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FRANK F. FASI
MAYOR

COPY

'94 FEB 15 AM

February 8, 1994

Mr. Kazu Hayashida
Manager and Chief Engineer
Honolulu Board of Water Supply
630 South Beretania Street
Honolulu, Hawaii 96843

Dear Mr. Hayashida:

I am pleased to accept the Final Environmental Impact Statement for the Hauula 180' Reservoir and Booster Station as satisfactory fulfillment of the requirement of Chapter 343, Hawaii Revised Statutes. This environmental impact statement will be a useful tool in the process of deciding if the action described therein should be allowed to proceed. My acceptance of the statement is an affirmation of the adequacy of that statement under the applicable laws and does not constitute an endorsement of the proposed action.

When the decision is made regarding the proposed action itself, I expect the appropriate legislative bodies and governmental agencies to consider if the societal benefits justify the economic, social and environmental impacts which will likely occur. These impacts are adequately described in the statement, and together with the comments made by reviewers, provide useful analysis of the proposed action.

Warm personal regards.

Sincerely,

FFF:rk
cc: Office of Environmental Quality Control

FILE COPY

1994 - Oahu - FEIS - Haauula 180

FINAL ENVIRONMENTAL IMPACT STATEMENT

HAUULA 180 RESERVOIR AND BOOSTER STATION

(TMK 5-4-4:4 and TMK 5-4-19:54)

This Environmental Document is Submitted
Pursuant to Chapter 343, HRS

PROPOSING AGENCY

Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843

Contact: Barry Usagawa, Telephone 527-5235

PREPARED BY

Engineering Design Group, Inc.
1525 Young Street
Honolulu, Hawaii 96826

January 1994

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ACCEPTING AUTHORITY

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SUMMARY

This Final Environmental Impact Statement addresses details of the Hauula 180 Reservoir Project, one of the projects presented in the Final Environmental Impact Statement (FEIS) for the Windward Oahu Regional Water Systems Improvements. This particular project is designed to store water for the existing water system in the area. This project proposes construction of a 1.0 million-gallon (MG) reservoir with booster pump station, access roadway from Kawaipuna Street, transmission mains and other appurtenant features to connect the reservoir to the existing water system. This reservoir is needed to: (1) adjust for the normal daily fluctuations which occur in demand; (2) to provide enough capacity for fire fighting; and (3) to stabilize water pressure in the existing system by controlling pressure surges in major water transmission mains which occur when pumps are turned on and off and to keep transmission mains full of water when pumps are turned off.

As described in the purpose of the proposed project, there will be positive long-term improvements to the existing water system which outweigh the short-term adverse impacts associated with construction activities. Mitigative measures will be taken during construction to reduce fugitive dust and to limit the hours of construction. In addition, the completed reservoir will be painted with a color to best blend with the surrounding environment after construction. The roadway and site will be landscaped with native species compatible with the existing environment.

Alternative designs or no action will not improve nor achieve the purpose of pressure regulation for fire fighting or stabilization of the water pressure in the system. Alternative site and access options involved more extensive grading requirements and considered less desirable to the proposed plan.

The only unresolved issue involves land agreements which are in the final stages of negotiation with the Plumbers and Fitters Local 675 of the United Association Trust for TMK 5-4-4:4 and TMK 5-4-19:54.

The proposed project does not involve development of new water sources and is consistent with land use plans and policies, with the proposed site already noted on the Koolauloa Development Plan Public Facilities Map of the City and County of Honolulu. As described in Section 9 of this EIS, approvals include approval of the EIS; approval of a Conservation District Use Application (CDUA); grubbing, grading and stockpiling permits; and a building permit.

SECTION 1

DESCRIPTION OF THE PROPOSED PROJECT

A. Background

This Final Environmental Impact Statement has been prepared to address details of the Hauula 180 Reservoir Project, which was one of the projects presented in the Final Environmental Impact Statement (FEIS) for the Windward Oahu Regional Water Systems Improvements. From an overall perspective, this windward project is part of an on-going program proposed by the City and County of Honolulu's Board of Water Supply to supply existing and future potable water requirements for the windward region of Oahu. Any water unused by the windward area may be diverted around Makapuu toward Honolulu to relieve demands on importing water toward Honolulu from the Pearl Harbor aquifer.

The proposed Hauula 180 Reservoir is basically designed to store water for the existing water system in the area. The current Hauula 180 system consists of Hauula Well, which has a sustainable yield of 0.25 million gallons per day (MGD) and Punaluu Well I, which averaged 0.33 MGD over the years of 1973 through 1984. During 1992, Hauula Well and Punaluu Well I provided an average daily consumption of 0.55 MGD and a maximum daily consumption of 0.70 MGD. The existing storage system is the Punaluu 180 Reservoir (0.5 MG), which does not have a booster station. The Hauula 180 system serves the area from Hauula to Punaluu, but pressure fluctuations create problems at the Hauula end of the system. Punaluu Wells II and III are connected to the system through closed control valves and could be used to supply water to the system during emergencies.

The water from the proposed Wailele, Laie, and Kaipapau wells would be transported to the proposed Hauula 180 Reservoir via a 16-inch influent line and transported out via a 20-inch effluent line running along Kawaipuna Street. These lines would be connected to the proposed 16-inch line along Kamehameha Highway and to the 12-inch line which serves the area.

B. Description of the Proposed Project

A reservoir is needed to adjust for the normal daily fluctuations which occur in demand, to provide enough capacity for fire fighting, and to stabilize water pressure. As stated

in the FEIS: "Pumpage can be regulated by controls that monitor reservoir water levels. Reservoirs can also be used to reduce water pressure from high elevation water sources, to even out pressure differences between water sources connected to the same water pressure system, to control pressure surges in major water transmission mains which occur when pumps are turned on and off, and to keep transmission mains full of water when pumps are turned off." [1]

The proposed Hauula 180 Reservoir would be located on the slope of Kaipapau Hill, at the 180-foot elevation. Refer to Figures 1 and 2 for Project Location and TMK maps of the project site, respectively. This project would involve construction of a 1.0 million-gallon (MG) reservoir with booster pump station, access roadway from Kawaipuna Street, transmission mains and other appurtenant features to connect the reservoir to the existing water system. This storage capacity, added to the existing 0.5 MG storage capacity of Punaluu 180 Reservoir, will provide a total of 1.5 MG storage for Hauula-Punaluu.

The facilities planning and design criteria for the Hauula 180 Reservoir Project shall follow the guidelines set forth in the "Water System Standards," Volumes 1 and 2, dated 1985, and Volume 3, Dated 1991, Board of Water Supply, City and County of Honolulu. These publications cover the areas of planning, materials, construction, list of approved materials and standard details which govern the design and construction of water system facilities under the jurisdiction of the Board of Water Supply.

As shown in Figure 1, the proposed reservoir will be approximately 3,100 feet inland from the intersection of Kamehameha Highway and Kawaipuna Street. The reservoir would be served by a 12-foot wide paved roadway which will extend about 1,400 feet to the site from the southwest end of Kawaipuna Street. Approximately 600 feet of the access road will be asphalt paved where grades do not exceed 12 percent. Approximately 800 feet of the access road will be concrete paved and used in areas where grades are above 12 percent and up to 20 percent, the maximum allowable by BWS. Upon evaluation of drainage conditions and with the approval of the BWS, crushed coral or gravel may be considered as road material to minimize additional runoff to adjacent properties.

The 1.0 MG reservoir will be approximately 22 feet high and 96 feet in diameter and constructed with reinforced concrete. Other construction items associated with the reservoir include a 10-foot reservoir perimeter road, a 6-foot high chain link security fence, drain pipeline, drainage system, electric power line, telemetering line, and other

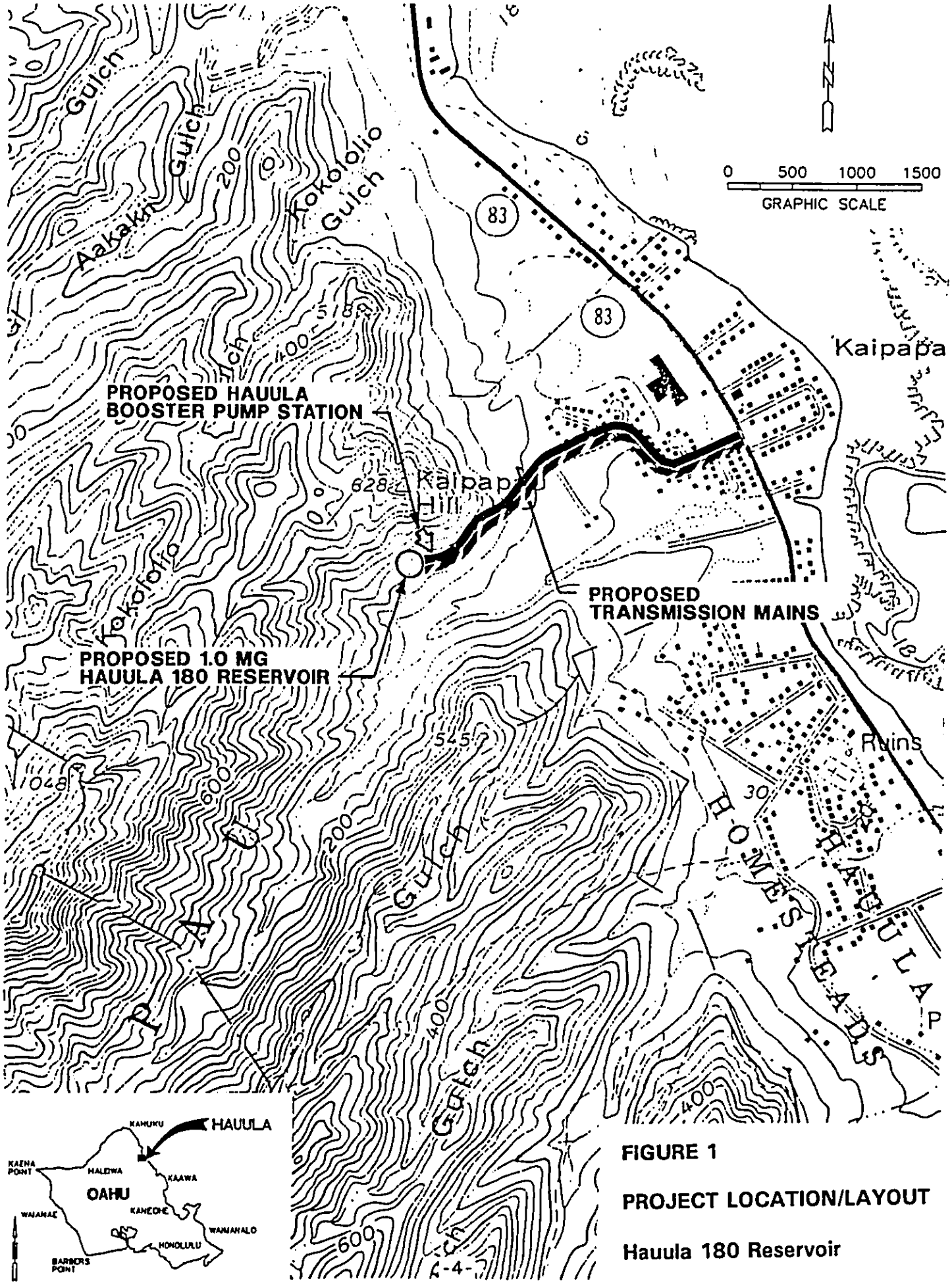

FIGURE 1

PROJECT LOCATION/LAYOUT

Hauula 180 Reservoir

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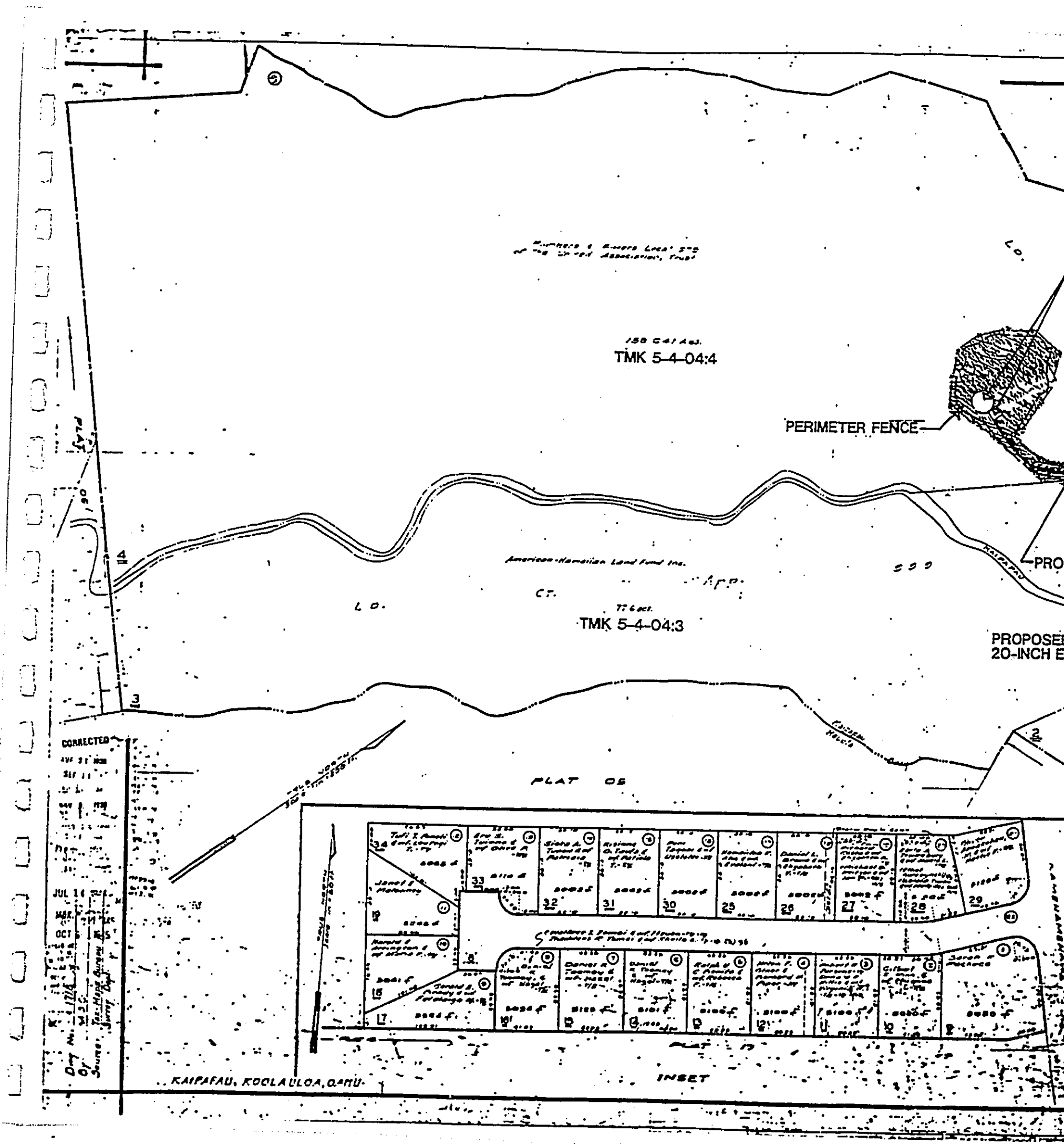

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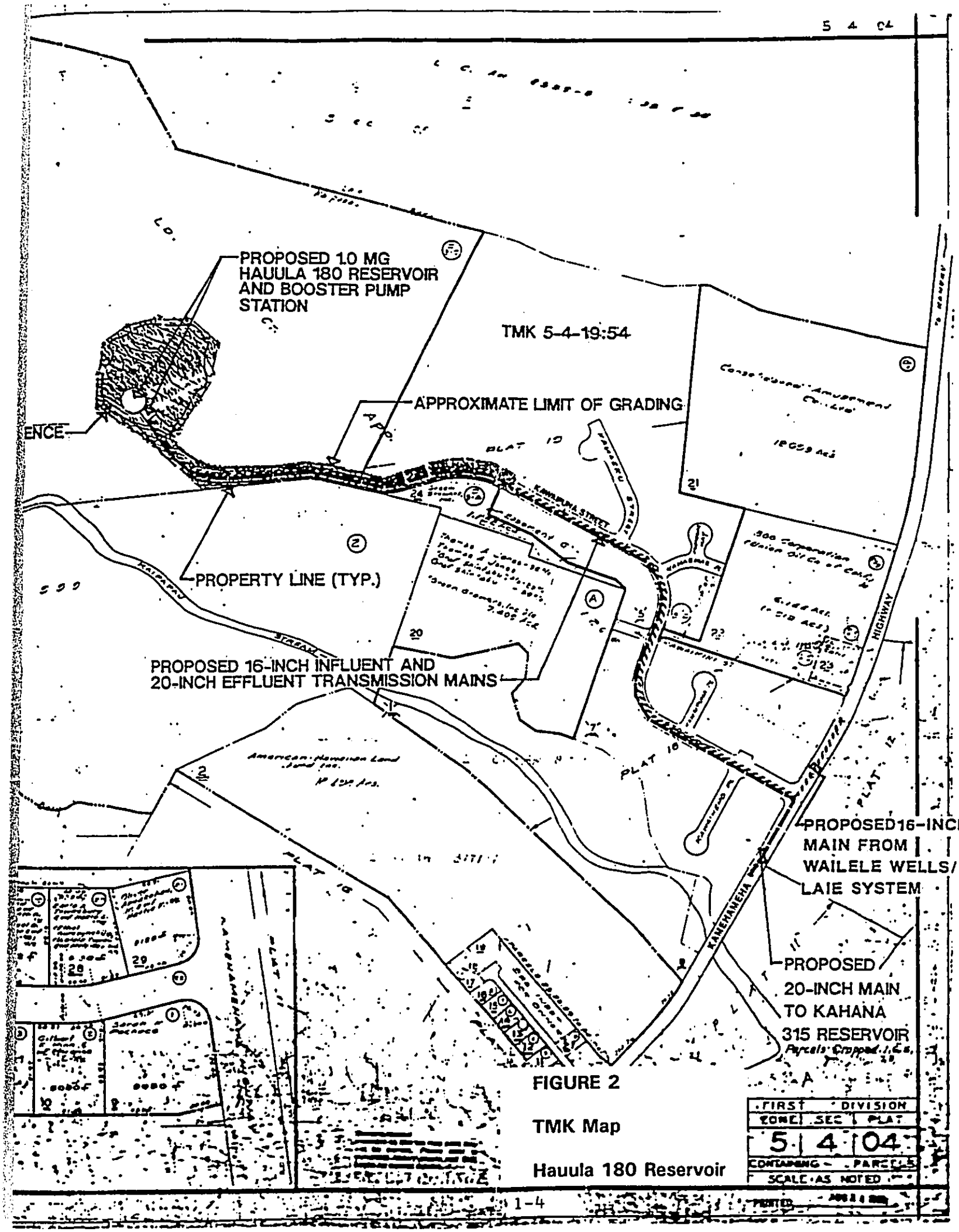

FIGURE 2

TMK Map

Hauula 180 Reservoir

appurtenant features required for the reservoir. A diagram of the reservoir and booster pump station layout is shown in Figure 3.

The 16-inch influent and effluent transmission pipelines that connect the reservoir to the proposed 16-inch transmission line shall be constructed within the access roadway and through Kawaipuna Street to Kamehameha Highway. The planned grading plan and limits of the earthwork of the proposed project are shown in Figures 4 and 5. The area to be graded is approximately 2.5 acres. There will be approximately 28,000 cubic yards of site excavation. Figures 6 and 7 are presented to illustrate cross sectional grading plans for the A-A and B-B sections shown in Figure 4.

C. Proposed Construction Phasing and Costs

The construction time is estimated to require 18 months. The anticipated phasing will be the following order: (1) initial site preparation and earthwork will require about 23 weeks; (2) construction of the transmission mains and access roadway will require about 10 weeks; (3) construction of the reservoir, booster station and appurtenant structures will require about 35 weeks; and (4) construction of transmission mains within Kawaipuna Street to Kamehameha Highway will require about 10 weeks.

The estimated construction cost for the proposed project is approximately $6,000,000, as follows:

BREAKDOWN OF CONSTRUCTION COSTS

Reservoir Site Grading	$1,320,000
1.0 MG Reservoir	1,500,000
Booster Pump Station	1,000,000
Chainlink Security Fence	44,000
Asphalt Pavement (Access and Perimeter Roads)	27,000
Concrete Access Road	72,000
Transmission Pipelines	1,876,000
TOTAL ESTIMATED CONSTRUCTION COST:	**$5,839,000**

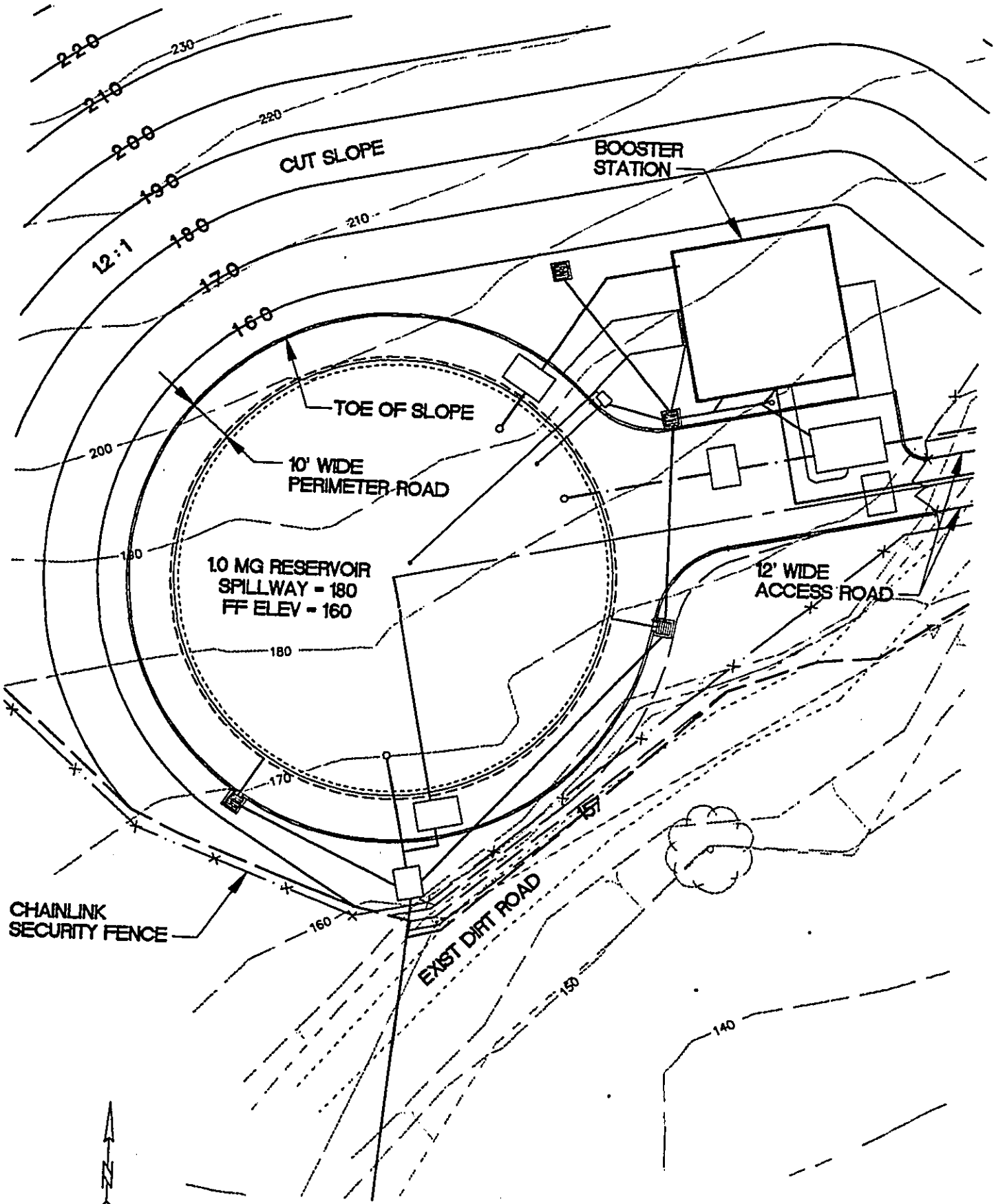

FIGURE 3

Reservoir and Booster Pump

Hauula 180 Reservoir

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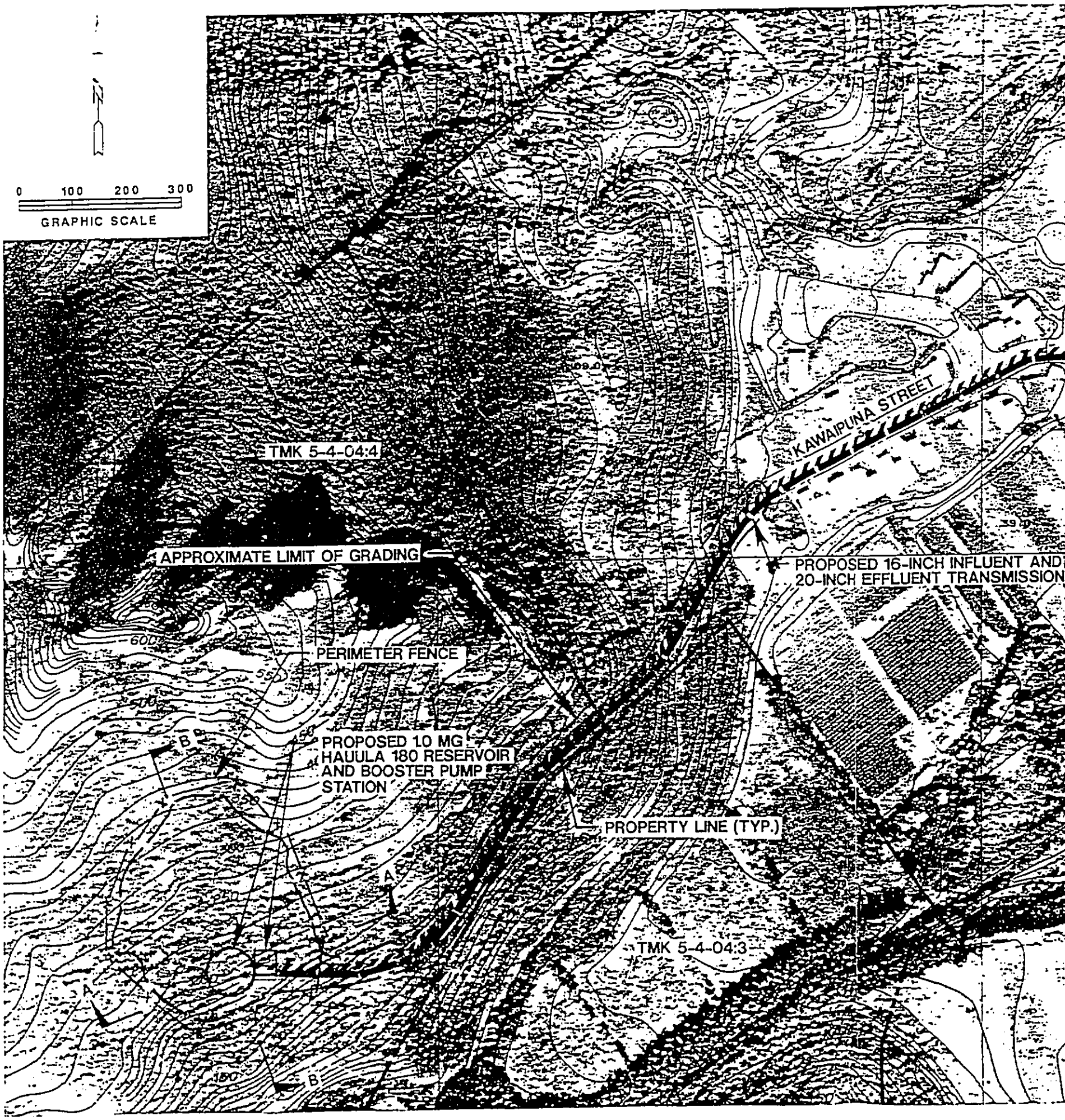

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FIGURE 4

Overall Grading Plan

Hauula 180 Reservoir

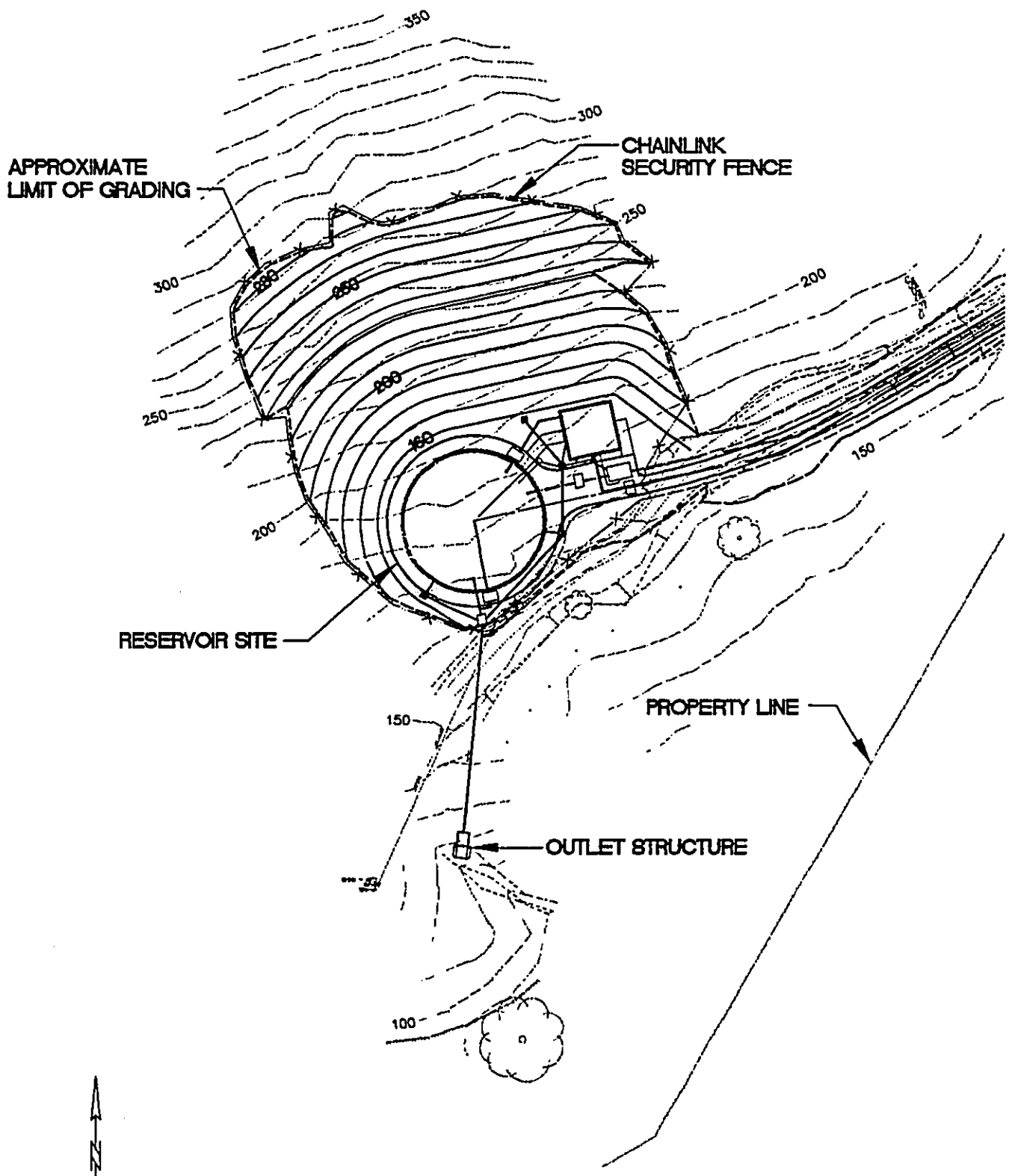
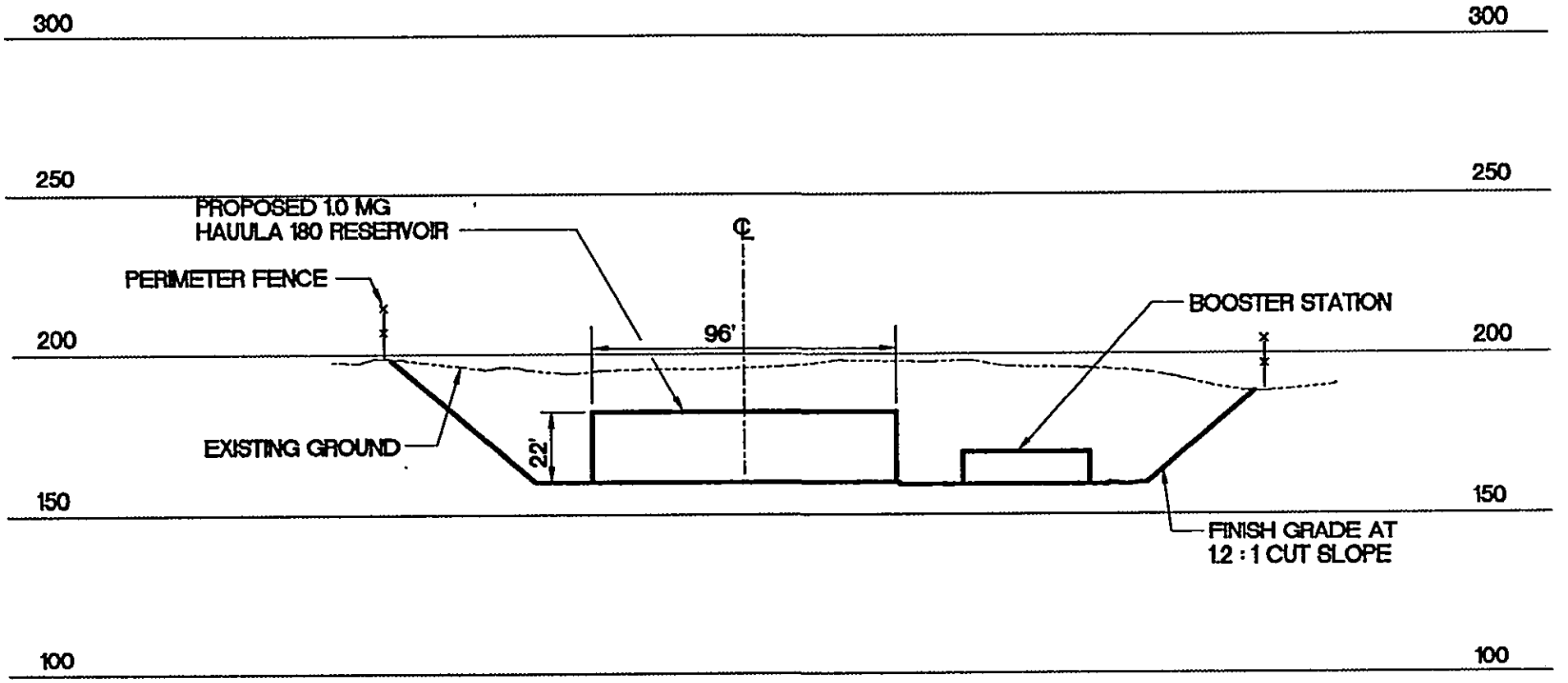


FIGURE 5

Reservoir Site Grading Plan

Hauula 180 Reservoir



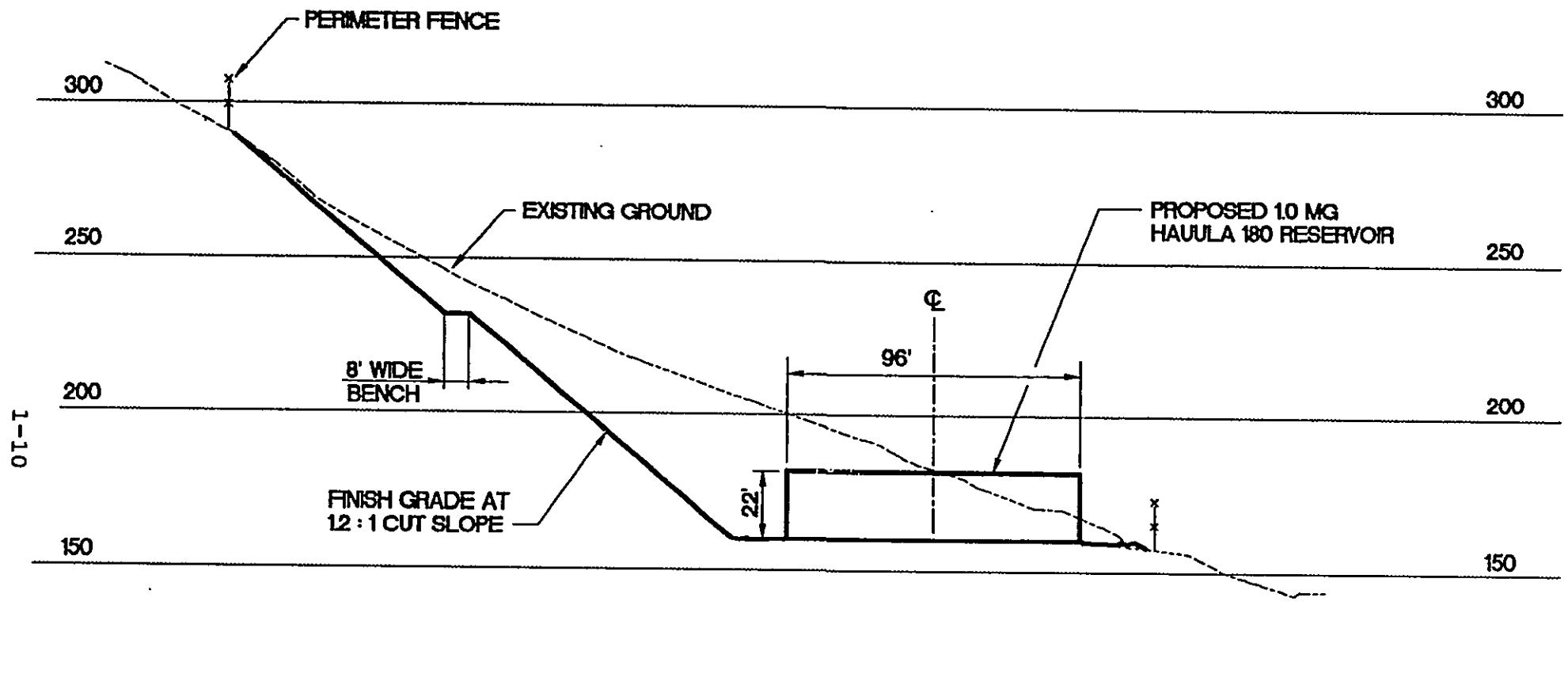
CROSS SECTION A-A OF PROPOSED
1.0 MG HAUULA 180 RESERVOIR

SCALE: HORIZONTAL 1"=50'
VERTICAL 1"=50'

FIGURE 6

A-A Grading Cross Section

Hauula 180 Reservoir



CROSS SECTION B-B OF PROPOSED
1.0 MG HAUULA 180 RESERVOIR

SCALE: HORIZONTAL 1"=50'
VERTICAL 1"=50'

FIGURE 7

B-B Grading Cross Section

Hauula 180 Reservoir

SECTION 2

DESCRIPTION OF THE EXISTING ENVIRONMENT

A. Description of the Existing Project Site (TMK 5-4-4:4 and TMK 5-4-19:54)

Kawaipuna Street ends at a privately owned parcel, TMK 5-4-4:4 and TMK 5-4-19:54, owned by the Plumbers and Fitters Local 675 of the United Association Trust. From there extends an old jeep trail which follows the approximate corridor proposed for the reservoir. Along this jeep trail is densely overgrown, almost impenetrable, vegetation of introduced exotic species. A description of species observed during a field reconnaissance is presented later in this section under "Biological Characteristics."

The slopes along the makai portion of Kaipapau Hill have been altered historically by clearing activities for agricultural use. Some of this area is overgrown but appears to have been previously cleared for pasture, evidenced by wooden corrals and boundary fencing. A description of these prior activities is presented in greater detail in Appendix B, "Archaeological Inventory Survey of Hau'ula 180 Reservoir and Booster Station."

B. Climate [2]

The climate in this area is characteristic of the windward coast. Rainfall data for Hauula was recorded from 1907 through 1964, and monthly median measurements ranged from a low of 2.2 inches for the month of June to a high of 7.2 inches in March, with an overall annual median value of 55.4 inches.

The nearest temperature measurement station in relation to the proposed project site is at Laie. Over a three-year period of measurement, the temperature ranged from an average minimum of 66.5°F during the month of March to an average maximum of 85.5°F in September. Overall, the temperature ranged from an annual average temperature of 70.2° F to an annual average maximum temperature of 83.3°F.

The closest wind measurement station in relation to the proposed project site is at the Kaneohe Marine Corps Air Station. Since the proposed project site is located along the

windward coast of Oahu, the prevailing winds are primarily from the ENE (34.7% of the time at 11.9 knots), E (19.3% of the time at 11.7 knots), and NE (13.8% of the time at 11.1 knots).

C. Geology

As described in the FEIS [1], this area is part of the remnant of the basaltic shield Koolau volcano. Erosion resulted in a series of valleys and alluvium accumulated in valley floors. Along the makai portion of the windward coast, deposits of terrestrial and marine sediments formed into relatively impermeable sedimentary material known as caprock.

The Koolau volcano was primarily composed of overlapping sloping basaltic lava flows. When magma flows through fissures in the shield of the volcano, dikes form which are nearly vertical. Numerous dikes are concentrated in complexes forming the main rift zone of the Koolau volcano, along which is located the proposed project site. [3;4]

D. Soils [5]

Soils at the project site and along the access road corridor include the Kawaihapai, Lolekaa, Paumalu, and Waialua Series and Rock land. As indicated in the soils report (Appendix A), the predominant surface soil is Paumalu silty clay. The Paumalu Series consists of well-drained silty clay soils on the uplands of northern Oahu, which developed in the old alluvium and colluvium derived from basic igneous rock. One of the soil types at the project site includes Paumalu silty clay, 25 to 40% slopes (PeE), on which runoff is medium to rapid and the erosion hazard is moderate to severe. "This soil is used for pasture and sugar cane."

Also included in the project area is Rock land (rRK) which is characterized as areas where exposed rock covers 25 to 90 percent of the surface. Rock outcrops are mainly basalt and andesite. "Rock land is used for pasture, wildlife habitat, and water supply."

E. Hydrology

Streams in the area between Kahuku and Kaluanui appear to infiltrate into the ground during dry weather below the 400-foot elevation. Except for Kaluanui and Koloa Streams, streams in this region generally do not discharge into the

ocean except when it rains. At low elevations even these streams are naturally intermittent. [6]

For any year the "lowest monthly mean discharge" is a crude estimate of the discharge which is exceeded 90% of the days in a year, i.e., Q_{90}. Kaipapau Stream is estimated to have a Q_{90} of 0.1-0.2 MGD at the elevation of maximum dry weather discharge. [1]

The proposed reservoir will be used to store and improve the distribution capability for the existing water system in the area and does not involve additional withdrawal of water. The water source for this area is from ground water in the valleys in this area. As stated in the FEIS, there is some evidence of continuity in the Koolauloa Basal Aquifer. In 1961 a 4-day pump testing of Kahuku Plantation Well 398 (DOWALD No. 3354-02), which is near the mouth of Kaluanui Valley, at a rate of 4.3 MGD resulted in a slight drawdown in the static heads of Plantation Well 401 (DOWALD No. 3654-04), which is 1,000 feet to the east, and of observation Well 396 (DOWALD No. 3654-02) which is 2,500 feet to the north. [4] The Punaluu wells were pumped at rates of 483 to 888 GPM for 4 hours in June 1983, which resulted in a slight drawdown in Well 401 (DOWALD No. 3654-04) which is about 1 mile to the northwest; but the same result was not obtained for Kaluanui Well I. [7]

F. Archaeological and Historical Characteristics

As presented in Appendix B an archaeological inventory survey of the proposed project was conducted on September 4, 1989 by Social Research Systems Co-op (SRSC). A second survey was conducted on January 20, 1992 of the proposed alignment and reservoir site. "No major sites of archaeological or historical interest were noted, though several boundary walls of apparently historical nature were noted. In addition, there are a number of small areas that appear to have been cleared for agricultural use. No other sites were noted during the surveys."

Prior archaeological surveys for this area have included one by Chiniago, Inc. (1983-1984) and another conducted by Paul H. Rosendahl, Inc. (PHRI) in 1988. The PHRI study reported two sites, Feature 418-1 and Feature 418-2, which would be along the proposed access corridor. Feature 418-1 was suggested in the PHRI report to have been for agricultural purposes, but a later SRSC reconnaissance concluded that these walls were not likely to have been used for agriculture

because of their orientation and concluded to have been historic, both in construction and function.

Feature 418-2 appears to be result of recent bulldozing. Sites 4241 (historic well) and 4242 (historic walls) also reflect recent activity in the valley, rather than precontact use. Consequently, there seem only to be three features of archaeological or historical interest:

> "1) The historic well and reservoir (Site 4241) now abandoned on the upper slope of Kaipapa'u Hill. This site does not appear to offer any particular research or informational opportunities, nor does it fall under the criteria a-d of evaluation of significance for the National Register of Historic Places.
>
> 2) The historic boundary wall (Site 418-1) orginally noted during the Walker/Rosendahl Study as an precontact boundary wall delineating planting areas. This wall has been reinterpreted as a historic period boundary wall. It does not appear to offer any particular research or informational opportunities, nor does it fall under the criteria a-d of evaluation of significance for the National Register of Historic Places. However, we concur with the Rosendahl recommendation that the wall be preserved in its entirety if at all possible, as it may at some time in the future be useful in analysis of historic change in land use patterns as per work done in Anahulu Valley. If not, then the site should be flagged, and monitoring be conducted while any construction is being conducted in the vicinity to recover any possible cultural material that may be exposed.
>
> 3) The historic boundary walls (Site 4242/418-2). These walls do not offer any visible research opportunities other than those noted for Feature 418-1, nor do they qualify under the criteria a-d of evaluation of significance for the National Register of Historic Places. As per Feature 418-1, we recommend that the site be left intact if at all possible, but if some damage must take place, that monitoring be conducted during all construction in the vicinity of the site to recover any cultural material that may be exposed."

"The lack of any clear indication of precontact or early historic use of the study area, combined with the poor soil, heavy talus and steep slopes, especially in the area beyond the proposed reservoir, all indicate that this area has a very low possibility of recovering of subsurface cultural materials."

Appendix B also presents details on a search for historical and cultural significance of the area. The summary of land use at contact states:

> "This section of Kaipapa'u appears to have been focused around marine exploitation as suggested in the oral tradition relating to fish migrations linked to the stream. The alluvial flats at the mouth of the valley were used for wet-field agricultural production in all areas which could be fed by diverted flow from Kaipapa'u stream. As the valley narrows dramatically just mauka of the stream mouth, this area of steep slope and spectacular stream flooding was likely used for forest products and occasional dry-land planting, though the soil in most areas is very poor (consisting of decomposed ash). Considerably further up the valley may have been an area of secondary wet-field or intensive dry-field agriculture, as the valley floor appears to flatten out and allow more intensive land use. The study areas proper appears to have been a portion of the lightly-exploited upland slope."

G. Biological Characteristics

During August of 1989 a biological reconnaissance of the proposed project site at Hauula, Oahu, Hawaii was conducted, starting from the end of the paved portion of Kawaipuna Street and including the location of the proposed site for the reservoir. The reconnaissance included the types of flora species seen at the site and the bird and mammal species either observed directly or those believed to frequent the general area.

The general area has been previously disturbed by pasture-type agricultural activities and the flora species observed are characteristic of lowland areas. The species observed represented common introduced plants and no rare nor endangered endemic flora species were observed during the reconnaissance of the proposed project corridor and sites. Such species would not be expected in this area and the proposed project area does not represent a sensitive wildlife habitat. Refer to Appendix C for a list of flora species observed during the reconnaissance, as well as a list of birds and mammals either observed directly during the reconnaissance or believed to frequent the proposed project site area.

SECTION 3

LAND USE PLANS AND POLICIES

A. Land Use Designations

The State Land Use designation for the proposed project is Conservation, Subzone Resource, and the County Zoning is P-1. According to Chapter 2 of Title 13, Hawaii Administrative Rules, the Resource Subzone "is to develop, with proper management, areas to ensure sustained use of the natural resources of those areas." Although the proposed project clearly would be permitted under the General Subzone, i.e., "development of water collection, pumping, storage, control, and transmission," the proposed action is a conditional use consistent with the permitted action under the Resource subzone, i.e., "governmental use not enumerated herein where public benefit outweighs any impact on the conservation district."

The proposed Hauula 180 Reservoir site already is noted on the Koolauloa Development Plan Public Facilities Map of the City and County of Honolulu (Ordinance 83-9, May 10, 1983). The recently passed ordinance number indicating site determined is 93-42.

B. Windward Oahu Regional Water System Improvements

The proposed project is part of the City and County of Honolulu's plan for the Windward Oahu Regional Water System Improvements. The final environmental impact statement for these improvements was submitted in August 1988 and subsequently accepted. The proposed project is consistent with the approved FEIS, based on the feasibility study conducted for the siting of the proposed Hauula 180 Reservoir.

C. State Coastal Zone Management Program

The State Coastal Zone Management (CZM) Law, Section 205A-2(c)(4) and 205A-5, Hawaii Revised Statutes, requires public agencies to protect coastal ecosystems, i.e., waterbird habitat and stream ecosystems. While development of new water sources would need to consider the impacts on coastal ecosystems, the proposed project does not involve development of new sources or water additional to that addressed in the

FEIS and will only provide increased efficiency of the existing water system.

D. State Water Code

Chapter 174C, Hawaii Revised Statutes, creates a new State agency, Commission on Water Resource Management, to head the Department of Land and Natural Resources on matters relating to this chapter. This is designed to regulate development of ground water sources directly or indirectly as it may relate to stream flow. Since the Hauula 180 Reservoir is designed to improve the existing water system, does not involve development of additional water sources, and already has been approved as part of the overall Windward Oahu Regional Water System Improvements, the issues relating to Chapter 174C are not applicable for the proposed project.

E. Flood Control Act of 1960 and Clean Water Act

According to the Federal Emergency Management Agency's Flood Insurance Rate Map, panel 150001-0015-C (September 28, 1990), the proposed project is located in Zone AE (areas inundated by the 100-year flood with a base flood elevation of 20-to-26 feet above mean sea level), Zone D (areas which flood hazards are undetermined), and Zone X (unshaded; areas determined to be outside of the 500-year floodplain).

The proposed project has been designed such that all of the above ground improvements will be constructed in areas above the flood elevation.

F. Special Management Area (SMA)

The only construction which will occur in the SMA will be the transmission lines along Kawaipuna Street. Since these transmission lines will run along this existing corridor, it is exempt from SMA regulations. All other construction associated with the proposed project will be located outside of the SMA. Refer to Section 11, page 11-43.

SECTION 4

ANTICIPATED IMPACTS AND MITIGATIVE MEASURES

A. Air Quality

Short-term:

With any construction, there will be some short-term construction related impacts. Site preparation will involve construction equipment with associated equipment exhaust and dust from ground clearing. The exhaust is expected to cause minimal impacts to ambient air quality and will be only for the duration of construction. Fugitive dust from site preparation or earth work will be controlled by periodic water sprinkling.

Long-term:

Equipment associated with the booster station will not generate significant amounts of emissions and is not expected to result in any detectable change to ambient air quality. Chlorine for periodic distribution system treatment will be housed in a secured building and stored according to specified guidelines. Personnel are trained in the proper handling of the chemical.

B. Water Quality

Short-term:

The proposed project's impact area is sufficiently far from Kaipapau Stream that no impacts to the stream are anticipated; no construction debris or graded material will enter the stream. After the construction has been completed and the pipelines installed, there will be a brief interruption of the water system to activate the new system and to chlorinate the pipelines to clean out the new lines. This will be a temporary disruption of about one working day.

Long-term:

Provision for a new reservoir will not result in a significant impact to the existing water quality nor will it have an impact on the water sources since it does not involve withdrawal of additional water. It is being provided to improve the efficiency of the existing water system and sources already developed, as addressed in the FEIS. [1]

C. Noise

Short-term:

There will be an increase of ambient noise levels during construction because of the equipment that will be used. Noise will be mitigated by limiting construction activities between the hours of 7:30 a.m. and 5:00 p.m. Earth work for the access road will start from the end of Kawaipuna Street and proceed away from the residential area toward the site. Site preparation and construction of the reservoir will occur about 1,500 feet from the residential area, and at this distance construction noise is expected to be minimal, if not imperceptible.

There will be construction noise associated with the installation of the new pipelines along Kawaipuna Street. This will entail construction to prepare trenches for the pipeline. These impacts will proceed along the roadway incrementally as the pipes are laid. This is expected to last a total of about 70 days for the entire length of Kawaipuna Street. The actual impact to a given resident is expected to be about 3 days, which is the estimated period of time construction activities of the roadway will actually occur fronting any given residential unit.

Long-term:

Noise associated with the booster station will be minimal and imperceptible to residents in the area. Consequently, no significant long-term impacts due to noise are expected.

D. Flora and Fauna

Short-term:

Disturbance of the proposed project corridor and sites by construction activities would clear existing vegetation in the construction areas. Although this would directly impact existing vegetation, such activities would not result in a significant long-term impact to any of the species encountered since there are many specimens of these species throughout the area.

Construction activities would temporarily displace avian and mammalian individuals into surrounding areas, which are open, and which should be able to absorb the numbers involved.

Long-term:

No significant long-term impacts to the flora and fauna are anticipated to result from the proposed action. The species observed during the reconnaissance were common throughout the area and other parts of the island with similar climatic conditions. Animals undoubtedly will be temporarily displaced into adjacent areas, but can return upon completion of construction. Construction of the proposed project, therefore, would not be expected to result in a significant long-term biological impact to any of the species encountered during the reconnaissance.

E. Archaeological and Historical

Short-term:

As presented in Section 2 and Appendix B, archaeological surveys of the proposed project's area have been conducted. Of the three features found with archaeological or historical interest (Site 4241; Site 418-1; and Site 4242/418-2), none offered particular research or informational opportunities, nor did they qualify under the criteria a-d of evaluation of significance for the National Register of Historic Places.

The consultant recommends preservation of Site 418-1 in its entirety if possible since it may be useful in future analysis of historic change in land use patterns for work done in Anahulu Valley. If not, then as a mitigative action during construction, it is recommended that "an archaeologist monitor construction excavation during the phases leading from the project start line at the end of the existing road for the first 1200 feet of the access road to record both any subsurface information exposed and also note any information uncovered during removal of Sites 418-1 and 4242, as this area has the only locations that may have been suitable for agricultural use."

"We do not see that any archaeological monitoring is necessary in either the road section beyond the initial 1200 feet nor at the well proper given the steep slope and talus material. However we would recommend that an archaeologist be on stand-by during all subsurface phases of the project in case material of archaeological or historical interest is exposed by construction activity."

Long-term:

"As noted orginally by Handy, Kaipapa'u is not a terribly attractive location for large-scale agriculture in the mauka portions due to the steep nature of the terrain. In fact the

only useful area presently in either habitation or agriculture is at the mouth of the valley in the floodplain. Unlike many other valleys we noted a general lack of erosional terraces on the slopes of Kaipapa'u Hill, which in other valleys provide a source for much of the useable agricultural land. This appears due to the narrow width of the valley, with extremely steep slopes, which keep slopes from developing an angle of repose that is stable."

"The prominent nature of Kaipapa'u Hill, with its distinctive saddle, would be a prime candidate for religious features, especially given its overlook position over the stream entrance which is key in the limited legendary record, but there is no indication of a structure on the hill, though it is possible the hill was a non-structural heiau (or possibly just the peak). The general lack of strong information relating to religious features in the valley, especially given the prestigious kahuna which inhabited (and logically worshipped) in the valley is puzzling and without further historical research will remain an anomaly."

Significant long-term impacts to the archaeological resources, therefore, are not expected by constructing the proposed project.

F. Traffic

Short-term:

Aside from the initial transportation of construction equipment to the area, there will be no additional traffic associated with the proposed project. There may be some re-routing of traffic when the new pipeline is installed along Kawaipuna Street, but traffic flow will not be interrupted. When construction is not occurring, trenches will be covered with steel plates to enable full traffic flow.

Long-term:

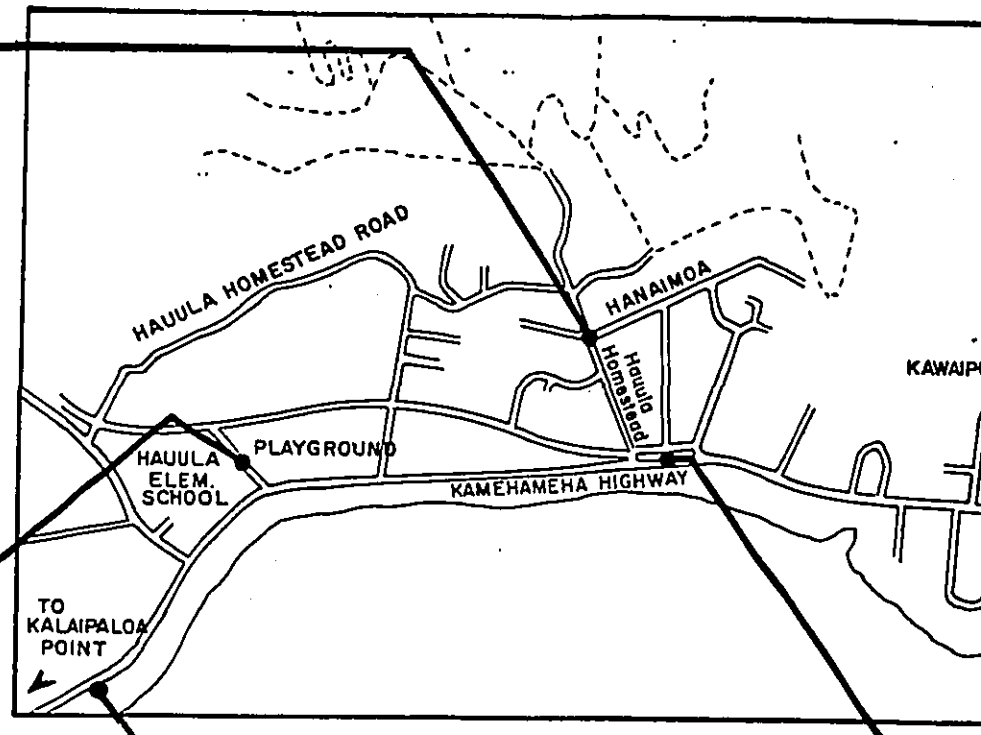
There will not be a detectable change in traffic due to the proposed project. The booster station will be automated and will require maintenance checks about twice a week by Board of Water Supply personnel, involving only one vehicle.

G. Visual

The proposed reservoir will be visible from some parts of the highway and to some residents in the area. Figure 8 illustrates the visibility of the project site and proposed

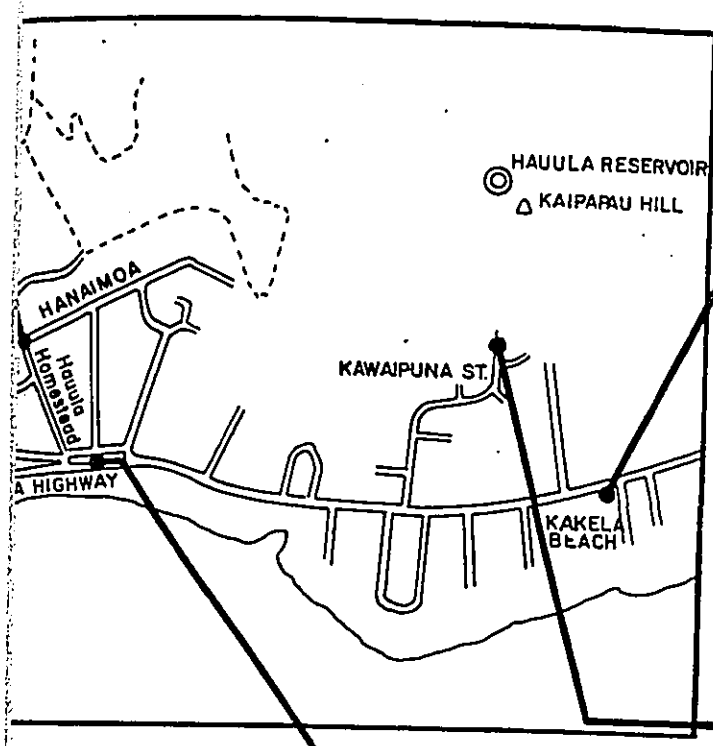
from **HANAIMOA STREET/ HOMESTEAD ROAD**

from **HAUULA ELEMENTARY SCHOOL**
(Athletic Field)

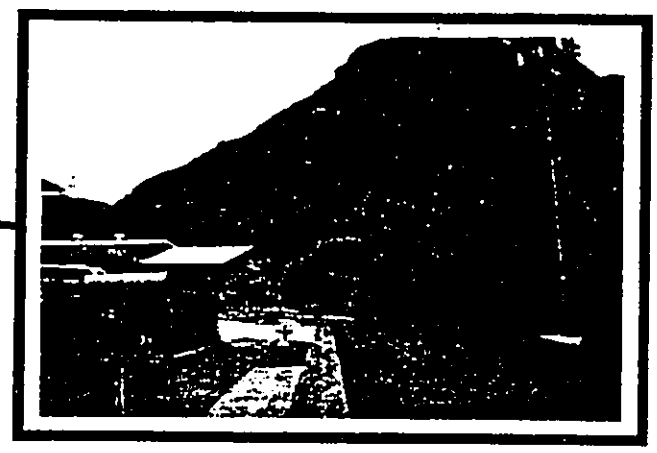


from **KAMEHAMEHA HIGHWAY**
(South of Kalaipaloa Point)

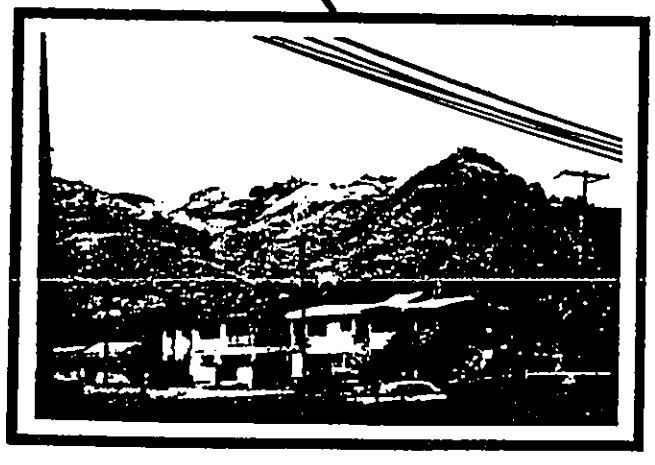
from **KAMEHAMEH**



from **KAMEHAMEHA HIGHWAY**
(Kakela Beach Park-Kahuku side)



from **KAWAIPUNA STREET**



from **KAMEHAMEHA HIGHWAY**

FIGURE 8

VIEW PLANES OF PROPOSED SITE

reservoir from various view plane locations in the surrounding area. Mitigative measures to minimize the visual impacts of the proposed project will include: (1) painting the reservoir and site structures with a color to best blend with the existing environment, to be determined after construction is completed; and (2) the site and access roadway will be landscaped with native species compatible with the surrounding environment.

H. Infrastructure

1. Water

The proposed project will have a significant positive impact on the existing efficiency and capability to distribute water in the Hauula 180 system. This reservoir will regulate pressure fluctuations in the system in this area and the booster station will enable more efficient transmission of water towards the Kahana area.

2. Fire

The proposed project will also have a beneficial effect on fire fighting capability since the reservoir will provide sufficient water and water pressure for fire fighting capability for the area. The proposed project itself will not significantly add to the burden of new development for which the Fire Department must provide services.

3. Police

The proposed project is not expected to significantly add to the existing responsibilities of the local Police Department. There will be a security fence around the reservoir and booster station building. The building itself will be secured.

4. Electricity

There will be electrical requirements associated with the booster station. These requirements are expected to be minimal and will be coordinated with Hawaiian Electric Company as part of the design phase of the project.

5. Telephone

There are telemetering requirements associated with the proposed project; design and construction phases will

be coordinated with GTE Hawaiian Telephone Company to assure that their existing services will not be disrupted.

6. Waste

Since the proposed project will only require periodic maintenance visits, there is no need for solid waste or sewage disposal.

I. Socioeconomic

Short-term:

There will be some short-term benefit associated with construction of the proposed project, lasting for the duration of the construction period.

Long-term:

There are no significant long-term socioeconomic impacts expected from the proposed project which is designed primarily to improve existing water system needs and capacity and estimated population growth for this area. In 1990 the estimated population for the project area was 3100 and is estimated to increase to 3641 by the year 2010. This population is expected to require about 0.72 MGD. The proposed storage capacity of the Hauula 180 Reservoir (1.0 MG), added to the existing capacity of the Punaluu 180 Reservoie (0.5 MG), will provide for a total storage capacity for this area of 1.5 MG. The proposed project, therefore, is not expected to support significant secondary population growth for this area.

SECTION 5

SUMMARY OF UNAVOIDABLE ADVERSE IMPACTS

There will be unavoidable impacts anticipated with the proposed project are those involved with construction related activities. These will involve clearing and grubbing of vegetation as previously shown in the Grading Plan (Figures 4 and 5), and disturbance of some of the archaeological features to the limits of the grading plan. These impacts are not considered significant since the vegetation involved are predominantly exotic species commonly found throughout Oahu and the State; no rare or endangered species were observed (nor would they be expected) in the proposed project area during a field reconnaissance. According to the recommendations outlined in the archaeological report (Appendix B):

> "As excavation will be taking placed during construction we recommend that an archaeologist monitor construction excavation during the phases leading from the project start line at the end of the existing road for the first 1200 feet of the access road to record both any subsurface information exposed and also note any information uncovered during removal of Sites 418-1 and 4242, as this area has the only locations that may have been suitable for agricultural use.
>
> We do not see that any archaeological monitoring is necessary in either the road section beyond the initial 1200 feet nor at the well proper given the steep slope and talus material. However we would recommend that an archaeologist be on stand-by during all subsurface phases of the project in case material of archaeological or historical interest is exposed by construction activity."

Refer also to Appendix D for the Department of Land and Natural Resource's statements regarding this proposed project.

There will be unavoidable visual impacts to the existing landscape with the construction of the reservoir along the slope of Kaipapau Hill. Refer to the discussion in Section 4 regarding visual impacts, starting on page 4-4. Steps to mitigate these impacts will include painting the reservoir and surrounding structures with a color to best blend with the existing environment after construction and landscaping the

reservoir and road with native species that are aesthetically comparable to the existing landscape.

Since the proposed project is designed to improve the efficiency of water distribution for the existing system, no long-term impacts are expected with the proposed reservoir and booster station. The proposed project will not involve withdrawal of water in addition to the existing carrying capacities of the existing water sources in the area.

SECTION 6

ALTERNATIVES TO THE PROPOSED PROJECT

A. No Action

This alternative will not improve on the existing pressure fluctuations and water storage capacity for fire fighting purposes. The proposed project is planned to improve on these aspects of the existing water system and will not involve a significant trade-off of adverse impacts over benefits which will occur as a result of the proposed action.

B. Alternate Design

There is no other reasonable design than that proposed which will achieve the system's needs. To provide for the pressure regulation and fire fighting needs for the area will require a reservoir. The only other design factor which can be adjusted would be the size of the reservoir, and a 1 MG reservoir is considered optimally balanced for the pressure and fire fighting needs and the existing carrying capacities of the water sources in the area.

C. Alternate Site

An alternate site and access for the proposed reservoir site was considered, but this alternative would have involved substantially greater grading requirements than that proposed. Refer to Figure 9. Consequently, that alternative was abandoned in favor of the proposed site and access route.

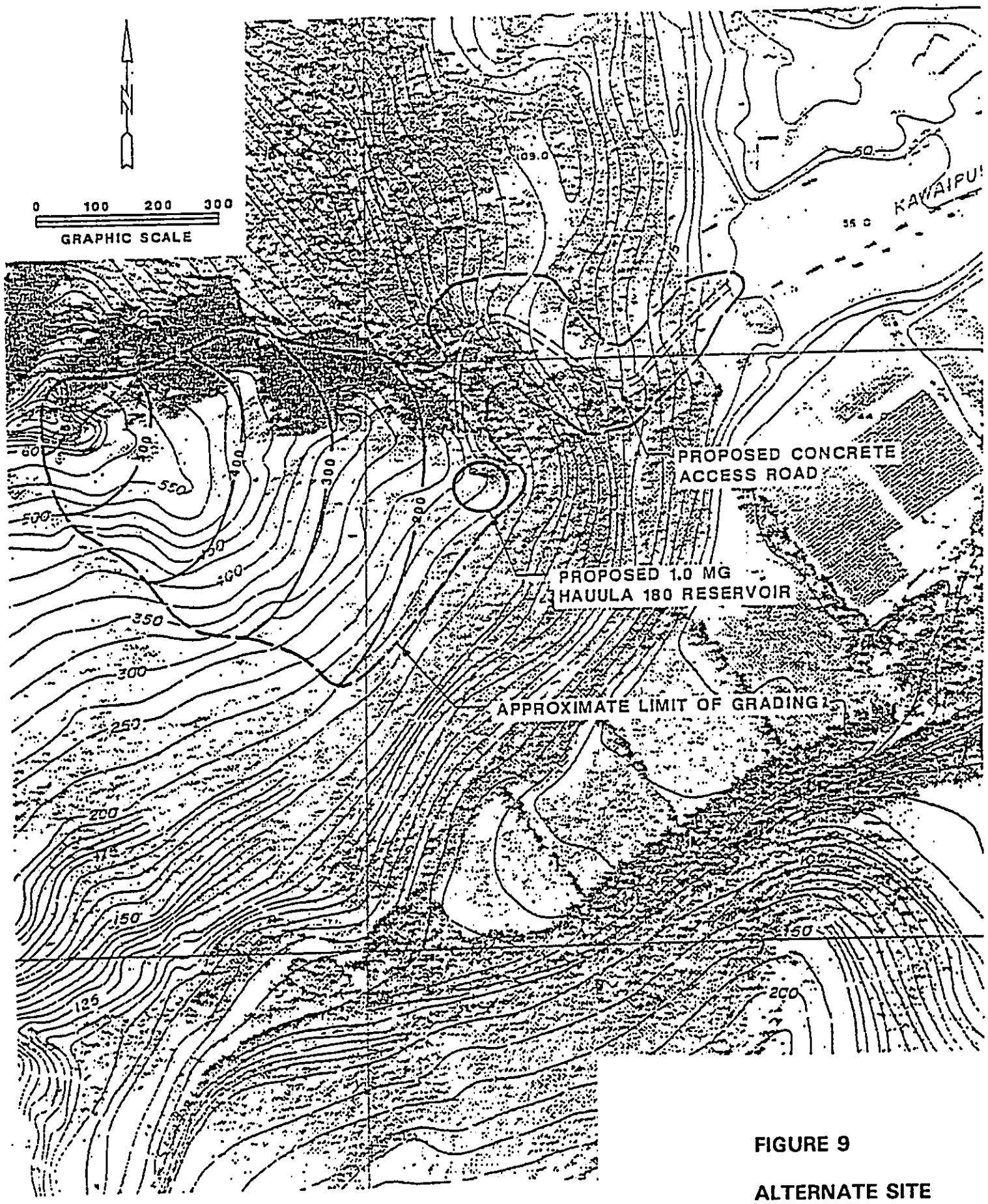


FIGURE 9

ALTERNATE SITE

Hauula 180 Reservoir

SECTION 7

RELATIONSHIP BETWEEN SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The proposed project will commit existing unused land for the purposes already presented, but it will do so to meet existing and future needs to improve on pressure fluctuations and potential fire fighting needs for the area. This benefit is considered to enhance the existing and potentially future needs for the surrounding community.

SECTION 8

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The proposed project will commit the use of the site land and access roadway for the duration of the project's operations. The proposed project is compatible with the land use plans for the area; the Hauula 180 reservoir site is designated on the Koolauloa Development Plan Public Facilities Map of the City and County of Honolulu (Ordinance 83-9, May 10, 1983). The recently passed ordinance number indicating site determined is 93-42. Once completed and operational, the proposed reservoir and booster station will not pose a significant disruption to the existing land uses in the area.

SECTION 9

LIST OF NECESSARY APPROVALS

Federal	No federal permits are needed
State	Approval of a Conservation District Use Application (CDUA) for development in a Conservation District, pursuant to Sec. 183-41 and 205-5, Hawaii Revised Statutes, by the Board of Land and Natural Resources
County	Grubbing, Grading, and Stockpiling Permits for grading, grubbing, stockpiling, pursuant to Chapter 180C, Hawaii Revised Statutes, and Chapter 23, Revised Ordinance of Honolulu, from the City and County of Honolulu's Department of Public Works
	Building Permit for construction of the reservoir and booster station and electrical and plumbing improvements, pursuant to Chapters 16, 17, 18, 19, and 25, Revised Ordinances of Honolulu, from the City and County of Honolulu's Building Department
	Acceptance of the Final Environmental Impact Statement, pursuant to State Environmental Council rules, by the Honolulu Board of Water Supply
	Permit to discharge effluent into a municipal storm drain and a National Pollutant Discharge Elimination System (NPDES) permit will be filed for hydrotesting to flush and chlorinate the reservoir, transmission mains and booster pumps.

SECTION 10

SUMMARY OF UNRESOLVED ISSUES

Land agreements are in the final stages of negotiation with the Plumbers and Fitters Local 675 of the United Association Trust for TMK 5-4-4:4 and TMK 5-4-19:54.

SECTION 11

AGENCIES AND ORGANIZATIONS CONSULTED

Although the overall anticipated environmental impacts appear to be minimal with this proposed project, it was previously determined that an Environmental Impact Statement (EIS) is to be prepared for any project associated with the Windward Oahu Regional Water Systems Improvements, as recommended in the FEIS for that project.

As outlined in "A Guidebook for the Hawaii State Environmental Review Process," the following agencies and organizations were sent copies of the draft environmental impact statement. Copies were distributed according to those listed in this guidebook.

Those with an asterisk provided comments during the review period. The letters of comments and corresponding letters of responses have been incorporated into this section on the pages indicated.

Page No.

DEPARTMENT OF THE NAVY
COMMANDER
NAVAL BASE PEARL HARBOR
BOX 110
PEARL HARBOR, HAWAII 96860-5020

IN REPLY REFER TO:
11011
Ser N42/3574
03 DEC 1992

RECEIVED
DEC 4 - 1992
ENGINEERING DESIGN GROUP, INC.

Engineering Design Group, Inc.
1525 Young Street
Honolulu, HI 96825

Gentlemen:

HAUULA 180 RESERVOIR AND BOOSTER STATION

We have reviewed the balance of the subject DEIS and have no comments to offer as stated in our earlier letter of 27 November 1992. Since we have no futher use for the DEIS, it is being returned to the Office of Environmental Quality Control.

Sincerely,

W. K. LIU
FACILITIES ENGINEER
BY DIRECTION OF
THE COMMANDER

Copy to:
OEQC (w/DEIS)

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

RECEIVED
JUL 2 - 1993
ENGINEERING DESIGN GROUP, INC.

June 28, 1993

Mr. W. K. Liu
Facilities Engineer
By Direction of the Commander
Department of the Navy
Naval Base Pearl Harbor
Pearl Harbor, Hawaii 96860-5020

Dear Mr. Liu:

Subject: Your Letters of November 27, 1992 and December 3, 1992, on the Draft Environmental Impact Statement, Hauula 180 Reservoir and Booster Station

Thank you for reviewing the draft environmental impact statement for our proposed project.

If you have any questions, please contact Roy Doi at 527-5235.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Engineering Design Group, Inc.
Office of Environmental Quality Control

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, HONOLULU
FORT SHAFTER, HAWAII 96858-5440

REPLY TO ATTENTION OF

December 3, 1992

Planning Division

Mr. George Kuo
State of Hawaii
Board of Water Supply
630 South Beretania Street
Honolulu, Hawaii 96843

Dear Mr. Kuo:

Thank you for the opportunity to review and comment on the Draft Environmental Impact Statement for the Hauula 180 Reservoir and Booster Station, Koolauloa, Oahu (TMK 5-4-4: 4 and 5-4-19: 54). 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 permits (DA) under the Clean Water Act; the Rivers and Harbors Act of 1899; and the Marine Protection, Research and Sanctuaries Act.

a. The project does not involve work in waters of the U.S.; therefore, a DA permit is not required.

b. According to the enclosed Federal Emergency Management Agency's Flood Insurance Rate Map, panel 150001-0015-C, dated September 28, 1990, the proposed project is located in Zone AE (areas inundated by the 100-year flood with a base flood elevation of 20 to 26 feet above mean sea level) Zone D (areas which flood hazards are undetermined) and Zone X (unshaded; areas determined to be outside of the 500-year floodplain).

Sincerely,

Kisuk Cheung, P.E.
Director of Engineering

Enclosure

LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100 YEAR FLOOD

ZONE A — No base flood elevations determined

ZONE AE — Base flood elevations determined

ZONE AH — Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined

ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined; for areas of alluvial fan flooding, velocities also determined

ZONE A99 — To be protected from 100-year flood by Federal flood protection system under construction; no base flood elevations determined

ZONE V — Coastal flood with velocity hazard (wave action); no base flood elevations determined

ZONE VE — Coastal flood with velocity hazard (wave action); base flood elevations determined

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

ZONE X — Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood

OTHER AREAS

ZONE X — Areas determined to be outside 0.2% annual chance floodplain

ZONE D — Areas in which flood hazards are undetermined

Flood Boundary

Floodway Boundary

Zone D Boundary

Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones

513 — Base Flood Elevation Line; Elevation in Feet*

D — D — Cross Section Line

(EL 87)* — Base Flood Elevation in Feet where Uniform within Zone*

M17 — Elevation Reference Mark

*Referenced to the National Geodetic Vertical Datum of 1929

NOTES

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

CITY AND COUNTY OF
HONOLULU,
HAWAII

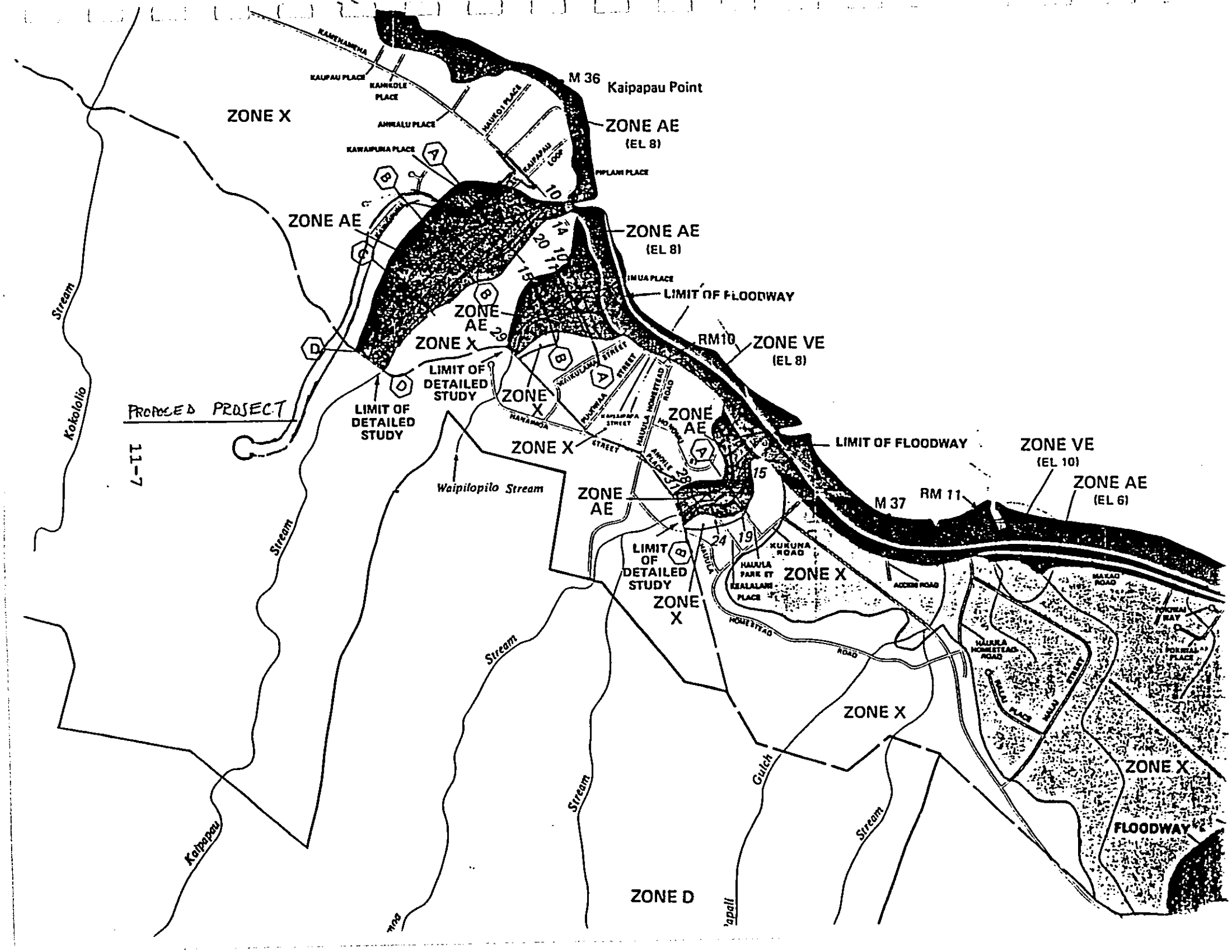
PANEL 15 OF 135
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
150001 0015C

MAP REVISED:
SEPTEMBER 28, 1990

Federal Emergency Management Agency

11-6


ZONE X
M 36
Kaipapau Point
ZONE AE
(EL 8)
ZONE AE
ZONE AE
(EL 8)
LIMIT OF FLOODWAY
ZONE AE
ZONE X
ZONE X
RM10
ZONE VE
(EL 8)
LIMIT OF DETAILED STUDY
LIMIT OF DETAILED STUDY
PROPOSED PROJECT
ZONE X
ZONE AE
LIMIT OF FLOODWAY
ZONE VE
(EL 10)
ZONE AE
(EL 6)
ZONE AE
M 37
RM 11
LIMIT OF DETAILED STUDY
ZONE X
ZONE X
ZONE X
ZONE X
FLOODWAY
ZONE D
Waipilopilo Stream
Kokololio Stream
Stream
Stream
Stream
Gulch
Stream
Kalpapau
11-7

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

June 25, 1993

RECEIVED
JUL 2 - 1993
ENGINEERING DESIGN GROUP, INC.

Mr. Kisuk Cheung
Director of Engineering
U. S. Army Engineer District, Honolulu
Department of the Army
Fort Shafter, Hawaii 96858-5440

Dear Mr. Cheung:

Subject: Your Letter of December 3, 1992 on the Draft Environmental Impact Statement; Hauula 180 Reservoir and Booster Station

Thank you for reviewing the draft environmental impact statement (EIS) for our proposed project. We have the following response to your comments:

1. We acknowledge that the project does not involve work in waters under your jurisdiction and consequently does not require a Department of the Army (DA) permit.

2. We note the Federal Emergency Management Agency's Flood Insurance Rate Map locating the proposed project. All of the above ground improvements will be constructed in areas above the flood elevation.

If you have any questions, please contact Roy Doi at 527-5235.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: ✓Engineering Design Group, Inc.
Office of Environmental Quality Control

(P)1948.2

NOV 27 1992

Board of Water Supply
630 South Beretania Street
Honolulu, Hawaii 96843

Attention: Mr. George Kuo

Gentlemen:

Subject: Hauula 180 Reservoir and Booster Pump Station
Koolauloa, Oahu, Hawaii
Draft EIS

Thank you for the opportunity to review the subject document. We have no comments to offer.

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

Very truly yours,

GORDON MATSUOKA
State Public Works Engineer

RY:jk
cc: Engineering Design Group, Inc.
Office of Environmental Quality Control

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

June 28, 1993

RECEIVED
JUL 2 - 1993
ENGINEERING DESIGN GROUP, INC.

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 November 27, 1992 on the Draft Environmental Impact Statement, Hauula 180 Reservoir and Booster Station

Thank you for reviewing the draft environmental impact statement for our proposed project.

If you have any questions, please contact Roy Doi at 527-5235.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: ✓Engineering Design Group, Inc.
Office of Environmental Quality Control

JOHN WAIHEE
GOVERNOR

JOSEPH K. CONANT
EXECUTIVE DIRECTOR

STATE OF HAWAII
DEPARTMENT OF BUDGET AND FINANCE
HOUSING FINANCE AND DEVELOPMENT CORPORATION
677 QUEEN STREET, SUITE 300
HONOLULU, HAWAII 96813
FAX (808) 587-0600

IN REPLY REFER TO:
92:PPE/5824jt

December 7, 1992

Mr. George Kuo
Board of Water Supply
630 South Beretania Street
Honolulu, Hawaii 96813

Dear Mr. Kuo:

Re: Draft Environmental Impact Statement for the Hauula 180 Reservoir and Booster Station

Thank you for the opportunity to review the subject dEIS. We have no comments to offer.

Sincerely,

JOSEPH K. CONANT
Executive Director

c: OEQC
Engineering Design Group, Inc.

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU

COPY

June 28, 1993

RECEIVED
JUL 2 - 1993
ENGINEERING DESIGN GROUP, INC.

Mr. Joseph K. Conant, Executive Director
Housing Finance and Development Corporation
Department of Budget and Finance
State of Hawaii
677 Queen Street, Suite 300
Honolulu, Hawaii 96813

Dear Mr. Conant:

Subject: Your Letter of December 7, 1992 on the Draft Environmental Impact Statement, Hauula 180 Reservoir and Booster Station

Thank you for reviewing the draft environmental impact statement for our proposed project.

If you have any questions, please contact Roy Doi at 527-5235.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Engineering Design Group, Inc.
Office of Environmental Quality Control

JOHN WAIHEE
Governor
MUFI HANNEMANN
Director
BARBARA KIM STANTON
Deputy Director
RICK EGGED
Deputy Director
TAKESHI YOSHIHARA
Deputy Director

DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

ENERGY DIVISION, 335 MERCHANT ST., RM. 110, HONOLULU, HAWAII 96813 PHONE: (808) 587-3800 FAX: (808) 587-3820

November 23, 1992

Mr. George Kuo
Board of Water Supply
630 South Beretania Street
Honolulu, Hawaii 96843

Dear Mr. Kuo:

Subject: Hauula 180 Reservoir and Booster Station
Island of Oahu, District of Koolauloa
Tax Map Key Numbers: 5-4-04:4 and 5-4-19:54

We wish to inform you that we have no comments to offer on the subject Draft Environmental Impact Statement (DEIS). We are returning the DEIS with no comments.

Thank you for the opportunity to review the document.

Sincerely,

Mufi Hannemann

MHK:hkeis55

cc: Office of Environmental Quality Control
Engineering Design Group, Inc.

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

June 28, 1993

Mr. Mufi Hannemann, Director
Department of Business, Economic
Development and Tourism
State of Hawaii
335 Merchant Street, Room 110
Honolulu, Hawaii 96813

Dear Mr. Hannemann:

Subject: Your Letter of November 23, 1992 on the Draft Environmental Impact Statement, Hauula 180 Reservoir and Booster Station

Thank you for reviewing the draft environmental impact statement for our proposed project.

If you have any questions, please contact Roy Doi at 527-5235.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Engineering Design Group, Inc.
Office of Environmental Quality Control

JOHN WAIHEE
GOVERNOR

MAJOR GENERAL EDWARD V. RICHARDSON
DIRECTOR OF CIVIL DEFENSE

ROY C. PRICE, SR.
VICE DIRECTOR OF CIVIL DEFENSE

PHONE (808) 734-2161

STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE DIRECTOR OF CIVIL DEFENSE
3949 DIAMOND HEAD ROAD
HONOLULU, HAWAII 96816-4495

November 24, 1992

TO: Mr. George Kuo
Board of Water Supply

FROM: Roy C. Price, Sr.
Vice Director of Civil Defense

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT; HAUULA 180 RESERVOIR AND BOOSTER STATION

We appreciate this opportunity to comment on the Draft Environmental Impact Statement from the Board of Water Supply, Hauula 180 Reservoir and Booster Station, Hauula, Oahu, Hawaii, project area TMK: 5-4-04: por. 4 and 5-4-19: por. 54.

We do not have negative comments specifically directed at this draft environmental impact statement. However, we do have a proposal that entails the coordination between the Board of Water Supply engineers; the National Weather Service (NWS) Honolulu Office; and the Department of Land and Natural Resources (DLNR), Division of Water Resource Management, for the possible location and installation of a rain gauge weather monitor. This station could function as a data collection point or as a reporting station to enhance the weather capabilities of both NWS and DLNR. Just as parks, schools, fire hydrants, underground and overhead utilities, and sidewalks are planned as integral parts of subdivisions and industrial areas, early warning and emergency warning systems must also be planned for the welfare and safety of the population and communities.

Our State Civil Defense planners and technicians are available to discuss this further if there is a requirement. Please have your staff call Mr. Mel Nishihara of my staff at 734-2161.

c: ✓Mr. Edgar K. M. Lee
Engineering Design Group, Inc.

Office of Environmental Quality Control

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

June 25, 1993

Mr. Roy C. Price, Sr.
Vice Director of Civil Defense
Department of Defense
State of Hawaii, Office of
the Director of Civil Defense
3949 Diamond Head Road
Honolulu, Hawaii 96816-4495

Dear Mr. Price:

Subject: Your Memorandum of November 24, 1992, on the Draft Environmental Impact Statement; Hauula 180 Reservoir and Booster Station

Thank you for reviewing the draft environmental impact statement for our proposed project. We have the following response to your comments:

As suggested in your letter, we will cooperate with the National Weather Service (NWS) and the Department of Land and Natural Resources (DLNR) if a rain gauge weather monitor is desired at this project site. While there are no specific plans for this area, we have contacted Mr. Mel Nishihara of your office, who will arrange a meeting with appropriate agencies prior to the final design of this project.

If you have any questions, please contact Roy Doi at 527-5235.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: ✓ Engineering Design Group, Inc.
Office of Environmental Quality Control

JOHN WAIHEE
GOVERNOR OF HAWAII

JOHN C. LEWIN, M.D.
DIRECTOR OF HEALTH

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

In reply, please refer to:

January 9, 1993

91-349/epo

Mr. George Kuo
Board of Water Supply
630 South Beretania Street
Honolulu, Hawaii 96813

Dear Mr. Kuo:

Subject: Draft Environmental Impact Statement (DEIS)
Hauula 180 Reservoir and Booster Station
Koolauloa, Oahu
TMK: 5-4-04: 4 and 5-4-19: 54

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

Water Pollution

A National Pollutant Discharge Elimination System (NPDES) permit is required for any discharge to waters of the State including the following:

1. Storm water discharges relating to construction activities for projects greater than five acres;
2. Storm water discharges from industrial activities;
3. Construction dewatering activities;
4. Cooling water discharges less than one million gallons;
5. Ground water remediation activities; and
6. Hydrotesting water.

Any person wishing to be covered by the NPDES general permit for any of the above activities should file a Notice of Intent with the Department's Clean Water Branch at least 90 days prior to commencement of discharge to waters of the State.

91-349

If you should have any questions on this matter, please contact Mr. Denis Lau of the Clean Water Branch at 586-4309.

Very truly yours,

JOHN C. LEWIN, M.D.
Director of Health

c: Office of Environmental Quality Control
Engineering Design Group, Inc.

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

March 17, 1993

John C. Lewin, M.D.
Director
State Department of Health
P. O. Box 3378
Honolulu, Hawaii 96801

Dear Dr. Lewin:

Subject: Your Letter of January 9, 1993 Regarding the Draft Environmental Impact Statement (DEIS) for the Proposed Hauula 180' Reservoir and Booster Station, TMK: 5-4-04: 4 and 5-4-19: 54, Off Kawaipuna Street

Thank you for responding to the DEIS for our proposed reservoir and pump station project. We have the following response to your comments:

1. The impact of stormwater runoff associated with construction activity will be addressed by submitting an Erosion Control Plan (ECP) to the Department of Public Works (DPW) for review and approval prior to construction. Please refer to the attached letter to DPW. The ECP will address measures to retain silt laden runoff on the project site by the use of swales, berms or a settling basin. The total project area including reservoir site, access road and staging area should be less than five acres, and therefore, may not require a National Pollutant Discharge Elimination System (NPDES) Permit for stormwater runoff associated with construction activity. This will be determined after the design is completed.

2. A Permit to Discharge Effluent into a municipal Storm Drain along Kawaipuna Street and a NPDES permit will be filed for Discharge of Hydrotesting Waters to flush and chlorinate the reservoir, transmission mains and booster pumps. Best Management Practices (BMP) will be provided to control and reduce the discharge of pollutants into receiving waters. The BMP's will be described in detail in the applications. Due to higher elevations at the project site, dewatering is not anticipated.

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

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If you have any questions, please contact Bert Kuioka at 527-5235.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

Attachment

cc: Engineering Design Group

JOHN WAIHEE
GOVERNOR OF HAWAII

WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES
JOHN P. KEPPELER, II
DONA L. HANAIKE

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

REF:OCEA:SKK

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

FILE NO.: 93-281
DOC. NO.: 1925

DEC 18 1992

Mr. George Kuo
Board of Water Supply
630 South Beretania Street
Honolulu, Hawaii 96843

Dear Mr. Kuo:

SUBJECT: Draft Environmental Impact Statement (DEIS) for the Hauula 180 Reservoir and Booster Station, Koolauloa, Oahu

Thank you for giving our Department the opportunity to comment on this matter. We have reviewed the submitted DEIS and have the following comments.

We note that a Temporary Variance (TV-92-2) for soil borings and topographical survey work, on parcel TMK: 5-4-04: 4, was approved by the Board of Land and Natural Resources (BLNR) on June 26, 1992, subject to 10 conditions. Condition on (1) of that approval states that:

> All work at the project site must be completed within 6 months from the date of this approval.

A such, your Temporary Variance (TV-92-2) expires on December 26, 1992.

In addition, we remind the applicant that a Conservation District Use Application (CDUA) is required for the proposed reservoir and booster station. Therefore, we expect to review the DEIS within the context of the CDUA process.

Also, we have enclosed some preliminary division comments on the DEIS for your convenience.

Thank you for your cooperation in this matter. Please feel free to call Sam Lemmo at our Office of Conservation and Environmental Affairs, at 587-0377, should you have any questions.

Very truly yours,

John P. Keppeler II

for WILLIAM W. PATY

Enclosure

11-21

Department of Land & Natural Resources
Division of Forestry and Wildlife

MEMORANDUM:

November 24, 1992
OCEA

TO: Roger Evans, OCEA

FROM: Carl T. Masaki, Acting Administrator

SUBJECT: Draft Environmental Impact Statement for the Hauula 180 Reservoir and Booster, Koolauloa, Oahu, File No. 93-281

We have reviewed File No. 93-281 and have the following comments:

1) We have no objections to the displacement of exotic plant species during the construction of the project. We do, however, recommend that a planting or landscaping plan be formulated and implemented to the area around the reservoir and booster station. We highly recommend that native plant species be used.

2) The applicant should consult with the Honolulu Fire Department in placing a standard pipe fitting to the reservoir so that the fire department may be able to connect their hoses in case of fires to the immediate area.

3) A fire contingency plan should be submitted to this office for approval prior to the construction of the project.

cc: Oahu Branch

State of Hawaii
Department of Land and Natural Resources
DIVISION OF AQUATIC RESOURCES

November 23, 1992

MEMORANDUM

To: Paul Kawamoto, Program Manager
Aquatic Resources and Environmental Protection

From: Bill Devick, Program Manager
Recreational Fisheries

Subject: Draft EIS Review

Comments Requested By: Roger Evans, OCEA
Date of Request: November 19, 1992
Date Received: November 23, 1992

Summary of Proposed Project

Title: Draft Environmental Impact Statement for the Hauula 180 Reservoir and Booster Station, File 93-281

Project By: Board of Water Supply, City and County of Honolulu

Location: Koolauloa, Oahu

Brief Description: The project involves construction of a 1.0 million gallon reservoir with booster station, access roadway, transmission mains, and appurtenances. No new water sources will be developed.

Comments: The project area slopes towards Hauula Stream. Measures should therefore be taken to prevent sediment runoff and erosion both during and after the construction phase.

Bill Devick

December 8, 1992

MEMORANDUM

LOG NO: 6872
DOC NO: 9212TD21

TO: Roger C. Evans, Administrator
Office of Conservation and Environmental Affairs

FROM: Don Hibbard, Administrator
Historic Preservation Division

SUBJECT: **Draft Environmental Impact Statement (DEIS) for the Hauula 180 Reservoir and Booster Station (File No. 93-281) Kalpapa'u, Ko'olauloa, O'ahu TMK: 5-4-4: 4 and 5-4-19: 54**

Our office has accepted an archaeological inventory survey report for this project. On the basis of the report we believe that this project will have "no effect" on historic sites.

TD:amk

WATER SUPPLY
Y OF HONOLULU

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RECEIVED
JUN 25 1993
ENVIRONMENTAL DESIGN HAWAII, INC.

June 24, 1993

Mr. Keith Ahue, Chairperson
Board of Land and Natural Resources
Department of Land and Natural Resources
State of Hawaii
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ahue:

Subject: Your Letter of December 18, 1992 on the Draft Environmental Impact Statement (EIS) Hauula 180 Reservoir and Booster Station

Thank you for reviewing the Draft EIS for our proposed project. We have the following response to the comments that we received from you:

1. *The soil borings in the Conservation District began on October 26, 1992* and was completed on November 11, 1992. We will be applying for a Conservation District Use Application (CDUA) for construction activities six months prior to commencing work on the proposed reservoir and booster station.

2. A landscaping plan will be prepared for the area around the reservoir and booster station. Landscaping for the proposed project will include the use of native plant species, particularly those which are compatible with the climate of the area. The Honolulu Fire Department will be consulted regarding the installation of a standard pipe fitting at the reservoir.

3. Measures will be taken to prevent sediment run-off and erosion during and after the construction phase.

4. We appreciate your concurrence that, based on the archaeological inventory survey, the proposed project will have "no effect" on historic sites.

If you have any questions, please call Roy Doi at 527-5235.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Engineering Design Group, Inc.
Office of Environmental Quality Control

JOHN WAIHEE
GOVERNOR

REX D. JOHNSON
DIRECTOR

DEPUTY DIRECTORS
JOYCE T. OMINE
AL PANG
JEANNE K. SCHULTZ
CALVIN M. TSUDA

IN REPLY REFER TO:

HWY-PS
2.4703

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

DEC 1 1992

RECEIVED
DEC 2 - 1992
ENGINEERING DESIGN GROUP, INC.

Mr. Kazu Hayashida
Manager and Chief Engineer
Board of Water Supply
630 South Beretania Street
Honolulu, Hawaii 96843

Dear Mr. Hayashida:

Hauula 180 Reservoir and Booster Station
Draft Environmental Impact Statement
TMK: 5-4-04: 4 & 5-4-19: 54, Hauula, Oahu, Hawaii

Thank you for your transmittal requesting our review of the subject project.

Plans for any construction work within the State highway right-of-way must be submitted for our review and approval.

Sincerely,

for Rex D. Johnson
Director of Transportation

c: Office of Environmental Quality Control
220 South King Street, Fourth Floor
Honolulu, Hawaii 96813
Attn: Mr. Brian J.J. Choy, Director

Board of Water Supply
630 South Beretania Street
Honolulu, Hawaii 96843
Attn: Mr. George Kuo

Engineering Design Group, Inc.
1525 Young Street
Honolulu, Hawaii 96826
Attn: Mr. Edgar K.M. Lee

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

June 25, 1993

RECEIVED
JUL 2 - 1993
ENGINEERING DESIGN GROUP, INC.

Mr. Rex D. Johnson, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Johnson:

Subject: Your Letter of December 1, 1992 on the Draft Environmental Impact Statement for Hauula 180 Reservoir and Booster Station

Thank you for reviewing the draft environmental impact statement for our proposed project.

We will submit plans for any construction work within the State highway right-of-way to your department for review and approval.

If you have any questions, please contact Roy Doi at 527-5235.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: ✓Engineering Design Group, Inc.
Office of Environmental Quality Control

JOHN WAIHEE
GOVERNOR

BRIAN J. J. CHOY
Director

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
220 SOUTH KING STREET
FOURTH FLOOR
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185

January 4, 1993

Mr. Kazu Hayashida, Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street, Fourth Floor
Honolulu, Hawaii 96813

Attention: George Kuo

Dear Mr. Hayashida:

SUBJECT: DRAFT EIS FOR THE HAUULA 180 RESERVOIR AND BOOSTER STATION KOOLAULOA, OAHU

Thank you for submitting the above mentioned document for our review. We have the following comment:

When submitting the Final EIS for this project please include the information required by §11-200-17(g), Hawaii Administrative Rules, specifically in regards to the population and growth characteristics of the affected area and any population and growth assumptions. Your determination of secondary population and growth impacts resulting from the proposed action and its alternatives should also be included in the Final Supplemental EIS.

Please call Margaret Wilson at 586-4185 if you have any questions about this request.

Sincerely,

Brian J. J. Choy
Director

c: Edgar Lee, Engineering Design Group, Inc.

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

June 1, 1993

Mr. Brian J. J. Choy, Director
Office of Environmental Quality Control
State of Hawaii
220 South King Street, Fourth Floor
Honolulu, Hawaii 96813

Dear Mr. Choy:

Subject: Your Letter of January 4, 1993 on the Draft Environmental Impact Statement for the Hauula 180 Reservoir and Booster Station

Thank you for reviewing the Draft Environmental Impact Statement (DEIS).

When we submit the final EIS for this project, we will include information regarding the population and growth characteristics of the affected area and any population and growth assumptions. We will also include our determination of secondary population and growth impacts resulting from the proposed action and its alternatives.

If you have any questions, please call Roy Doi at 527-5235.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Engineering Design Group, Inc.

University of Hawaii at Manoa

Environmental Center
A Unit of Water Resources Research Center
Crawford 317 • 2550 Campus Road • Honolulu, Hawaii 96822
Telephone: (808) 956-7361

January 7, 1993
RE:0616

Mr. Bert Kuioka
Honolulu Board of Water Supply
630 South Beretania Street
Honolulu, Hawai'i 96843

Dear Mr. Kuioka:

Draft Environmental Impact Statement (DEIS)
Hau'ula 180 Reservoir and Booter Station
Ko'olauloa, O'ahu

This project proposes to construct a 1.0 million-gallon (MG) reservoir with booster pump station, access roadway from Kawaipuna Street, transmission mains and other appurtenant features to connect the reservoir to the existing water system. This reservoir is needed to: 1) adjust for the normal daily fluctions which occur in demand; (2) to provide enough capacity for fire fighting; and (3) to stabilize water pressure in the existing water system by controlling pressure surges in major water transmission mains which occur when pumps are turned on and off and to keep transmission mains full of water when pumps are turned off. Mitigative measures are proposed to reduce construction-related fugitive dust and to limit the hours of construction. The developers intend for the completed reservoir to be painted with a color that blends well with the surrounding environment.

The Environmental Center has reviewed the referenced DEIS with the assistance of Paul Ekern, (Emeritus) Water Resources Research Center; and Alex Buttaro of the Environmental Center.

Visual Resources

1) What color will the reservoir be painted to best blend with the surrounding environment?

2) Are the reservoir and road expected to be aestetically comparable to the existing landscape?

3) Is painting of the reservoir expected to totally mitigate the adverse visual impact this project will have?

4) Why did the Summary of Unavoidable Impacts neglect to mention visual impacts (page V-1)?

5) We acknowledge that painting the reservoir may help to mitigate some visual impacts in the short-term, but has consideration been given to the possibility of landscaping the road and reservoir with trees and shrubs as a long-term mitigative strategy?

Archaeology

The archaeological inventory survey report (Appendix B) states with regard to apparent terracing, "the talus has stabilized into what often appears on initial examination to be constructed stacking but upon close examination it becomes evident are natural erosion terraces" (Appendix B, page B14).

1) What evidence did "close examination" of the terraces yield that led to the conclusion that they were natural?

2) Is it possible that manmade terraces may appear natural after hundreds of years of erosion and tallus sedimentation from natural processes?

3) How might natural terraces be differentiated from man-made terraces that have been subject to physically altering erosion and sedimentation processes?

The archaeology reports recomends that an archaeologist monitor construction excavation during the phases leading from the project start line of the existing road for the first 1200 feet of the access road and that an archaeologist be on standby for the remainder of subsurface activities (Appendix B, page B19-B20).

4) Does the developer intend to implement these recommendations?

Water Quality

The DEIS states that "the proposed reservoir will be used to store and improve the distribution capability for the existing water system in the area but does not involve the additional withdrawal of water" (page II-4).

1) Is it possible that the withdrawal rates of wells feeding this reservoir will increase at times, due to the additional storage and usage capacity provided?

2) How is the water balance of this area expected to be affected?

3) How is the development of Kaipapa'u well connected to this reservoir?

4) Considering the possible indirect impacts associated with possible increased use due to increased capacity and the extent to which the increased use will increase pumpage of aquifer sources, what are the

potential impacts to those streams and aquifers which are in various ways interrelated to the project (e.g. dewatering, sustainable yields)?

This DEIS states that "the proposed project's impact is sufficiently far from Kaipapau Stream that no impacts to the stream are anticipated; no construction debris or graded material will enter the stream" (pages IV-1 to page IV-2).

5) Our reviewers note that the proposed road runs along Kaipapa'u, and appears to be within approximately 75 feet of the stream. How far are the access road and reservoir from the stream?

6) Why is the project considered sufficiently far from the stream so as not to entail impacts?

7) How might adverse impacts resulting from erosion be mitigated?

This DEIS mentions that the proposed project is part of the Windward O'ahu Regional Water System, yet does not expound on their interrelationship and the extent to which this project participates in the cumulative impacts of the Windward O'ahu Regional Water System.

8) To what extent and in what ways does this project contribute and interrelate to the cumulative environmental impacts of the Windward O'ahu Regional Water System Improvements?

9) Might this project have <u>any</u> "downstream" effects on adjacent and interrelated stream flows, durations, fauna, or uses, and if so, what possibilities exist?

<u>Summary</u>

This DEIS appears to adequately address many of the potential impacts associated with the proposed development. However, our reviewers expressed concern that aquifer pumpage and use may increase as a result of the increased storage capacity. If increased use is a possibility, this EIS should better assess the cumulative effects this reservior may have on adjacent and interrelated resources.

Thank you for the opportunity to review this document and we hope our comments are helpful.

Sincerely,

John T. Harrison

John T. Harrison, Ph.D.
Environmental Coordinator

cc: OEQC
Edgar Lee, Engineering Design Group, Inc.
Roger Fujioka
Paul Ekern
Dave Penn
Alex Buttaro

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU

COPY

June 30, 1993

RECEIVED
JUL 7 - 1993
ENGINEERING DESIGN GROUP, INC.

John T. Harrison, Ph.D.
Environmental Coordinator
Environmental Center
University of Hawaii at Manoa
Crawford 317
2550 Campus Road
Honolulu, Hawaii 96822

Dear Dr. Harrison:

Subject: Your Letter of January 7, 1993 on the Draft Environmental Impact Statement (EIS) for the Hauula 180' Reservoir and Booster Station Project

Thank you for reviewing the Draft EIS for the proposed project. We have the following response to your comments:

VISUAL RESOURCES

1. "What color will the reservoir be painted to best blend with the surrounding environment?"

   Reservoir painting will be done with a color to best blend in with the surrounding area after the structure is constructed. The reservoir most likely will be painted a shade of green, but we have not yet determined the exact color.

2. "Are the reservoir and road expected to be aesthetically comparable to the existing landscape?"

   Landscaping of the reservoir and road will be done with native species that are aesthetically comparable to the existing landscape. This would help to soften and blend in the facility's visual impact.

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CITY AND COUNTY OF HONOLULU

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3. "Is painting of the reservoir expected to totally mitigate the adverse visual impact this project will have?"

   Painting will help to mitigate some of the visual impacts created by the reservoir.

4. "Why did the Summary of Unavoidable Impacts neglect to mention visual impacts?"

   We will revise our Final EIS Summary of Unavoidable Impacts to include the project's visual impacts. Visual impacts were addressed in Section IV G of the Draft EIS. We will attempt to mitigate any visual impacts as best we can.

5. "We acknowledge that painting the reservoir may help to mitigate some visual impacts in the short-term, but has consideration been given to the possibility of landscaping the road and reservoir with trees and shrubs as a long-term mitigative strategy?"

   As stated in our reply to comment 2., landscaping of the reservoir and road will be done as a long-term mitigative strategy.

ARCHAEOLOGY

1. "What evidence did 'close examination' of the terraces yield that led to the conclusion that they were natural?"

   Upon initial examination, even layers of stone appeared to reflect a front-facing of 2-3 layers of stacked material, which had been partially covered by loose talus material at a later date. However, when vegetation and loose material were removed at several locations, it became clear that the front-facing was actually the fractured exposed surface of layers of harder basaltic

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

material. One can spot these natural features by noting the mirror fracturing on the different layers of the exposed facing. It appears that when exposed to erosional forces, especially water, this material fractures quite frequently on the exposed face. If one attempts to move one of these stones, you end up trying to move a slab of material still affixed in the basalt layer. The wear pattern of the softer tufts above these basalt layers, combined with the heavy vegetation and loose material give a false impression of human activity.

2. "Is it possible that man-made terraces may appear natural after hundreds of years of erosion and talus sedimentation from natural processes?"

In certain situations, it is possible that man-made terraces may appear natural. However, on these very steep slopes, which show significant signs of nearly continual rock slides, you would not find still-intact front facing in good condition marking man-made terraces. Instead, it would be expected that later rock slides and erosional activity, both natural and man-induced, would have kicked out the facing material, but left the back section of the terraces. So the terrace would have lost the stone facing, but one could expect to note a regular and unnatural pattern of leveled areas partially filled over by loose talus material. The exposure noted in the research of this natural basalt layer is the reverse phenomena.

3. "How might natural terraces be differentiated from man-made terraces that have been subject to physically altering erosion and sedimentation processes?"

A man-made terrace would likely have lost its stone front facing, but would retain a significant soil layer within the terrace level. The Hauula features noted did not exhibit a soil layer within the terrace level. There was loose talus material but lack of significant soil deposits within the terrace level.

4. "The archaeology report recommends that an archaeologist monitor construction excavation. Does the developer intend to implement these recommendations?"

The State Historic Sites Division concurred that the project will have no effect on historic sites and recommended that a standby archaeologist is not needed during construction. However, we recognize the possibility of excavating subsurface historical artifacts during construction, and should this occur, further excavation would cease until proper mitigative measures have been by an archaeologist. This is a standard procedure for all Board of Water Supply (BWS) construction projects involving excavation.

WATER QUALITY

1. "Is it possible that the withdrawal rates of wells feeding this reservoir will increase at times, due to the additional storage and usage capacity provided?"

The withdrawal rates of wells feeding this reservoir may be affected but only to the extent of permitted use allowed by the Commission on Water Resource Management. The demand in the Hauula 180' system will not increase as a result of the proposed reservoir.

The primary purpose of the proposed Hauula 180' reservoir is to provide storage capacity for the area, which is currently provided by the existing Punaluu 180' reservoir. The new reservoir would provide additional capacity to bring the Hauula system up to BWS water system standards and also to stabilize pipeline pressure fluctuations within the Hauula area.

2. "How is the water balance of this area expected to be affected?"

The water balance will not be affected by the new reservoir.

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

3. "How is the development of Kaipapau Well connected to this reservoir?"

   Kaipapau Well will be connected into the Hauula 180' reservoir for operational storage and boosted to the Kahana 315' reservoir for distribution in the windward area.

4. "Considering the possible indirect impacts associated with possible increased use due to increased capacity and the extent to which the increased use will increase pumpage of aquifer sources, what are the potential impacts to those streams and aquifers which are in various ways interrelated to the project (e.g. dewatering, sustainable yields)?"

   There are no anticipated effects on aquifer sources as a result of the reservoir project.

   Any potential effects of proposed BWS well developments will be presented in the Environmental Assessments prepared individually for each well project.

   The sustainable yields of Windward areas are not well defined and have been declared as temporarily unavailable by the State DLNR, until better determinations on quantities are made. Proposed BWS exploratory well testing in conjunction with streamflow gaging and monitoring would help to provide the necessary data for determining sustainable yields, the effects of pumpage, and establishing standard levels of streamflow.

5. "Our reviewers note that the proposed road runs along Kaipapau, and appears to be within approximately 75 feet of the stream. How far are the access road and reservoir from the stream?"

   The access road and reservoir are over 400 feet away from Kaipapau Stream, not 75 feet as noted by your reviewers.

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

6. "Why is this project considered sufficiently far from the stream so as not to entail impacts?"

   The distance of 400 feet is sufficient distance to prevent construction activities from affecting the stream.

7. "How might adverse impacts resulting from erosion be mitigated?"

   The project will provide a detailed erosion plan proposing mitigative measures to be done in conjunction with construction of the project. The plan will be reviewed and approved for conformance by appropriate agencies. We have made initial contact with these agencies and our correspondence will be published in the Final EIS.

8. "To what extent and in what way does this project contribute and interrelate to the cumulative environmental impacts of the Windward Oahu Regional Water System Improvements?"

   This project will have localized impacts in the Hauula area only, and these would occur from short-term construction activities.

   Any regional environmental impacts that could occur would be more appropriately associated with water development projects. The EIS for Windward Oahu Regional Water System Improvements presented an overview of potential BWS projects in the Windward Region. Some of these projects were designated in the EIS as being for additional water development, and others for improving existing water systems. The proposed Hauula 180' Reservoir is primarily intended for improving the existing water system storage capacity and stabilizing pipeline pressure fluctuations within the Hauula area.

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

9. "How might this project have any downstream effects on adjacent and interrelated stream flows, durations, fauna, or uses, and if so, what possibilities exist?"

Any effects that could possibly occur from this project, would be from reservoir and access road construction activities. These are planned to be completely mitigated in the erosion control plan. Since no water development is involved, there should not be any effects on streams resulting from the project.

If you have any questions, please contact Roy Doi at 527-5235.

Very truly yours,

Kazu Hayashida
Manager and Chief Engineer

cc: Engineering Design Group
Office of Environmental Quality Control

DEPARTMENT OF GENERAL PLANNING
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813

RECEIVED
DEC 18 1992
ENGINEERING DESIGN GROUP, INC.

FRANK F. FASI
MAYOR

BENJAMIN B. LEE
CHIEF PLANNING OFFICER

ROLAND D. LIBBY, JR.
DEPUTY CHIEF PLANNING OFFICER

ET 11/92-3274A

December 15, 1992

MEMORANDUM

TO: KAZU HAYASHIDA, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

FROM: BENJAMIN B. LEE, CHIEF PLANNING OFFICER
DEPARTMENT OF GENERAL PLANNING

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)
HAUULA 180 RESERVOIR AND BOOSTER STATION,
OAHU, HAWAII, TAX MAP KEY 5-4-4:04 and 5-4-19:54

We have reviewed the subject DEIS and have the following comments to offer:

1. The Hauula 180 Reservoir is currently designated on the Koolauloa Development Plan Public Facilities Map (DPPFM) as site undetermined, within six years. Prior to implementation of the subject project, an amendment to the DPPFM should be processed to change the Public Facilities symbol designation to site determined.

2. The Final Supplemental Environmental Impact Statement (SEIS) should assess the visual impacts of the subject project on the surrounding area. Mitigative measures such as landscaping should be considered to minimize the visual impact of the extensive clearing and grading that is indicated.

3. The Final SEIS should also quantify the grading required for the proposed project.

4. The DEIS incorrectly references Ordinance No. 87-49 which mapped the Kahawainui Stream Flood Control project. The reference should be corrected to be Ordinance No. 83-9, which passed on May 10, 1983.

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

Sincerely,

BENJAMIN B. LEE
Chief Planning Officer

BBL:lh

cc: ✓Engineering Design Group, Inc.
OEQC

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU

COPY

RECEIVED

JUL 2 - 1993

ENGINEERING DESIGN GROUP, INC.

June 25, 1993

TO: ROBIN FOSTER, CHIEF PLANNING OFFICER
PLANNING DEPARTMENT

FROM: KAZU HAYASHIDA, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

SUBJECT: YOUR MEMORANDUM OF DECEMBER 15, 1992 ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE HAUULA 180 RESERVOIR AND BOOSTER STATION

Thank you for reviewing the Draft environmental impact statement. We have the following response to your comments:

1. An amendment to the Koolauloa Development Plan Public Facilities Map (DPPFM) was passed into ordinance on May 1993, to change the Public Facilities symbol designation to site determined.

2. As suggested, landscaping will be provided to minimize the visual impact of the proposed project.

3. The quantity of grading will be included in the final EIS.

4. Thank you for correcting the Ordinance reference. The final EIS will be revised to indicate Ordinance No. 83-9. The recently passed ordinance number indicating site determined is 93-42.

If you have any questions, please contact Roy Doi at 527-5235.

cc: Engineering Design Group, Inc.
Office of Environmental Quality Control

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813 • (808) 523-4432

930095

JAN 13 11 29 AM '93

FRANK F. FASI
MAYOR

DONALD A. CLEGG
DIRECTOR

LORETTA K.C. CHEE
DEPUTY DIRECTOR

92-04773(JT)

January 11, 1993

MEMORANDUM

TO: KAZU HAYASHIDA, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

FROM: DONALD A. CLEGG, DIRECTOR

ATTENTION: GEORGE KUO

SUBJECT: THE DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR HAUULA 180 RESERVOIR AND BOOSTER STATION KOOLAULOA, OAHU, HAWAII

We have reviewed the Draft Environmental Impact Statement (DEIS) for the Hauula 180 Reservoir and Booster Station and submit the following comments.

The maps that have been provided in the DEIS (Figures 2, 3 and 5 on pages I-2b, -2c and -4a, respectively) do not clearly show the proposed work in relation to the Special Management Area (SMA). When the DEIS maps are compared with the SMA maps on file at the Department of Land Utilization, it appears that portions of the proposed transmission lines and access road may be within the SMA. While transmission lines that run along existing corridors (public roads) may be exempted from SMA regulations, new construction within the SMA, such as the proposed access road and installation of transmission lines alongside the road, would require a Special Management Area Use Permit. The Environmental Impact Statement (EIS) should clarify whether any proposed work will take place within the SMA, and whether they will be subject to SMA regulations.

The proposed grading plan indicates a wide expanse of grading uphill of the proposed reservoir (see Figure 5, page I-4a). Discussion of the proposed grading plan should include an explanation of the extensive grading.

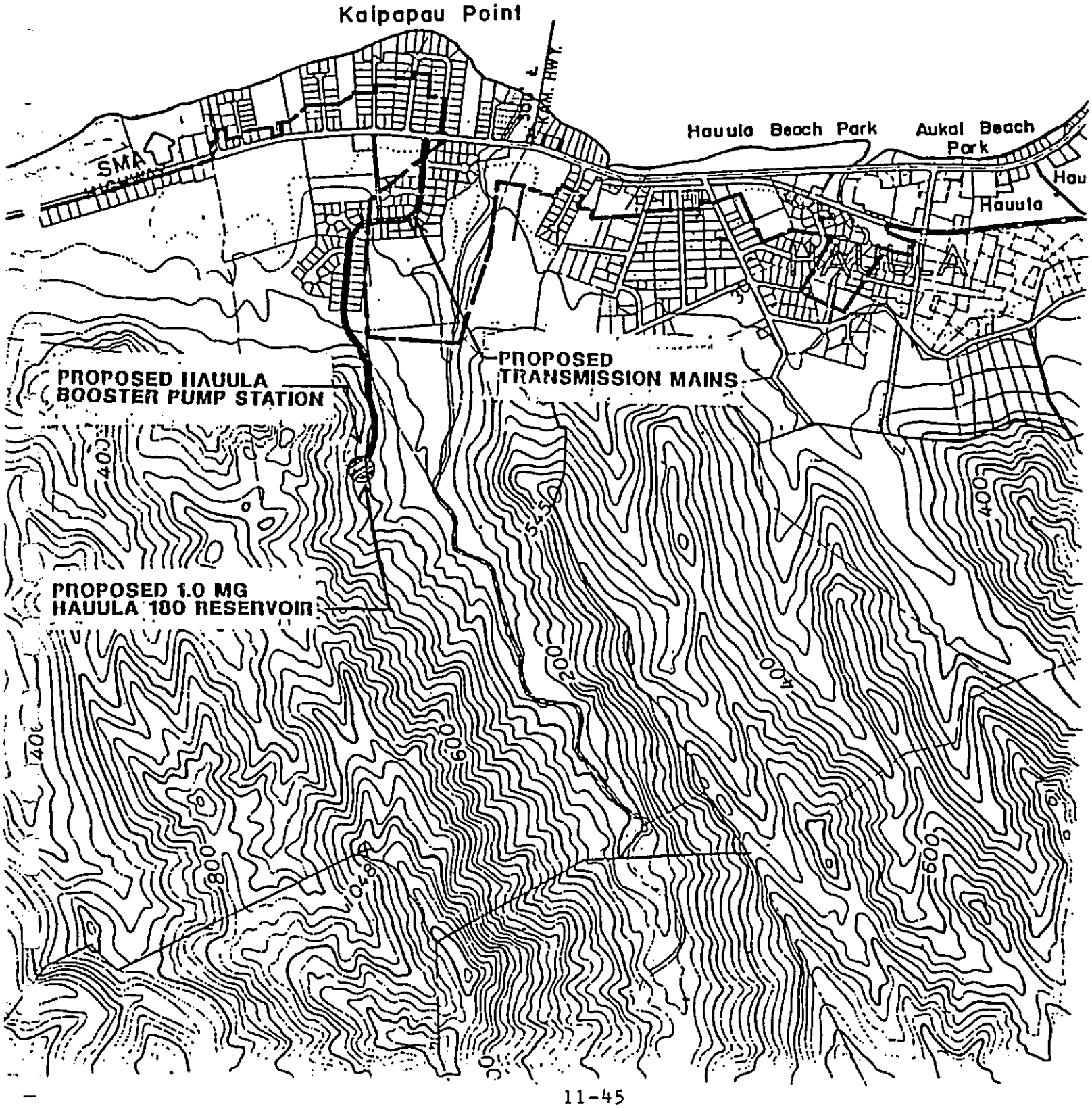
We appreciate the opportunity to review and comment upon the DEIS. Should you have any questions, please contact Joan Takano of our staff at 527-5038.

Donald Clegg

DONALD A. CLEGG
Director of Land Utilization

DAC.smc
enclosure
g:deis180.jht

portion of SMA map



BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU

COPY

June 23, 1993

TO: DONALD A. CLEGG, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM: KAZU HAYASHIDA, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

SUBJECT: YOUR MEMORANDUM OF JANUARY 11, 1993 ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR THE HAUULA 180 RESERVOIR AND BOOSTER STATION

Thank you for reviewing the Draft EIS for our proposed project. We have the following response to your comments:

1. The waterlines along Kawaipuna Street are within the Special Management Area (SMA); however, their location in a public roadway should exempt them from SMA regulations. The new access road and proposed reservoir are outside of the SMA and are not subject to SMA regulations. Refer to the attached map which shows the proposed project in relation to the SMA.

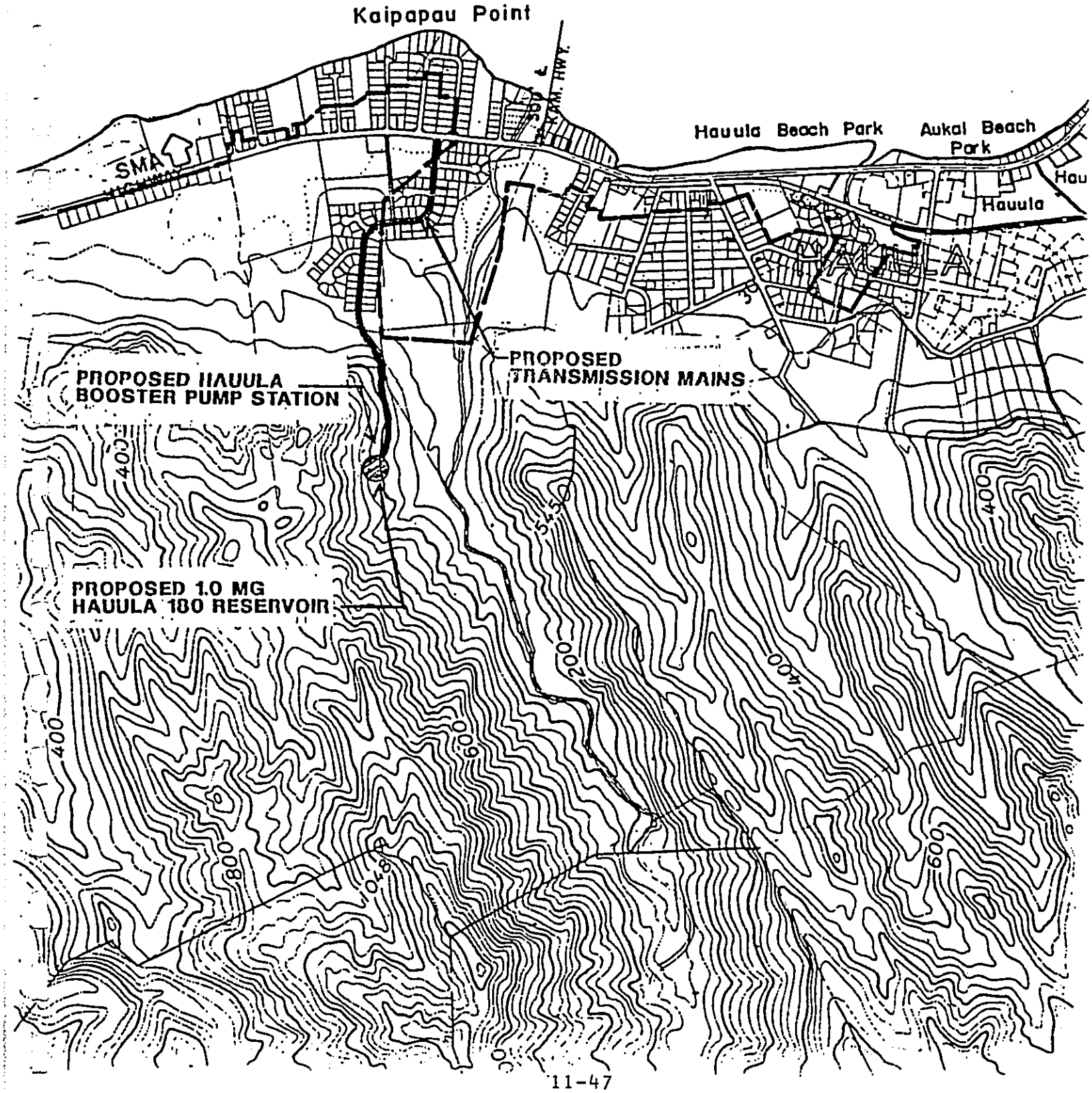
2. The proposed grading plan is being designed and final plans will be shown in the Final EIS. Details of grading for the entire project will be submitted as part of the construction review and permit process. The proposed grading plan is based on a maximum cut slope of 1.2:1, as recommended by the soils engineer for slope stability. An alternate site would require a larger cut area than what is proposed. As part of the mitigative action for the visual impacts, landscaping for the reservoir will be provided.

If you have any questions, please call Mr. Roy Doi at 527-5235.

Attachment

cc: Engineering Design Group, Inc.
Office of Environmental Quality Control

portion of SMA map



EPARTMENT OF PARKS AND RECREAT

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

WALTER M. OZAWA
DIRECTOR

ALVIN K.C. AU
DEPUTY DIRECTOR

RECEIVED
NOV 25 1992
ENGINEERING DESIGN GROUP, INC.

November 23, 1992

TO: KAZU HAYASHIDA, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

FROM: WALTER M. OZAWA, DIRECTOR

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR THE HAUULA 180 RESERVOIR AND BOOSTER STATION

The proposed reservoir and booster station improvements will not have any negative impact on existing or planned recreation facilities in the Hauula area.

Thank you for the opportunity to review the DEIS.

WALTER M. OZAWA, Director

WMO:ei

cc: Office of Environmental Quality Control
✓Engineering Design Group, Inc.

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU

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June 25, 1993

RECEIVED
JUL 2 - 1993
ENGINEERING DESIGN GROUP, INC.

TO: WALTER M. OZAWA, DIRECTOR
DEPARTMENT OF PARKS AND RECREATION

FROM: KAZU HAYASHIDA, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

SUBJECT: YOUR MEMORANDUM OF NOVEMBER 23, 1992 ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE HAUULA 180 RESERVOIR AND BOOSTER STATION

Thank you for reviewing the draft environmental impact statement and for acknowledging that the proposed project will not have any impacts on existing or planned recreation facilities.

If you have any questions, please contact Roy Doi at 527-5235.

cc: Engineering Design Group, Inc.
Office of Environmental Quality Control

922846

DEPARTMENT OF PUBLIC WORKS

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813

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'92 NOV 20 10 18 AM

FRANK F. FASI
MAYOR

C. MICHAEL STREET
DIRECTOR AND CHIEF ENGINEER

FELIX B. LIMTIACO
DEPUTY DIRECTOR

ENV 92-294

November 18, 1992

MEMORANDUM

TO: MR. KAZU HAYASHIDA, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

ATTENTION: MR. GEORGE KUO

FROM: C. MICHAEL STREET, DIRECTOR AND CHIEF ENGINEER

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)
HAUULA 180 RESERVOIR AND BOOSTER STATION
TMK:5-4-04:4 AND 5-4-19:54

We have reviewed the subject DEIS and have the following comments:

1. We have no objections to the proposed project.

2. The DEIS should address the impact of storm water discharges associated with construction activities on water quality of the receiving waters.

3. The DEIS should also state what structural or non-structural best management practice (BMP) will be provided to control and reduce the discharge of pollutants as outlined in the National Pollutant Discharge Elimination System (NPDES) regulations (40 CFR Part 122, Subpart B for municipal separate storm sewer systems).

for C. MICHAEL STREET
Director and Chief Engineer

cc: Office of Environmental Quality Control
Engineer Design Group, Inc. (Edgar K.M. Lee)

11-50

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU

COPY

January 4, 1993

RECEIVED
JAN 7 - 1993
ENGINEERING DESIGN GROUP, INC.

TO: C. MICHAEL STREET, DIRECTOR AND CHIEF ENGINEER
DEPARTMENT OF PUBLIC WORKS

FROM: KAZU HAYASHIDA, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

SUBJECT: YOUR MEMORANDUM OF NOVEMBER 18, 1992, REGARDING THE DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS), FOR THE PROPOSED HAUULA 180' RESERVOIR AND BOOSTER STATION, TMK: 5-4-04: 4 AND 5-4-19: 54, OFF KAWAIPUNA STREET

Thank you for responding to the DEIS for our proposed reservoir project. We have the following response to your comments:

1. The impact of stormwater runoff associated with construction activity will be addressed by submitting an Erosion Control Plan (ECP) for your review and approval prior to construction. The ECP will address measures to retain silt laden runoff on the project site by the use of swales and berms or a settling basin. The total project area, including reservoir site, access road and staging area is less than five acres and therefore, will not require a National Pollutant Discharge Elimination System (NPDES), permit for stormwater runoff associated with construction activity.

2. A permit to discharge effluent into a Municipal Storm Drain and a NPDES permit will be filed for Hydrotesting to flush and chlorinate the reservoir, transmission mains and booster pumps. Best Management Practices (BMP), will be provided to control and reduce the discharge of pollutants into receiving waters. The BMP's will be described in detail in the permits. Due to higher elevations, dewatering is not anticipated.

If you have any questions, please contact Bert Kuioka at 527-5235.

cc: ✓Engineering Design Group

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOSEPH M. MAGALDI, JR.
DIRECTOR

AMAR SAPPAL
DEPUTY DIRECTOR

TE-4800
PL92.1.407

December 21, 1992

MEMORANDUM

TO: KAZU HAYASHIDA, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

ATTENTION: GEORGE KUO

FROM: JOSEPH M. MAGALDI, JR., DIRECTOR

SUBJECT: HAUULA 180 RESERVOIR AND BOOSTER STATION
DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)
TMK: 5-4-04: 4 AND 5-4-19: 54

This is in response to the DEIS submitted to us for review on November 16, 1992 from the Office of Environmental Quality Control.

Based on our review, we have no objections to the proposed project at this time. Construction plans for all work within the City's street right-of-way should be submitted to our department for review. A traffic control plan showing temporary detours for pedestrians and vehicles should be included in these plans.

We recommend increasing the pavement width at the entrance of the access road from 12 feet to 20-24 feet to allow for two-way traffic.

If a gate or chain is used to restrict access on this roadway, it should be recessed as far into the roadway as practical. A sign should be installed on the access roadway at the terminus of Kawaipuna Street to indicate the restrictive nature of the roadway.

Should you have any questions, please contact Lance Watanabe of my staff at local 4199.

JOSEPH M. MAGALDI, JR.

cc: Engineering Design Group, Inc.
Office of Environmental Quality Control

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU

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RECEIVED
JUL 2 - 1993
ENGINEERING DESIGN GROUP, INC.

June 25, 1993

TO: JOSEPH M. MAGALDI, DIRECTOR
DEPARTMENT OF TRANSPORTATION SERVICES

FROM: KAZU HAYASHIDA, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

SUBJECT: YOUR MEMORANDUM OF DECEMBER 21, 1992 ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE HAUULA 180 RESERVOIR AND BOOSTER STATION

Thank you for reviewing the Draft environmental impact statement (EIS) for our proposed project. We have the following response to your comments:

1. Construction plans for all work within the City's street right-of-way will be submitted to your department for review, including the traffic control plan requested.

2. Since the access road is only for service and maintenance, only one vehicle is expected at the site on any given day. For this reason, allowing two-way traffic should be unnecessary.

3. The gate or chain for the access road will be recessed further back into the roadway. The sign you suggest will be included in the final plans.

If you have any questions, please contact Roy Doi at 527-5235.

cc: Engineering Design Group, Inc.
Office of Environmental Quality Control

PB 92-1159

November 20, 1992

MEMO TO: KAZU HAYASHIDA, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

ATTN: GEORGE KUO

FROM: HERBERT K. MURAOKA
DIRECTOR AND BUILDING SUPERINTENDENT

SUBJECT: HAUULA 180 RESERVOIR AND BOOSTER STATION

We have reviewed the draft Environmental Impact Statement for the subject project and have no comments to offer.

FOR HERBERT K. MURAOKA
Director and Building Superintendent

GT:jo
cc: J. Harada
Engineering Design Group, Inc.
Office of Environmental Quality Control

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU

COPY

RECEIVED
JUL 2 - 1993
ENGINEERING DESIGN GROUP, INC.

June 28, 1993

TO: HERBERT K. MURAOKA
DIRECTOR AND BUILDING SUPERINTENDENT
BUILDING DEPARTMENT

FROM: KAZU HAYASHIDA, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

SUBJECT: YOUR MEMORANDUM OF NOVEMBER 20, 1992 ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE HAUULA 180 RESERVOIR AND BOOSTER STATION

Thank you for reviewing the draft environmental impact statement for our proposed project.

If you have any questions, please contact Roy Doi at 527-5235.

cc: ✓Engineering Design Group, Inc.
Office of Environmental Quality Control

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU
3375 KOAPAKA STREET, SUITE H425
HONOLULU, HAWAII 96819-1869

FRANK F. FASI
MAYOR

LIONEL E. CAMARA
FIRE CHIEF

DONALD S.M. CHANG
DEPUTY FIRE CHIEF

December 10, 1992

TO: GEORGE KUO
BOARD OF WATER SUPPLY

FROM: LIONEL E. CAMARA, FIRE CHIEF

SUBJECT: **HAUULA 180 RESERVOIR AND BOOSTER STATION**
TMK: 5-4-04:4 AND 5-4-19:54
KOOLAULOA, OAHU

We have reviewed the application for the above subject request and have no objections to the proposal.

Should you have any questions, please contact Assistant Chief Attilio Leonardi of our Administrative Services Bureau at 831-7775.

Attilio K. Leonardi
for LIONEL E. CAMARA
FIRE CHIEF

AKL:ny

Copy to: ✓Engineering Design Group
Office of Enviromental Quality Control w/EIS Draft

11-57

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU

COPY

June 28, 1993

RECEIVED
JUL 2 - 1993
ENGINEERING DESIGN GROUP, INC.

TO: LIONEL E. CAMARA, FIRE CHIEF
FIRE DEPARTMENT

FROM: KAZU HAYASHIDA, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

SUBJECT: YOUR MEMORANDUM OF DECEMBER 10, 1992 ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE HAUULA 180 RESERVOIR AND BOOSTER STATION

Thank you for reviewing the draft environmental impact statement for the proposed project.

If you have any questions, please contact Roy Doi at 527-5235.

cc: ✓Engineering Design Group, Inc.
Office of Environmental Quality Control

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

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RECEIVED
JUL 8 - 1993
ENGINEERING DESIGN GROUP, INC.

July 6, 1993

TO: DONALD S. M. CHANG, FIRE CHIEF
FIRE DEPARTMENT

FROM: KAZU HAYASHIDA, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

SUBJECT: YOUR MEMORANDUM OF DECEMBER 10, 1993 ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE HAUULA 180 RESERVOIR AND BOOSTER STATION

Thank you for reviewing the draft environmental impact statement for the proposed project.

If you have any questions, please contact Roy Doi at 527-5235.

cc: ✓Engineering Design Group, Inc.
Office of Environmental Quality Control

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU
801 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96813 - AREA CODE (808) 529-3111

FRANK F. FASI
MAYOR

MICHAEL S. NAKAMURA
CHIEF

HAROLD M. KAWASAKI
DEPUTY CHIEF

OUR REFERENCE CS-LK

November 27, 1992

TO: KAZU HAYASHIDA, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

ATTENTION: GEORGE KUO, ENGINEERING SUPPORT SECTION

FROM: MICHAEL S. NAKAMURA, CHIEF OF POLICE
HONOLULU POLICE DEPARTMENT

SUBJECT: Draft Environmental Impact Statement for Hauula 180 Reservoir and Booster Station

We have reviewed the subject document as requested. Based on the information provided, it seems as though the proposal will have no long term impact on the facilities and services of this department.

However, during the construction period, we may experience an increase in calls for police service unless some kind of action is taken to minimize dust and noise problems. It would also be helpful if the residents in the area are notified before the work actually begins through flyers, etc. of the fact that there will be construction work going on; the time frame; and how they (the residents) will benefit in the end. The notice should contain the foreman's name and telephone number so that the residents would be able to direct their concerns. We believe that these measures will assist in minimizing the increase in calls for service.

Thank you for the opportunity to respond.

MICHAEL S. NAKAMURA
Chief of Police

For By
CHESTER E. HUGHES
Assistant Chief of Police
Support Services Bureau

cc: Office of Environmental Quality Control
Board of Water Supply
Engineering Design Group, Inc.

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU

COPY

RECEIVED
JUL 2 - 1993
ENGINEERING DESIGN GROUP, INC.

June 28, 1993

TO: MICHAEL S. NAKAMURA, CHIEF
POLICE DEPARTMENT

FROM: KAZU HAYASHIDA, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

SUBJECT: YOUR MEMORANDUM OF NOVEMBER 27, 1992 ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE HAUULA 180 RESERVOIR AND BOOSTER STATION

Thank you for reviewing the Draft environmental impact statement and your concurrence that the proposed project is not expected to result in long term impacts on the facilities and services of your department. We have the following response to your comments:

1. Letters will be sent to the Representatives of the district and to the Neighborhood Board before the construction phase begins to inform them of the construction, time frame, and the benefits of the project.

2. The residents along the pipeline will be notified by the Contractor and the Board of Water Supply Inspector. Flyers will be provided which will include the Contractor's name, phone number, and other pertinent information.

If you have any questions, please contact Roy Doi at 527-5235.

cc: Engineering Design Group, Inc.
Office of Environmental Quality Control

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

November 19, 1993

Mr. Norman Kaluhiokalani; Chair
Koolauloa Neighborhood Board No. 28
c/o Hauula Satellite City Hall
54-010 Kukuna Road
Hauula, Hawaii 96717

Dear Mr. Kaluhiokalani:

Subject: Hauula 180 Reservoir and Booster Station Draft Environmental Impact Statement (EIS) - Neighborhood Board Meeting Presentation

Thank you for allowing us to present our plans for the proposed project at your meeting of October 14, 1993. We have the following responses to concerns that were raised at the meeting:

1. Residential traffic safety

   The contractor will be required to provide traffic controls and signs, dust control, and continuous residential traffic access. The contractor will be informed that children often play along Kawaipuna Street warranting additional safety awareness.

2. Notification procedures prior to commencing construction

   The contractor will be notifying residents along Kawaipuna Street prior to beginning any trenching and pipeline installation. Contact persons with phone numbers will also be provided.

3. Adequacy of drainage

   Drainage for the project has been designed to minimize the alteration of existing drainage in the area. The contractor will also be required to provide construction site runoff controls.

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

4. Potential roadway damage

   Any damage to the roadway or private property resulting from construction activity will be restored by the contractor.

5. Public access after project completion for hunting and hiking in Kaipapau Valley via the existing dirt road at the end of Kawaipuna Street

   Our all-weather access road to the reservoir will follow a Right-of-Way easement which will be granted to the Board of Water Supply by the property owners. Any permission to enter the valley via our access road easement must be secured from the property owners.

Any comments regarding the Draft EIS should be made in writing by November 30, 1993. If you have any questions, please contact Barry Usagawa at 527-5235.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Dr. Sharlene Furuto, BYU-Hawaii Campus, Laie, Hawaii 96762
Engineering Design Group

LIST OF REFERENCES

[1] Final Environmental Impact Statement for Windward Oahu Regional Water System Improvements. City and County of Honolulu Board of Water Supply. August 1988.

[2] Department of Land and Natural Resources, Division of Water and Land Development. Personal communication. May 1990.

[3] Macdonald, Gordon A., et al. Volcanoes in the Sea: The Geology of Hawaii. 2nd Edition. University of Hawaii Press, Honolulu. copyright 1983.

[4] Water Resources of Windward Oahu, Hawaii. Geological Survey Water-Supply Paper 1894. U.S. Department of the Interior, Geological Survey. U.S. Government Printing Office, Washington, D.C. 1969.

[5] Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii. United States Department of Agriculture Soil Conservation Service. August 1972.

[6] Water in the Kahuku Area, Oahu, Hawaii. Geological Survey Water-Supply Paper 1874. U.S. Department of the Interior, Geological Survey. U.S. Government Printing Office, Washington, D.C. 1977.

[7] Revised Environmental Impact Statement for the Kaluanui Wells. City and County of Honolulu Board of Water Supply. July 1984.

[8] Archaeological Reconnaissance Survey, Proposed Kaipapau Exploratory Well Site and Access Road Project Area. Prepared for Belt, Collins & Associates by Paul H. Rosendahl, Ph.D., Inc. November 1988.

APPENDIX A

PRELIMINARY FEASIBILITY STUDY

HAUULA 180 RESERVOIR AND BOOSTER PUMP STATION

HAUULA, OAHU, HAWAII

TMK: 3-7-20: 21

for

ENGINEERING DESIGN GROUP, INC.

W.O. 89-1878
November 26, 1990

EH ERNEST K. HIRATA & ASSOCIATES, INC.

ERNEST K. HIRATA & ASSOCIATES, INC.
Soils and Foundation Engineering

ERNEST K. HIRATA P.E.
PAUL S. MORIMOTO P.E.
JUNG K. KIM P.E.
DAVID M. KITAMURA P.E.

Mailing Address: P.O. Box 1028, Aiea, Hawaii 96701-1028
99-1433 Koaha Place, Aiea, Hawaii 96701 Phone (808) 486-0787 Fax (808) 486-0870

November 26, 1990
W.O. 89-1878

Engineering Design Group, Inc.
1525 Young Street
Honolulu, Hawaii 96826

Attention: Mr. Edgar Lee

Subject: Preliminary Feasibility Study
Hauula 180 Reservoir and Booster Pump Station
Hauula, Oahu, Hawaii
TMK: 3-7-20: 21

Gentlemen:

This report presents our preliminary feasibility study for the proposed reservoir and pump station. As indicated in our proposal dated August 14, 1990, our work was limited to a visual reconnaissance of the site, and a review of the Soil Survey prepared by the U.S. Soil Conservation Service. The purpose of this report was to provide an indication of the soils that can be expected at the proposed site.

Site Description

The project site is located about 1/2 mile west of Kamehameha Highway, above Kaipapau Point in Hauula. The nearest paved street is Kawaipuna Street, which ends about 1/4 mile east of the site. The enclosed Location Map indicates the general location of the project.

The project area generally slopes downward in a south and southeasterly direction from what appears to be Kaipapau Hill. Based on the topographic data provided by your office, the top of the hill is at approximate elevation +600. The hillside slopes downward at gradients as steep as

1:1, but averaging about 1½:1 (horizontal to vertical). The site begins to level off at approximate elevation +75. The proposed reservoir site presently slopes at a 1½:1 to 2:1 gradient.

The site is presently vacant and covered by a very heavy growth of vegetation.

Soil Conditions

The Soil Survey identifies the predominant surface soil in the project area as Paumalu silty clay. The soil is developed in old alluvium and colluvium derived from igneous rock. The silty clay is dark reddish brown in color with a moderate shrink-swell potential. The substratum consists of highly weathered gravel. Areas exposing the Paumalu silty clay slope as steep as 70 percent.

In the higher sections of the site, the Soil Survey identifies the surface soil as Rock Land. Rock land consists of areas where exposed rock covers 25 to 90 percent of the surface.

Due to the heavy onsite vegetation, we were unable to confirm the presence of Paumalu silty clay throughout the project site. However in the more lightly vegetated areas, a reddish brown to brown silty clay was observed. Boulders were also observed on the slope face, indicating the presence of colluvial soils.

In the higher areas of the slope, above the proposed reservoir site, rock outcrops were observed.

Conclusions

Preliminary plans for the reservoir indicate that grading at the tank site will consist primarily of cutting. Cuts at the tank site will range in depth from 0 to more than 30 feet. Based on our observations, we believe that the excavations will expose either the surface silty clay, weathered rock, or basalt. The use of conventional spread footings is anticipated. However deeper footing excavations may be required along the downhill side of the reservoir as footings may need to extend through the surface layer of silty clay.

Uphill of the reservoir, 1:1 cut slopes are planned with 8 foot wide benches at 15 feet vertical intervals. The overall slope gradient will be on the order of 1½:1 (horizontal to vertical), and the total slope height will be approximately 150 feet. Based on the steepness of the existing slopes, we believe that the planned cut slopes may be feasible.

Borings should be drilled and slope stability analyses performed during the final design phase of this project.

Limitations

Our professional services were performed, findings obtained, and conclusions prepared in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions. This warranty is in lieu of all other warranties expressed or implied.

We appreciate this opportunity to be of service. Should you have any questions concerning this report, please feel free to call on us.

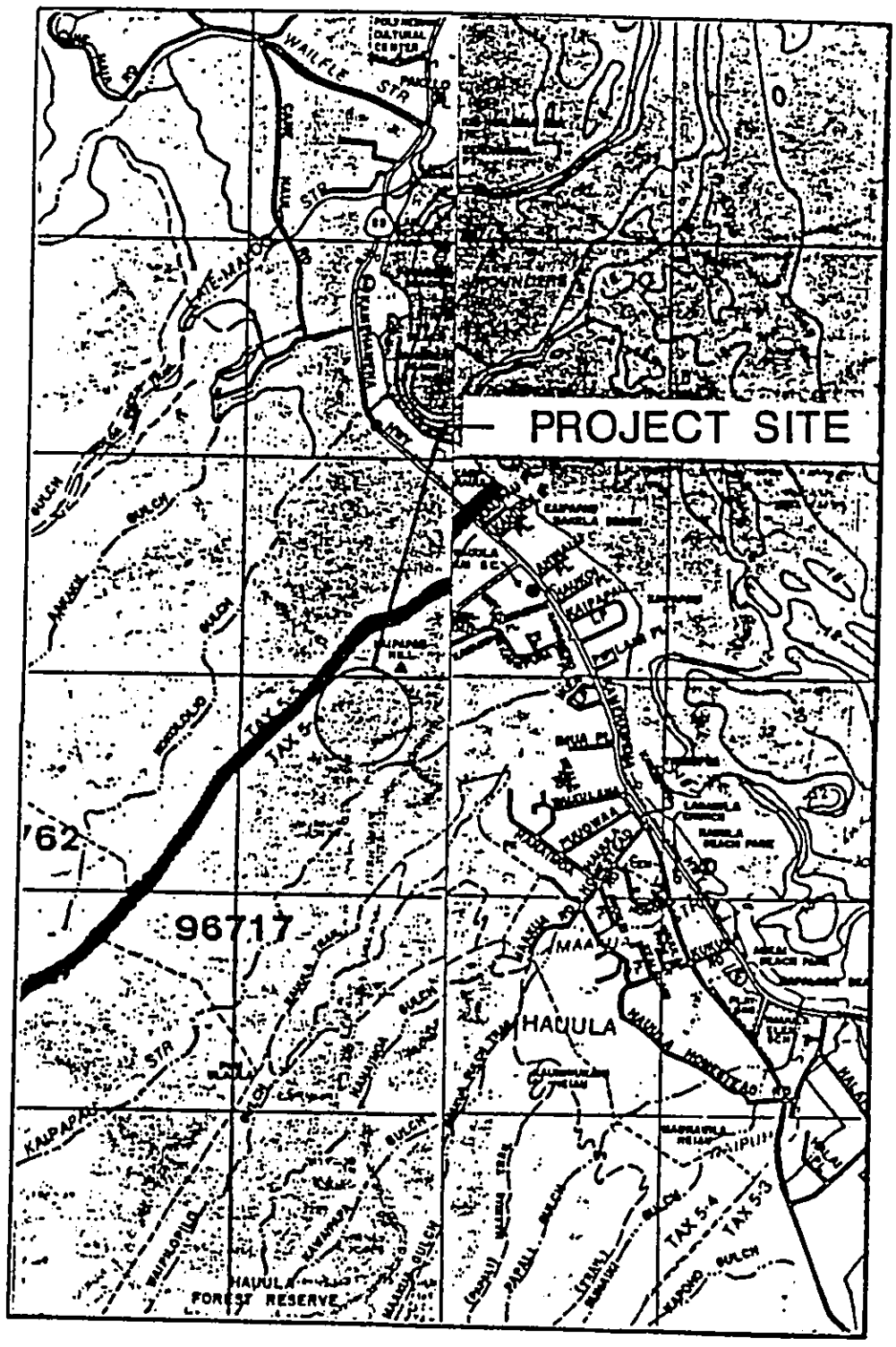
PAUL S. MORIMOTO
REGISTERED PROFESSIONAL ENGINEER
No. 5299
HAWAII, U.S.A.

Very truly yours,

Ernest K. Hirata & Associates, Inc.

Paul S. Morimoto, P.E.

Enc: Location Map



Reference: Bryan's Sectional Maps

W.O. 89-1878	Hauula 180 Reservoir
ERNEST K. HIRATA & ASSOCIATES, INC.	LOCATION MAP

APPENDIX B

ARCHAEOLOGICAL INVENTORY SURVEY
FOR
KAIPAPA'U EXPLORATORY WELL, HAU'ULA '180' RESERVOIR
AND ACCESS ROAD

Conducted for

City and County of Honolulu Board of Water Supply

by

Social Research Systems Co-op.

Richard Bordner

October 1992

ARCHAEOLOGICAL INVENTORY SURVEY FOR KAIPAPA'U EXPLORATORY WELL, HAU'ULA '180' RESERVOIR AND ACCESS ROAD

AHUPUA'A OF KAIPAPA'U, O'AHU

Abstract

On September 4, 1989 an archaeological inventory survey was conducted of the area proposed for the Hau'ula '180' Reservoir and Pump Station. A second survey was conducted on January 20, 1992 of the proposed road alignment and wellsite for the Kaipapau Well. No major sites of archaeological or historical interest were noted, though several boundary walls of apparently historical nature were noted. In addition, there are a number of small areas that appear to have been cleared for agricultural use. No other sites were noted during the surveys.

Introduction

The proposed Kaipapa'u well and associated Hau'ula '180' Reservoir and Pump Station is located on the slopes of Kaipapa'u Hill near Hau'ula in the ahupua'a of Kaipapa'u. According to Pukui et al the term, which is seen not only in the ahupua'a, hill and stream but also on the point means 'shallow sea'.

Historical Background

In planning and conducting research of specific parcels of land, it is common to search literature for references to the broad district in which the parcel is located and then to seek specific information on the parcel itself. By this process, a cultural and historical context is established; details relative to a particular parcel can then be more fully comprehended and appreciated when viewed in terms of the broader surrounding environment.

After a thorough examination of readily-available published and unpublished literature pertaining to Hawaiian culture, mythology, land use and history, it became evident that little information exists relative to the district of Kaipapa'u and virtually nothing could be

found relative to the specific project site. As a result of this dearth, it has become the primary intent of this narrative to assemble available literary references to the broader project area (Kaipapa'u district) and to offer reasonable analyses and interpretations of the data presented.

Native Traditions

Naming of the District

It is suggested that Kaipapa'u (literally "ocean of shoals") is so called because this name provides an accurate description of one of the area's distinctive physical attributes. John Clark explains further:

> To Hawaiian fishermen, a *papa* is a flat section of ocean bottom that is somewhat smooth, such as a shelf or reef. A *papau* is just the opposite, being a rough, uneven reef area with many pockets and a rocky bottom. The land division of Kaipapau, *meaning* "ocean of shoals," was named for its shallow, rocky offshore bottom. There is very little sand beach along the Kaipapau shoreline, which stretches from the Sacred Hearts Seminary to Waipilopilo Stream.... (Clark 1977:146)

He adds the following note on the seaward portion of the district:

> The *makai* region of Kaipapau, the area surrounding the Hauula Kai Shopping Center, formerly was known as Kakaihala. Papapiapia, Papaakea, and Kao were the popular fishing grounds fronting Kakaihala.... (Clark 1977:146)

The Hawaiians of old saw great opportunity in the above name and would jest about Kaipapa'u in reference to a slow-witted individuals by uttering "No Kaipapau, paha? From Kaipapau, perhaps?"

Pukui explains the above:

> A play on the name Kaipapau (Shallow-sea). He must be from Kaipapau, for he appears to be shallow-minded. (Pukui 1983:254)

Legendary References

There are definite associations between this land area, a number of seemingly unrelated priests who chose to dwell in this vicinity and certain kinds of fish frequenting these waters.

Summers cites Westervelt in relating the following tale relative to an unnamed priest and the *ulua* fish:

There is a valley near Hauula called Kaipapau. Here lived an old kahuna who always worshipped the two great gods Kane and Kanaloa. These gods had their home in the place where the old man continually worshipped them. Once the gods came to their sister's home and received from her dried fish for food. This they carried to the sea and threw into the waters, where it became alive again and swam along the coast while the gods journeyed inland. By and by they came to the little river on which the old man had his home. The gods went inland along the bank of the river, and the fish turned also, forcing their way over the sand bank which marked the mouth of the little stream. Then they went up the river to a pool before the place where the gods had stopped. Ever since, when high water has made the river accessible, these fish, named ulua, have come to the place where the gods were worshipped by the kahuna and where they rested and drank awa with him. (Summers 1978:160)

Though somewhat strange in parts, it is possible that the above tale explains a natural phenomena observed by the ancients and understood by them in terms of the gods to whom they owed their existence.

In her compilation of cultural references as they relate to various sites on Oahu, Summers includes the following brief mention to another priest who resided in Kaipapa'u:

Kapukaihaoa was the famous priest of Oahu. He could discern mysteries and secret and forthcoming events. He lived in Kaipapau, Koolauloa. (Fornander as cited in Summers 1978:160)

Efforts were made to locate additional details concerning this priest; no further information was found in any of the sources consulted.

One other priest is encountered in traditional literature who has definite ties with the area. Two separate references describe the priest Makuakaumana as traveling to and from Hawaii to his homeland Kahiki in company with the 12th-century priest Paao. His departure from Kahiki is commemorated in the saying "Eia no kahi koe o ka moamoa. Here is the only space left, the *moamoa*."

Pukui explains the above, thus:

Said when offering a small space or seat to a friend when every other place is occupied. As Paao was leaving from Kahiki with a canoe filled to capacity, a priest, Makuakaumana, called out, asking to come along. He was offered the only available space-the sharp point at the stern of the canoe, the *moamoa*. (Pukui 1983:38)

On his return to Kahiki, Makuakaumana again faces the same problematic situation. Handy writes the following and ends with a direct reference to a spring situated in Kaipapa'u which memorializes Makuakaumana's residence in this district.

> ...Is is from here [Hauula] that, according to legend, the *kahuna* Makuakaumana was taken back to Kahiki by a whale when his chief, Paao, had no room for him in his canoe. There is still a spring in the uplands of Kaipapau, the adjacent district, named for the famous seer who dwelt in the vicinity, Puna-a-Makuakaumana. (Handy 1972:460)

A final entry under the heading of Legendary References describes another natural phenomena of which the Hawaiians of old were aware--the travel and spawning habits of the anaeholo fish. These observations were simply summarized in the saying "Ka ia hali a ka makani. The fish fetched by the wind."

Pertaining to the above, Pukui writes:

> The *anaeholo*, a fish that travels from Honouliuli, where it breeds, to Kaipapau on the windward side of Oahu. It then turns about and returns to its original home. It is driven closer to shore when the wind is strong. (Pukui 1983:145)

Land Records

The Land Commission Awards of the late 1840's

It appears from official published documentation that during the Great Mahele when fee-simple title was first instituted in the Islands, there was minimal interest in claiming lands in the district of Kaipapa'u. Only two natives registered their claims for lands which they resided upon and actively cultivated in this district: Hikiau (LCA 8167) was awarded two parcels of land totaling 8.75 acres and Hoopalahee (LCA 8171) received a single 22-acre parcel.

Both of these properties are located makai of the study area, in the flats that now form the major portion of the residential subdivision mauka of Kamehameha Highway.

Land Commission Award 8167 (Hikiau) [Native Register]:

Be it known to you, the Land Commissioners, that my claim for land is in the *Ahupua'a* of Kaipapau. Keaweiki has the *mo'o*, I only have a *kula*. It is bounded on the north by Kanihooi's *mo'o*, on the east, Hoopalahe's *mo'o*. I have a claim for cultivation in the upland, and in the forest, and a fishing claim, and a house lot claim. *Hikiau.* (N. Register: v. 5 pp. 496)

[Foreign Testimony]: Maiiahi, sworn, says he knows the kula land claimed by Hikiau in Kaipapau (a Gov't. land). There is but one [?] which is cultivated in potatoes, melons, etc. It is bounded on the north by the land of Kanihooi, - east by the seaside, - south by the land of Hoopalahe, - west by the konohiki. Claimant has occupied the land since before there was any law. Keaweiki is the name of the *mo'o aina.*

Witness knows the House Lot of the 6th[?]. It is not enclosed. It is bounded on the Waialua side by a stream - makai by a hill - Hauula side the same - Mauka by the land of Hoopalahe.

Kawahine, the konohiki, had no objections to make to this claim. (For. Testimony: v. 8 pp. 10)

Land Commission Award 8171 (Hoopalahee) [Native Register]:

Be it known by the Land Commissioners that my land claim in the *Ahupua'a* of Kaipapau. The *mo'o* is Kihapai, in this *mo'o* I have 4 *lo'i*, bounded on the north by a house claim, on the east by Kawainui's *mo'o*. I have a *kula* claim in this *mo'o* adjoining on the east [or south?] of Hikiau's *mo'o kula*. I cultivate in the *kula* of Kanihooi, and in the *kula* of Kawahine, and in the *kula* of Maiahe.

I have a claim of cultivation in the upland and in the forest. I farm in the *Ahupua'a* of Hauula. The *mo'o* is Kalaipahoa, I have 2 *lo'i* in it and a small *kula* also adjoining on the north of the *lo'is* in this *mo'o*. The boundaries are: on the north, the *kula*, on the east, the *mo'o* of the Konohikis. Those are my claims, from the Konohikis. I also have a house claim. *Hoopalahe* (Nat. Reg: v. 5 pp. 497)

[Foreign Testimony]:

Hoopalahe: Maiiahi, sworn, says he knows the kalo land claimed by Hoopalahe in Kaipapau. There are 4 patches, forming 1 piece. Bounded on the Waialua side by the kula land of Hiklau, - makai the same, - Hauula side by the boundary of Hauula, - mauka the same. Claimant has a piece of kula land planted. It is enclosed with a fence, and Bounded on Waialua side by Hikiau's land,- makai by the Konohiki,- Hauula side by Hauula boundary,- mauka by the hills.

Koekoe, sworn, says he knows the kalo land claimed by Hoopalahe in Hauula. There are 2 patches forming 1 piece. Bounded on the north by a stream,- east by the Konohiki,- south by Kamanu's land,- west by Hinamo'o's lands.

Witness knows the house lot claimed by Hoopalahe in Kaipapau, the stones are prepared for building a wall round it. It is bounded on the north by a stream,- east by the seaside,- south by Hauula boundary,- west by claimant's kalo land.

Kawahine, the konohiki of Kaipapau, made no objection to the claim in that land. Claimant [?] has occupied since long before witness came there.

The King's Land Agent made no objection to the claim in Hauula. (For.Test.: v. 10 pp. 9)

Land Grants: 1850-1915

Even the number of Land Grants purchased from the Government after the Mahele were insignificant. It is of some interest to note that of the four Grants listed in the Indices, all were fairly sizeable in acreage:

No.	Grantee	Acreage	Date of Purchase
1802	Kaupea & Kauai	133.30	1855
2110	Naliilii	66.66	1856
2351	Hoopalahee	123.00	1857
4855	Jas. B. Castle	282.00	1904

Land Use Through Historic Time

E.S. Craighill Handy conducted a comprehensive survey of land use in the 1930's for districts of all islands. Of Kaipapa'u, he wrote:

> Kaipapau was a large stream giving this *ahupuaa* its name. The level land opening out below the valley, now in cane, presumably all in terraces. Hauula natives say that there are old taro flats along the stream up the valley, which is very narrow and steep. (Handy 1971:91)

He later updated his account through the early 1950's:

> ...In Kaipapau (Shallow Sea) the *ahupuaa* adjacent to Hauula, the upper stream valley is steep and narrow, yet natives of the district say that, making the most of small opportunity, a few *loi* used to be worked there. The level land to seaward may once have supported a moderate amount of terracing, but as this was all under cane when the area was studied in 1953, the extent could not be determined. (Handy et al. 1972:460)

Summary

The ancient traditions, though fragmented and possibly of an early era, bear out the theme of Kaipapa'u as a residence of priests--some of which were known and well-respected. With this in mind, it would be natural to expect the survival of some of the structures connected with the priesthood. This, however, does not appear to be the case; literature and even transcribed oral tradition have not preserved the names or locations of

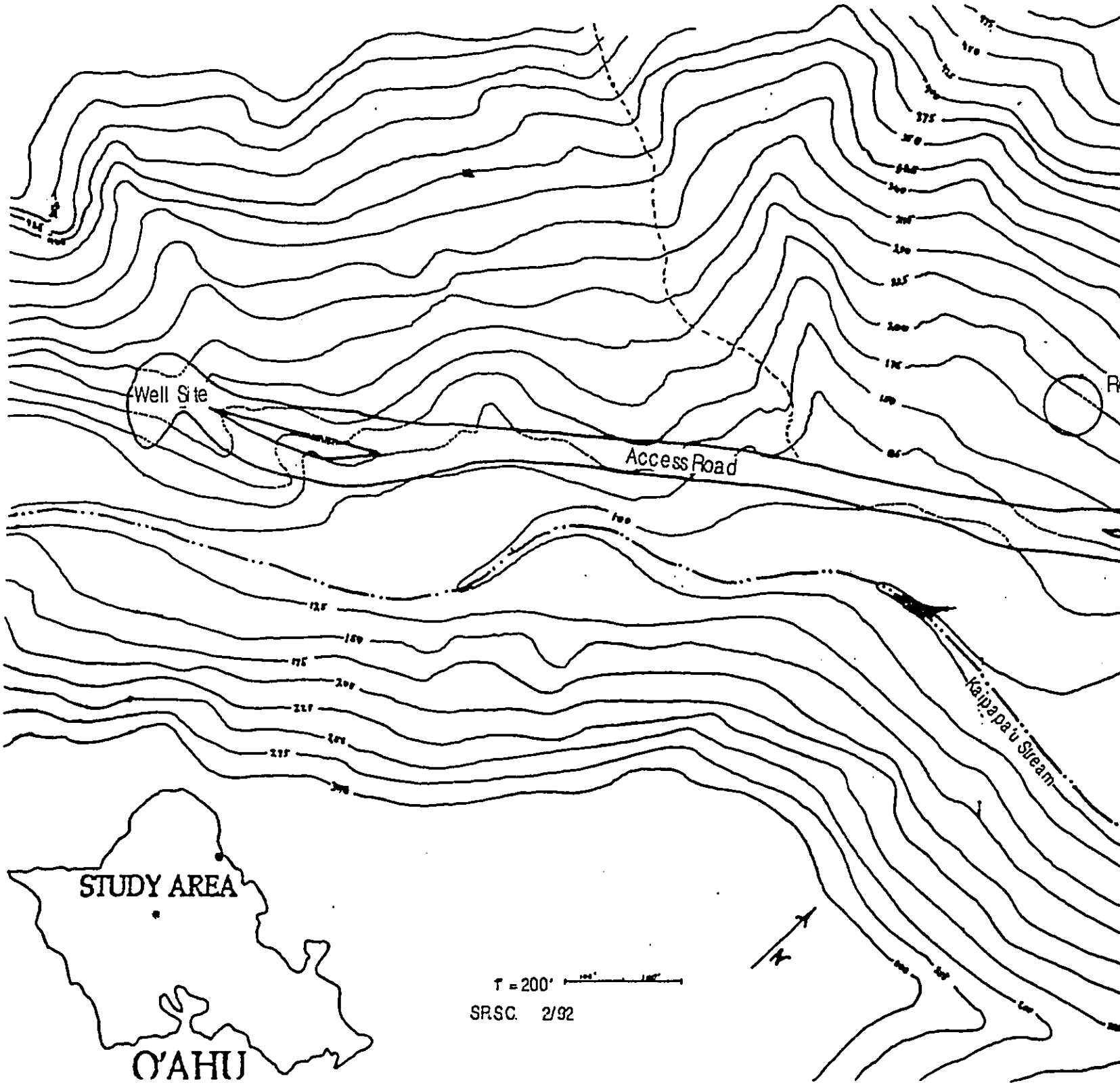
any sacred sites or structures within the area. Whether these existed at all or whether it was lost to memory is difficult to ascertain from the meager information available.

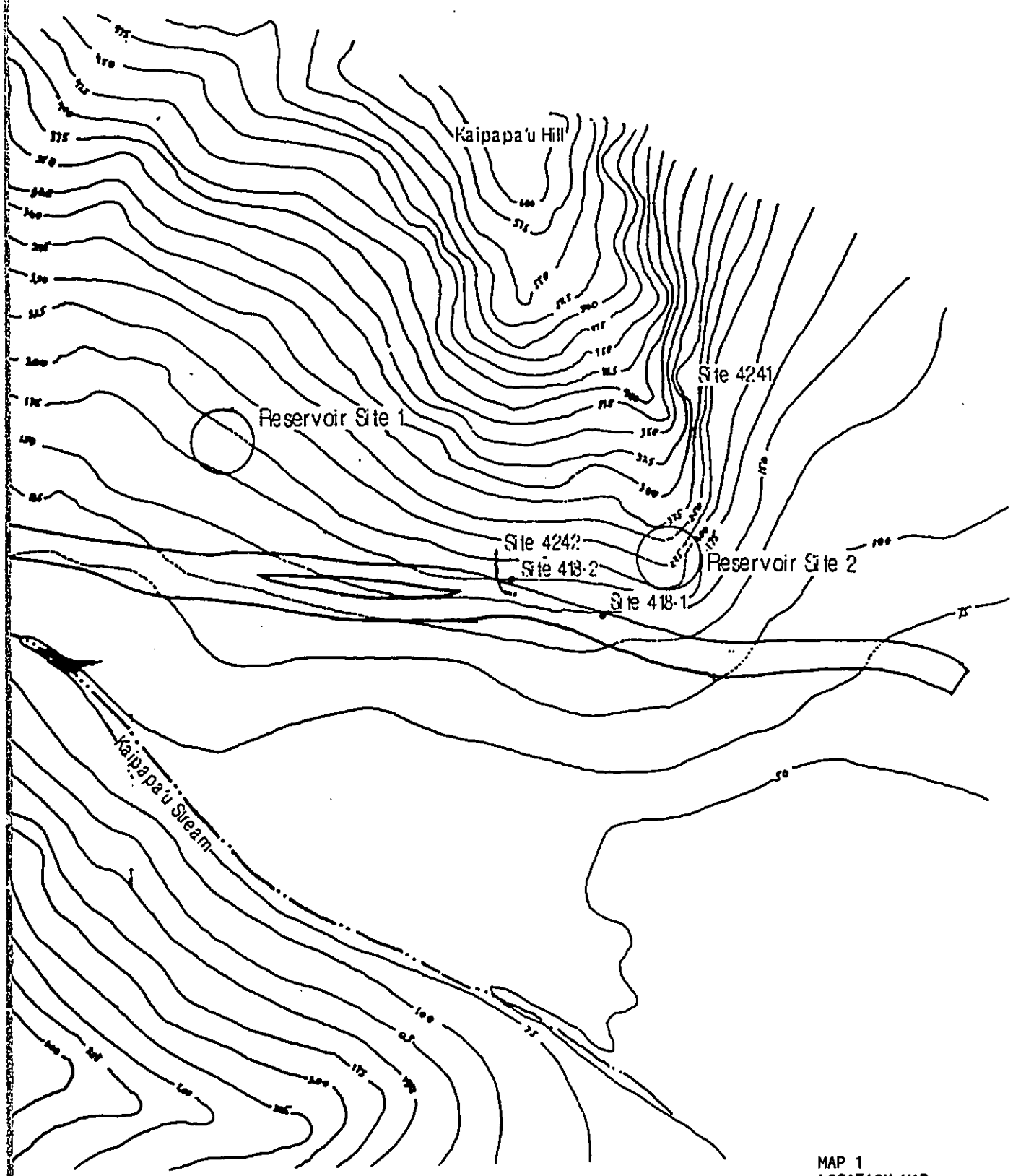
Taro cultivation and fishing as occupations sustained a small resident population through the 1850's as indicated by the available land records. It should be noted that the Land Commission Awards indicate that land was carried in cultivation for cash-cropping in the 1850's, though a number of the individuals cited in the boundary testimony do not show up in the Land Commission Awards. Other than vague assertions of "cultivation in the uplands" (Hikiau's 8167 Register claim) at a non-specified location, the historic records give no clear indication of land use specifically within the study area, though the area makai of the study area that is now in subdivision appears to have been the major agricultural area for the immediate region.

The boundary walls encountered in the study area may reflect the Hikiau (L.C.A. 8167) uplands claim, though this claim could apply to any mauka section of the valley, and in fact may be linked to the reported terracing noted much further back in the valley where the valley widens back out. Given the very steep nature of the valley floor in the study area, combined with the large amount of both water-transport and landslide boulder, it is highly unlikely that any agriculture was conducted in the majority of the valley floor within the study area boundaries. This is supported by the lack of clear land testimony for the area, which was likely peripherally exploited in conjunction with the more intensive use makai near the shore.

Summary of Land Use at Contact:

This section of Kaipapa'u appears to have been focused around marine exploitation as suggested in the oral tradition relating to fish migrations linked to the stream. The alluvial flats at the mouth of the valley were used for wet-field agricultural production in all areas which could be fed by diverted flow from Kaipapa'u stream. As the valley narrows dramatically just mauka of the stream mouth, this area of steep slope and spectacular stream flooding was likely used for forest products and occasional dry-land planting,


Well Site
Access Road
Kaipapa'u Stream
STUDY AREA
O'AHU
1" = 200'
SR.SC. 2/92
N



MAP 1
LOCATION MAP
KAIPAPA'U EXPLORATORY WELL
AND ACCESS ROAD

though the soil in most areas is very poor (consisting of decomposed ash). Considerably further up the valley may have been an area of secondary wet-field or intensive dry-field agriculture, as the valley floor appears to flatten out and allow more intensive land use. The study area proper appears to have been a portion of the lightly-exploited upland slope.

Prior Archaeological Work

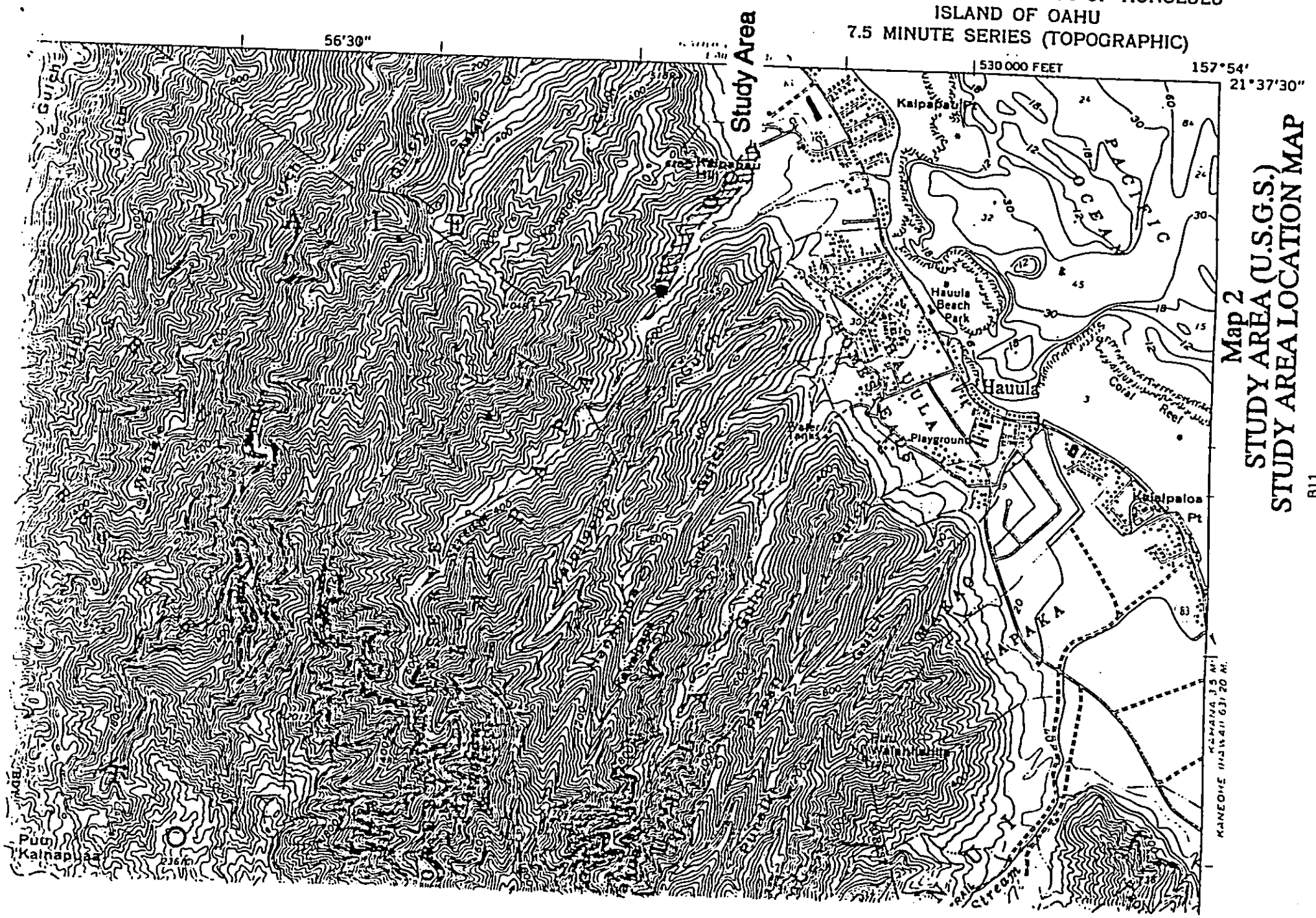
The study area has been surveyed by archaeologists on two occasions, the first in 1983-1984 by Chiniago Inc. (for VTN Pacific), the second in 1988 by Paul H. Rosendahl, PhD., Inc. (for Belt, Collins & Associates). The first was in reaction to the Statewide Inventory of Historic Places, which had located a Site 1056 Upper Kaipapau Stream location which included the upper section of the study area. Site 1056 was said to contain a large wall, terracing and 'wahine slit' rock on a platform. The sites were not located due to thick vegetation, and had only been viewed by farmers. The site boundary was thus entirely speculative.

The 1983-84 survey by Chiniago Inc. consisted entirely of a visual reconnaissance from a nearby ridge as access to the study area could not be obtained. No sites were located during the visual reconnaissance, but due to the cursory nature of the study a physical reconnaissance was recommended.

The 1988 reconnaissance survey by Paul H. Rosendahl, Phd., Inc. was conducted on September 28, 1988:

"by Supervisory Archaeologists Alan T. Walker and Bert Rader, assisted by PHRI Field Archaeologist Jack Harris. The survey was accomplished by means of a series of pedestrian transects oriented both parallel and perpendicular to the major axis of the Access Road. The parallel transects consisted of walking along the 2,800 foot long narrow foot trail traversing the southeast side of the project area and examining the area immediately adjacent to the trail. The perpendicular transects were conducted over the area extending 30 m northwest of the trail and over the area of the proposed well sites. The perpendicular transects overall progressed in a southwesterly to northeasterly direction. During the perpendicular transects, intervals between sweeping crew members were 15.0-20.0 m."(Rosendahl 1988:5)

HAUULA QUADRANGLE
HAWAII—CITY AND COUNTY OF HONOLULU
ISLAND OF OAHU
7.5 MINUTE SERIES (TOPOGRAPHIC)



Map 2
STUDY AREA (U.S.G.S.)
STUDY AREA LOCATION MAP

S.R.S.C. 8/92

B11

This reconnaissance survey located two possible archaeological sites, a wall and ditch. The wall, designated Feature 418-1, was a:

> ...somewhat L-shaped wall situated on the northwest slope of Kaipapau Gulch... The wall is in poor to fair condition and appears to be an original, unmodified construction. The wall measures c. 15.0 m long (measured from tip to tip of L-shape) by 0.50-0.75 m wide by 1.0 m high. It consists of subangular basalt boulders crudely stacked three to four courses high. The wall is free-standing and is crudely faced on both sides. Several soil pockets are present in the vicinity of the wall. Because the wall may have served to delineate these pockets, the wall is tentatively assigned an agricultural function. The structural form of the feature and its location and condition indicate it is prehistoric.(Rosendahl 1988:6)

Feature 418-2, the ditch, was located in the proximity of Feature 418-1 and consisted of:

> ...very eroded and is in poor to fair condition, and it appears to be unmodified. The ditch measures c. 30.0+ m long by 1.75m wide by 0.40m deep. It is constructed perpendicular to the slope of the mountain. The upslope side of the ditch is cut slightly into the soil and the downslope side consists of a rounded soil embankment. The ditch in cross-section profile appears as a shallow U-shape. The ditch is not boulder-faced, and it does not contain kerbstones; it is tentatively interpreted to function as an 'auwai or agricultural irrigation channel. The structural form of the feature and its location and condition indicate it may be prehistoric.(Rosendahl 1988:6)

The report concluded that the features indicated a possibility that both dryland and wetland agricultural systems were present in Kaipapa'u Gulch, though primary association would be with coastal settlement as per other sections of windward O'ahu. Based on this conclusion they recommended that:

> Although Features 418-1 and -2 are not good examples of site/feature types and are of limited cultural value, they still contain potentially significant information content--specifically, the features have not yet been dated, and dating may provide valuable information on the nature and function of inland agricultural features associated with coastal settlements. Therefore, it is recommended that a program of limited data recovery be conducted in the project area. This program would include test excavations and detailed recording of all features, and would focus on recovering dating samples. It is also recommended that additional historical documentary research on the project area be conducted.
>
> If the above recommendations are not compatible with development plans, it is recommended that Features 418-1 and -2 be preserved "as is" and limited data recovery work at the features be conducted at a later date...it is recommended that the features be flagged prior to any development work, and that all grubbing or other development work in the immediate vicinity of the features be monitored by a qualified archaeologist.(Rosendahl 1988:11)

As will be noted later, informants located during the 1992 survey indicated that the Site 1056 features are in fact located significantly further up the valley beyond the study area

where Kaipapa'u stream bears due south.

Field Survey

A inventory survey of the area of the road alignment inclusive of the proposed Hau'ula 180 Reservoir was conducted on September 4, 1989 by Richard Bordner and David Cox of Social Research Systems Co-op. The survey was conducted on foot, and concentrated in the areas noted as the probable access road and reservoir sites on the maps provided by the client. The survey was done on foot in sweeps with individuals 15m apart due to the poor visibility in order to adequately cover the survey area. It was a primary concern of this survey to both relocate the sites tagged during the Paul Rosendahl Inc. survey (Features 418-1 and -2) and also conduct sweeps in those areas noted during the earlier research as consisting of extremely thick vegetation, as any sites missed during the earlier work would be likely located in these areas.

A second inventory survey was conducted on January 20, 1992, this time extending the survey to include the road alignment up to and inclusive of the proposed Kaiapapa'u well. The survey was conducted by Richard Bordner, David Cox and Bill Kelly of S.R.S.C. The field survey techniques were the same as utilized on the first survey, with 15m gaps wherever feasible (except in areas of extreme slope). Due to the heavy vegetation the area of the initial (1989) survey was resurveyed to ensure complete coverage of all sections of the study area.

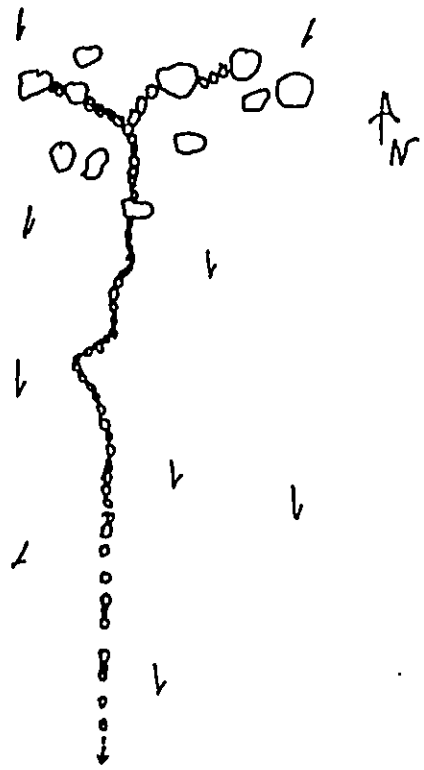
The lower makai slopes of Kaipapa'u Hill have been heavily modified by clearing and grubbing. At present tho makai slopes down to the stream are in agricultural use, with bulldozed trails meandering through the lower slopes. The slopes facing directly makai are now overgrown but have been cleared in the past for pasture. Wooden corrals and boundary fences were present in this area. A historic well and reservoir (private) is located on the upper makai slope of Kaipapa'u Hill, designated by the State Historic Site Number

Site 4241, and appears to have some relation to a series of bulldozed trails running between the 100-150 foot contour of the hill to the vicinity of proposed Reservoir Site 2. The existing well, which is not in use, appears to be slightly higher than the proposed reservoir (elevation 180 feet).

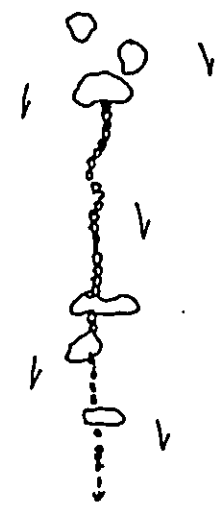
Once out of the makai slopes, the vegetation was very dense, consisting mainly of christmas berry, lantana, koa haole and guava. The terrain was extremely broken, the ground being covered in boulder talus from the upper slopes of the hill. This talus has stabilized into what often appears on initial examination to be human constructed stacking but upon close examination it becomes evident are natural erosion terraces. The slope is steep in the lower sections, becoming very steep in the upper reaches. This combined with the large boulders and the thick vegetation made for poor visibility and difficult conditions. That similar conditions are the norm may explain the apparent misinterpretation of 'features' during earlier surveys as noted below, especially combined with the apparently random bulldozer activity in the area.

Within the proposed access road and near to the proposed Reservoir Site 2 there are several apparent boundary/cattle walls which run downslope which have been designated State Historic Site 4242. These consisted of stacked rock up to .4m high and .4m wide. In the lower slopes, where the walls were in somewhat better condition they were still of stacked construction, up to .7m high and .5m wide. Near these wall sections was an area that contained a large number of noni and ti. However there were no visible features in the area.

We were unable to locate the flags or marker from the Walker /Rosendahl reconnaissance during our 1989 survey, but did locate several flags with partial notation during the 1992 survey. A flag was noted which seemed to mark a short possible boundary wall section similar to those noted in Site 4242. It is assumed that this indicates the Walker/Rosendahl Site 418-1. Given the right-angle orientation of the walls to the slope we agree with the earlier assessment that the feature served as a designator for



SITE 4242



SITE 418-1

MAP 3
SITE MAPS
1" = 30'

slope exploitation, likely for dry-land planting. However the casual nature of the wall construction and its orientation are more in keeping with boundary walls constructed during the early historic period, when cash-cropping made concern about land boundaries more intense, with a number of disputes arising.

A good example can be found just to the south in Hau'ula, where Land Commission Awards records note a series of complaints about an individual claiming land that he had recently enclosed by boundary walls though the land had been used traditionally by others. The L.C.A. testimony for Kaipapa'u suggests casual exploitation of slope areas throughout the valley for opportunistic, low-intensity dryland planting. Thus the walls most likely delineate areas exploited by certain individuals during the historic period.

Several heavily overgrown bulldozed trails run along the slope in the area below and to the southwest of proposed Reservoir Site 2, and on one of the trails we noted a flag: "PHRI 88-418 Site 418-2 9/28/88". It appears that this flag denotes Archaeological Site 418-2 located by Alan Walker et al of Paul Rosendahl, Inc. for R.M. Towill and the Proposed Kaipapau Exploratory Well in Nov. 1988 (see Walker and Rosendahl 1988). This location was 3m from Site 4242 and close to a large piece of forged iron that has been identified as the blade to a Cat-7 bulldozer. At the marker and flag the only feature noted was the edge of a bulldozed trail, which could have easily been intrepreted as a ditch in the very heavy vegetation, especially given that the system of field sweeps conducted by Walker et al would have arrived at this location from downslope, thus minimizing the possibility that they would have correlated the surface disturbance to the bulldozer trail which runs from west to east.

Other than the boundary walls within the proposed access road corridor (Site 4242/Feature 418-1) we were unable to locate any other features of archaeological or historical interest during either the 1989 or 1992 surveys. In the lower slope sections we noted areas that were flat enough and free from large stone and would have served as agricultural areas, but there were no visible signs of clearing or of terracing. This was

especially true of the area between Reservoir Site 1 and the well site. The vegetation in this area is, if possible, even worse than that near Reservoir Site 2--a combination of extremely high sword grass, lantana and hau in the lower stretches changing to lantana, christmas berry and guava in the higher elevations. The flats are located outside the study area proper, but the vegetation and lack of archaeological features that could be expected (especially given the L.C.A. testimony for the makai sections) is likely due to the fact that this area was placed into sugar production in the last part of the 19th century, and thus had been extensively cleared.

The study area from this area on up to the well site had very poor visibility, but it was noted that as with the Reservoir Site 2 the slope is very steep and littered with talus material. In this area the slope material consists of very friable and unstable decomposed ash, and contains a number of recent landslides. This section is much narrower than the area beyond the proposed reservoir and is significantly steeper. We did not locate any features of past human exploitation of this area. In the area of Kaipapa'u stream, the quantity and large size talus material, combined with the lack of visible human modification and the striking indicators of significant flash-flooding due to the narrow aspect of the valley indicate that sub-surface testing would be fruitless.

Despite the heavy vegetation throughout the study area, we are confident that all visible sites were located during the survey. The multiple surveys.conducted of this area by two different firms, at three different times, will have provided adequate coverage to the area, especially given the poor potential of a goodly portion of the study area.

In an attempt to locate the Site 1056 agricultural system, we extended the 1992 survey to the opposite stream bank in an attempt to locate any possible agricultural areas, but were unable to locate any features of interest. Thus while this section of the study area is marked as being within the State Site 1056 agricultural valley system, we fail to see any indication that the site boundaries should include this section. Conversations with hunters while conducting the survey indicated that the sites noted as defining Site 1056 are in fact

located a considerable distance up Kaipapa'u stream at the the point where the stream bends to the south and the valley opens up with a more gentle slope. This would indicate that the State should re-evaluate the site boundaries for Site 1056, as at present the boundaries indicated in the State Historic Office files do not accurately reflect the likely site boundaries, at least within the study area.

Conclusion

We were able to locate and identify the archaeological features noted by the PHRI archaeologists (Sites 418-1 and 418-2) but have noted that Site 418-2 appears to be the result of recent bulldozing, while Site 418-1 is historic. The Sites 4241 (the historic well) and 4242 (historic walls) also reflect recent activity in the valley rather than precontact use.

This may explain the relative dearth of traditional accounts related to the study area. The major paradox remaining is the apparent strong religious connotations of Kaipapa'u as a priestly residence, especially given the lack of large named religious structures. We suggest that this function (residence) is tied to Kaipapa'u Hill as a natural manifestation of mana rather than man-made objects. The only way to resolve this issue would be to examine the peak for coral or other indicators of past use. However this area is outside the scope of this project and will not be impacted by the Kaipapa'u Well project.

Only three features of archaeological or historical interest were noted in these surveys:

1) The historic well and reservoir (Site 4241) now abandoned on the upper slope of Kaipapa'u Hill. This site does not appear to offer any particular research or informational opportunities, nor does it fall under the criteria a-d of evaluation of significance for the National Register of Historic Places.

2) The historic boundary wall (Site 418-1) originally noted during the Walker/Rosendahl Study as an precontact boundary wall delineating planting areas. This wall has been reinterpreted as a historic period boundary wall. It does not appear to offer

any particular research or informational opportunities, nor does it fall under the criteria a-d of evaluation of significance for the National Register of Historic Places. However, we concur with the Rosendahl recommendation that the wall be preserved in its entirety if at all possible, as it may at some time in the future be useful in analysis of historic change in land use patterns as per work done in Anahulu Valley. If not, then the site should be flagged, and monitoring be conducted while any construction is being conducted in the vicinity to recover any possible cultural material that may be exposed.

3) The historic boundary walls (Site 4242/418-2). These walls do not offer any visible research opportunities other than those noted for Feature 418-1, nor do they qualify under the criteria a-d of evaluation of significance for the National Register of Historic Places. As per Feature 418-1, we recommend that the site be left intact if at all possible, but if some damage must take place, that monitoring be conducted during all construction in the vicinity of the site to recover any cultural material that may be exposed.

The existing well/reservoir (Site 4241) is outside of the area of impact of the proposed Reservoir Site 2, but both the 418-1 wall and Site 4242 boundary walls will be impacted directly by the access road construction.

The lack of any clear indication of precontact or early historic use of the study area, combined with the poor soil, heavy talus and steep slopes, especially in the area beyond the proposed reservoir, all indicate that this area has a very low possibility of recovering of subsurface cultural materials.

Recommendations

As excavation will be taking place during construction we recommend that an archaeologist monitor construction excavation during the phases leading from the project start line at the end of the existing road for the first 1200 feet of the access road to record both any subsurface information exposed and also note any information uncovered during

removal of Sites 418-1 and 4242, as this area has the only locations that may have been suitable for agricultural use.

We do not see that any archaeological monitoring is necessary in either the road section beyond the initial 1200 feet nor at the well proper given the steep slope and talus material. However we would recommend that an archaeologist be on stand-by during all subsurface phases of the project in case material of archaeological or historical interest is exposed by construction activity.

As noted originally by Handy, Kaipapa'u is not a terribly attractive location for large-scale agriculture in the mauka portions due to the steep nature of the terrain. In fact the only useful area presently in either habitation or agriculture is at the mouth of the valley in the floodplain. Unlike many other valleys we noted a general lack of erosional terraces on the slopes of Kaipapa'u Hill, which in other valleys provide a source for much of the usable agricultural land. This appears due to the narrow width of the valley, with extremely steep slopes, which keep slopes from developing an angle of repose that is stable.

The prominent nature of Kaipapa'u Hill, with its distinctive saddle, would be a prime candidate for religious features, especially given its overlook position over the stream entrance which is key in the limited legendary record, but there is no indication of a structure on the hill, though it is possible the hill was a non-structural heiau (or possibly just the peak). The general lack of strong information relating to religious features in the valley, especially given the prestigious kahuna which inhabited (and logically worshiped) in the valley is puzzling and without further historical research will remain an anomaly.

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Land Records:
Indices of Land Commission Awards
Grant Index

APPENDIX C

FLORA OBSERVED DURING FIELD RECONNAISSANCE

Family Name	Scientific Name	Common Name
ACANTHACEAE		
	Thunbergia fragrans	white thunbergia
ANACARDIACEAE		
	Mangifera indica	mango; manako
	Schinus terebinthifolius	Christmas berry; Brazilian pepper
ARALIACEAE		
	Brassaia actinophylla	umbrella tree; octopus tree
CASUARINACEAE		
	Casuarina spp.	ironwood; paina
COMPOSITAE		
	Bidens pilosa	Spanish needle; beggar tick; pilipili
	Emilia sonchifolia	floras paintbrush; red pualele
	Wedelia trilobata	wedelia
CONVOLVULACEAE		
	Ipomoea alba	moonflower; white-flowered morning glory
CUCURBITACEAE		
	Momordica charantia	balsam apple; peria
EUPHORBIACEAE		
	Euphorbia glomerifera	graceful spurge
	Phyllanthus debilis	niruri

APPENDIX C

FLORA OBSERVED DURING FIELD RECONNAISSANCE (continued)

Family Name	Scientific Name	Common Name
GRAMINEAE		
	Brachiaria mutica	California grass; para grass
	Cynodon dactylon	manienie; Bermuda grass
	Eleusine indica	wiregrass; goosegrass
	Paspalum conjugatum	Hilo grass
	Paspalum dilatatum	dallis grass; paspalum
	Pennisetum purpureum	feathery pennesetum
	Setaria glauca	yellow foxtail
LEGUMINOSAE		
	Acacia farnesiana	klu
	Canavalia cathartica	mauna loa
	Cassia leschenaultiana	Japanese tea
	Chamaecrista leschenaultiana	partridge pea; lauki
	Crotalaria mucronata	smooth rattle pod
	Desmodium uncinatum	Spanish clover
	Leucaena leucocephala	haole koa; ekoa
	Mimosa pudica	sensitive plant; hilahila

APPENDIX C

FLORA OBSERVED DURING FIELD RECONNAISSANCE (continued)

Family Name	Scientific Name	Common Name
MALVACEAE		
	Hibiscus tiliaceus	hau
	Malva parviflora	cheese weed
MELASTOMATACEAE		
	Clidemia hirta	clidemia; Koster's curse
MYRTACEAE		
	Eugenia cuminii	Java plum
	Psidium guajava	guava; kuawa
ORCHIDACEAE		
	Spathoglottis plicata	Philippine (wind) orchid
OXALIDACEAE		
	Oxalis corniculata	yellow wood sorrel
PASSIFLORACEAE		
	Passiflora edulis	passion fruit; liliko'i
POLYPODIACEAE		
	Dyopteris dentata	oak fern
	Microsorium scolopendria	laua'e
RUBIACEAE		
	Morinda citriflora	Indian mulberry; noni
STERCULIACEAE		
	Waltheria americana	hialoa; waltheria

APPENDIX C

FLORA OBSERVED DURING FIELD RECONNAISSANCE (continued)

Family Name	Scientific Name	Common Name
UMBELLIFERAE		
	Centella asiatica	asiatic pennywort
URTICACEAE		
	Pipturus albidus	mamaki
VERBENACEAE		
	Lantana camara	lantana; lakana
	Stachytarpheta urticaefolia	cayenne vervain; oi

APPENDIX C

FAUNA OBSERVED DURING FIELD RECONNAISSANCE OR WHICH MIGHT FREQUENT THE SITE

CLASS	Scientific Name	Common Name
CLASS AVES		
	Acridotheres tristis	common mynah
	Cardinalis cardinalis	northern cardinal
	Carpodacus mexicanus	house finch
	Copsychus malabaricus	white-rumped shama
	Estrilda astrild	common waxbill
	Geopelia striata	barred dove
	Paroaria coronata	red-crested cardinal
	Passer domesticus	house sparrow
	Pycnonotus cafer	red-vented bulbul
	Pycnonotus jacosus	red-whiskered bulbul
	Streptopelia chinensis	lace-necked dove
	Zosterops japonicus	Japanese white-eye

APPENDIX C

FAUNA OBSERVED DURING FIELD RECONNAISSANCE OR WHICH MIGHT FREQUENT THE SITE (continued)

CLASS	Scientific Name	Common Name
CLASS MAMMALIA		
	Canis familiaris	domestic dog
	Felis catus	cat
	Herpestes auropunctatus	mongoose
	Mus musculus	house mouse
	Rattus exulans	polynesian rat
	Rattus norvegicus	Norway rat
	Rattus rattus	roof rat

922294

JOHN WAIHEE
GOVERNOR OF HAWAII

APPENDIX D

WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCE

DEPUTIES

JOHN P. KEPPELER, II
DONA L. HANAIKE

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

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

RECEIVED
BOARD OF WATER SUPPLY
'92 SEP 15 9 52 AM

LOG NO: 16228
DOC NO: 9225t

'92 SEP 22 AM 9

September 8, 1992

Mr. Kazu Hayashida
Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, HI 96843

Dear Mr. Hayashida:

SUBJECT: Temporary Variance for the Proposed Hauula 180 Reservoir and Booster Station
Hau'ula, Ko'olauloa, O'ahu
TMK: 5-4-4: por. 4

We have received a revised Archaeological Inventory Survey for Kaipapa'u Exploratory Well, Hau'ula 180 Reservoir and Access Road from Richard Bordner of Social Research Systems Co-Op. This revised report responds adequately to the comments in our March 18, 1992 Memorandum to Roger Evans at OCEA and the points raised in a meeting with Bordner and David Cox at our office. We now believe that survey techniques were sufficient to find all historic sites.

Two sites were found. Both appear to be historic period walls, whose locations and measurements are the only information important to Hawaiian history that they contain. We agree with the opinion expressed in the report that these sites are not likely to yield further information important to the history and prehistory of Hawaii. Thus, they are "no longer significant", and recommendations that destruction of these walls along the access road corridor be monitored by a qualified archaeologist can not be supported.

It is also clear, from the description of the topography along the route of the access road and at the well site, and the observation that the "lower makai slopes of Kaipapa'u Hill have been heavily modified by clearing and grubbing" (p. 13) that it is unlikely that subsurface historic sites are present. The inventory report notes that the lower 1200' of the access road corridor is the only area that gardening could have taken place, but the survey yielded no evidence for that activity.

Therefore, we believe that activities associated with the construction of this project will have "no effect" on historic sites.

Sincerely,

DON HIBBARD, Administrator
State Historic Preservation Division

TD:amk