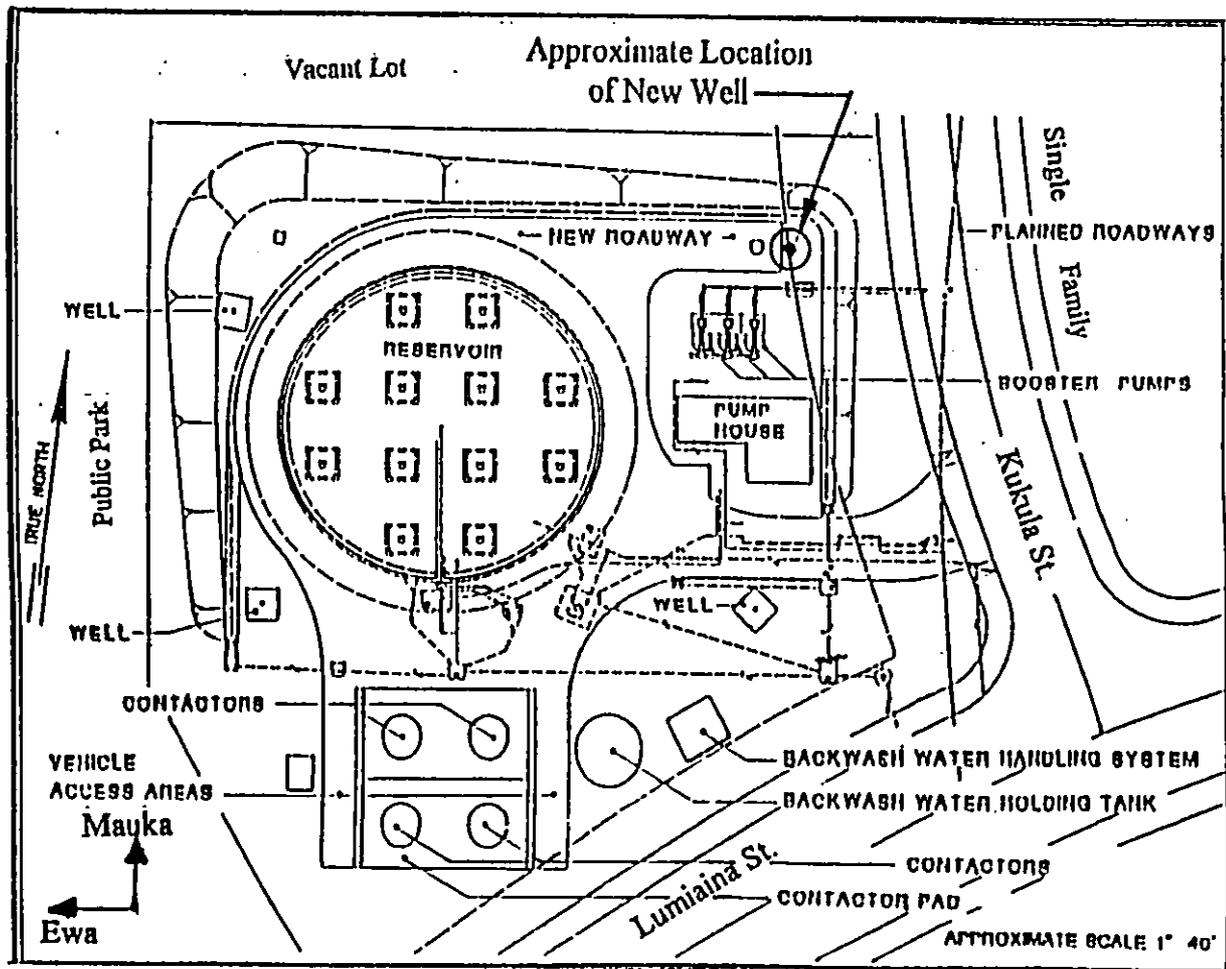


Figure 3  
Existing Well, Pumping, Storage and Treatment System  
and Proposed Location of Well Addition

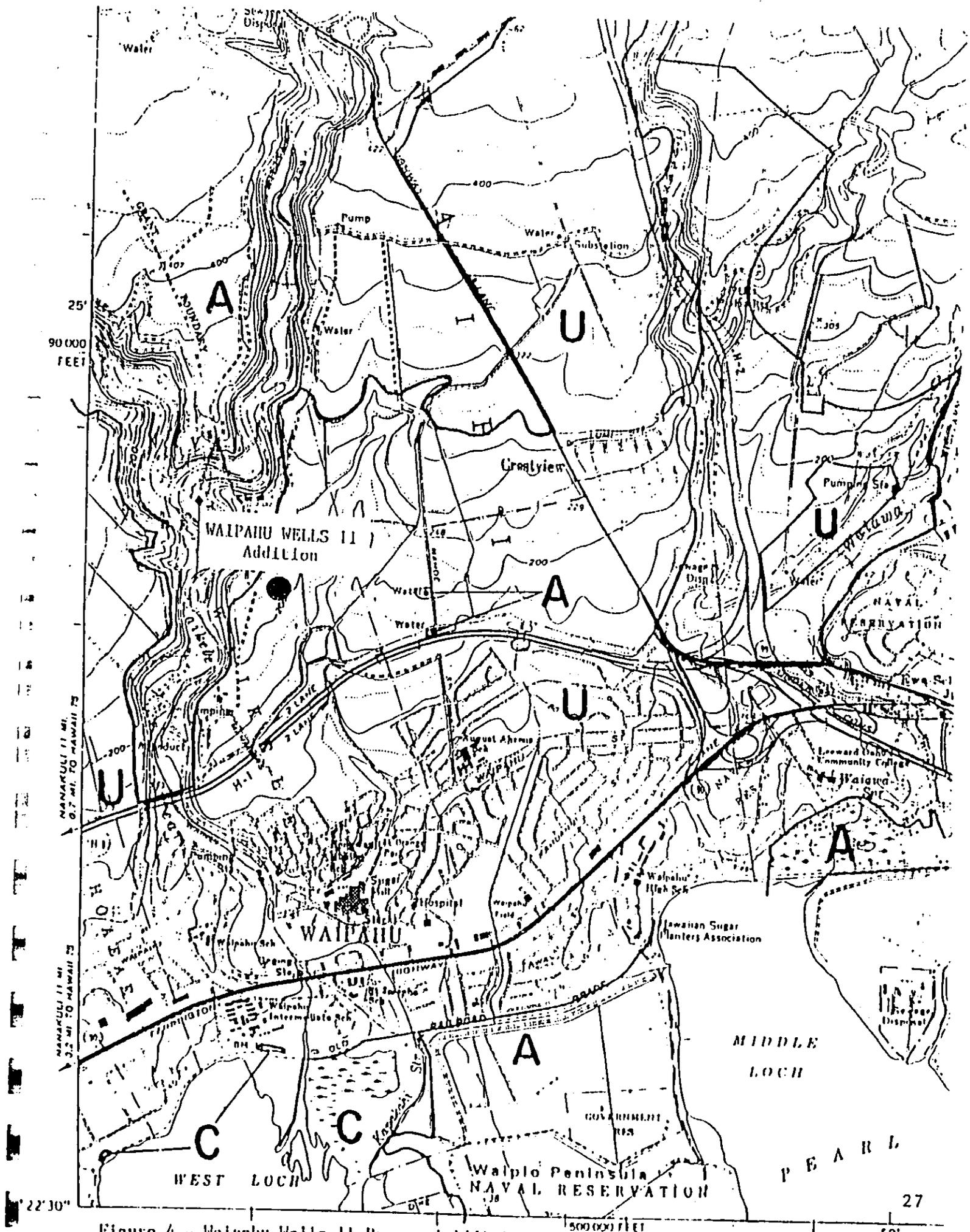
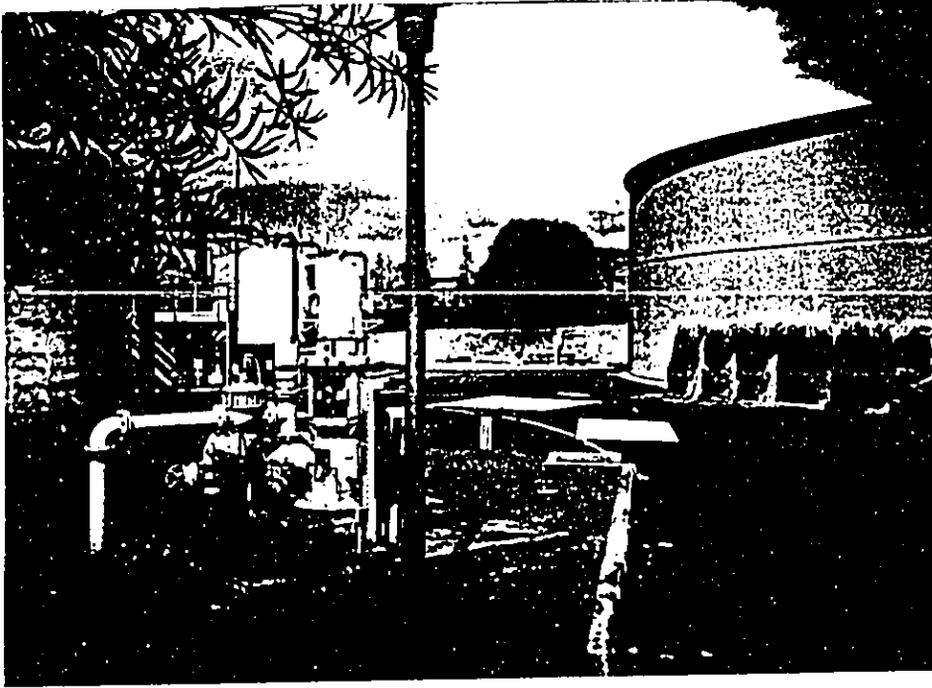


Figure 4 - Waipahu Wells II Proposed Addition on Land Use Map

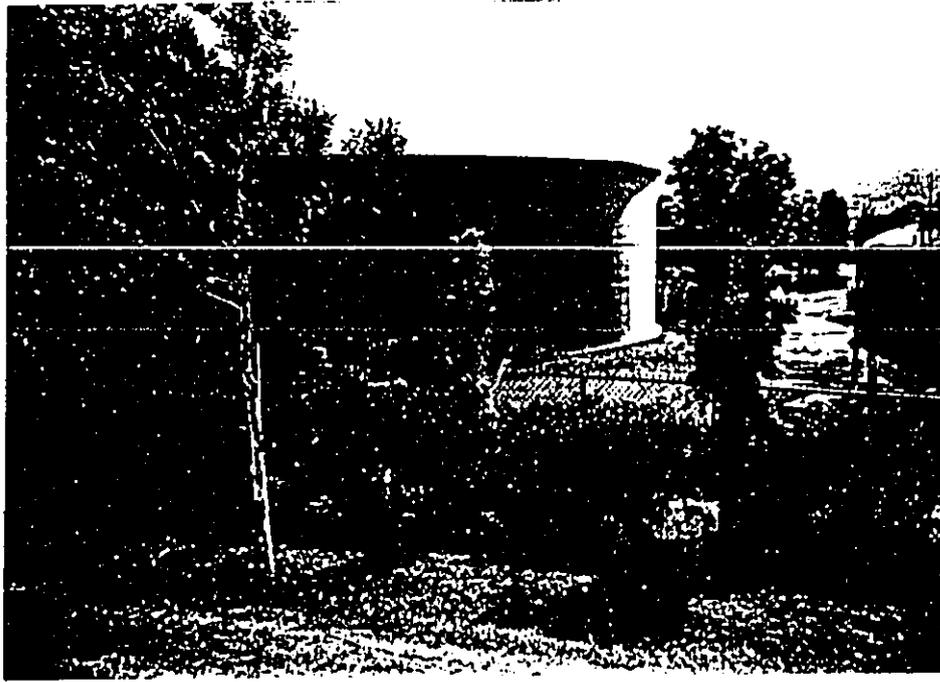


Photograph 1. View of Waipahu II at the entry gate looking west. One of the pumps is shown on the left foreground. The reservoir is in the background right. The GAC units are in the left background.

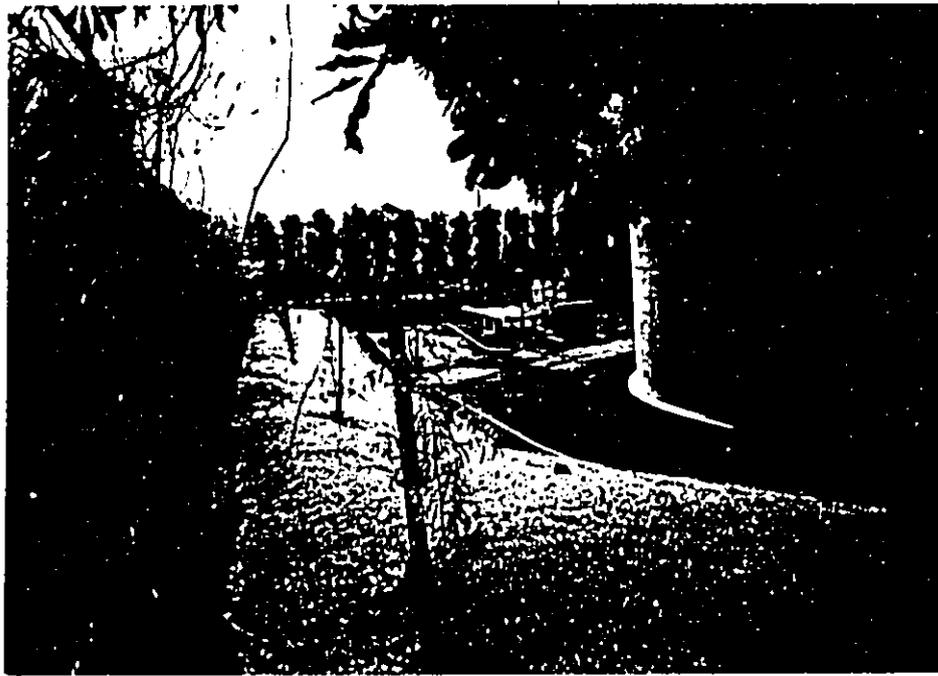


Photograph 2. View of Waipahu II from the fence line looking east toward Kukula St. A line of tall trees along Kukula St. partially screens the facility.

Figure 5



Photograph 3. View of Waipahu II from the public park looking east showing some of the ground's landscaping.



Photograph 4. View of Waipahu II from the corner of the fence at the public park and vacant lot looking east. The booster pump and line of trees on Kukula St. are in the background.

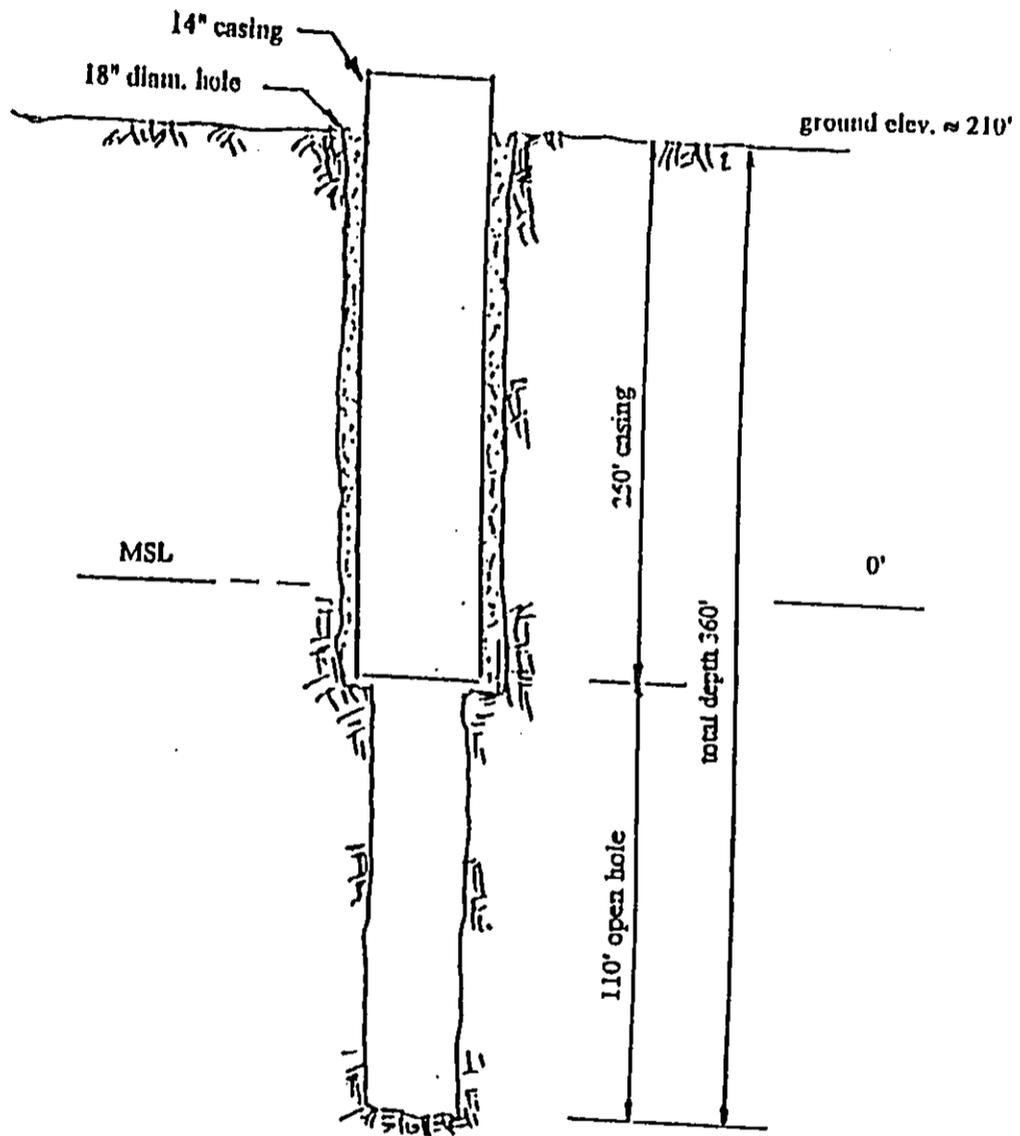


Figure 7

Well Cross Section  
 Waipahu Wells II  
 (not to scale)



Photograph 5. View of Waipahu Wells II from the border between the public park and vacant parcel looking southwest. The housing in the right background are duplex houses. The reservoir is visible in the left background.



Photograph 6. View of Waipahu Wells II from the vacant parcel looking southeast. Diamond head is on the right horizon. The row of houses front Kukula Street. The reservoir is visible in the extreme right.