BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

AUG 23 2001

RAYNARD C. SOON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

JOBIE M. K. M. YAMAGUCHI
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

RECEIVED
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OFC. OF ENVIRONMENTAL
QUALITY CONTROL

August 10, 2001

To: The Honorable Bruce S. Anderson
Department of Health

Attn: Genevieve Salmonson, Director
Office of Environmental Quality Control

From: Raynard C. Soon, Chairman
Hawaiian Homes Commission

Subject: Kawaihae 1.0 Million-Gallon Tank
Final Environmental Assessment and
Finding of No Significant Impact (FONSI)
Kawaihae, South Kohala, Island of Hawaii, Hawaii

The State Department of Hawaiian Home Lands has reviewed the comments received during the Draft Environmental Assessment (DEA) 30-day public comment period that ended August 22, 2000.

Based on our review, the chief issues that were raised during the comment period are discussed below:

Community Participation

The Kawaihae community, and Department of Hawaiian Home Lands (DHHL) beneficiaries in particular, were actively consulted during preparation of the Environmental Assessment for the proposed water tank. In addition to publication in the OEQC Environmental Notice, copies of the DEA were forwarded to representatives of DHHL's Kawaihae community for review and comment. Residents of Kawaihae were also sought out and consulted during preparation of the Native Rights Assessment for the project. DHHL is committed to ensuring that its projects are conducted in a manner that reflects beneficiaries' input and is open to community review.

Impacts to Historic and Archaeological Resources

An Archaeological Inventory Survey was conducted in the project area and is included in the Final Environmental Assessment (Final EA) as Appendix B. Based on the findings of the survey, the access road to the proposed water tank and the water influent line have been realigned to avoid all known archaeological sites. Based on written and verbal communication with Mr. Pat McCoy of the State Historic Preservation Division (SHPD), Department of Land and Natural Resources, the new alignment satisfies SHPD's concerns regarding impacts to historic and archaeological resources.

Cultural Impacts

A Native Rights Assessment was conducted in the project area and is included in the Final EA as Appendix C. Based on interviews with local residents of Kawaihae who possess personal knowledge of historic and traditional practices in the project area, the project is not expected to have any adverse impacts on cultural practices or resources in the area.

Runoff / Drainage Impacts

Erosion control measures will be employed during all phases of construction. The contractor will be referred to Hawaii's Coastal Nonpoint Source Control Plan for guidance in developing runoff control measures and practices for specific project activities.

Following project completion, the water system operator will consult with the Department of Health, Clean Water Branch, prior to discharging the water tank blowoff line to determine if there are permit requirements.

Impacts from Material Stockpiling

Excavation will be undertaken only within project boundaries and only to the extent required by the project design. The contractor will be directed to use any usable excavated material. Leftover and unusable material might be temporarily piled near the project site as a normal product of earth moving

operations. Material will not be piled more than 28 days. Materials not used by this time will be hauled away and disposed of off-site by the project contractor in compliance with State and County regulations.

No other significant concerns were raised during the review period. Best Management Practices and mitigation measures described in the Final EA will ensure that no significant negative impacts to water and air quality, flora and fauna, cultural and scenic resources, land use, and community well-being will result from the proposed project.

Individual comments and responses can be referenced in the Final EA, Appendix E, *Responses to Comments Received during the DEA 30-Day Public Review Period.*

In view of the foregoing, the Department of Hawaiian Home Lands has therefore determined that this project will not have significant environmental effects and hereby issues a Finding of No Significant Impact (FONSI).

Please publish a notice of availability for the Final Environmental Assessment (FEA) and a notice of the FONSI in the Office of Environmental Quality Control's (OEQC) next issue of *The Environmental Notice.*

We have enclosed a completed OEQC *The Environmental Notice* Publication Form, four copies of the FEA, and the project summary on a computer disk. Should you have any questions regarding the contents or preparation of the FEA, please contact Mr. Jim Niermann of R. M. Towill Corporation at 842-1133.

Should you have any questions regarding the project itself, please have your staff call Gerald Lee of our Design and Construction Branch at 587-6447.

Enc.

c: R. M. Towill Corporation

Should you have any additional questions or comments regarding the project, please call William Makanui of our Design and Construction Branch, Land Development Division at 586-3818.

Aloha,

Raynard C. Soon, Chairman
Hawaiian Homes Commission

c: R.M. Towill Corporation

C.K —

Stephen K. Yamashiro
Mayor

Jiro A. Sumada
Deputy Chief Engineer

County of Hawaii

DEPARTMENT OF PUBLIC WORKS

25 Aupuni Street, Room 202 • Hilo, Hawaii 96720-4252
(808) 961-8321 • Fax (808) 961-8630

August 28, 2000

Mr. William Makanui
Department of Hawaiian Homelands
State Of Hawaii
P.O. Box 1879
Honolulu, HI 96805

Subject: Draft Environmental Asessment (DEA)
Kawaihae 1 M.G. Water Tank
Kawihae, South Kohala, HI
TMK: 6-1-01: 03, 6-1-06: 02-07 and 6-1-04:041

We reviewed the subject report and have the following comments:

All development generated runoff shall be disposed of on-site and shall not be directed toward any adjacent properties. The applicant shall be informed that if they include drywells in the subject development, an Underground Injection Control (UIC) permit may be required from the Department of Health, State of Hawaii.
All earthwork and grading shall conform to Chapter 10, Erosion and Sediment Control, of the Hawaii County Code.
Thank you for the opportunity to comment . If you have any questions, please contact Kiran Emler of our Kona office at 327-3530.

Galen Kuba, Division Chief
Engineering Division

KE

c: Eng. Div.- Hilo
Eng. Div.-Kona

FYI.

Post-it® Fax Note 7671	Date	# of pages ▶ 1
To Craig W. Luke P.E	From Kiran Emler	
Co./Dept. R. M. Towill	Co.	
Phone #	Phone # 327-3530	
Fax # 842-1937	Fax # 327-3533	

BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

RAYNARD C. SOON
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DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

October 11, 2000

Mr. Galen Kuba, Division Chief
Department of Public Works
County of Hawaii
25 Aupuni Street, Room 202
Hilo, HI 96720

Dear Mr. Kuba:

SUBJECT: Kawaihae 1.0 Million-Gallon Tank
Environmental Assessment (EA)
Kawaihae, South Kohala, County of Hawaii, Hawaii

Thank you for your letter dated August 28, 2000 regarding the subject Draft EA for the proposed Kawaihae 1.0 Million-Gallon Tank. In response to your comments we offer the following information:

- All development-generated runoff will be disposed of on-site and shall not be directed toward any adjacent properties.

- If drywells are included in the project design, an Underground Injection Control (UIC) permit will be obtained from the State of Hawaii Department of Health.

- All earthwork and grading will conform to Chapter 10, Erosion and Sediment Control, of the Hawaii County Code.

Should you have any additional questions or comments regarding the project, please call William Makanui of our Design and Construction Branch, Land Development Division at 586-3818.

Aloha,

Raynard C. Soon, Chairman
Hawaiian Homes Commission

c. R.M. Towill Corporation

Stephen K. Yamashiro
Mayor

Wayne G. Carvalho
Police Chief

James S. Correa
Deputy Police Chief

County of Hawaii

POLICE DEPARTMENT

349 Kapiolani Street • Hilo, Hawaii 96720-3998
(808) 935-3311 • Fax (808) 961-2702

July 27, 2000

Mr. William Makanui
Department of Hawaiian Homelands
State of Hawaii
P. O. Box 1879
Honolulu, HI 96805

Dear Mr. Makanui:

RE: PUBLIC REVIEW OF DRAFT ENVIRONMENTAL ASSESSMENT (DEA) FOR KAWAIHAE 1.0 MILLION GALLON TANK, SOUTH KOHALA, COUNTY OF HAWAII

Staff has reviewed the above-referenced proposal and found no adverse effects to public safety or traffic impact created by the proposed action.

Thank you for the opportunity to comment.

Sincerely,

WAYNE G. CARVALHO
POLICE CHIEF

Thomas J. Hickcox

THOMAS J. HICKCOX
ASSISTANT POLICE CHIEF
FIELD OPERATIONS BUREAU

HSK:lk

BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

RAYNARD C. SOON
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HAWAIIAN HOMES COMMISSION

JOBIE M. K. M. YAMAGUCHI
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

October 11, 2000

Mr. Wayne Carvalho, Chief
Police Department
County of Hawaii
349 Kapiolani
Hilo, HI 96720

Dear Mr. Carvalho:

SUBJECT: Kawaihae 1.0 Million-Gallon Tank
Environmental Assessment (EA)
Kawaihae, South Kohala, County of Hawaii, Hawaii

Thank you for your letter dated July 27, 2000 regarding the subject Draft EA for the proposed Kawaihae 1.0 Million-Gallon Tank. We note that the County of Hawaii Police Department has no comments to offer at this time.

Should you have any additional questions or comments regarding the project, please call William Makanui of our Design and Construction Branch, Land Development Division at 586-3818.

Aloha,

Raynard C. Soon, Chairman
Hawaiian Homes Commission

c. R.M. Towill Corporation

2001-08-23-HI-FEA—

AUG 23 2001

FILE COPY

Final Environmental Assessment

Kawaihae 1.0 Million Gallon Tank
Kawaihae, South Kohala, County of Hawaii

August 2001

Prepared for:
State of Hawaii
Department of Hawaiian Home Lands
1099 Alakea Street, 12th Floor
Honolulu, Hawaii 96813

Prepared by:
R.M. Towill Corporation
420 Waiakamilo Street
Honolulu, Hawaii 96817
RMTC Ref No. 1-18685-OE

Final Environmental Assessment

KAWAIHAE 1.0 MILLION GALLON TANK
Kawaihae, South Kohala, Island of Hawaii

August 2001

Prepared for:

State of Hawaii
Department of Hawaiian Home Lands
1099 Alakea Street, 12th Floor
Honolulu, Hawaii 96813

Prepared by:

R.M. Towill Corporation
420 Waiakamilo Road, Suites 411
Honolulu, Hawaii 96817
RMTC Ref 1-18685–OE

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FIGURES

APPENDICES

PROJECT SUMMARY

Project	Kawaihae 1.0 Million Gallon Tank
Proposing Agency	State of Hawaii Department of Hawaiian Home Lands 1099 Alakea Street, 12th Floor Honolulu, Hawaii
Accepting Authority:	State of Hawaii Department of Hawaiian Home Lands 1099 Alakea Street, 12th Floor Honolulu, Hawaii
TMK:	6-1-01:03; 6-1-06:03 - 07
Location:	Kawaihae, South Kohala, County of Hawaii
Project Area:	Approximately 6.204 acres
EA Preparer	R. M. Towill Corporation 420 Waiakamilo Road, Suite 411 Honolulu, Hawaii 96817 Phone: (808) 842-1133 Facsimile: (808) 842-1937
Existing Land Uses:	Vacant, grazing pasture, industrial
Proposed Action:	Construct a 1.0 million gallon reservoir tank, water system improvements and access road
County Permits	Plan Approval Building and Construction Permits
State Permits	NPDES Form C for Storm Waters Associated with Construction Activities NPDES Form F for Hydrotesting Waters

CHAPTER 1
INTRODUCTION

1.1 PROJECT OVERVIEW

The State of Hawaii Department of Hawaiian Home Lands (DHHL) proposes to construct a 1.0 million gallon (mg) reservoir tank in order to increase the flow and pressure of the surrounding existing water system and provide adequate fire protection for the existing Kaei Hana II Industrial Subdivision. The proposed reservoir, will be located about ¼ mile above the Kaei Hana II Industrial Subdivision in Kawaihae of South Kohala on the island of Hawaii (**Figures 1-1 and 1-2**).

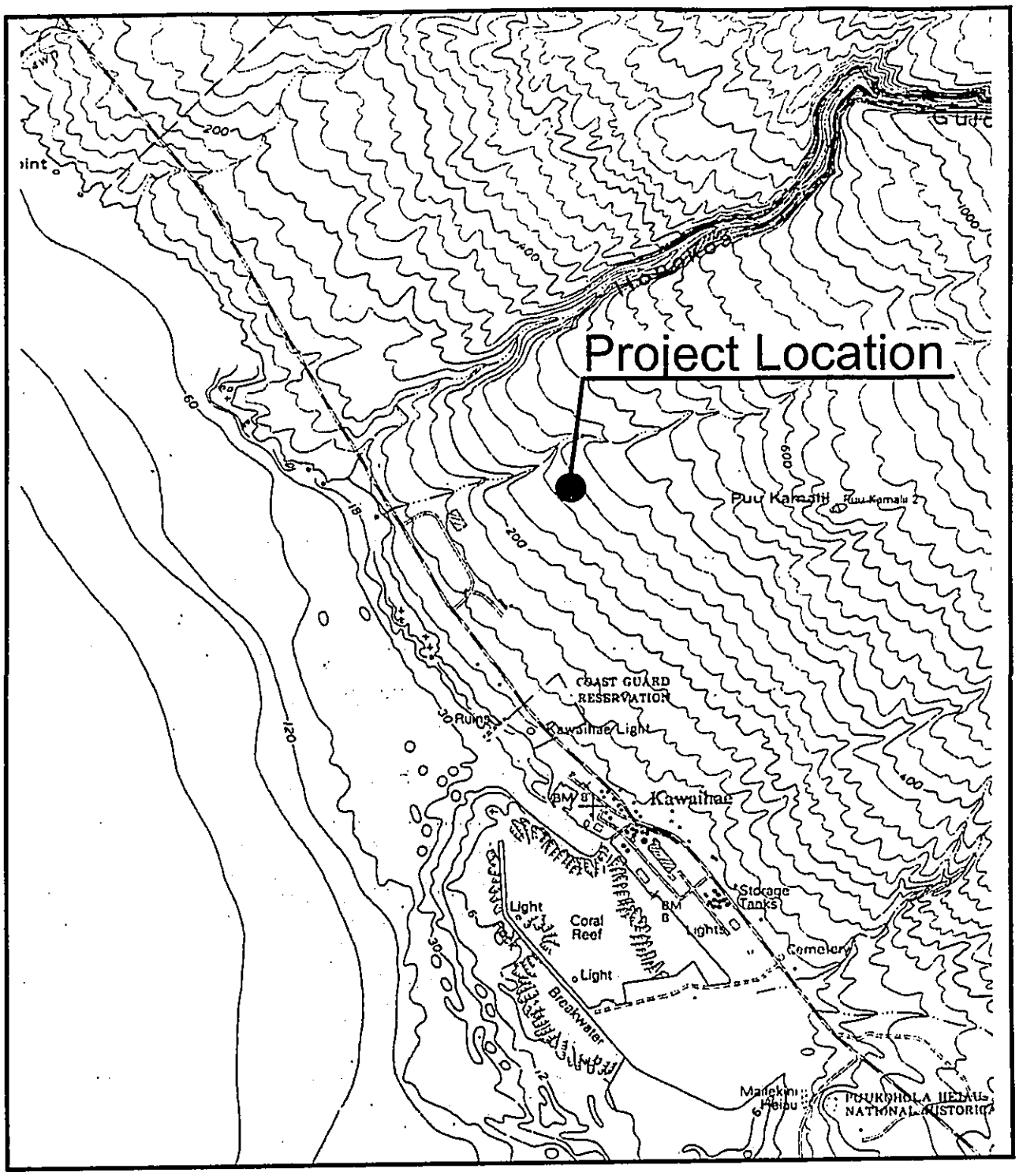
Completion of the project will involve evaluation of environmental conditions and existing land uses to determine the overall impact of construction activities and the impacts of the new facility on nearby community activities and land uses. All project activities will be assessed for compliance with State and County policies and land use plans.

1.2 PURPOSE OF THE ENVIRONMENTAL ASSESSMENT

State of Hawaii lands and funds will be used for the proposed development. The project therefore is subject to preparation of environmental documentation per requirements of Chapter 200, Title 11, Hawaii Administrative Rules (HAR) and Chapter 343, Hawaii Revised Statutes (HRS). This Draft Environmental Assessment (EA) will address the limited environmental impacts anticipated from development of the proposed project. A Final EA and Finding of No Significant Impact (FONSI) will be filed by DHHL as part of the requirement for prccessing an EA.

1.3 PURPOSE AND NEED FOR THE PROJECT

The existing water system of the Industrial Subdivision is extremely limited and concerns of inadequate flow and pressure have resulted in the need for substantial improvements. The water system for the Industrial Subdivision consists of a 8-inch



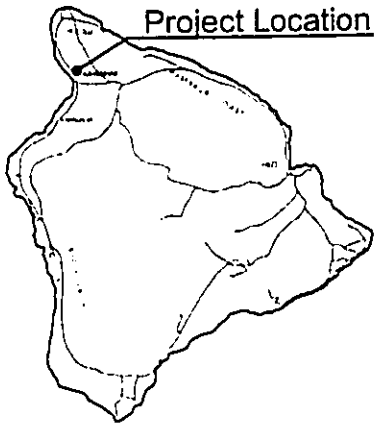


Figure 1-1
Location Map

0 2000 4000
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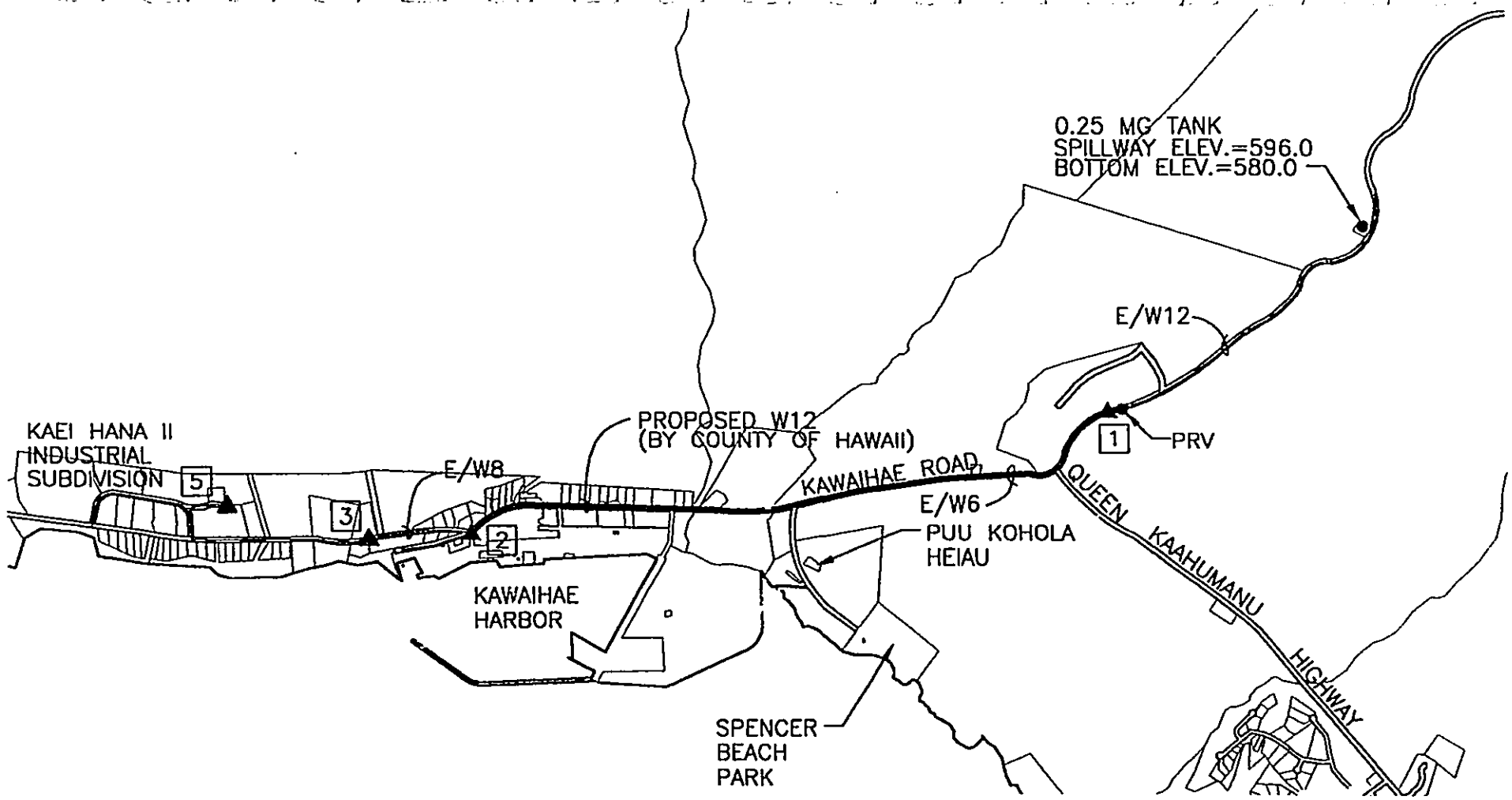
KAWAIHAE 1.0 MG TANK
Environmental Assessment

R. M. TOWILL CORPORATION
August 2001



LEGEND

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Figure 1-3
Existing Water System

0 2000 4000

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KAWAIHAE 1.0 MG TANK

R. M. TOWILL CORPORATION

August 2001

The peak flow criteria and demands were calculated for the existing system utilizing the above mentioned criteria and demands. The peak flow analysis showed that the existing system is capable of meeting peak hour flow of 283 gpm with a residual pressure of 61 psi at the Industrial Subdivision. However the existing system does not meet the fire flow demand required of 2,085 gpm with a minimum residual pressure of 20 psi. According to the analysis of the existing water system at the required flow resulted in a residual pressure at the Industrial Subdivision of (-) 1,001.4 psi. Therefore, the existing water system requires significant improvements to increase flow and pressure and bring it up to County fire protection standards.

In fact, due to the water pressure deficiency in the existing system, the Industrial Subdivision is having difficulty developing and utilizing the full potential of the subdivision. New leases have difficulty obtaining building permits or in some cases industrial lots could not be leased without proper water pressure. Those able to obtain building permits were required to construct their own on-site water storage tank to increase water pressure and fire flow capacity to provide their own fire protection. The intent of this project is to bring the existing inadequate system up to County fire protection standards for the Industrial Subdivision.

Upon determining that the existing water system needed vital improvements, the DHHL utilized the DWS standards and the Kawaihae Master Plan to design and size and location of the proposed reservoir. Water demands, calculated according to the rates specified in the Hawaii County DWS standards for the various land use designations, are summarized in Table 1-1, Summary of Master Planned Community Water Demand According to Land Use.

TABLE 1-1 SUMMARY OF WATER DEMAND ACCORDING TO LAND USE

Development Designation	Approx. Dwelling/ Acre	Total Area (Acres)	Gallon/ Acre	Avg. Daily Demand (Gallon)	Max. Daily Demand (Gallon)
Low Density Residential	2 3/4	1,197	1,100	1,316,700	1,975,050
Medium Density Residential	10	30	4,000	120,000	180,000
Existing Lots		12	2,900	34,800	52,200
Industrial		227	4,000	908,000	1,362,000
Commercial		46	3,000	138,000	207,000
Town Center		58	3,000	174,000	261,000
School/Parks		84	4,000	336,000	504,000
Religious		8	3,000	24,000	36,000
Preservation		20	4,000	80,000	120,000
	TOTAL	1,682		3,131,500	4,697,250

However, since the existing County water system lacks ability to support the Kawaihae Community, the approved Kawaihae 10-Year Master Plan plans provides an analysis for the development of seven (7) reinforced concrete reservoirs to fulfill fire protection and minimum storage requirements.

The demand and storage capacities of the reservoirs at the different pressure zones were tabulated and are presented in Table 1-2, Storage Requirements.

TABLE 1-2 STORAGE REQUIREMENTS

Reservoir No.	Pressure Zone (Ft.Elev.-msl*)	Service Limit (Ft.Elev.-msl*)	Avg. Daily Demand (MG**)	Max. Daily Demand (MG**)	Reservoir Capacity
1	310	0 to 210	1,138,427	1,707,641	1.7
2	576	210 to 476	615,866	923,799	1.0
3	842	476 to 742	602,607	903,911	1.0
4	1108	742 to 1008	415,020	622,530	1.0
5	1374	1008 to 1274	251,800	377,700	0.5
6	1374A	1008 to 1274	59,600	89,400	0.1
7	1640	1274 to 1540	48,180	72,270	0.1

*mean seal level (msl)

** million gallon (mg)

As detailed in the Kawaihae 10-Year Master Plan, a 1.7 mg reservoir at the 310-foot elevation would provide water supply to the existing and future Kawaihae community and Kaei Hana II Industrial Subdivision. The 10-Year Master Plan Water System (See

Figure 1-4) shows identifies future distribution water mains, transmission water mains and reservoir locations.

The proposed 1.0 mg reservoir was sized and located to conform to the Kawaihae Master Plan. (See **Figure 1-5**, Proposed Improvements in Relation to the 10-Year Water System Master Plan.) By conforming to the Kawaihae Master Plan, the design and construction of the proposed 1.0 mg will minimize disruptions for relocation of waterlines and access roads in the event of future development. The proposed 1.0 mg reservoir will also assist in addressing future water needs as indicated in the Master Plan.

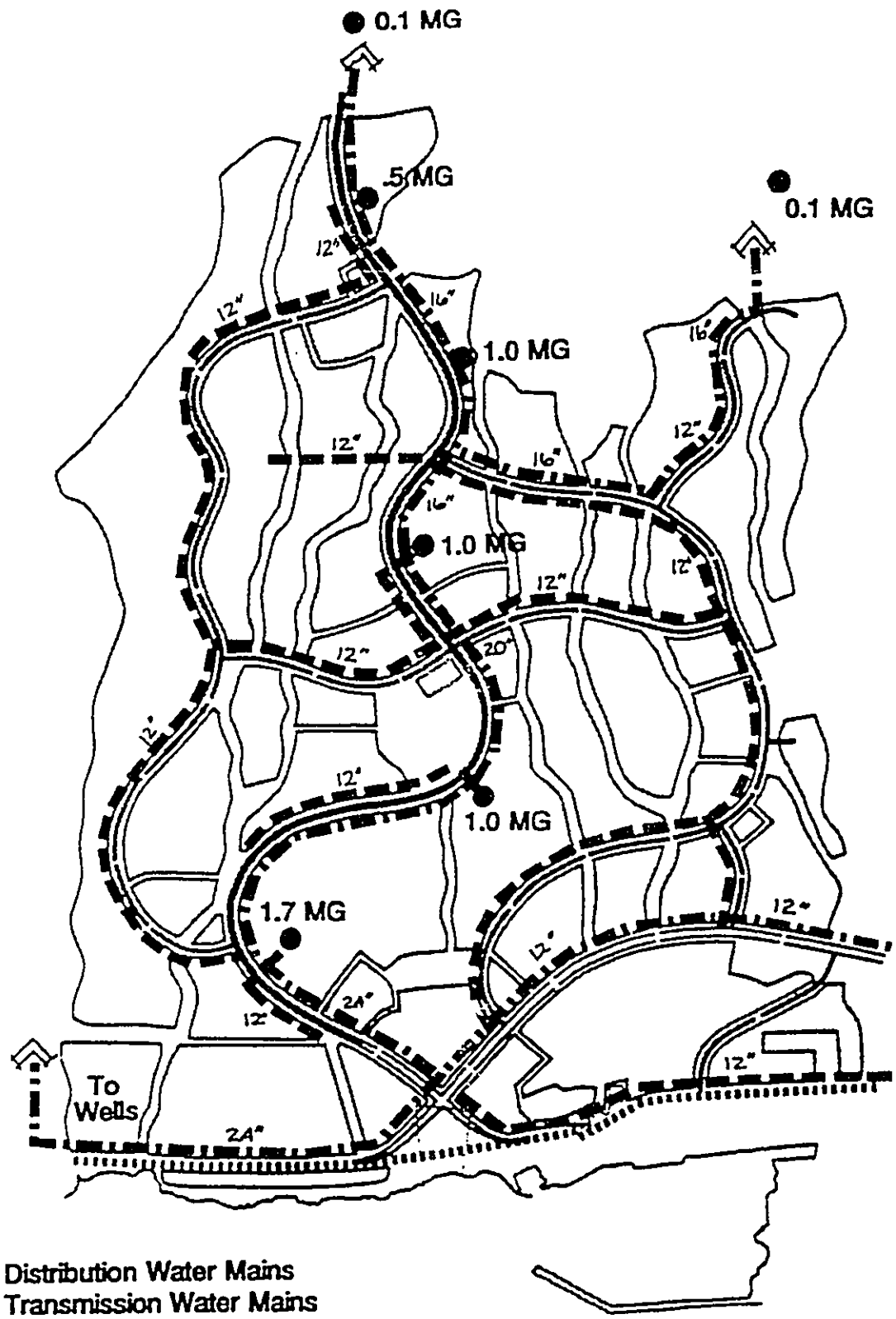
1.4 ALTERNATIVES

As part of the analysis for this project, several alternatives were considered to address the need for improving the facilities. The alternatives evaluated include the no action alternative, an alternative location, and the proposed 1.0 mg reservoir and water improvements.

1.4.1 Alternative 1: No Action

State and Federal legislation require that a "no action" alternative be considered to serve as a baseline against which potential actions can be measured. The No Action alternative would result in no effort made to provide adequate fire protection for the existing Industrial Subdivision and potable water for possible future expansion of the Industrial Subdivision and the future Kawaihae community.

Mauka areas such as Waimea Village, rely primarily on water from the Kohala Mountain streams. However, because of its limited supply during dry weather, alternative sources need to be explored and tapped to assure a more reliable water supply. The Hawaii County Water Use and Development Plan declares that except for times when there are large reserves of water in the Waimea System, water from Waimea should be kept for the mauka sections of South Kohala. It should be not relied upon as a source for the coastal areas.

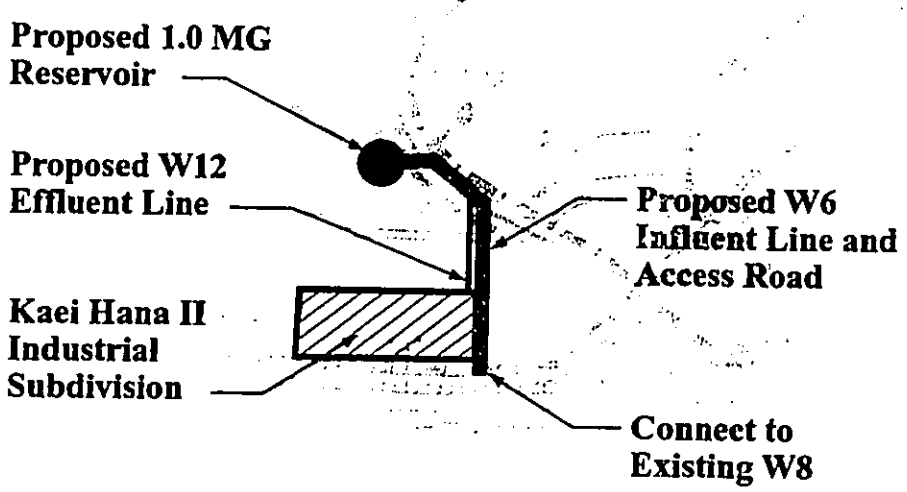


Kawaihae 10-Year Master Plan, December 1992
DHHL, State of Hawaii

Figure 1-4
10-Year Water System Master Plan

KAWAIHAE 1.0 MG TANK
Environmental Assessment

R. M. TOWILL CORPORATION
August 2001



Existing Roadway
Distribution Water Mains
Transmission Water Mains
Reservoir Capacity

0 900 1800
Feet

Kawaihae 10-Year Master Plan, December 1992
DHHL, State of Hawaii

Figure 1-5
Proposed Improvements in Relation to
The 10-Year Water System Master Plan

KAWAIHAE 1.0 MG TANK
Environmental Assessment

R. M. TOWILL CORPORATION
August 2001

As detailed in the Kawaihae community master plan, the reinforced concrete reservoir will be required to fulfill fire protection and minimum water storage requirements of the Industrial Subdivision and surrounding area. Under this No Action alternative, the existing Industrial Subdivision continues to rely on an inadequate water system and the proposed Kawaihae community cannot be developed as approved in the 10-Year Master Plan. This No Action alternative was therefore rejected.

1.4.2 Alternative 2: Alternative Location

Since the size and location of the proposed 1.0 mg reservoir tank conforms to the Master Plan, which has been evaluated and conceptually approved, an alternative location requires additional evaluation and analysis for the master planned Kawaihae community. A new location would require reevaluation of the entire Kawaihae community to determine the most efficient location within the required physical criteria.

According to a Water System Study (Appendix A, Water System Study - Final) the bottom elevation of the reservoir must be at least 290 feet above msl (mean sea level) for proper water quality. In order to provide acceptable fire protection and conform to the Kawaihae Master Plan a reservoir tank must be placed above the Kaei Hana II Industrial Subdivision and still within range to provide service the proposed Kawaihae planned community.

Due to the physical and development restrictions to locate a 1.0 mg reservoir tank, the alternative location would likely be near the proposed site. Therefore, this alternative would generate environmental outcomes similar to the Preferred Alternative to develop the proposed 1.0 mg reservoir tank at the proposed location. Due to the potential cost of re-evaluating and redesigning the Master Plan and resulting in similar environmental outcomes, this Alternative was rejected.

1.4.3 Alternative 3: Proposed 1.0 mg Reservoir Tank

Since the existing water system does not meet minimum County fire protection standards, this alternative provides a comprehensive, reliable method to provide the needed flow and pressure to the existing Industrial Subdivision, possible future expansion of the Industrial Subdivision and any surrounding master planned community. By developing a 1.0 mg reservoir tank, the entire Industrial Subdivision would immediately be provided with a water system that meets minimum County fire protection standards. The individual lessees could develop their lots according to the initial plan of the Industrial Subdivision and would greatly contribute to the economy of the area.

By locating the reservoir within the master planned community and conforming to the design of the Master Plan, the proposed reservoir could assist in providing water with minimal delay and without need of additional transmission mains and other supporting facilities. This alternative would provide the vital water flow and pressure needed for the existing and future Kaei Hana II Industrial Subdivision as well as the Kawaihae community and therefore is the preferred alternative.

CHAPTER 2
DESCRIPTION OF PROPOSED ACTION

2.1 PROJECT LOCATION AND SITE CHARACTERISTICS

The proposed project is located approximately ¼ mile above the Kaei Hana II Industrial Subdivision in South Kohala on the Island of Hawaii. The project site is a portion of the 7,650-acre State-owned lot, which is a part of the 10,000-acre Kawaihae Master Planned Community. The site and surrounding Kawaihae area is currently under the jurisdiction of the DHHL.

The site is vacant and requires the construction of an access road and water distribution line from the reservoir to the existing water system within Akoni Pule Highway approximately 2,500 feet to the south.

2.2 FACILITY CHARACTERISTICS

The proposed reservoir will be a reinforced concrete tank approximately 22 feet in height and 100 feet in diameter. The reservoir will be constructed in accordance with the County of Hawaii DWS standards for a 1.0 mg reservoir. A six (6) foot tall chainlink fence and gate will be installed around the perimeter of the project site for security purposes.

Since this area is currently undeveloped, a road for access and water distribution lines would need to be constructed to connect influent and effluent lines from the reservoir to the existing water system. As shown in **Figure 2-1**, Proposed Water System, the proposed access road will be approximately 2,500 feet in length and run adjacent to the Kaei Hana Industrial area along the proposed 12-inch effluent water line corridor from the tank site to Akoni Pule Highway. This alignment will avoid all known archaeological sites. Additional effluent lines will connect the proposed reservoir to existing and future service lines for the area. In order to minimize future construction impacts and realignments, the proposed 1.0 mg reservoir was sized and located to conform to the approved Master Plan.

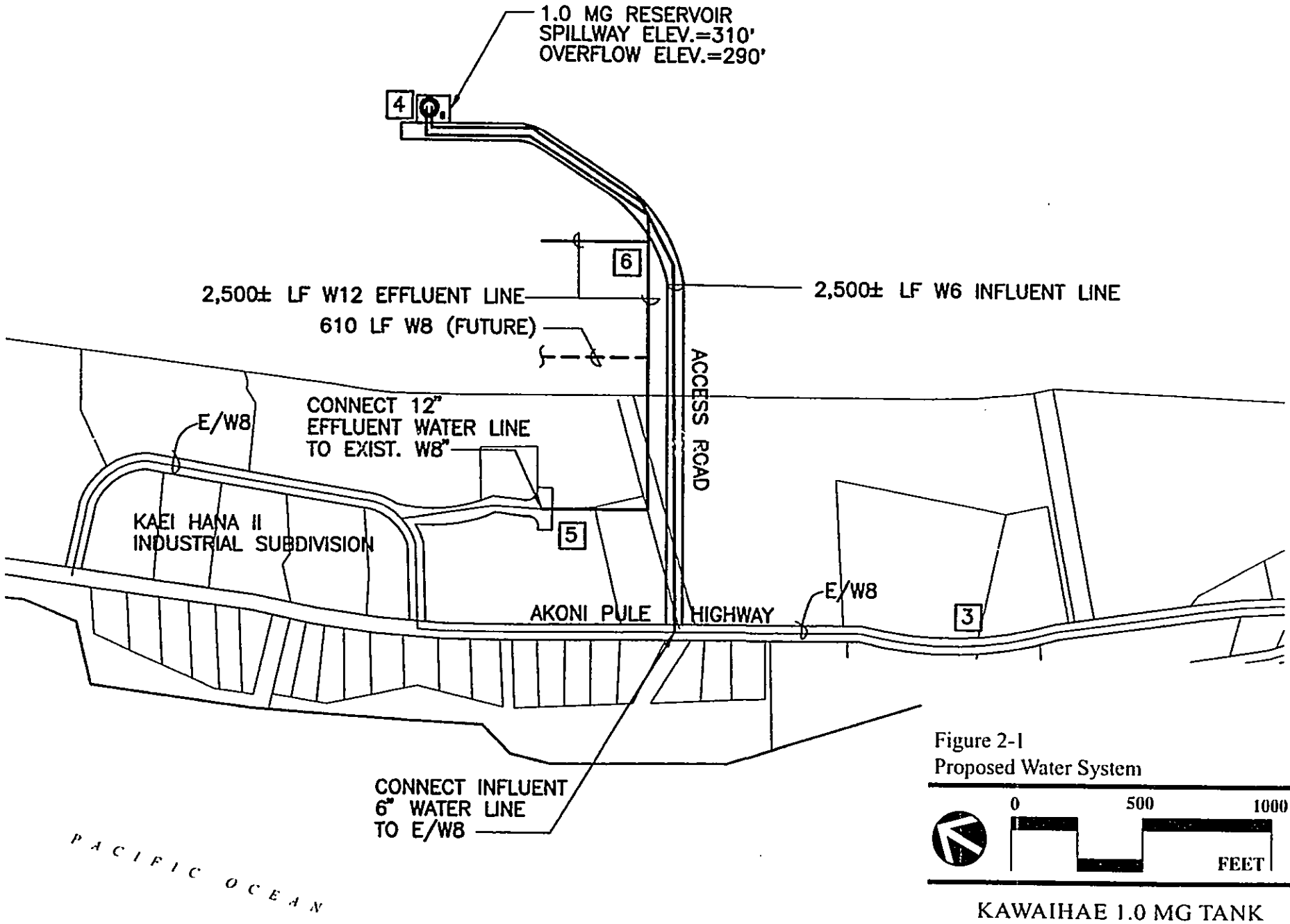


Figure 2-1
Proposed Water System

0 500 1000
FEET

KAWAIHAE 1.0 MG TANK

R. M. TOWILL CORPORATION
August 2001

As discussed, the proposed reservoir and water system recommendations were based on the assumption that the County would complete its upgrade of 9,000 feet of existing 6-inch water main to a 12-inch. The upgrade will include the water main within the Akoni Pule Highway beginning at the Queen Kaahumanu Highway intersection and ending in the vicinity of the Kawaihae Small Boat Harbor. The upgrade will be completed prior to construction of the proposed 1.0 mg reservoir. Upon completion, the water tank and appurtenances will be conveyed to the DWS for operation and maintenance via license agreement.

Alignment of the access road and water system improvements have been designed to conform to the Kawaihae Master Plan in order to reduce impacts from re-alignment or relocation of improvements.

2.3 CONSTRUCTION ACTIVITIES

Construction activities will include mobilization, clearing and grubbing, grading, construction of the facilities, demobilization and restoration.

Mobilization of equipment, materials, and workforce shall occur on an as-needed basis, in schedule with the phases of construction. Construction activities require that staging areas be established on-site. Prior to mobilization, the project contractor will identify staging and stockpiling areas for construction equipment and materials.

Staging and stockpile areas shall be prepared as necessary with appropriate storm water discharge pollution prevention features, fugitive dust containment, and parking areas for workers. During mobilization, ground disturbance shall be held to the minimum area necessary to accommodate the heavy equipment and materials required for construction activities.

Vegetation and debris will be cleared from the site to accommodate staging and construction. The site will be graded in preparation of foundation work and paving. The project will retain existing topsoil and maintain soil health by clearing only areas reserved for the proposed project.

Due to the extremely arid and dusty conditions in the area, the contractor will be required to utilize appropriate mitigation measures to minimize airborne dust. Dust levels will be controlled by use of standard water tanker trucks or sprinkler systems. The contractor will be required to adhere to dust control practices according to Air Pollution Control Regulations, Title 11 (Chapter 60), of the State Department of Health (DOH), which includes scheduled water sprinkling, compacting, and intermediate cover.

Upon completion of construction activities, the contractor shall restore the project site as much as possible to pre-project conditions:

- All construction-related material, including excavated material, fill material, and refuse shall be removed from the project site and disposed of properly by the contractor.
- All construction equipment shall be removed from the project site promptly after construction is complete.
- Any modifications to existing utilities, such as power lines or water sources, shall be restored or relocated according to requirements of the reservoir operations and respective utility service provider.
- Roadways providing access to the site shall be cleared of construction debris and any damage from construction traffic will be repaired. Gates and/or fencing removed to provide access to the site shall be replaced and/or repaired.

2.4 PROJECT SCHEDULE AND COST

Construction for the reservoir will require approximately 12 months to complete and is tentatively scheduled to begin at the end of the year 2000. The preliminary construction cost estimate for the entire project will be approximately $3 million - $3.4 million. Funding for the project will be provided by the State DHHL.

CHAPTER 3
AFFECTED ENVIRONMENT - IMPACTS AND MITIGATION MEASURES

This chapter assesses the environmental consequences of the proposed action described in Chapter 1. Potential impacts are described and evaluated. Mitigation measures that would eliminate and/or reduce potential adverse impacts are identified.

3.1 TOPOGRAPHY

3.1.1 Topography

The proposed project site is located approximately ¼ mile north of Kaei Hana II Industrial Subdivision at the 300 foot elevation. The site is relatively level, with a slight upward slope towards the northeast. The project site is located southwest of the Kohala Mountains. The Kawaihae Master Planned Community, when fully developed, will stretch from the shoreline up to the 1,200 foot elevation. The most prominent nearby topographic feature is the Honokoa Gulch located approximately 2,000 feet to the north. A number of other gulches, gullies and swales, including Mahakuna and Palihae Gulches, are located to the south. Other prominent features include Puu Kamalii and Puu Kanane north of the project site.

3.1.2 Impacts and Mitigation Measures

The proposed 1.0 mg reservoir will change the topographic conditions of the land. Impervious surfaces will be created by the construction of the reservoir and access road. However, the natural drainage pattern in the area will be maintained. Storm water runoff created by the development will be directed by natural drainage patterns, retained by landscaping or routed by culverts.

3.2 CLIMATE AND RAINFALL

3.2.1 Climate and Rainfall

The climate of the Kawaihae area is affected by its leeward and coastal situation. The strong tradewinds approach the project site from the east between the Kohala Mountains and Mauna Kea. Kona storms generate occasional strong winds from the

south during winter. When the tradewinds are weak or absent, small scale breeze or mountain-induced circulation may develop. These smaller scale phenomena tend to dominate the wind pattern for the area causing winds to be predominantly bimodal with an east-west orientation. During the daytime, winds move onshore from the west while at night a 180-degree shift typically occurs reversing the flow. Wind speeds generally vary between 5 to 20 miles per hour.

Based on temperature data for the area, temperatures of the project site range between 55° F and 95° F. Average annual rainfall is very low, between 10 to 20 inches with summer months being the driest. Hot and dry conditions in the area make most types of agricultural use difficult and undesirable unless extensive irrigation is provided.

3.2.2 Impacts and Mitigation Measures

The project is *not* expected to significantly impact existing climatic conditions at the project site. The structural considerations and siting of the facility will accommodate the frequent windy conditions.

3.3 GEOLOGY

3.3.1 Soils

The project site is situated on the southwestern flank of Kohala Mountain which is the oldest of the five shield volcanoes forming the island of Hawaii. The Kohala Mountain was formed by basaltic lava flows from the Pololu and Hawi Volcanic series. Pololu series of lava flows are characterized as thinly bedded with a high degree of porosity. The later stage of lava, Hawi Volcanic series, are antistatic and trachytic in composition and cover most of the Palely rocks. These andesitic rocks generally form thicker and denser flows.

According to the US Department of Agriculture Soil Conservation Services, Survey of the Island of Hawaii, the project site is classified as having Kawaihae very rocky, very fine, sandy loam. These soils are characterized by moderate permeability and moderate to high susceptibility to erosion.

3.3.2 Impacts and Mitigation Measures

The project is not expected to significantly impact existing soil conditions at the project site. The structural considerations and siting of the facility will accommodate the rocky and fine sandy conditions.

3.4 DRAINAGE

3.4.1 Surface and Ground Water

Major gulches in the area include the Keananhalulu Gulch, Kaiopae Gulch, Kawaihae Gulch, Kilohana Gulch, Honokoa gulch, Waiapahoehoe Gulch, Keawewai Gulch, Makahuna Gulch and Palihae Gulch. The closest features are the Honokoa Gulch and a smaller, natural gully just north of the project site. There are no streams within the project site. The most prominent nearby surface water feature is an unnamed, intermittent tributary which runs within the natural gully north of the project. The unnamed, intermittent tributary and gully are approximately 250 feet to the north.

At the project site, groundwater occurs as a basal water table in saturated volcanic rocks at or very near to sea level. No sources of surface water occur within the project area.

3.4.2 Impacts and Mitigation Measures

The proposed 1.0 mg reservoir is not anticipated to impact streams, gulches or gullies in the surrounding area. Water supply for the proposed reservoir would come from the existing water system controlled by the DWS. Final decision on water commitment will be made as the area is developed on a first-come, first-served basis.

3.5 NATURAL HAZARDS

3.5.1 Earthquakes

The Uniform Building Code (UBC) provides minimum design criteria to address potential for damages due to seismic disturbances. Range of seismic risk varies from Zone 0, indicating no damage, to Zone 4, indicating major damage. The 1997 Building Code Standards for the Island of Hawaii is currently being upgraded from Seismic Zone

3 to Seismic Zone 4, as established by the UBC, indicating potential major damage from earthquakes.

3.5.2 Impact and Mitigation Measures

The proposed project is not at seismic risk and is not likely to be affected by seismic activity. All structures proposed for this project will be built, at a minimum, according to standards for UBC Seismic Zone 4.

3.6 AIR QUALITY

3.6.1 Air Quality

Presently, air quality in the vicinity of the project is good. The primary sources of air pollution are from auto emissions and agricultural activities. Agricultural sources of air pollution include burning of vegetation, spraying of insecticides and herbicides, and equipment emissions. To a lesser and occasional extent, air quality is impacted by natural pollution sources. Natural sources of air pollution that may affect the air quality of the site include the ocean, plants, wind-blown dust and volcanic activity.

3.6.2 Impacts and Mitigation Measures

It is inevitable that some short-term impacts on air quality will occur either directly or indirectly as a consequence of project construction. Short-term impacts from fugitive dust will likely occur during the project construction phase. To a lesser extent, exhaust emissions from stationary and mobile construction equipment, and from workers' vehicles may also affect air quality during the period of construction. Minor long-term air quality impacts will result from periodic vehicle traffic accessing the unmanned reservoir, however these impacts will not significantly degrade local air quality.

State standards have been established to maintain ambient air quality at healthy levels. State air pollution control regulations require that there be no visible fugitive dust emissions at the project boundary. Therefore, an effective dust control plan will be implemented by the project contractor to ensure compliance with state regulations, especially in dust-prone South Kohala.

Fugitive dust emissions can be controlled to a large extent by watering of active work areas, using wind screens, and by covering open-bodied trucks. Exhaust emissions will be mitigated by ensuring that project contractors properly maintain their internal combustion engines and comply with DOH Rules Title 11, Chapter 60-1, regarding Air Pollution Control.

Upon completion of the proposed construction, the project does not anticipate significant long-term impacts to air or noise quality at the project site and surrounding area. No additional mitigation measures are planned for the proposed project.

3.7 NOISE QUALITY

3.7.1 Noise Quality

Ambient noise levels in the area are currently dominated by traffic on nearby streets – primarily on Akoni Pule Highway and Kawaihae Road. Natural sounds from the surf and sounds from the wind moving through the vegetation on the site and surrounding master planned community are also found on the project site. With the exception of areas affected by traffic noise, ambient sound level are typical of rural areas.

3.7.2 Impacts and Mitigation Measures

Construction of the proposed reservoir will likely generate noise which could impact nearby areas. The actual noise levels produced are dependent on the construction methods employed. Diesel engine powered bulldozers, trucks, backhoes, front-end loaders, etc., will probably be the noisiest equipment used during construction. However, as the noise will be temporary, no lasting impact from construction activities is expected.

Mitigation measures to reduce construction noise to acceptable levels, such as the use of mufflers, can be utilized as appropriate. Measures including the use of quiet equipment and construction curfew periods will be implemented in accordance with State rules and regulations. In order to mitigate noise impacts, contractors will muffle all construction vehicles and machinery and maintain all noise attenuation equipment in good operating condition. Faulty equipment will be repaired or replaced. Additionally,

construction activities and use of heavy equipment will be scheduled as much as possible, during daylight hours to avoid disturbing area residents. All construction and facility operations will comply with applicable maximum permissible sound levels as indicated in HAR, Chapter 11-46, "Community Noise Control." The contractor will obtain a noise permit if the noise levels from construction activities are expected to exceed the allowable levels of the rules.

The 1.0 mg reservoir will not be used for noise-intensive activities. Normal activities at the facility will generate relatively low levels of noise, from periodic vehicle traffic of maintenance staff to the unmanned facility. No adverse long-term noise impacts are anticipated from the proposed development of the site.

3.8 BIOLOGICAL RESOURCES

3.8.1 Flora

The flora on the site consist primarily of alien (non-native) species. Although there are no rare plants within the project site, there are three rare plants found in the nearby steep slopes or gulches of the Kawaihae area. The three rare plants are *Acacia koaia*, *Lobelia hypoleuca* and *Cyanea tritomantha*. The Acacia koaia are found in two locations: Waipahoehoe Gulch and Honokoa Gulch (Keawewai Stream). Lobelia hypoleuca are found at the base of Puu Lapalapa. The Cyanea tritomantha are found on the slopes of Puu Mala. The Koai'a forest which is located at the 2,000 to 3,000 foot elevation, is northeast of the, 300 foot elevation, project site. According to the Biological Database & Reconnaissance Survey prepared for the EIS of the Master Planned Community, there are no rare plants and forest within the reservoir project area.

3.8.2 Fauna

Domestic animals, including cats and dogs, are found in and around the project site. No threatened or endangered birds are known to inhabit the project area, however, rare animals have been reported in lands adjacent to the Hawaiian Home Lands property. These rare animals include the Hawaiian hoary bat, Hawaiian duck, Hawaiian hawk and the achatinellid land snail.

3.8.3 Impacts and Mitigation Measures

Project activities include clearing vegetation to make room for the reservoir facility. Since the project is not in the vicinity of the Koai'a forest, which is located at the 2,000 to 3,000-foot elevation, it will not have an impact on the rare acacia koaia. Similarly, the two rare Hawaiian lobelaids seen among the 'Ohi'a/'Olapa Montane Wet Forest are not in the area of the project and will not be impacted. In addition, these rare plants were found on steep unbuildable slopes and in gulches which are outside of the project area.

Because the property is not known to contain any rare animals, impacts on rare animals are not expected. The relatively dry climate and sparse vegetation in the area does not provide good habitat for the rare animals known to exist in the nearby forest. Given the above findings, the proposed project will not have a significant negative impact on botanical or faunal resources. No other mitigation measures are required or recommended for botanical and faunal resources.

3.9 HISTORIC AND ARCHAEOLOGICAL RESOURCES

3.9.1 Historic Resources

The proposed reservoir project site is located on a vacant lot with no known architectural or other features of historical significance. Kawaihae has been the focus of several detailed surveys of the historical and ethnographic record. Well known as a residence of kings, Kawaihae was also known as the best anchorage in west Hawaii and a center of significant economic activity based on cattle ranching and agriculture.

3.9.2 Archaeological Resources

An archaeological reconnaissance survey was preformed in June1991 for the preparation of the Kawaihae 10-Year Master Plan EIS. The features recorded in the 1991 survey and analysis include sites recommended for preservation; sites of known, probable or possible burials; and sites recommended for further data recovery. The report also noted numerous other sites that have been investigated and determined not to be significant.

A new archaeological assessment was prepared for the proposed project in October 2000. (Appendix B, Archaeology - Cultural Surveys Hawaii). Field reconnaissance conducted for this report detected no archaeological sites within the proposed 1.0 mg reservoir project site. However, several significant archaeological features are located at lower (100 to 200 foot) elevations in the area originally proposed for construction of the water tank access road. The field inspection also included the 12" water line corridor and areas to the north and west of the tank site in the vicinity of a large unnamed gulch near the old "Pioneer" warehouse and light industrial subdivision. These areas were found to be void of archaeological sites.

3.9.3 Impacts and Mitigation Measures

Due to the identification of archaeological resources within the general project area, the proposed access road and 6-inch influent line to the water tank have been realigned to avoid significant archaeological features. The new road and water line alignment will be located adjacent to the Kaei Hana Industrial area and will follow the proposed 12-inch effluent water line corridor. (See **Figure 2-1, Proposed Water System**.) Based on the findings of the archaeological field reconnaissance, this alignment will avoid all known archaeological sites. (See **Appendix B, Archaeological Resources**, and **Appendix C, Cultural Resources**.)

There is always the possibility that previously unknown or unexpected subsurface cultural features, deposits, or burials may be encountered. To provide additional assurance that no cultural resources are destroyed during project construction, work within the project area will be monitored by the project contractor and/or qualified personnel retained by the contractor and approved of by DHHL. In the unlikely event that significant archaeological remains are encountered, work will cease in the immediate area and the SHPD will be notified at (808) 692-8015 to determine significance and treatment of any findings. Therefore, slight adjustments to the alignment of the proposed water system or access road may occur should significant archaeological or historical sites be encountered during construction.

3.10 CULTURAL RESOURCES

3.10.1 Cultural Resources

A cultural impact assessment for this project was conducted by Cultural Surveys Hawaii (March 2001) It is included as Appendix C of this document. Interviews were conducted with several residents of Kawaihae who have ancestral ties to the land. For most residents, their general knowledge of Kawaihae history focuses on the coast which was the center of activities, both commercial and recreational. The coast was also where the main settlement was located. Interviews with community members did not yield any information regarding traditional and modern-day cultural practices specific to the project area (i.e., gathering *'ilima* for *lei* and/or *hula*, gathering *'uhaloa* for medicinal or cultural purposes) and, of most concern, the burial features. The interviews also did not yield any new information about archaeological sites, trails, possible burial features or history of the project area in general.

3.10.2 *Impacts and Mitigation Measures*

No impacts to cultural resources or practices are expected to result from proposed project activities. Residents consulted in the cultural impact assessment expressed their preference for moving the access road closer to the industrial area to avoid known archaeological sites. No further mitigation measures are recommended or required.

3.11 SCENIC RESOURCES

3.11.1 Scenic Resources

The proposed 1.0 mg reservoir site will be visible from Akoni Pule Highway approximately ¼ mile to the southeast. The site and adjacent areas offer panoramic views of the South Kohala and North Kona coast. Views from coastal resorts looking mauka onto the project site and adjacent areas are dominated by rolling hillsides with patches of pasture and grazing lands.

3.11.2 Impacts and Mitigation Measures

Scenic impacts associated with the construction and use of the proposed 1.0 mg reservoir are discussed in terms of short-term and long-term effects.

Short-Term Scenic Impacts

Short-term visual impacts associated with the project primarily relate to construction activities. Temporary signage, dust screens, the presence of heavy construction equipment and ongoing modifications to the existing landscape will all create short-term impacts on the visual setting surrounding the project site. Construction activities will be apparent from the industrial subdivision and Akoni Pule Highway. Visual impacts related to construction activities are temporary in nature however, and not considered significant.

Long-Term Scenic Impacts

The proposed project will result in long-term visual impacts in the form of a new 1.0 mg reservoir facility where currently only sparse vegetation exits. The reservoir facility will be designed to minimize the visual impacts on the existing industrial subdivision and future master planned community.

To minimize the visual impact of construction activities, the project contractor will ensure that work crews, heavy equipment, and signage will be utilized only to the extent required for project operations. The use of earth tone colors, height limits and grading techniques to minimize the visual impacts will be incorporated in the design and construction.

3.12 LAND USE AND OWNERSHIP

3.12.1 Land Use

The proposed reservoir site is located on TMK parcel 6-1-01:03 within the State Land Use Agricultural District and the County of Hawaii zoning designation of Agriculture (A-40a). The 1.0 mg reservoir facility is a permitted use in the A-40a zoned district pursuant to Section 25-4-11 and 25-5-72 of the Hawaii County Zoning Code. Additionally, the proposed access road, influent line, and effluent line will run through TMK: 6-1-06: 4, 5, 6, 7. All of these additional parcels are zoned MG-1a Industrial General (1 acre lot minimum) and are within the State Urban District.

The proposed 1.0 mg reservoir project is a permitted use in the MG-1a zoned district pursuant to Section 25-4-11(c) of the Hawaii County Zoning Code. Although, no land use permits will be required to allow the establishment of the proposed reservoir, water system improvements and access road, a Plan Approval is required. The Plan Approval will be obtained prior to securing a building permit for the construction of the proposed facility.

Much of the area is undeveloped land, used for cattle and horse grazing. Surrounding the project site is a 90-acre industrial park and a few scattered structures on half-acre homestead lots along Akoni Pule Highway and Kawaihae Road. In addition, there are 22 awarded, unimproved homestead lots located on the makai side of Akoni Pule Highway, across from the industrial park.

There are a number of small water tanks scattered over the Kawaihae Master Planned Community in the undeveloped areas, mostly in the higher elevations. These tanks are used for providing water to grazing animals. In addition, there are numerous unimproved trails that cross portions of the master planned community area. Some appear to be providing access to the water tanks. Most are over rugged terrain, making vehicular passage difficult if not impossible in some areas.

3.12.2 Ownership

The reservoir site is a portion of the 7,650 acre State-owned parcel (TMK: 6-1-01:03) that is currently under the jurisdiction of the DHHL. The access road, influent line, and effluent line will run through TMK: 6-1-06: 3, 4, 5, 6, 7. All of these parcels are owned by DHHL and are vacant or leased to Hokuloa, Inc. (an industrial company).

3.12.3 Impacts and Mitigation Measures

The proposed reservoir facility is consistent with existing State and County land use plans for the region. Although development of the 1.0 mg reservoir will require Plan Approval from the County Department of Planning, no zoning changes will be necessary to accommodate the new facility.

A Plan Approval will be obtained prior to securing a building permit for the construction of the proposed facility. This review will ensure that the proposed facility complies with all of the requirements of the County Zoning Code. No other mitigation measures are recommended or required.

CHAPTER 4

SOCIO-ECONOMIC - IMPACTS AND MITIGATION MEASURES

4.1 DEMOGRAPHICS

4.1.1 Population Characteristics

The South Kohala district has the second highest increase in resident population in Hawaii County. South Kohala population increased from 92,900 in 1980 to 137,200 in 1995. Much of this increase in population was attributed to the development of three major resorts: the Mauna Kea Beach Resort, Mauna Lani Resort, and the Waikoloa Beach Resort. The basic population and commercial center within the South Kohala district is Waimea where a variety of small businesses serve the local population.

Recent social and economic trends indicate that Hawaii will continue to experience fairly rapid population growth. The County of Hawaii population is projected to increase from 137,200 people in 1995 to 205,400 people in 2020, a 1.6 percent annual increase during the 1995 - 2020 period (Population and Economic Projects for the State of Hawaii to 2020, State DBEDT)

Although the population of the South Kohala district is relatively high, population in the Kawaihae area is low (about 150 people) according to the 1985 Kawaihae Development Plan. Most of the residents in the South Kohala district reside in Waimea or near the resort developments south of Kawaihae.

4.1.2 Impacts and Mitigation Measures

The proposed 1.0 mg reservoir is anticipated to provide water service to the existing industrial subdivision and future Kawaihae Master Planned Community for qualified native Hawaiians.

4.2 ECONOMIC CHARACTERISTICS

4.2.1 Economic Characteristics

Tourism and agriculture are Hawaii County's main industries. The tourist industry is the key industry in Hawaii County, particularly in West Hawaii where the Kona and Kohala Coast have almost all of the County's hotel room inventory.

Hawaii County has the highest cattle and calves inventory with other livestock including milking cows, hogs, and pigs and chickens. According to the Hawaii State Data Book, the civilian labor force for Hawaii County was 66,850 in 1996. Of this total, approximately 60,200 were employed leaving 9.9 percent unemployed in 1995. This is the second highest percent of unemployment compared to the other three counties. Kauai is the only County with a higher unemployment rate, of 12.1 percent. The job count for Hawaii County was 49,350 of which 46,850 were for non-agricultural employment and 2,500 were for agricultural employment. The per capital personal income for the County of Hawaii in 1994 was $17,798.

Kawaihae Harbor is the only deep draft harbor on the west coast of the Big Island. It is being expanded to accommodate the growing number of commodities being shipped directly to West Hawaii rather than shipped and trucked via Hilo. The harbor expansion includes enlargement of the barge terminal backup area, dredging of the barge terminal berth, paving the container yard area and extending the oversea pier. There are also plans for the construction of a small boat harbor adjacent to the Kawaihae Harbor on the south side.

West Hawaii's main airport, Keahole, is in the process of a major expansion of its facility by the addition of a $30 million runway extension and related improvements. Related improvements include relocating navigational aids, installing airfield lighting, building a service road for rescue and fire fighting equipment and constructing a blast pad. The State is subsequently requiring land area at Kawaihae for a jet fuel tank farm

that will provide storage capacity for the expanded airport. The location of the tank farm at Kawaihae is due to its proximity to Kawaihae Harbor.

4.2.2 Impacts and Mitigation Measures

Hawaii's economy will be enhanced due to the increase in tax revenues resulting from the improvements made possible with the proposed 1.0 mg reservoir. The proposed 1.0 mg reservoir tank is needed to provide increased flow and pressure of the surrounding existing water system and adequate fire protection for the existing Kaei Hana II Industrial Subdivision as well as, support approved development of Kawaihae Master Planned Community. No adverse affects to the economic or social welfare of the community or State are anticipated from the development of the reservoir facility.

Short-term economic impacts from the proposed project will result from construction jobs, services, and procurement in the form of construction supplies and equipment, however, these benefits will be primarily realized outside of the local community. No mitigation measures are required or recommended.

CHAPTER 5

PUBLIC SERVICES - IMPACTS AND MITIGATION MEASURES

5.1 TRAFFIC AND ROADWAYS

5.1.1 Site Access

The proposed project is approximately ¼ mile northeast of the Kaei Hana II Industrial Subdivision. The Kawaihae area is presently served by a system of rural two-lane highways. The low level of development within the South Kohala area results in comparatively light to moderate traffic volumes on most of the roadways. The harbor contributes significantly to the truck activity.

The project site is serviced by the Akoni Pule Highway and Kawaihae Road. Akoni Pule Highway is a two-lane, two-way arterial that runs from Kawaihae to Hawi to the north. The Kawaihae Road runs between Waimea and Kawaihae in the east-west direction. This two-way, two-lane minor arterial has a 22-foot pavement width and intersects the south end of Akoni Pule Highway, the north end of Queen Kaahumanu Highway, south end of Kohala Mountain Road, and Mamalahoa Highway. The Kawaihae Road has a posted speed limit of 45 miles per hour (mph).

At present, the only traffic signal-controlled intersection in the vicinity of the project is at Kawaihae Road and Mamalahoa Highway in Waimea. Major intersections with stop sign controls include the Kawaihae Road intersections with Kohala Mountain Road, Queen Kaahumanu Highway, and Akoni Pule Highway. Kawaihae Road is the through route at each intersection.

The County of Hawaii, Department of Public Works, has recommended in the Kawaihae 10-Year Master Plan EIS that a major road parallel to and between the Kohala Mountain Road and the Akoni Pule Highway be included as part of the Long Range Master Plan for the Kawaihae community.

5.1.2 Impacts and Mitigation Measures

Development of the reservoir will result in a temporary rise in heavy truck traffic on the surrounding streets, particularly during mobilization and demobilization of the construction area. Upon completion of the reservoir, regular traffic is not anticipated to be impacted due to the limited traffic to and from the reservoir facility. The reservoir is an unmanned facility and will require only periodic maintenance by personnel.

A road from Akoni Pule Highway needs to be constructed to access the reservoir site. The proposed access road will be approximately 2,500 feet in length and run adjacent to the Kaei Hana Industrial area along the proposed 12-inch water line corridor from the tank site to Akoni Pule Highway. This alignment will avoid all known historic and archaeological sites.

The average road slope would be about 12 percent. The road will be 12 feet wide and have 2 foot shoulders. The access road will consist of a 6-inch layer of soil cement or asphaltic concrete, as determined and approved by the DWS. All construction plans will be approved by the required State and County agencies prior to construction.

To minimize traffic impacts to the nearby residents, the contractor will schedule heavy truck activity between the hours of 9:00 am and 3:00 pm on weekdays and will suspend activity on weekends and State holidays. All roadways impacted by construction-related debris or damage will be returned to clean and serviceable condition following completion of construction activities.

5.2 FLOODING AND DRAINAGE

5.2.1 Flooding and Drainage

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate map (FIRM) identifies the proposed project site as lying within an area determined to be outside of the 500-year flood plain. This designation indicates the site is not subject to

flooding that would impact the project and not restricted by any development guidelines. No flood insurance is required for this designation.

There are no major gulches or slopes within the project site. The nearest gulches include the Keanahalulu Gulch, Kaiopae Gulch, Kawaihae Gulch, Kilohana Gulch, Honokoa Gulch, Waiapahoehoe Gulch, Keawewai Gulch, Makahuna Gulch and Palihae Gulch. The closest feature is an unnamed dry gulch which has intermittent stream flow approximately 270 feet north of the project site.

There are existing culverts under Akoni Pule Highway for storm water runoff which discharges into Class A coastal waters.

5.2.2 Impacts and Mitigation Measures

The proposed project is not at risk from flood damage and should not exacerbate conditions that would contribute to flooding. Because the project will not increase runoff discharging into the coastal waters, no impact on the existing drainage pattern is expected. The drainage system within the project will maintain the natural drainage pattern of the area.

According to DWS standards, in emergency situations or similar events the reservoir must be designed with the ability to be completely drained within 12 hours. The proposed 1.0 mg reservoir, designed according to DWS standards, will be equipped with an underground blowoff line that will direct water towards the natural, unnamed gulch north of the project site. The final location and dimension of the line will be determined upon the final design of the reservoir. According to correspondence with the Army Corps of Engineers, the propose 1.0 mg reservoir and proposed improvements will not require a Department of Army permit (See Appendix C, Correspondence). The water system operator will consult with the Department of Health, Clean Water Branch prior to any discharges from the blowoff line to determine if there are any permitting requirements. The DHHL will continue to coordinate with the

appropriate Federal, State, and County agencies for review and approval of the design and construction of the proposed improvements.

5.3 WASTEWATER

5.3.1 Wastewater

Presently, there are no municipal sewage system or sewage treatment facilities in the area. Residential development in the region relies primarily on private septic tanks, cesspools or private sewage treatment plants. The nearest municipal wastewater treatment facility for the West Hawaii Region is located at Kealakehe in North Kona.

5.3.2 Impacts and Mitigation Measures

All plans for the proposed 1.0 mg reservoir will conform to applicable provisions of the DOH's Administrative Rules, and not affect or be affected by wastewater improvements existing or planned in the surrounding area. Since the reservoir will be an unmanned facility with no restroom facilities, it is not anticipated to have significant impacts on wastewater generation or disposal. No additional mitigation measures will be planned or required for the proposed project.

5.4 RECREATIONAL RESOURCES

5.4.1 Recreational Resources

The proposed project site is a moderately vegetated, vacant lot. No recreational facilities exist on the proposed project site and the site is not used for recreational purposes. Nearby recreational areas include golf courses, tennis courts, hiking trails, historic sites, parks, boat harbors and launching ramps and beach parks. The majority of the golf courses and tennis courts occur at the resort development in the Kawaihae region.

Two major public recreation facilities in the area are the Hapuna Beach State Recreation Area and the Samuel M. Spencer Beach Park. Hapuna is a major water-oriented recreation area with an exceptionally attractive, wide, white sand beach.

Spencer Park is located near the Kawaihae Harbor and is a smaller, sandy beach. Both of these areas permit surfing, swimming, picnicking, skin diving, limited camping and boating.

5.4.2 Impacts and Mitigation Measures

No recreational resources will be impacted by the proposed project. Development of the 1.0 mg reservoir will not include recreational activities nor, will it create an impetus for additional recreational activities in the area.

5.5 POTABLE WATER

5.5.1 Potable Water

The Hawaii County Water Use and Development Plan declares that except for times when there is a large reserve of water in the Waimea System, water from Waimea should be kept for mauka South Kohala use. It should not be relied upon as a source for the coastal areas. The Plan also includes the 10,000 acre Kawaihae Master Planned Community in calculating the estimates of the County system future water supply needs.

Currently there is no County water system or sources to support the Kawaihae Master Planned Community. In fact, the existing water system does not meet minimum County fire protection standards due to inadequate water flow and pressure.

The existing water system for Kaei Hana II Industrial Subdivision consists of an existing 8-inch water main whose source is a 250,000 gallon concrete tank. A 12-inch transmission main from the tank heads west for 4,000 feet to a pressure reducing valve unit at 300 feet elevation. The 6-inch transmission main from the pressure reducing valve follows Kawaihae Road in a northerly direction until the intersection of Akoni Pule Highway, where it connects to an 8-inch main. The 8-inch main continues northward to the Kaei Hana II Industrial Subdivision.

The DWS is currently planning to upgrade approximately 9,000 feet of the existing 6-inch water main to a 12-inch main. The upgrade is planned to start at the Queen Kaahumanu Highway intersection and end in the vicinity of the Kawaihae Small Boat Harbor. The DWS is scheduled to complete construction of the proposed 12-inch water line by the Spring of 2001. Therefore, the upgrade should be completed prior to construction of the proposed 1.0 mg reservoir.

5.5.2 Impacts and Mitigation Measures

The DHHL proposes to construct a 1.0 mg reservoir on the project site in Kawaihae, South Kohala. The proposed reservoir would increase water flow and pressure needed to meet adequate County fire flow standards, for the existing Kaei Hana II Industrial Subdivision. The proposed reservoir would also support further development in the area by meeting future consumer and fire flow demands.

The reservoir's size and location is designed in conformance with the Kawaihae Master Plan to minimize construction related impacts from realignment or relocation of improvements.

The water used to fill the proposed 1.0 mg reservoir will come from the existing water system controlled by DWS. The DWS will determine the adequacy of source, storage and transmission facilities for the proposed reservoir.

5.6 SOLID WASTE

5.6.1 Solid Waste

Solid waste generated in the surrounding area is currently disposed of at the Kealakehe Sanitary Landfill. This landfill is reaching capacity and some of the wastes are trucked to Hilo for disposal. A new solid waste landfill site is being planned for the West Hawaii region. When this new landfill is opened for operation, the solid waste for this area will be disposed of at this site.

5.6.2 Impacts and Mitigation Measures

The proposed 1.0 mg reservoir will be an unmanned facility with periodic visits for maintenance by staff personnel only. Therefore, the proposed reservoir is not anticipated to have significant impacts on the solid waste generation or disposal for the surrounding community.

5.7 POWER AND COMMUNICATION

5.7.1 Power and Communication

Existing off-site power and communication facilities include 69 KV and 12 KV Hawaii Electric Light Company (HELCo.) overhead lines and structures and Hawaiian Telephone Company (HTCo.) Lines that extend from Kawaihae Road and traverses the Kawaihae Master Planned Community area. The closest electrical substation is located at Kohala Estates and the nearest telephone switching station is at Kona Center.

5.7.2 Impacts and Mitigation Measures

Telephone improvements will be required for telemetering operations at the reservoir site. Since the project site is not near any developed area, a telephone line from the reservoir site will need to connect to an existing telephone line along Akoni Pule Highway. Telephone poles and overhead lines will need to be installed along the access road alignment.

Electrical improvements will be required only if chlorination facilities or booster pumps are required. Since the reservoir will be filled by pressurized flow from the existing water system, booster pumps are not anticipated to be required. Electricity will be required to operate chlorination facilities only if they are required by the DWS to mitigate stagnant water in the reservoir. Electricity can be connected to the project site via electrical lines located along Akoni Pule Highway. Overhead electrical lines can be installed on the telephone service poles used for telemetering.

On-site improvements for the utility service will have minimal impact on the environment. Noise, aesthetic considerations, safety hazards, and loading impact will be within normally applied guidelines. The on-site electrical and communication systems will be maintained by the respective service companies.

5.8 EMERGENCY FACILITIES

5.8.1 Police Services

The project site and surrounding area are currently serviced by the Waimea Police Station. The Waimea Police Station service area covers 688 square miles, from Anaehoomalu to the south to Mahukona to the north.

5.8.2 Fire Protection Services

Fire protection and emergency (ambulance) medical services are located near the Mauna Lani Hotel and Waimea. The primary fire protection service for the South Kohala district is provided by the South Kohala station, located eight to nine miles from the project site on Queen Kaahumanu Highway. This station also provides advanced life support ambulance unit services.

5.8.3 Health Care Facilities

Health care facilities in the Kohala area are served by two state-operated hospitals, the Kohala Hospital located in Kapaau in North Kohala and the Kona Hospital in Waimea. The Kona hospital is a "full-service" health care facility. The Lucy Henriques Medical Center is a privately owned, non-profit facility and provides outpatient health services. Honokaa hospital in Honokaa may also be used for health care services.

5.8.4 Impacts and Mitigation Measures

The proposed 1.0 mg reservoir will be an unmanned facility requiring periodic maintenance visits by staff personnel only. The proposed project is not anticipated to influence changes in emergency facilities within Kawaihae community or within the local neighborhood surrounding the site. The proposed reservoir facility will not be an

impetus to increased emergency service requirements or result in any adverse impacts that would disproportionately impact emergency service for the surrounding community.

5.9 SCHOOLS

5.9.1 Schools

The project area is within the Honokaa and Waimea school districts.

5.9.2 Impacts and Mitigation Measures

The proposed project is not anticipated to influence changes in schools or educational facilities within Kawaihae community or within the local neighborhood surrounding the site.

CHAPTER 6
RELATIONSHIP TO LAND USE POLICIES AND CONTROLS OF THE AFFECTED AREA

6.1 OVERVIEW

State and County policy, land use plans and controls are established to guide development in a manner that enhances the overall living environment of Hawaii, and that ensures that long-term social, economic, environmental, and land use needs of the people of Hawaii are met. The use of the site for the proposed development of the 1.0 mg reservoir is in accordance with State and County land use plans and policies, as discussed below.

6.2 STATE OF HAWAII

6.2.1 State Plan

The State Plan, adopted in 1978, consists of three parts:

(1) an overall theme together with broad goals, objectives, and policies;
(2) a system designed to coordinate public planning to implement the goals, objectives, and policies of the State Plan; and,
(3) priority guidelines which are statements of Statewide interrelated problems deserving immediate attention.

Three broad goals in the areas of the economy, the physical environment, and the physical, social and economic well-being of the people express the ideal end-states of the State Plan. Development of the proposed 1.0 mg reservoir supports the State Plan's general objectives and policies in the following areas:

Objective: Economy - Potential Growth Activities: "Planning for the State's economy with regard to potential growth activities shall be directed towards achievement of the

objective of development and expansion of potential growth activities that serve to increase and diversity Hawaii's economic base."

Policy: "Expand Hawaii's capacity to attract and service international programs and activities that generate employment for Hawaii's people."

Policy: "Provide public incentives and encourage private initiative to attract new industries that best support Hawaii's social, economic, physical, and environmental objectives."

Policy: "Foster a broader public recognition and understanding of the potential benefits of new, growth-oriented industry in Hawaii."

Objective: Physical Environment - Land, Air, and Water Quality: Planning for the State's physical environment with regard to land, air, and water quality shall be directed towards achievement of the following objectives.

Policy: "Maintenance and pursuit of improved quality in Hawaii's land, air, and water resources."

Policy: "Promote the proper management of Hawaii's land and water resources."

Policy: "Encourage design and construction practices that enhance the physical qualities of Hawaii's communities."

Objective: Facility Systems - In General: Planning for the State's facility systems in general shall be directed towards achievement of water, transportation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives.

Policy: "Accommodate the needs of Hawaii's people through coordination of facility systems and capital improvement priorities in consonance with State and County plans."

Objective: Facility Systems - Water: Planning for the State's facility systems with regard to water shall be directed towards achievement of the objective of the provision of water to adequately accommodate domestic, agricultural, commercial, industrial, recreational, and other needs within resource capacities.

Policy: "Coordinate development of land use activities with existing and potential water supply."

Policy: "Assist in improving the quality, efficiency, service, and storage capabilities of water systems for domestic and agricultural use."

Policy: "Support water supply services to areas experiencing critical water problems."

The proposed 1.0 mg reservoir will be designed and constructed to support the economic, physical environment and facility system goals of the State Plan. The proposed 1.0 mg reservoir tank is needed to support the approved development of the Kawaihae Master Planned Community, as well as increased flow and pressure of the surrounding existing water system and provide adequate fire protection for the existing Kaei Hana II Industrial Subdivision.

6.2.2 State Functional Plans

The State Functional Plans are intended to provide more detail to the State Plan. They serve to guide State and County actions under specific functional topics of governance. The functional plans relevant to the proposed 1.0 mg reservoir are the State Housing

and Tourism Functional Plans. Applicable objectives and policies from these plans are discussed below:

Housing: To guide the State, the counties, as well as the private sector in meeting the overall goal that every Hawaii resident will have the opportunity to live in a safe, decent and affordable home.

Objective A: "Homeownership for at least sixty percent, or roughly 248,500 households by the year 2000.

Policy A(1): Direct Federal, State and County resources and efforts toward the development of affordable for-sale housing units.

Policy A(3)(a): Ensure the (1) housing projects and (2) projects which impact housing provide a fair share/adequate amount of affordable homeownership opportunities.

Policy A(5): Use alternative approaches in providing affordable housing for sale.

Tourism: Direct planning for the State's economy towards (1) increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawaii's people; and (2) a steadily growing and diversified economic base that is not overly dependent on a few industries.

Objective I.A.: "Development, implementation and maintenance of policies and actions which support the steady and balanced growth of the visitor industry."

Policy I.A.1.: "Identify and ensure a rate of industry growth that is consistent with the social, physical and economic needs of the residents and the preservation of Hawaii's natural environment."

Objective II.A.: "Development and maintenance of well-designed visitor facilities and related developments which are sensitive to the environment, sensitive to neighboring communities and activities, and adequately serviced by infrastructure and support services."

Policy II.A.1: "Maintain high standards of overall quality of existing visitor destination and attraction areas."

The project is consistent with Objectives and policies of the State Housing and Tourism Functional Plans. The proposed 1.0 mg reservoir project is needed to support the approved development of the Kawaihae Master Planned Community as well as, increased flow and pressure of the surrounding existing water system and provide adequate fire protection for the existing Kaei Hana II Industrial Subdivision.

6.2.3 State Land Use Law

The State Land Use Commission classifies all lands in the State of Hawaii into one of four land use designations: Urban, Rural, Agricultural, and Conservation. The proposed reservoir site is located within the State Agricultural District. Hawaiian Home Lands are exempt from land reclassification requirements for homestead development purposes. The proposed project, therefore, will comply with the purpose and intent of the State Land Use Agricultural designation.

6.2.4 State 2010 Master Plan for Kawaihae Harbor

The 2010 Master Plan for Kawaihae Harbor, produced by the State Department of Transportation (DOT), provides a general long-range guide for the State, based on the knowledge and experience of users of the facilities and their anticipation of future

trends. The Master Plan recognizes DHHL's plans for the Kawaihae Master Planned Community as was described in the May 1986 plans: "...plans for this area include the development of residential and farm homesteads, industrial, recreational, and commercial uses..."

There will be close coordination between DHHL and DOT in the planning and development of the proposed 1.0 mg reservoir within the project area to assure maximum economic benefit and minimal disruption to the existing infrastructure systems in the vicinity.

6.2.5 Hawaii County Water Use and Development Plan

Hawaii's state constitution mandates that the State has an obligation to protect, control, and regulate the use of Hawaii's water resources for the benefit of its people. To meet this mandate, a State Water Code was established by Act 45, Session of Laws of Hawaii 1987, now codified as Chapter 174C, Hawaii Revised Statutes. The Code calls for a six member Commission on Water Resources Management to set policies governing water quality, use and conservation for the State of Hawaii.

The Code also requires the development of a Hawaii Water Plan to serve as a long-range guide for water resources management. This Hawaii County Water Use and Development Plan (WUDP) is one of four county components of the Hawaii State Water Plan. The purpose of the WUDP is to meet a requirement of the Water Code and to aid the Commission on Water Resource Management in granting permits for water use and designing water management areas.

The Hawaii County WUDP identifies the need for additional water in the South Kohala district in order to provide water for Hawaiian Home Land farm and ranch lots. The WUDP states that the upper region of South Kohala, in and around Waimea, is also expected to see rapid growth.

As described in the WUDP, the coastal region of the South Kohala district is seen as the focal point of resort hotel and condominium projects, as well as a blossoming community. The mauka areas are required to rely on high level water supplies, primarily from the Kohala Mountain streams or more reliable sources to meet future needs. The WUDP identifies the DHHL Kawaihae Master Plan development and its requirements for 2.23 mgd. The proposed 1.0 mg reservoir is a part of the identified and approved Kawaihae Master Planned Community.

6.2.6 West Hawaii Regional Plan

The West Hawaii Regional Plan includes the districts of North Kohala, South Kohala and North Kona. The goals of the State's Plan are:

- to coordinate State activities in the region in order to respond more effectively to emerging needs and critical problems;
- to address areas of State concern;
- to coordinate the Capitol Improvements Program within a regional planning framework;
- to provide guidance in State land use decision-making processes.

The West Hawaii Regional Plan relates to the reservoir project in the following ways:

- Indicates the development of a government-assisted support community at Kawaihae.
- Indicates the development of secondary support community at Waimea.
- Identifies the need for additional water sources to supply the support communities associated with resort development.

The proposed 1.0 mg reservoir is a part of the Kawaihae Master Plan which implements the recommendation of the West Hawaii Regional Plan to: implement DHHL programs, assess in a comprehensive manner, the land requirements of the State agencies and other users of State lands; evaluate the short-term and long-term impacts of a particular use; and introduce predictability to the land disposition process.

6.3 COUNTY OF HAWAII

6.3.1 Hawaii County General Plan

On the County of Hawaii's General Plan Land Use Pattern Allocation Guide Map, the project site is located in an area designated as Urban Expansion. The General Plan defines the Urban Expansion area as an area which allows for a mix of high density, medium density, low density, industrial and/or open designations in areas where new settlements may be desirable, but where the specific settlement pattern and mix of uses have not yet been determined. This designation can be found within areas designated for resort development. The proposed 1.0 mg reservoir is a part of the Kawaihae Master Planned Community of this area and is therefore consistent with the urban expansion designation.

6.3.2 Kawaihae Development Plan

The proposed reservoir is a part of the Kawaihae master plan community, which is one of the first developments to implement the Kawaihae Development Plan (DP). The Kawaihae master plan implements the DP by providing urban expansion of the Kawaihae Ahupuaa.

6.3.3 Special Management Area and Coastal Zone Management

Special controls on development in coastal areas are established to avoid the permanent loss of valuable coastal resources and the foreclosure of management options. Special Management Area (SMA) boundaries are set by the County to delineate coastal zone areas subject to such controls.

Project parcels inside the SMA zone include **TMK: 6-1-06: (portions) 04, 05, 06, & 07** which are crossed by segments of the access road, and influent and effluent water lines. The reservoir site on **TMK: 6-1-01: 03** is outside of the SMA zone. (See **Appendix E**, letter from County of Hawaii Planning Department dated August 31, 2000.)

The State of Hawaii designates a Coastal Zone Management program to manage the intent, purpose and provisions of Chapter 205A-2 of the Hawaii Revised Statutes (HRS), as amended, and federal regulations for the areas from the shoreline to the seaward limit of the State's jurisdiction and any other area which a lead agency may designate for the purpose of administering the Coastal Zone Management program.

However, the State Department of the Attorney General has determined that according to the state constitution and the Hawaiian Homes Commission Act (1920), Hawaiian home lands are not subject to County land use regulations and SMA rules. Furthermore, in the coastal zone, the control of Hawaiian home lands have not been preempted by the State Coastal Management Act, which is the enabling legislation for the County's SMA rules. All of the project lands are under the ownership and jurisdiction of DHHL, therefore the proposed project is exempt from SMA permit requirements.

Nevertheless, the proposed 1.0 mg reservoir does conform to the Coastal Zone Management Program Objectives and Policies of Chapter 205A, HRS:

1. *Recreational Resources*

The Coastal Zone Management (CZM) recreational resources objectives and policies are focused on governmental responsibility to provide coordination and funding for coastal recreational opportunities and to provide accessible and diverse recreational opportunities in the coastal zone management area.

There are no coastal recreational facilities in the proposed project site. The proposed project will not encroach upon, obstruct access to, or otherwise adversely impact any coastal recreational resources. Therefore the project is consistent with the recreational resources objectives and policies of the CZM program.

2. *Historic Resources*

The CZM historic resources objectives and policies provide for the protection of significant archaeological and historic resources through the preservation or through information retention.

The project site is a vacant lot with no known architectural or other features of historical significance. An extensive archaeological reconnaissance survey was preformed in October 2000 for the preparation of the Draft EA. (**See Appendix B.**) Based on the findings of the survey, the proposed access road and influent line have been realigned to avoid all known archaeological sites. No archaeological sites were found within the 1.0 MG reservoir tank pad site.

Additionally, a Native Rights Assessment was prepared in March 2001 for the Final EA. Interviews were conducted with local residents of Kawaihae who possess personal knowledge of the historic and traditional practices in the project area and surrounding regions. (See **Appendix C.**) The interviews did not reveal any new information regarding the project area or archaeological sites and features, and no cultural practices were identified within the proposed project area.

No adverse impacts to cultural, historic, or archaeological resources are anticipated from the proposed development of the 1.0 MG reservoir. Therefore the proposed development is consistent with the Historic Resources objectives and policies of the CZM program.

3. *Scenic and Open Space Resources*

The CZM scenic and open space resources objectives and policies provide for the protection of important coastal scenic and open space resources. The proposed 1.0 MG reservoir site will be visible from Akoni Pule Highway approximately ¼ mile to the southeast. The site and adjacent areas offer panoramic views of the South Kohala and North Kona coast.

The reservoir facility will be designed to minimize the visual impacts on the existing industrial subdivision and future master planned community. Landscaping will be provided for shade and aesthetics. All landscaping and the new roadway and structures will be designed and constructed according to the Codes Covenants and Restrictions (CC&R) of the land.

The proposed reservoir is located within the master planned Kawaihae community. By locating within the planned community, the reservoir will minimizes the alteration of undeveloped coastal lands, natural land forms, and existing public views to and along the shoreline. Therefore the proposed development is consistent with the Scenic and Open Space Resources objectives and policies of the CZM program.

4. Coastal Ecosystems

The coastal ecosystem objectives and policies call for the protection of valuable coastal ecosystems from disruption and to minimize adverse effects. The proposed reservoir facility is not located along the coastline and is not anticipated to impact coastal ecosystems. The objectives to protect the coastal ecosystems will be fulfilled by complying with water quality permits and conditions designated to protect coastal water quality. DHHL will further require that all contractors do the same. Therefore the proposed development is consistent with the Coastal Ecosystems objectives and policies of the CZM Program.

5. Economic Uses

Economic uses objectives and policies are intended to ensure that coastal dependent developments are appropriately planned and developed. The proposed 1.0 MG reservoir is a part of the support utilities for the Kawaihae master planned community. The proposed reservoir will increase the flow and pressure for the existing Kaei Hana II Industrial Subdivision, south of the project site. The proposed reservoir would also be able to support further development in the area by meeting future consumer and fire flow demands. By supporting existing and future community development the proposed

reservoir will increase the economic potential of the Kawaihae area as well as entire county. Therefore the proposed development is consistent with the Economic Uses objectives and policies of the CZM Program.

6. *Coastal Hazards*

The coastal hazard objectives and policies are intended to minimize impacts to life and property along shoreline. The area is located outside the 500-year flood plain. The project is not anticipated to have any adverse effects on the existing shoreline system. No special consideration relative to tsunami inundation or flooding is necessary because the project does not alter the configuration of the shoreline of the site. Therefore, proposed development is consistent with the Coastal Hazards objectives and policies of the CZM Program.

7. *Managing Development*

The managing development objectives and policies are related to improving the development review process, communication, and public participation in the management of coastal resources and hazards. The applicant, DHHL is processing an environmental assessment (EA), as well as various other permits, requiring assessment of potential short and long-term project-related impacts. Therefore, the proposed development is consistent with the Public Participation objectives and policies of the CZM Program.

8. *Public Participation*

The public participation objectives and policies are intended to stimulate public awareness, education, and participation in coastal management. The proposed project will be processed by DHHL through the EA public comment period as well as the SMA public hearing. Therefore the proposed development is consistent with the Public Participation objectives and policies of the CZM Program.

9. Beach Protection

The beach protection objectives and policies are intended to protect beaches for public use and recreation. The project site is located approximately 2,250 feet mauka of the shoreline and does not contain any beach front land. All structures will be situated away from shoreline area and will not impact any beach resources. Therefore the proposed development is consistent with the Beach Protection objectives and policies of the CZM Program.

10. Marine Resources

The marine resources objectives and policies are intended to protect marine resources. The proposed site is located approximately 2,250 feet mauka of the shoreline and is not anticipated to negatively impact marine resources. The project will be designed and constructed in accordance with the State and County guidelines for new water systems. Therefore the project is consistent with the Marine Resources objectives and policies of the CZM Program.

6.3.4 Zoning

The reservoir site is in the County of Hawaii Agriculture (A-40a) zoning district. The 1.0 mg reservoir facility is considered a public use and structure, and therefore is permitted in this Agriculture district. According to the County Planning Department, no land use permits will be required to allow the establishment of the proposed reservoir facility within the project site. A Plan Approval will be obtained prior to securing a building permit for the construction of the proposed reservoir facility. This review will ensure that the proposed facility complies with all of the requirements of the Zoning Code.

CHAPTER 7

NECESSARY PERMITS AND APPROVALS

7.1 STATE OF HAWAII

7.1.1 Department of Health (DOH)

NPDES - NOI for Hydrotesting Waters

NPDES - NOI for Storm Water Associates with Construction Activities

7.2 COUNTY OF HAWAII

7.2.1 Department of Public Works

Building Permit

Grading Permit

Plan Approval

CHAPTER 8

ORGANIZATIONS AND AGENCIES CONSULTED DURING DEA 30-DAY COMMENT PERIOD

8.1 FEDERAL

US Army Corps of Engineers

8.2 STATE AGENCIES

Department of Accounting and General Services

Department of Agriculture

Department of Business Economic Development &Tourism

- Office of Planning, Coastal Zone Management Program

Department of Health

- Environmental Planning
- Office of Environmental Quality Control

Department of Housing Community Development Corporation of Hawaii

Department of Land and Natural Resources

- Land Management Division
- State Historic Preservation Division

Department of Transportation

University of Hawaii

- UHM Environmental Center
- UHM Water Resources Research Center

8.3 COUNTY OF HAWAII

Department of Public Works

Department of Water Supply

County Fire Department

County Police Department

Planning Department

Thelma Parker Memorial Public School & Library

8.4 PRIVATE ORGANIZATIONS

Kawaihae Hawaiian Homes Homeowners Community Association

Jojo Tanimoto, President

Kawaihae Homestead Association

Stewart Dela Cruz, President

Hawaiian Telephone Company

Hawaii Electric Light Company

8.5 ELECTED OFFICIALS

Mayor's Office

CHAPTER 9
DETERMINATION

9.1 OVERVIEW

In accordance with the provisions set forth in Chapter 343, Hawaii Revised Statutes, and in Section 11-200-12 of Title 11, Chapter 200, Hawaii Administrative Rules (HAR), the proposed 1.0 mg reservoir facility has been assessed for short- and long-term and cumulative effects on the environment.

9.2 SIGNIFICANCE CRITERIA

Significance criteria set forth in Section 11-200-12 of Title 11, Chapter 200 HAR were used to evaluate the potential impacts of the proposed project on the environment. The thirteen criteria are listed below along with a brief discussion.

Criteria 1. Involves an irrevocable commitment to loss or destruction of any natural or cultural resource;

According to an assessment of flora and fauna resources at and near the project area, the presence of natural rare and endangered resources are not found within the project site. None of the plant species that would be affected by construction activities are rare or endangered. Because the property is not known to contain any rare or endangered animals, impacts on rare or endangered species are not expected. The relatively dry climate and sparse vegetation in the area does not provide good habitat for the rare animals known to exist in the nearby forest.

An archaeological assessment was prepared for the proposed project in October 2000. (Appendix B, Archaeology - Cultural Surveys Hawaii). Field reconnaissance conducted for this report detected no archaeological sites within the proposed 1.0 mg reservoir project site. However, several significant archaeological features are located at lower (100 to 200 foot) elevations in the area originally proposed for construction of the water tank access road and water influent line.

Due to the identification of archaeological resources within the general project area, the proposed access road and 6-inch influent line to the water tank have been realigned to avoid significant archaeological features. Based on the findings of the archaeological field reconnaissance, the new road and waterline alignment will avoid all known archaeological sites.

Criteria 2. Curtails the range of beneficial uses of the environment;

The proposed project site is located on a vacant parcel of land. The site is currently unused with sparse amounts of vegetation. Development of the site will not displace any structures or activities and will not detract from the function or use of the environment.

Criteria 3. Conflicts with the State's long-term environmental policies or goals and guidelines as expressed in chapter 344, HRS;

The project proposal has been prepared according to State and County guidelines, plans, and policies and has been found to be in compliance with all relevant provisions.

Criteria 4. Substantially affects the economic or social welfare of the community or State;

The proposed 1.0 mg reservoir facility is expected to have a beneficial effect on the economic and social welfare of the Kawaihae and Waimea community. The facility is proposed to support the approved development of Kawaihae community as well as increase flow and pressure of the surrounding water system and provide adequate fire protection for the existing Kaei Hana II Industrial Subdivision. No adverse affects to the economic or social welfare of the community or State are anticipated from the development of the proposed facility.

Criteria 5. Substantially affects the public health;

Factors affecting public health, including air quality, water quality, and noise levels, were assessed and determined to be only minimally affected or unaffected by the

construction and development of the proposed 1.0 mg reservoir facility. Appropriate mitigation measures for short-term and long-term impacts to noise levels, air quality, and water quality will be followed by the project applicant.

Criteria 6. Involves substantial secondary impacts, such as population changes or effects on public facilities;

Development of the proposed project is a part of the approved Kawaihae Master Planned Community and therefore will have secondary impacts to the natural and built environment, and to the social and economic community. The proposed project however, will not stimulate unexpected change in the population, but will accommodate the current and future needs of the local population as approved by the County. The proposed 1.0 mg reservoir facility will utilize and improve existing public facilities, including area streets and utilities, but will not place significant additional burden on those facilities.

Criteria 7. Involves a substantial degradation of environmental quality;

Analysis of air and water quality, noise levels, and land use associated with the construction and use of the 1.0 mg reservoir facility has determined that the proposed project will not substantially degrade environmental quality.

Criteria 8. Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions;

The proposed project is being developed in accordance with the State Plan and the State Housing and Tourism Functional Plans. The proposed reservoir facility is a component of the State's commitment to assure the availability of affordable homes and maintain high standard of quality for visitor destinations.

Criteria 9. Substantially affects a rare, threatened, or endangered species, or its habitat;

Site visits have identified no species that are listed as rare, threatened, or endangered by the State or Federal government. Historic agricultural activities and intensive modifications in the project area have long since replaced native habitat.

Criteria 10. Detrimentally affects air or water quality or ambient noise levels;

Short-term impacts to air quality and ambient noise levels will result from construction activities, however these effects would be minimal and would cease when construction is complete. No sources of surface water occur in the project area. No detrimental long-term effects to these environmental measures are anticipated from development of the project.

Criteria 11. Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters;

The project site is located inland from any coastal waters within an area determined by the Federal Emergency Management Agency to be outside of the 500-year flood zone. All structures proposed for this project will be built according to standards for Seismic Zone 4, as established by the Uniform Building Code. The project is not likely to affect or suffer damage from natural forces.

Criteria 12. Substantially affects scenic vistas and view planes identified in County or State plans or studies;

The project site is not located within any scenic vista or view plane identified in County or State Plans. The proposed 1.0 mg reservoir facility is designed to blend into the surrounding landscape and single-family dwellings. Visual impacts associated with construction activities will be temporary.

Criteria 13. Requires substantial energy consumption.

Construction activities associated with the 1.0 mg reservoir facility would require high, short-term energy use, however, daily operations of the proposed facility would not result in a substantial burden to the available power supply. Coordination with the Hawaii Electric Light Company will be made should electrical service be necessary to serve this project. The facility will be designed to maximize the natural daylight and tradewinds of the area by using architectural styles and building surfaces that improve radiant and/or insulation with minimal intrusion on the surrounding area.

9.3 FINDINGS

In accordance with the provisions set forth in Chapter 343, Hawaii Revised Statutes, and the significance criteria in Section 12 of Title 11, Chapter 200, this assessment has determined that the project will have no significant adverse impact to water quality, air quality, existing utilities, noise levels, social welfare, archaeological sites, or wildlife habitat. All anticipated impacts will be temporary and will not adversely impact the environmental quality of the area.

REFERENCES

Department of Research and Development, County of Hawaii (1997) *1997 County of Hawaii Data Book*, Hilo, Hawaii.

Cultural Surveys Hawaii, (Revised June 1991), *Documents Relating to the Cultural Surveys Hawaii's Inventory of Hawaiian Home Lands at Kawaihae Excluded from the Main Body of the Report*, Honolulu, Hawaii.

Cultural Surveys Hawaii, (March 2001), *A Native Rights Assessment for Proposed Water Line Corridors and a Reservoir Site in the Ahupua'a of Kawaihae 1, South Kohala District, Island of Hawaii,* Honolulu, Hawaii.

State of Hawaii, Department of Business, Economic Development & Tourism (DBEDT) (1996) *The State of Hawaii Data Book, 1996.* Honolulu, Hawaii.

University of Hawaii, Department of Geography (1983) *Atlas of Hawaii* (2nd Edition), University of Hawaii Press, Honolulu, Hawaii.

U.S. Department of Agriculture, Soil Conservation Service (1972) *Soil Survey of the Island of Hawaii, State of Hawaii*, with University of Hawaii Agricultural Experiment Station, Honolulu, Hawaii.

State of Hawaii, Department of Hawaiian Home Lands, (1992), *Kawaihae Master Plan*, Honolulu, Hawaii.

State of Hawaii, Department of Hawaiian Home Lands, December 1992, *Kawaihae 10-Year Master Plan, Environmental Impact Statement*, Honolulu, Hawaii.

State of Hawaii, Department of Hawaiian Home Lands, February 1999, *Kawaihae 1.0 Million Gallon Tank - Water System Study, Honolulu, Hawaii.*

State of Hawaii, DLNR Commission on Water Resource Management, *Hawaii County Water Use and Development Plan*, (Plan Revision Draft 1991), Honolulu, Hawaii.

APPENDIX A

WATER SYSTEM STUDY, FINAL

FINAL

KAWAIHAE 1.0 MILLION GALLON TANK WATER SYSTEM STUDY

TMK: 6-1-01 & 06

Prepared For:
State of Hawaii
Department of Hawaiian Home Lands
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February 1999

TABLE OF CONTENTS

1. INTRODUCTION

The State of Hawaii Department of Hawaiian Home Lands (DHHL) plans to construct a 1.0 million gallon reservoir in Kawaihae, South Kohala, Hawaii as part of the Kawaihae Master Plan dated December 1992. The reservoir, a concrete tank, would be located about ¼ mile above the Kaei Hana II Industrial Subdivision. This area is currently undeveloped. Therefore, an access road and water distribution line would need to be constructed to connect influent and effluent lines from the reservoir to the existing water system. The proposed reservoir would increase the flow and pressure of the surrounding existing water system, and provide adequate fire protection for the existing Kaei Hana II Industrial Subdivision. The proposed reservoir would also be able to support further development in the area by meeting future consumer and fire flow demands.

2. EXISTING WATER SYSTEM

2.1 LAYOUT

The existing water system is shown in Figure 1. The Kaei Hana II Industrial Subdivision is currently served by an 8-inch transmission main whose source is a 250,000 gallon concrete tank. The source tank has a spillway elevation of 596 feet and a bottom elevation of 580 feet. A 12-inch transmission main from the tank heads west for 4,000 feet to a pressure reducing valve unit at elevation 300 with a static pressure of 30 psi. The 6-inch transmission main from the pressure reducing valve follows Kawaihae Road in a northerly direction until the intersection of Akoni Pule Highway, where it connects to an 8-inch main. The 8-inch main continues northward to the Kaei Hana II Industrial Subdivision.

2.2 IMPROVEMENTS

The Department of Water Supply (DWS) is currently planning to upgrade approximately 9,000 feet of the existing 6-inch water main to a 12-inch main. The upgrade is planned to start at the Queen Kaahumanu Highway intersection and end in the vicinity of the Kawaihae Small Boat Harbor. The Department of Water Supply is scheduled to complete construction of the proposed 12-inch water line by the end of 1999. Therefore, the upgrade should be completed prior to construction of the 1.0 million gallon Kawaihae reservoir.

2.3 WATER SYSTEM ANALYSIS

The existing water system was analyzed to determine if county requirements for fire flow and peak hour demands at the Kaei Hana II Industrial Subdivision could be met. Figure 2 shows a schematic layout of the existing water system.

2.3.1 CRITERA

The following criteria from the Department of Water Supply was used to analyze the existing water system:

- Maximum Daily Demand = 1.5 x Average Day.
- Peak Hour = 5 x Average Day.
- Fire Demand = Fire Flow + Max. Daily Demand with residual pressure of 20 psi.
- Peak Hour Demand = Peak hour flow with residual pressure of 40 psi.

2.3.2 WATER SYSTEM DATA

After meeting with the Department of Water Supply in August 1998, the following information was provided regarding the existing water system demands for the Kaei Hana II Industrial Subdivision and surrounding areas:

- Average Daily Demand is 56.6 gpm.
- Peak Hour Flow is 283 gpm.
- Maximum Daily Demand is 85 gpm.
- Pressure at Node 1 is 30 psi.

2.3.3 PEAK HOUR FLOW ANALYSIS

The peak hour flow results are shown in Figure 2 and Table 1. The existing system is capable of meeting the peak hour flow of 283 gpm with a residual pressure of 61 psi at the Kaei Hana II Industrial Subdivision. Since the residual pressure is greater than the required minimum 40 psi required, the existing water system is adequate to meet the peak hour demand.

2.3.4 FIRE FLOW ANALYSIS

The fire flow results are shown in Figure 2 and Table 2. The fire hydrants located in the existing Kaei Hana II Industrial Subdivision are spaced adequately. However, the water pressure is not adequate for fire protection. The required fire flow demand is 2,085 gpm with a minimum residual pressure of 20 psi. The analysis of the existing water system at the required flow resulted in a residual pressure at the subdivision of (–)1,001.4 psi. The water pressure in the existing system needs to be increased to meet the required fire flow demand.

3. PROPOSED 1.0 MG RESERVOIR

3.1 SITE

The spillway elevation of the proposed reservoir was set at an elevation of 310 feet. The spillway elevation was determined by the overall hydraulics of the County's water system and discussions with the Department of Water Supply in August 1998. Since a 1.0 million gallon reservoir has a maximum depth of 20 feet, the bottom elevation of the reservoir will be at elevation 290 feet. The site for the reservoir was chosen based on the 10-year development plan of the Kawaihae Master Plan. The water master plan located a water tank above the Kaei Hana II Industrial Subdivision. Based on the water master plan and the bottom elevation of the reservoir at 290 feet, a location was chosen about 1,600 feet above the existing Kaei Hana II Industrial Subdivision (See Figure 3).

3.2 ACCESS ROAD

A road from Akoni Pule Highway needs to be constructed to access the reservoir site. The proposed access road will be about 3,200 feet long and follow the horizontal roadway master plan alignment of a future major arterial. The average road slope would be about 8%. The road will be 12 feet wide and have 2 feet shoulders with 2 horizontal to 1 vertical fill slopes and 1.5 horizontal:1 vertical cut slopes (See Figure 4). The temporary access road (until the major arterial is constructed) will consist of a 6-inch layer of soil cement. The temporary soil cement access road is subject to DWS approval since a standard DWS access road is usually asphaltic concrete. Therefore, if the soil cement road is not approved by DWS, an asphaltic concrete road will need to be constructed.

3.3 RESERVOIR STORAGE TANK

The proposed reservoir storage tank will have a 1.0 million gallon capacity. It will be a 94 foot diameter (inside wall) concrete tank with a 20 foot maximum water depth. The reservoir will be constructed in accordance with the Department of Water Supply standard details for a 1.0 million gallon reservoir.

3.3.1 RESERVOIR INFLUENT WATER MAIN

About 1,500 feet north of the intersection of the intersection of Akoni Pule Highway and Kawaihae Road, the 6-inch influent water main will be connected to the existing 8-inch water line (See Figure 5). A valve will be installed on the north side of this connection and will remain closed indefinitely. The valve will be closed after the effluent line from the reservoir is integrated into the existing water system, maintaining one pressure zone for the existing water line north of the connection. The influent water main will follow the access road alignment to the reservoir. About 3,200 feet of 6-inch water line is required to connect the reservoir to the existing 8-inch water line on Akoni Pule Highway.

3.3.2 INFLUENT WATER MAIN SIZE

The reservoir influent pipe size is based on the amount of residual pressure provided at the reservoir. An analysis of the existing water system was used to determine the residual pressure at the reservoir. The reservoir will draw about 200 gpm from the existing water system. A low "fill" rate was used to minimize friction loss in the pipe. The influent water main will be sized based on two criterions:

- Provide adequate residual pressure at the reservoir to keep it filled.
- Avoid the use of an in-line pump if possible to minimize maintenance costs.

There are two scenarios to consider for this analysis:

- Scenario A is based on the existing 6-inch transmission main (See Figure 6).
- Scenario B is based on the 12-inch upgrade of the existing 6-inch transmission line (See Figure 7).

Tables 3 and 4 show the results of the analysis based on these two scenarios.

In order to determine residual pressures at various nodes within the existing and proposed water system, the following water demands were used:

- The maximum daily demand for the industrial subdivision is 85 gpm.
- The reservoir demand is 200 gpm.

In Scenario A, the residual pressure at the reservoir is (–)22.2 psi. The negative pressure indicates that a pump would be required to push water into the proposed reservoir. In Scenario B, the residual pressure at the reservoir is 22.9 psi. This pressure amounts to approximately 50 vertical feet of water. Since the water depth in the reservoir will not exceed 20 feet, this pressure should be adequate.

3.3.3 EFFLUENT WATER MAIN

The existing water system servicing the Kaei Hana II Industrial Subdivision is currently inadequate. However, connection of a proposed 12-inch water main from the proposed reservoir to the existing water system (See Figure 5) will bring the industrial subdivision to County of Hawaii standards. About 2,500 linear feet of effluent line is required to connect the proposed reservoir to the existing 8-inch water line in the Kaei Hana II

Industrial Subdivision (See Figure 8). Based on a 12-inch effluent water line size, the residual pressure at the industrial subdivision would be 72.1 psi (elevation 110 feet) at a fire flow demand of 2085 gpm. If the industrial subdivision is fully developed, the maximum fire hydrant elevation can not exceed the elevation of 200 feet. At this elevation, the residual fire flow pressure would be about 48 psi. These flows and residual pressures are greater than the minimum requirement of 20 psi at 2000 gpm.

The horizontal alignment of the 12-inch effluent water main (See Figure 5) was based on the location of future roadways shown in the Kawaihae Master Plan. The effluent line will follow the access road from the proposed reservoir site for approximately 1000 feet. Then, the 12-inch effluent main will head west along the south edge of the Kaei Hana II Industrial Subdivision. At the bottom of the subdivision, the 12-inch main will connect to an existing 8-inch water main.

To control high water velocities during a fire, an 8-inch water main should be connected to the 12-inch effluent water main at about elevation 160 feet. This water main will be used to service the future development of the industrial subdivision. Approximately 610 feet of 8-inch water main will be required to keep the fire flow velocity below 10 feet per second. The alignment of the water line should be looped through the undeveloped portion of the subdivision and should not go below the 160 feet elevation.

3.3.4 SUMMARY OF WATER SYSTEM IMPROVEMENTS

In summary, construction of a 1.0 million gallon reservoir and improvements below are required to bring the existing Kaei Hana II Industrial Subdivision water system up to County Standards for fire protection. The following improvements are recommended:

- 3,200 feet of 6-inch pipe for the influent water line.
- 2,500 feet of 12-inch pipe for the effluent water line.
- 610 feet of 8-inch pipe for future development of the industrial subdivision.
- 1.0 million gallon reservoir.
- 3,200 feet access road to reservoir.

The above recommended water system improvements are based on the County of Hawaii's planned upgrade of the existing 6-inch water main along Kawaihae Road to a 12-inch water line.

4. ADDITIONAL LAND DEVELOPMENT

The proposed reservoir and other improvements recommended in section 3.3.4, Summary of Water System Improvements, will provide additional capacity to the water system surrounding the Kaei Hana II Industrial Subdivision. Surplus water can be used to develop land in the industrial subdivision. The Kawaihae Master Plan calls for the Kaei Hana II Industrial Subdivision to be 63 acres of light industry. Currently, about one-third of the area has been developed for light industry.

The proposed water system was analyzed to determine if the reservoir could support 63 acres of light industrial use. The average daily water demand for light industry is projected to be about 4,000 gallons per day. The residual pressures at node 5 (elevation 110 feet, low point of the subdivision) and node 6 (elevation 230 feet, high point of the subdivision) resulting from fire flow demand are 67.4 psi and 24.3 psi respectively. Since both of these residual pressures are greater than 20 psi, the water system is able to support the complete development of the 63 acres of the Kaei Hana II Industrial Subdivision.

4.1 WATER COMMITMENT

The existing water system will only be able to support an additional 42 acres of development in the Kaei Hana II Industrial Subdivision if the 1.0 million-gallon reservoir is constructed. The water used to fill this reservoir would come from the existing water system controlled by the Department of Water Supply. The Department of Water Supply has not determined whether there will be a water commitment for the additional development. The Department of Water Supply normally determines water commitments based on land use and compliance with County standards. Since the Department of Hawaiian Home Lands can exempt itself from County standards, there should not be a problem securing a water commitment for this project. The final decision on water commitment will be made as the area is developed on a first come first serve basis.

5. TELEPHONE/ELECTRICAL IMPROVEMENTS

Telephone improvements will be required for telemetering operations at the reservoir site. Since the proposed reservoir site is not near any developed area, a telephone line from the reservoir site will need to connect to an existing telephone line along Akoni Pule Highway. Telephone poles and overhead lines will need to be installed along the access road alignment. The telemetering equipment can be mounted outdoors and will not require any special housing.

Electrical improvements are only required if chlorination facilities or booster pumps will be required. Since the reservoir will be filled by pressurized flow from the existing water system, booster pumps will not be required. Electricity will be required to operate chlorination facilities if they are required by the Department of Water Supply due to stagnant water in the reservoir. Electricity can be connected to the reservoir site via electrical lines located along Akoni Pule Highway. Overhead electrical lines can be installed on the telephone poles used for telemetering.

6. CHLORINATION

Chlorination may be avoided by controlling the water level in the reservoir. The depth of water in the reservoir can be set so as to ensure circulation of water within the tank. The water depth would be based on the amount of water being used by the industrial subdivision. As more of the area is developed, the water level in the reservoir can be adjusted accordingly. As long as the water is continuously being used, stagnation will not occur and chlorination of the water will not be required. During the design phase of

this project, the engineering consultant will coordinate the water depth with the Department of Water Supply to avoid stagnation. However, the Department of Water Supply reserves the right to implement chlorination if they determine that it is necessary.

7. ESTIMATED CONSTRUCTION COSTS

The construction of the 1.0 million gallon reservoir involves four main components:

- Access road
- Reservoir tank and site
- Water distribution system
- Telephone work

Two scenarios will be considered for this project. Case 1 includes the four minimum components listed above that are required to construct the reservoir. Case 2 includes the components from Case 1 plus a chlorination facility, electrical improvements, and an asphaltic concrete access road. The total estimated construction costs for Case 1 is $3,010,000. The total estimated construction costs for Case 2 is $3,440,000. A breakdown of these costs is shown in Tables 5 and 6.

8. DWS APPROVAL/ACCEPTANCE

The Department of Water Supply (DWS) and the Fire Department have reviewed this study and accepted it. The next stage of this project is the design phase. During this phase, the proposed reservoir will be designed in accordance with the standards of the DWS and the Fire Department. These two agencies will review and comment on the design plans for the reservoir to ensure compliance with their standards. According to

the DWS, review by the State Commission on Water Resource Management will not be required.

9. REQUIRED PERMITS/APPROVALS/DOCUMENTS

The following permits, approvals, and documents will be required to complete the construction of the reservoir:

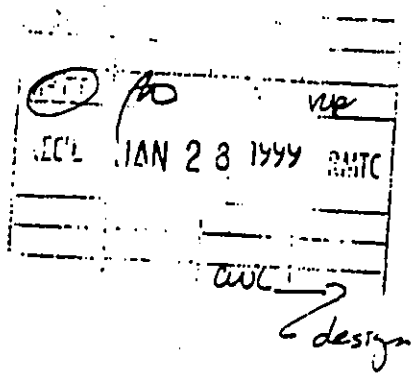
AGENCY	PERMIT/APPROVAL	REASON NEEDED
State Department of Health	NPDES – NOI	Hydrotesting, discharge of chlorinated water
County of Hawaii, DPW	Approval of construction plans	County compliance
County of Hawaii, DWS	Approval of construction plans	Reservoir and water system will be dedicated to DWS
County of Hawaii, Planning	Environmental Assessment/ Construction Plans	Use of public funds

Construction of the access road will require easements in favor of the Department of Water Supply since it will cross through the Department of Hawaiian Home Lands property. Easement and subdivision maps will need to be prepared to show the location of the easements.

1. "Water System Standards, Volume 1," State of Hawaii, 1985.
2. "Kawaihae Master Plan, Kawaihae, South Kohala, Hawaii," Department of Hawaiian Home Lands, December 1992.
3. Discussion with Department of Water Supply, August 1998.
4. Discussion and verbal approval with Mr. Richard Kihara of the County of Hawaii Fire Department, February 12, 1999.
5. Letter from the Department of Water Supply, January 26, 1999, attached.

DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAII
25 AUPUNI STREET • HILO, HAWAII 96720
TELEPHONE (808) 961-8660 • FAX (808) 961-8657

January 26, 1999



Mr. Craig Luke
R.M. Towill Corporation
420 Waiakamilo Road, Suite 411
Honolulu, HI 96817-4941

WATER SYSTEM STUDY - KAWAIHAE 1.0-MILLION GALLON TANK
TAX MAP KEY: 6-1-001 AND 006

We have no further comments to offer regarding the study.

Construction plans for the proposed improvements shall be submitted to the Department of Water Supply for review, comment, and approval. The Department reserves the right to make modifications to the conceptual design outlined in the study during the plan review process.

If you have any questions, please contact Mr. Keith Okamoto of our Engineering Division at 961-8660.

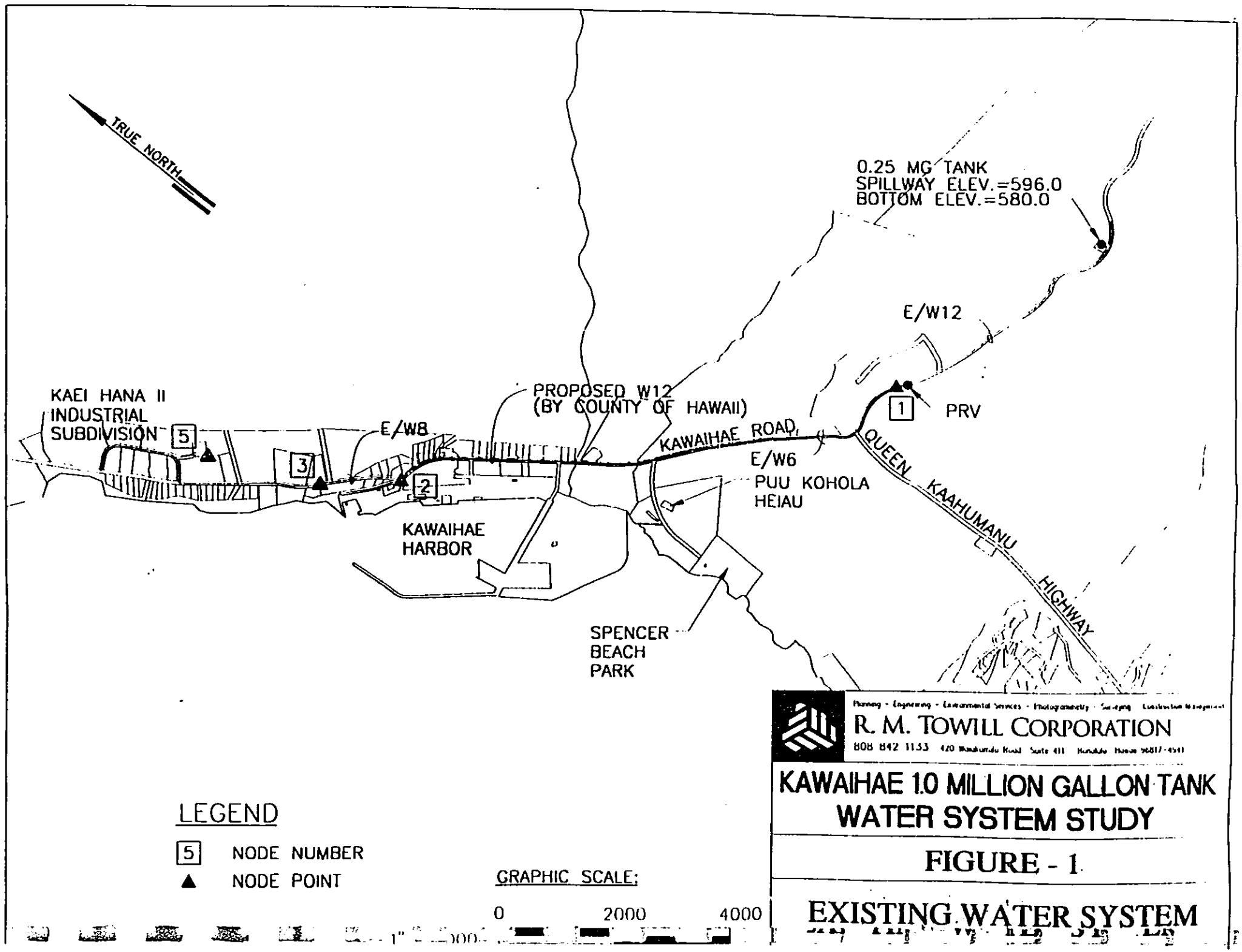
Milton D. Pavao, P.E.
Manager

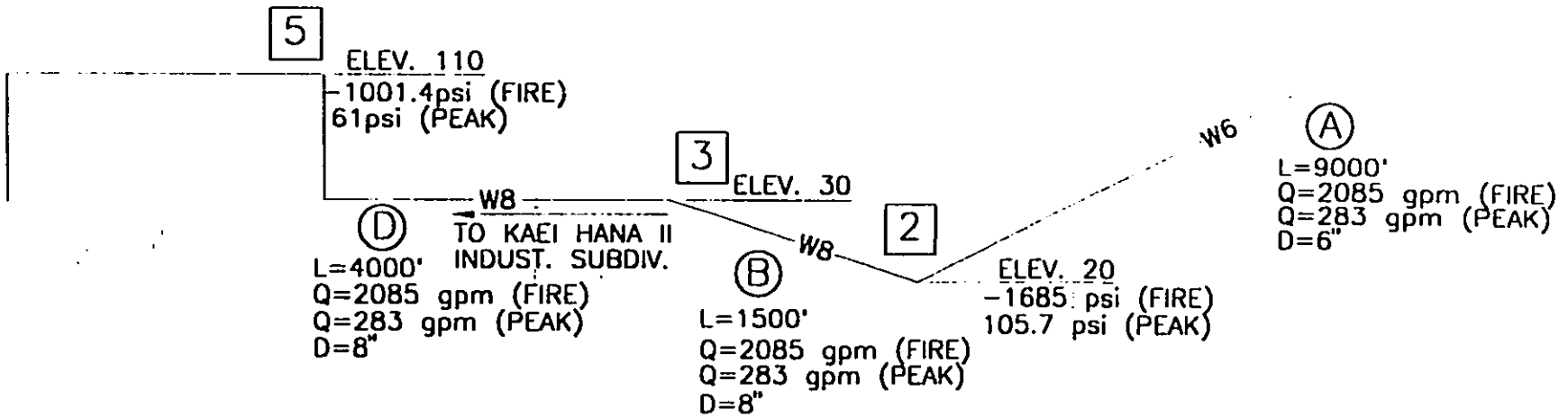
KKO:gms

... Water brings progress...

APPENDIX B

FIGURES


TRUE NORTH
0.25 MG TANK
SPILLWAY ELEV.=596.0
BOTTOM ELEV.=580.0
E/W12
PRV
1
KAEI HANA II
INDUSTRIAL
SUBDIVISION
5
3
2
E/W8
PROPOSED W12
(BY COUNTY OF HAWAII)
KAWAIHAE ROAD
E/W6
PUU KOHOLA
HEIAU
QUEEN KAAHUMANU HIGHWAY
KAWAIHAE
HARBOR
SPENCER
BEACH
PARK
LEGEND
5 NODE NUMBER
▲ NODE POINT
GRAPHIC SCALE:
0 2000 4000
1" = 2000'
R. M. TOWILL CORPORATION
KAWAIHAE 1.0 MILLION GALLON TANK
WATER SYSTEM STUDY
FIGURE - 1
EXISTING WATER SYSTEM



NOTE:
SEE FIGURE-1 FOR LOCATIONS OF EXISTING NODES.

Planning - Engineering - Environmental Services - Development - Surveying - Construction Management
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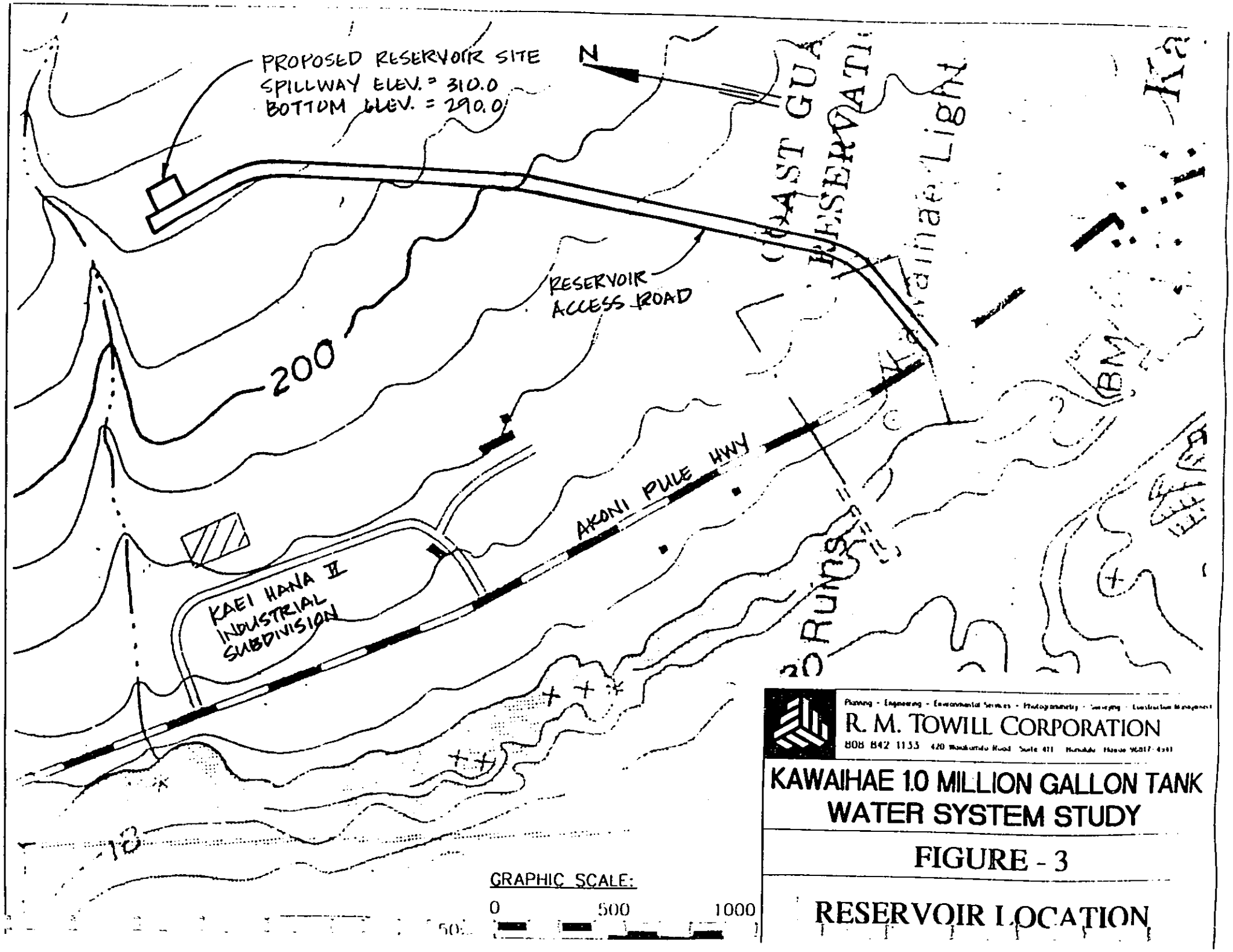
KAWAIHAE 1.0 MILLION GALLON TANK WATER SYSTEM STUDY

FIGURE - 2

EXISTING WATER SYSTEM



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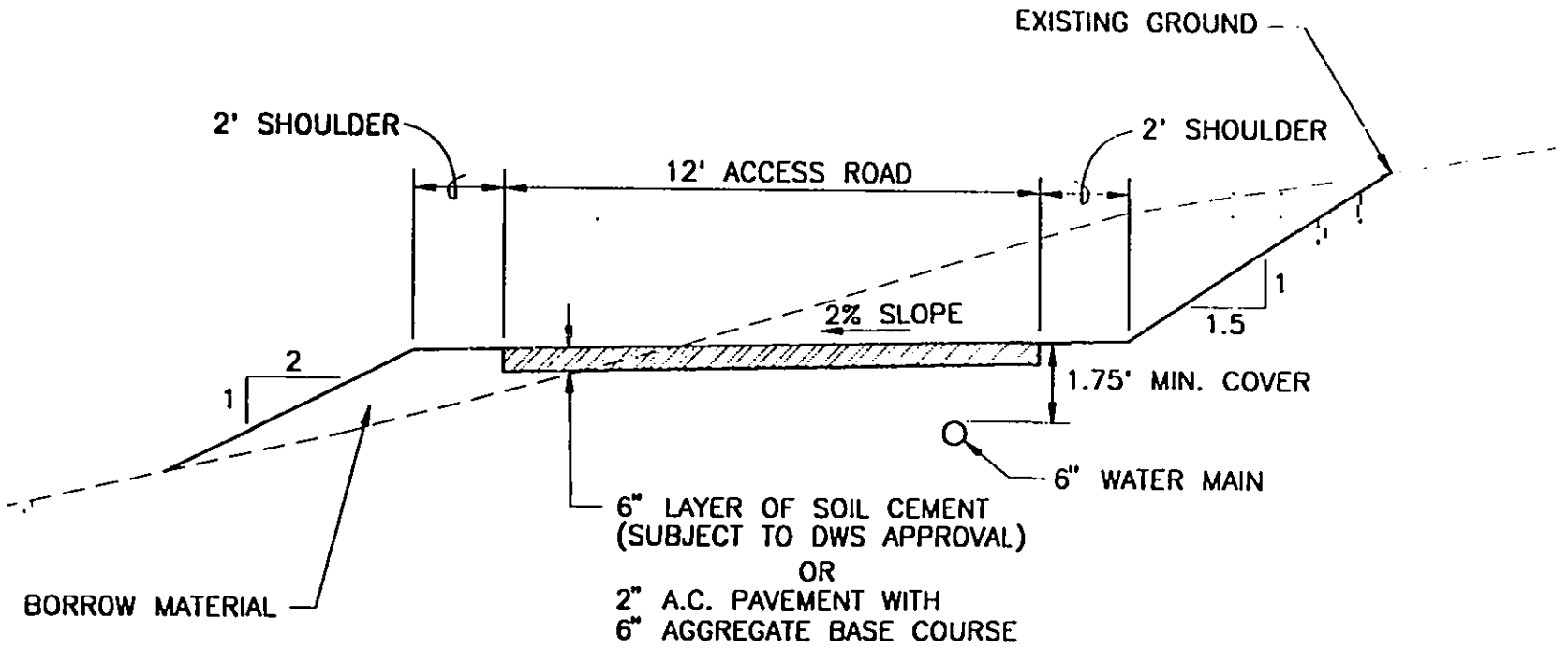
KAWAIHAE 1.0 MILLION GALLON TANK WATER SYSTEM STUDY

FIGURE - 3

RESERVOIR LOCATION



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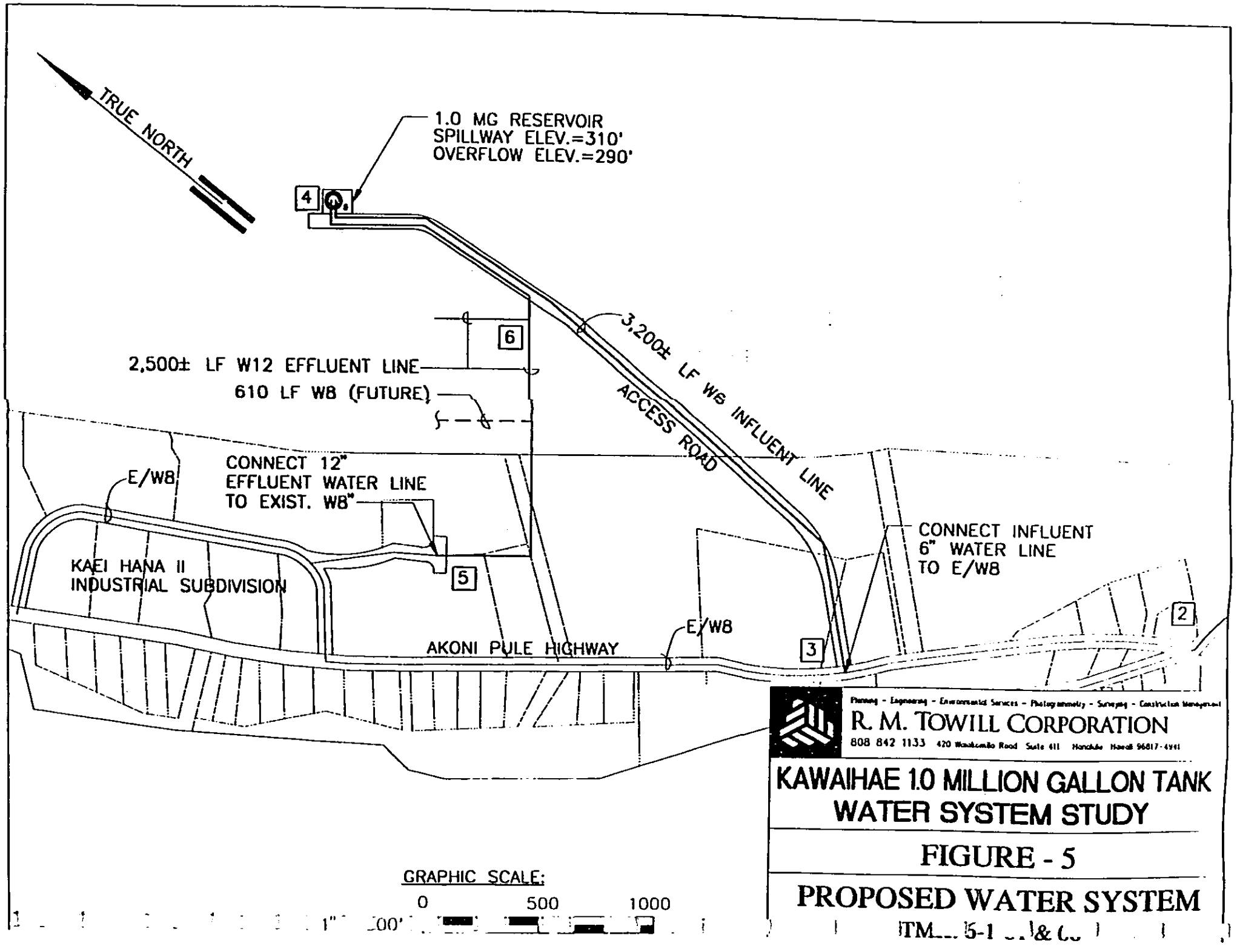
KAWAIHAE 1.0 MILLION GALLON TANK WATER SYSTEM STUDY

FIGURE - 4

RESERVOIR ACCESS ROAD TYPICAL SECTION



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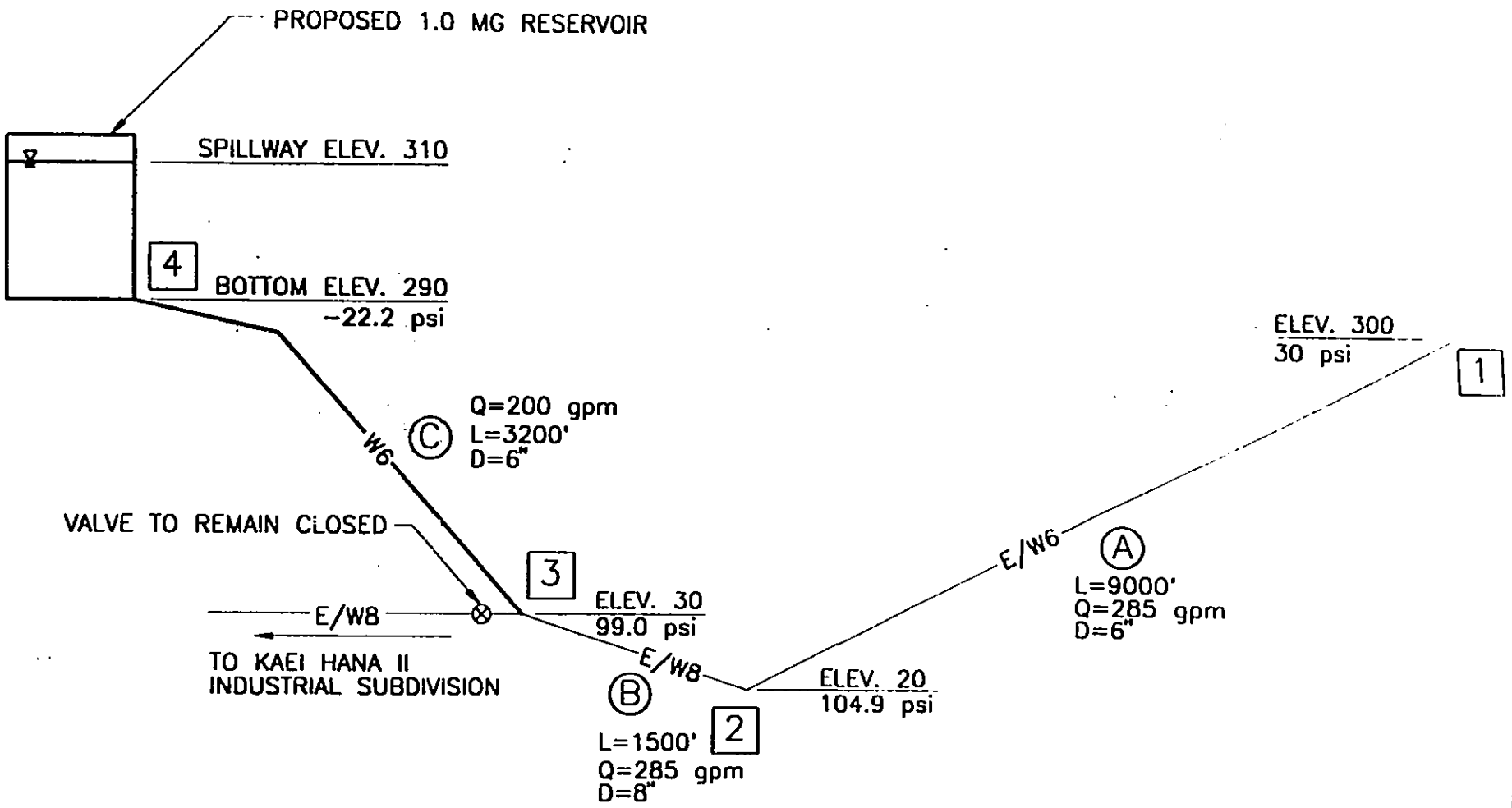
KAWAIHAE 1.0 MILLION GALLON TANK WATER SYSTEM STUDY

FIGURE - 5

PROPOSED WATER SYSTEM

TM... 5-1 ...1& C...



NOTE:
SEE FIGURE-5 FOR LOCATIONS OF EXISTING NODES.

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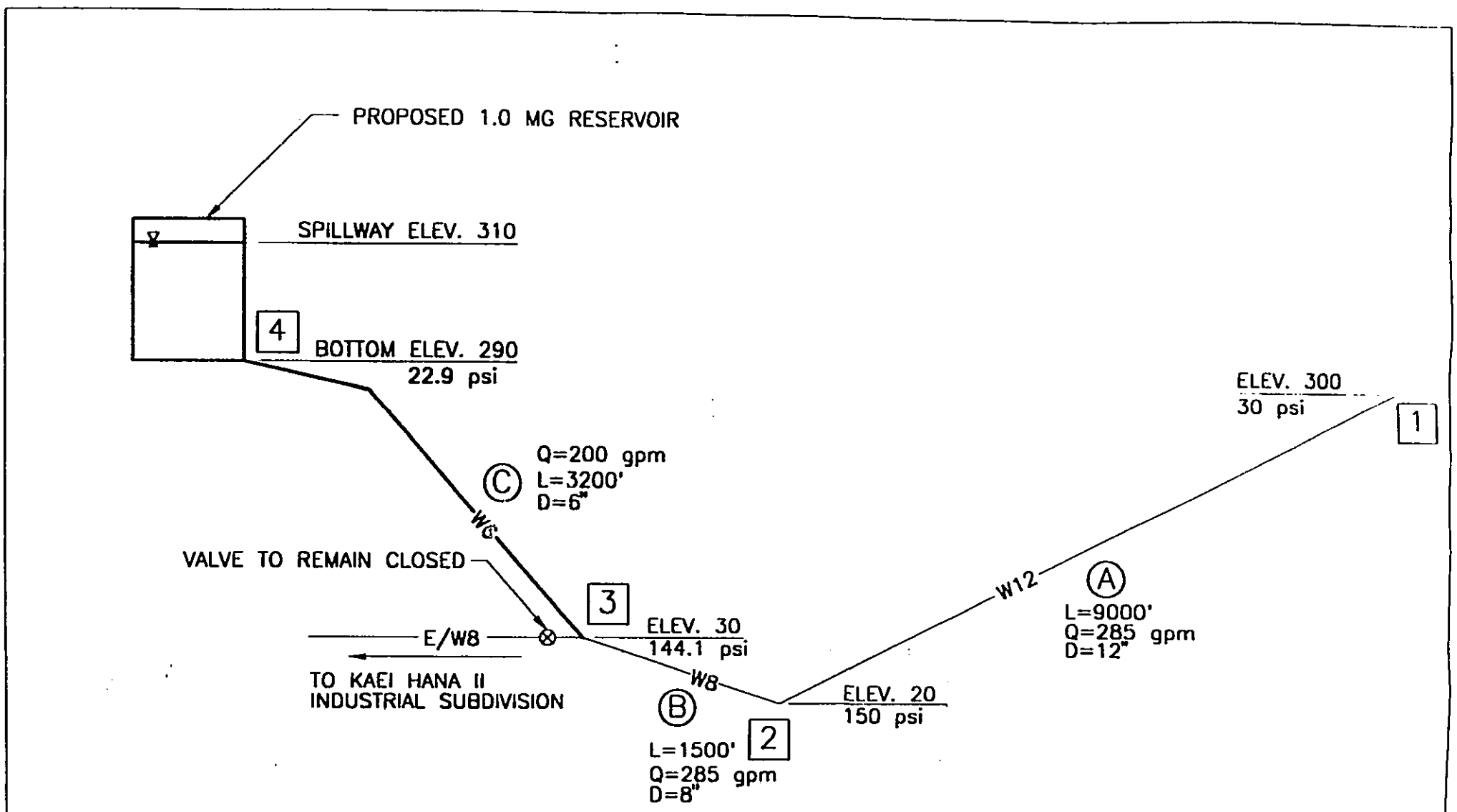
KAWAIHAE 1.0 MILLION GALLON TANK WATER SYSTEM STUDY

FIGURE - 6

RESERVOIR INFLUENT LINE SCENARIO "A"



NOTE:
SEE FIGURE–5 FOR LOCATIONS
OF EXISTING NODES.

Planning - Engineering - Environmental Services - Photogrammetry - Surveying - Construction Management
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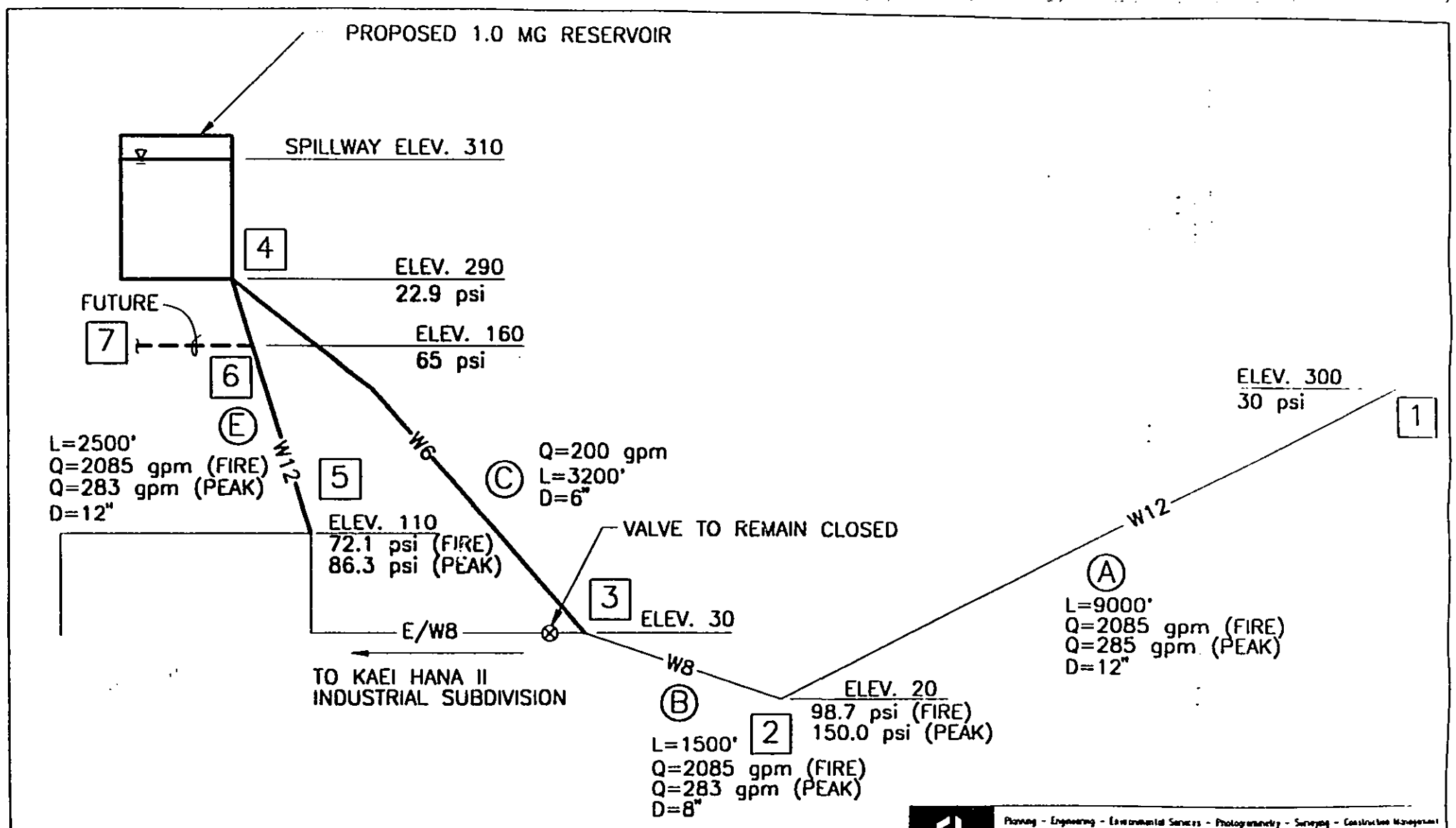
KAWAIHAE 1.0 MILLION GALLON TANK WATER SYSTEM STUDY

FIGURE - 7

RESERVOIR INFLUENT LINE



NOTE:
SEE FIGURE-5 FOR LOCATIONS OF EXISTING NODES.

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KAWAIHAE 1.0 MILLION GALLON TANK WATER SYSTEM STUDY

FIGURE - 8

EXISTING WATER SYSTEM PROPOSED IMPROVEMENTS

APPENDIX C

TABLES

TABLE 1
EXISTING WATER SYSTEM ADEQUACY
RESIDUAL PRESSURES USING FIRE FLOW

NODE	PIPE	PIPE SIZE (IN.)	ELEVATION (FT.)	FLOW (GPM)	RESIDUAL PRESSURE (PSI)
1			300	2085	30
	A	6			
2			20	2085	-1685.18
	B	8			
5			110	2085	-1001.38

TABLE 2
EXISTING WATER SYSTEM ADEQUACY
RESIDUAL PRESSURES USING PEAK HOUR FLOW

NODE	PIPE	PIPE SIZE (IN.)	ELEVATION (FT.)	FLOW (GPM)	RESIDUAL PRESSURE (PSI)
1			300	283	30
	A	6			
2			20	283	105.7
	B	8			
5			110	283	61

TABLE 3
RESIDUAL PRESSURE AT
PROPOSED RESERVOIR WITH EXISTING
6" PIPELINE

NODE	PIPE	PIPE SIZE (IN.)	ELEVATION (FT.)	FLOW (GPM)	RESIDUAL PRESSURE (PSI)
1			300		30
	A	6		285	
2			20		104.9
	B	8		285	
3			30		99
	C	6		200	
4			290		-22.2

TABLE 4
RESIDUAL PRESSURE AT
PROPSED RESERVOIR WITH EXISTING
6" PIPELINE UPGRADE TO 12"

NODE	PIPE	PIPE SIZE (IN.)	ELEVATION (FT.)	FLOW (GPM)	RESIDUAL PRESSURE (PSI)
1			300		30
	A	12		285	
2			20		150
	B	8		285	
3			30		144.1
	C	6		285	
4			290		22.9

TABLE 5
CASE 1 - MINIMUM REQUIREMENTS
1.0 MG RESERVOIR COST ESTIMATE

QUANTITY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL
ACCESS ROAD				
1	L.S.	Earthwork	$165,000	$165,000
6000	S.Y.	6" Layer Soil Cement	$8	$48,000
1	L.S.	Misc. Drainage Structure	$80,000	$80,000
RESERVOIR				
1	L.S.	Clearing & Grubbing	$5,000	$5,000
1	L.S.	Earthwork	$165,000	$165,000
1	L.S.	1.0 MG Concrete Tank	$1,300,000	$1,300,000
450	L.F.	6' High Chain Link Fence & Gate	$30	$13,500
1	L.S.	Landscaping & Irrigation	$15,000	$15,000
1	L.S.	Control Valves, Telemetering, etc.	$300,000	$300,000
WATER				
3200	L.F.	6" Ductile Iron Pipe (Influent Line)	$65	$208,000
610	L.F.	8" Ductile Iron Pipe	$70	$42,700
2500	L.F.	12" Ductile Iron Pipe (Effluent Line)	$80	$200,000
TELEPHONE				
22	EA.	Overhead Telephone Lines & Poles	$3,500	$77,000
		(Poles spaced at 200' O.C.)		
CONTINGENCY (15%)				$392,880
		TOTAL		$3,010,000

TABLE 6
CASE 2 - MINIMUM REQUIREMENTS + CHLORINATION
1.0 MG RESERVOIR COST ESTIMATE

QUANTITY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL
ACCESS ROAD				
1	L.S.	Earthwork	$165,000	$165,000
6000	S.Y.	2" Asphaltic Concrete	$12	$72,000
6000	S.Y.	6" Aggregate Base Course	$10	$60,000
1	L.S.	Misc. Drainage Structures	$80,000	$80,000
RESERVOIR				
1	L.S.	Clearing & Grubbing	$5,000	$5,000
1	L.S.	Earthwork	$165,000	$165,000
1	L.S.	1.0 MG Concrete Tank	$1,300,000	$1,300,000
450	L.F.	6' High Chain Link Fence & Gate	$30	$13,500
1	L.S.	Landscaping & Irrigation	$15,000	$15,000
1	L.S.	Control Valves, Telemetering, etc.	$300,000	$300,000
CHLORINATION FACILITY				
1	L.S.	Chlorination Facilities (Building, Tanks, etc.)	$250,000	$250,000
WATER				
3200	L.F.	6" Ductile Iron Pipe (Influent Line)	$65	$208,000
610	L.F.	8" Ductile Iron Pipe	$70	$42,700
2500	L.F.	12" Ductile Iron Pipe (Effluent Line)	$80	$200,000
TELEPHONE				
22	EA.	Overhead Telephone Lines & Poles	$3,500	$77,000
		(Poles spaced at 200' O.C.)		
ELECTRICAL				
3200	L.F.	Electrical Line	$10	$32,000
1	L.S.	Miscellaneous Electrical	$10,000	$10,000
CONTINGENCY (15%)				$449,280
		TOTAL		**$3,440,000**

APPENDIX D

CALCULATIONS

KAWAIHAE 1.0 MG TANK
WATER SYSTEM CALCULATIONS

PURPOSE: To determine the size and length of pipe required to provide adequate pressure at the proposed reservoir.

REFERENCES: "Water System Standards, Volume 1," State of Hawaii, 1985.
"Condensed Hydraulic Data," Ingersol-Rand Company, 1968

EQUATIONS USED:

The energy equation was used to determine the pressure of the water line at various nodes:

$$\frac{p_1}{\gamma}+\frac{v_1^2}{2g}+z_1=\frac{p_2}{\gamma}+\frac{v_2^2}{2g}+z_2+h_f$$

Where

p = pressure at node (lbs/ft^2)
γ = specific weight of water (lbs/ft^3)
v = velocity at node (ft/sec)
g = gravitational acceleration (ft/sec^2)
z = elevation at node (ft)
h_f = headloss due to friction (ft)

Headloss per 100 feet of pipe:

$$f = 0.2083\left(\frac{100}{C}\right)^{1.85}\frac{q^{1.85}}{d^{4.8655}}$$

Where,

C = Hazen Williams coefficient of roughness (100 for 6", 110 for 8" & 12")
q = discharge in pipe (gpm)
d = diameter of pipe (in)

EXISTING WATER SYSTEM PRESSURE CALCULATIONS:
Since pressures will be established at nodes of the same pipe, the velocity terms of the energy equation will be disregarded. The resulting equation is:

$$\frac{p_1}{\gamma}+z_1=\frac{p_2}{\gamma}+z_2+h_f$$

SCEANRIO "A" (See Figure 6)
Pipe A (node 1 to node 2)
Determine pressure at node 2.

Pipe diameter = 6 in.
Length = 9000 ft
q = 285 gpm
z_1 = 300 ft.
z_2 = 20 ft.
p_1 = 30 psi

$$h_f = L\left(\frac{f}{100}\right)$$

$$f = 0.2083\left(\frac{100}{100}\right)^{1.85}\frac{285^{1.85}}{6^{4.8655}} = 1.19$$

$$h_f = 9000\left(\frac{1.19}{100}\right) = 107.10 \text{ ft}$$

$$\frac{30(144)}{62.4} + 300 = \frac{p_2}{62.4} + 20 + 107.1$$

$p_2 = 15{,}108 \text{ lb/ft}^2 = 104.9 \text{ psi}$

Pipe B (node 2 to node 3)
Determine pressure at node 3.

Pipe diameter = 8 in.
Length = 1500 ft
q = 285 gpm
z_2 = 20 ft.
z_3 = 30 ft.
p_2 = 104.9 psi

$$h_f = L\left(\frac{f}{100}\right)$$

$$f = 0.2083\left(\frac{100}{110}\right)^{1.85}\frac{285^{1.85}}{8^{4.8655}} = 0.245$$

$$h_f = 1500\left(\frac{0.245}{100}\right) = 3.68 \text{ ft}$$

$$\frac{104.9(144)}{62.4} + 20 = \frac{p_3}{62.4} + 30 + 3.68$$

$p_3 = 14{,}251.97 \text{ lb/ft}^2 = 98.97 \text{ psi}$

PROPOSED RESERVOIR INFLUENT WATER LINE CALCULATIONS

If a 6-inch pipe is connected to the existing 8-inch line at node 3, determine if there is enough pressure in the water line at the proposed 1.0 mg reservoir.

Pipe C (node 3 to node 4)

Assume Pipe C to be an 6-inch pipe.

Pipe diameter = 6 in.
Length = 3200 ft
q = 200 gpm
z_3 = 30 ft.
z_4 = 290 ft.
p_3 = 98.97 psi

$$h_f = L\left(\frac{f}{100}\right)$$

$$f = 0.2083\left(\frac{100}{100}\right)^{1.85}\frac{200^{1.85}}{6^{4.8655}} = 0.616$$

$$h_f = 3200\left(\frac{0.616}{100}\right) = 19.71 \text{ ft}$$

$$\frac{98.97(144)}{62.4} + 30 = \frac{p_4}{62.4} + 290 + 19.71$$

p_4 = -3202.22 lb/ft^2 = -22.24 psi

A negative pressure indicates that the water pressure in the 6-inch line is not enough to reach the proposed reservoir site.

Recalculate pressures from node 1 through 2 assuming that the existing 6-inch line will be replaced with a 12-inch line.

SCENARIO "B" (See Figure 7)

Pipe A (node 1 to node 2)

Pipe diameter = 12 in.
Length = 9000 ft
q = 285 gpm
z_1 = 300 ft.
z_2 = 20 ft.
p_1 = 30 psi

$$h_f = L\left(\frac{f}{100}\right)$$

$$f = 0.2083\left(\frac{100}{110}\right)^{1.85}\frac{285^{1.85}}{12^{4.8655}} = 0.034$$

$$h_f = 9000\left(\frac{0.034}{100}\right) = 3.07 \text{ ft}$$

$$\frac{30(144)}{62.4} + 300 = \frac{p_2}{62.4} + 20 + 3.07$$

$$p_2 = 21{,}600 \text{ lb/ft}^2 = 150 \text{ psi}$$

Pipe B (node 2 to node 3)

Pipe diameter = 8 in.
Length = 1500 ft
q = 285 gpm
z_2 = 20 ft.
z_3 = 30 ft.
p_2 = 150 psi

$$h_f = L\left(\frac{f}{100}\right)$$

$$f = 0.2083\left(\frac{100}{110}\right)^{1.85}\frac{285^{1.85}}{8^{4.8655}} = 0.245$$

$$h_f = 1500\left(\frac{0.245}{100}\right) = 3.68 \text{ ft}$$

$$\frac{150(144)}{62.4} + 20 = \frac{p_3}{62.4} + 30 + 3.68$$

$$p_3 = 20{,}746.37 \text{ lb/ft}^2 = 144.07 \text{ psi}$$

Pipe C (node 3 to node 4)

Assume Pipe C to be a 6-inch pipe.

Pipe diameter = 6 in.
Length = 3200 ft
q = 200 gpm
z_3 = 30 ft.
z_4 = 290 ft.
p_3 = 144.07 psi

$$h_f = L\left(\frac{f}{100}\right)$$

$$f = 0.2083\left(\frac{100}{100}\right)^{1.85}\frac{200^{1.85}}{6^{4.8655}} = 0.616$$

$$h_f = 3200\left(\frac{0.616}{100}\right) = 19.71 \text{ ft}$$

$$\frac{144.07(144)}{62.4} + 30 = \frac{p_4}{62.4} + 290 + 19.71$$

$$p_4 = 3292.18 \text{ lb/ft}^2 = 22.9 \text{ psi}$$

A pressure of 22.9 psi is equivalent to about 53 feet of water. The water depth of the proposed reservoir will not exceed 20 feet. Therefore, the water pressure supplied to the reservoir by the 6-inch line will be more than adequate.

Pipe C (node 3 to node 4)
Assume Pipe C to be an 8-inch pipe.

Pipe diameter = 8 in.
Length = 3200 ft
q = 200 gpm
z_3 = 30 ft.
z_4 = 290 ft.
p_3 = 144.07 psi

$$h_f = L\left(\frac{f}{100}\right)$$

$$f = 0.2083\left(\frac{100}{110}\right)^{1.85}\frac{200^{1.85}}{8^{4.8655}} = 0.127$$

$$h_f = 3200\left(\frac{0.127}{100}\right) = 4.06 \text{ ft}$$

$$\frac{144.07(144)}{62.4} + 30 = \frac{p_4}{62.4} + 290 + 4.06$$

$$p_4 = 4268.74 \text{ lb/ft}^2 = 29.6 \text{ psi}$$

A pressure of 29.6 psi is equivalent to about 68 feet of water. The water depth of the proposed reservoir will not exceed 20 feet. Therefore, the water pressure supplied to the reservoir by the 8-inch line will be more than adequate.

Since the 6-inch and the 8-inch pipe will provide adequate pressure to the proposed reservoir, a 6-inch pipe will be used for Pipe C.

A. CHECK ADEQUACY OF EXISTING WATER SYSTEM

Criteria
The water pressure at the Kaei Hana II Industrial Subdivision must meet the following criteria:

- Maximum daily flow plus the fire flow with a residual pressure of 20 psi.
- Peak hour flow with a minimum residual pressure of 40 psi.

Required Flows
Maximum daily flow = 85 gpm
Required fire flow = 2000 gpm
Peak hour flow = 283 gpm

Fire Flow

Flow = 2000 gpm + 85 gpm = 2085 gpm

Determine pressure at node 3, assuming water system is not upgraded.

Pipe A (node 1 to node 2)

Pipe diameter = 6 in.

Length = 9000 = 9000 ft

q = 2085 gpm

z_1 = 300 ft.

z_2 = 20 ft.

p_1 = 30 psi

$$h_f = L\left(\frac{f}{100}\right)$$

$$f = 0.2083\left(\frac{100}{100}\right)^{1.85}\frac{2085^{1.85}}{6^{4.8655}} = 47.09$$

$$h_f = 9000\left(\frac{47.09}{100}\right) = 4238.1 \text{ ft}$$

$$\frac{30(144)}{62.4} + 300 = \frac{p_2}{62.4} + 20 + 4238.1$$

p_3 = -242,665.4 lb/ft^2 = -1685.18 psi

Determine residual pressure at node 5

Pipes B+D (node 2 to node 5)

Pipe diameter = 8 in.

Length = 5500 ft

q = 2085 gpm

z_2 = 20 ft.

z_3 = 110 ft.

p_2 = -1685.18 psi

$$h_f = L\left(\frac{f}{100}\right)$$

$$f = 0.2083\left(\frac{100}{110}\right)^{1.85}\frac{2085^{1.85}}{8^{4.8655}} = 9.74$$

$$h_f = 5500\left(\frac{9.74}{100}\right) = 535.7 \text{ ft}$$

$$\frac{-1685.18(144)}{62.4} + 20 = \frac{p_5}{62.4} + 110 + 535.7$$

p_5 = -144,198.19 lb/ft^2 = -1001.38 psi

The residual pressure is less than the minimum 20 gpm required. Therefore, this line is inadequate.

Determine pressure at node 2, assuming water system is upgraded from 6-inch to 12-inch.

Pipe A (node 1 to node 2)

Pipe diameter = 12 in.

Length = 9000 ft

q = 2085 gpm

z_1 = 300 ft.

z_2 = 30 ft.

p_1 = 30 psi

$$h_f = L\left(\frac{f}{100}\right)$$

$$f = 0.2083\left(\frac{100}{110}\right)^{1.85}\frac{2085^{1.85}}{12^{4.8655}} = 1.35$$

$$h_f = 9000\left(\frac{1.35}{100}\right) = 121.50 \text{ ft}$$

$$\frac{30(144)}{62.4} + 300 = \frac{p_3}{62.4} + 20 + 121.50$$

p_2 = 14,210.4 lb/ft^2 = 98.68 psi

Determine residual pressure at node 5

Pipes B+D (node 2 to node 5)

Pipe diameter = 8 in.

Length = 5500 ft

q = 2085 gpm

z_2 = 20 ft.

z_5 = 110 ft.

p_2 = 98.68 psi

$$h_f = L\left(\frac{f}{100}\right)$$

$$f = 0.2083\left(\frac{100}{110}\right)^{1.85}\frac{2085^{1.85}}{8^{4.8655}} = 9.74$$

$$h_f = 5500\left(\frac{9.74}{100}\right) = 535.7 \text{ ft}$$

$$\frac{98.68(144)}{62.4} + 20 = \frac{p_5}{62.4} + 110 + 535.7$$

p_5 = -24,833.76 lb/ft^2 = -172.46 psi

The residual pressure is less than the minimum 20 gpm required. Therefore, this line is inadequate even if the existing 6-inch line is upgraded to a 12-inch.

B. PROPOSED WATER SYSTEM IMPROVEMENT

Since the water pressure at node 5 is inadequate for the required fire flow, connect a 6-inch water line from the proposed reservoir to the Kaei Hana II Industrial Subdivision.

- Recalculate pressure at node 5 based on this new 6-inch connection.
- Determine residual pressure at node 5

Pipe E (node 4 to node 5)
Assume Pipe diameter = 8 in.
Length = 1800 ft
q = 2085 gpm
z_4 = 290 ft.
z_5 = 110 ft.
p_4 = pressure in full tank = 20(144)/62/4 = 8.67 psi

$$h_f = L\left(\frac{f}{100}\right)$$

$$f = 0.2083\left(\frac{100}{110}\right)^{1.85}\frac{2085^{1.85}}{8^{4.8655}} = 9.74$$

$$h_f = 1800\left(\frac{9.74}{100}\right) = 175.29 \text{ ft}$$

$$\frac{8.67(144)}{62.4} + 290 = \frac{p_5}{62.4} + 110 + 175.29$$

p_5 = 1542.38 lb/ft^2 = 10.7 psi
Since the residual pressure is less than 20 psi, an 8-inch pipe will not be adequate.

Pipe E (node 4 to node 5)
Assume Pipe diameter = 12 in.
Length = 2500 ft
q = 2085 gpm
z_4 = 290 ft.
z_5 = 110 ft.
p_4 = pressure in full tank = 20(144)/62.4 = 8.67 psi

$$h_f = L\left(\frac{f}{100}\right)$$

$$f = 0.2083\left(\frac{100}{110}\right)^{1.85}\frac{2085^{1.85}}{12^{4.8655}} = 1.35$$

$$h_f = 2500\left(\frac{1.35}{100}\right) = 33.75 \text{ ft}$$

$$\frac{8.67(144)}{62.4} + 290 = \frac{p_5}{62.4} + 110 + 33.75$$

p_5 = 10,374.48 lb/ft^2 = 72.0 psi

A 12-inch pipe is adequate to provide the required fire flow to the subdivision.

Based on future water demands. a both the 8-inch and the 12-inch mains will need to be analyzed to determine whether they will be adequate.

C. PEAK HOUR FLOW

Determine pressure at node 2, assuming water system is not upgraded.

Pipe A (node 1 to node 2)
Pipe diameter = 6 in.
Length = 9000 ft
q = 283 gpm
z_1 = 300 ft.
z_2 = 20 ft.
p_1 = 30 psi

$$h_f = L\left(\frac{f}{100}\right)$$

$$f = 0.2083\left(\frac{100}{100}\right)^{1.85}\frac{283^{1.85}}{6^{4.8655}} = 1.17$$

$$h_f = 9000\left(\frac{1.17}{100}\right) = 105.3 \text{ ft}$$

$$\frac{30(144)}{62.4} + 300 = \frac{p_2}{62.4} + 20 + 105.3$$

p_2 = 15,221.28 lb/ft^2 = 105.70 psi

Determine residual pressure at node 5

Pipes B+D (node 2 to node 5)
Pipe diameter = 8 in.
Length = 5500 ft
q = 283 gpm
z_2 = 20 ft.
z_5 = 110 ft.
p_2 = 105.70 psi

$$h_f = L\left(\frac{f}{100}\right)$$

$$f = 0.2083\left(\frac{100}{110}\right)^{1.85}\frac{283^{1.85}}{8^{4.8655}} = 0.24$$

$$h_f = 5500\left(\frac{0.24}{100}\right) = 13.2 \text{ ft}$$

$$\frac{105.70(144)}{62.4} + 20 = \frac{p_5}{62.4} + 110 + 13.2$$

p_5 = 8781.12 lb/ft^2 = 60.98 psi

The residual pressure is greater than the minimum 40 gpm required. Therefore, the existing 8-inch line is adequate to handle the peak hour flow.

Determine pressure at node 2, assuming water system is upgraded from 6-inch to 12-inch.

Pipe A (node 1 to node 2)
Pipe diameter = 12 in.
Length = 9000 ft
q = 283 gpm
z_1 = 300 ft.
z_2 = 20 ft.
p_1 = 30 psi

$$h_f = L\left(\frac{f}{100}\right)$$

$$f = 0.2083\left(\frac{100}{110}\right)^{1.85}\frac{283^{1.85}}{12^{4.8655}} = 0.034$$

$$h_f = 9000\left(\frac{0.034}{100}\right) = 3.06 \text{ ft}$$

$$\frac{30(144)}{62.4} + 300 = \frac{p_2}{62.4} + 20 + 3.06$$

p_3 = 21,601.06 lb/ft^2 = 150.01 psi

Determine residual pressure at node 5

Pipes B+D (node 2 to node 5)
Pipe diameter = 8 in.
Length = 5000 ft
q = 2085 gpm
z_2 = 20 ft.
z_5 = 110 ft.
p_2 = 150.01 psi

$$h_f = L\left(\frac{f}{100}\right)$$

$$f = 0.2083\left(\frac{100}{110}\right)^{1.85}\frac{283^{1.85}}{8^{4.8655}} = 0.24$$

$$h_f = 5500\left(\frac{0.24}{100}\right) = 13.2 \text{ ft}$$

$$\frac{150.01(144)}{62.4} + 20 = \frac{p_2}{62.4} + 110 + 13.2$$

p_5 = 15,161.76 lb/ft^2 = 105.29 psi

The residual pressure is greater than the minimum 40 gpm required. Therefore, the

existing 8-inch line is adequate to handle the peak hour flow.
Check Pipe E at Peak Hour Flow
Determine residual pressure at node 5

Pipe E (node 4 to node 5)
Assume Pipe diameter = 8 in.
Length = 2500 ft
q = 283 gpm
z_4 = 290 ft.
z_5 = 110 ft.
p_4 = 8.67 psi

$$h_f = L\left(\frac{f}{100}\right)$$

$$f = 0.2083\left(\frac{100}{110}\right)^{1.85}\cdot\frac{283^{1.85}}{8^{4.8655}} = 0.242$$

$$h_f = 2500\left(\frac{0.242}{100}\right) = 6.05 \text{ ft}$$

$$\frac{8.67(144)}{62.4} + 290 = \frac{p_5}{62.4} + 110 + 6.05$$

p_5 = 12,102.48 lb/ft^2 = 84.05 psi

Pipe E (node 4 to node 5)
Assume Pipe diameter = 12 in.
Length = 2500 ft
q = 283 gpm
z_4 = 290 ft.
z_5 = 110 ft.
p_4 = 8.67 psi

$$h_f = L\left(\frac{f}{100}\right)$$

$$f = 0.2083\left(\frac{100}{110}\right)^{1.85}\frac{283^{1.85}}{12^{4.8655}} = 0.034$$

$$h_f = 2500\left(\frac{0.034}{100}\right) = 0.85 \text{ ft}$$

$$\frac{8.67(144)}{62.4} + 290 = \frac{p_5}{62.4} + 110 + 0.85$$

p_5 = 12,426.96 lb/ft^2 = 86.30 psi

Since this pressure is greater than the minimum 40 psi residual pressure required, both the 8-inch and 12-inch connection to the industrial subdivision from the proposed reservoir will be adequate to provide the fire flow.

ADDITIONAL DEVELOPMENT AVAILABLE FROM 1.0 MG TANK

The proposed reservoir will enable more land to be developed in the Kaei Hana II Industrial Subdivision.

Total acreage in industrial area = 63 acres. Determine if the reservoir can support 63 acres of industrial demand.

CRITERIA

- Ave. Daily Demand for light industry = 4000 gal/acre/day
- Fire Flow = 2000gpm + 1.5 X Ave. demand
- Peak Hour Flow = 5 x Ave. demand

DEMAND

- Ave. Daily Demand = 4000(63) = 252,000 gpd = 175 gpm
- Fire Flow = 2000+(1.5)(175) = 2262.5 gpm
- Peak Hour Flow = 5(175) = 875 gpm

Since Fire flow demand requires the most flow, determine if proposed system can provide enough residual pressure at node 5.

Determine residual pressure at node 5 (min. pressure = 20 psi).

Pressure at node 4 due to ¾ full reservoir.

Height = 0.75(20) = 15'

Pressure = 6.5 psi

Pipe diameter = 8 in.

Length = 2500 ft

q = 2262.5 gpm

z_4 = 290 ft.

z_5 = 110 ft.

p_4 = 6.5 psi

Energy equation from node 4 to node 5:

$$\frac{6.5(144)}{62.4}+290=\frac{p_5(144)}{62.4}+110+h_f$$

h_f = 2500 ft

$$f = 0.2083\left(\frac{100}{110}\right)^{1.85}\frac{2262.5^{1.85}}{8^{4.8655}} = 11.33$$

$$h_f = 2500\left(\frac{11.33}{100}\right) = 283.25 \text{ ft.}$$

$$\frac{6.5(144)}{62.4}+290=\frac{p_5(144)}{62.4}+110+283.25$$

p_5 = -38.2 psi

Determine residual pressure at node 6 (min. pressure = 20 psi).
Pressure at node 4 due to ¾ full reservoir.

Height = 0.75(20) = 15'
Pressure = 6.5 psi
Pipe diameter = 8 in.
Length = 1200 ft
q = 2262.5 gpm
z_4 = 290 ft.
z_6 = 230 ft.
p_4 = 6.5 psi

Energy equation from node 4 to node 5:

$$\frac{6.5(144)}{62.4}+290=\frac{p_6(144)}{62.4}+110+h_f$$

$$f = 0.2083\left(\frac{100}{110}\right)^{1.85}\frac{2262.5^{1.85}}{8^{4.8655}} = 11.33$$

$$h_f = 1200\left(\frac{11.33}{100}\right) = 135.92 \text{ ft.}$$

$$\frac{6.5(144)}{62.4}+290=\frac{p_6(144)}{62.4}+230+135.92$$

p_6 = -26.4 psi

Therefore, the 8-inch effluent line will not be adequate since the residual pressures are below 20 psi.

Recalculate using a 12-inch effluent line.

Determine residual pressure at node 5 (min. pressure = 20 psi).
Pressure at node 4 due to ¾ full reservoir.

Height = 0.75(20) = 15'
Pressure = 6.5 psi
Pipe diameter = 12 in.
Length = 2500 ft
q = 2262.5 gpm
z_4 = 290 ft.
z_5 = 110 ft.
p_4 = 6.5 psi

Energy equation from node 4 to node 5:

$$\frac{6.5(144)}{62.4}+290=\frac{p_5(144)}{62.4}+110+h_f$$

$$f = 0.2083\left(\frac{100}{110}\right)^{1.85}\frac{2262.5^{1.85}}{12^{4.8655}} = 1.58$$

$$h_f = 2500\left(\frac{1.58}{100}\right) = 39.4 \text{ ft.}$$

$$\frac{6.5(144)}{62.4} + 290 = \frac{p_5(144)}{62.4} + 110 + 39.4$$

p_5=67.4 psi

Determine residual pressure at node 6 (min. pressure = 20 psi).
Pressure at node 4 due to ¾ full reservoir.

Height = 0.75(20) = 15'
Pressure = 6.5 psi
Pipe diameter = 12 in.
Length = 1200 ft
q = 2262.5 gpm
z_4 = 290 ft.
z_6 = 230 ft.
p_4 = 6.5 psi

Energy equation from node 4 to node 6:

$$\frac{6.5(144)}{62.4} + 290 = \frac{p_6(144)}{62.4} + 110 + h_f$$

$$f = 0.2083\left(\frac{100}{110}\right)^{1.85}\frac{2262.5^{1.85}}{12^{4.8655}} = 1.58$$

$$h_f = 1200\left(\frac{1.58}{100}\right) = 18.90 \text{ ft.}$$

$$\frac{6.5(144)}{62.4} + 290 = \frac{p_6(144)}{62.4} + 230 + 18.90$$

p_6= 24.3 psi

Both residual pressures are greater than 20 psi. Therefore, a 12-inch effluent line will be adequate for fire flow demand.

Determine the length of 8-inch pipe required to reduce fire flow velocity through the undeveloped portion of the industrial subdivision.

Assumptions

- The 8-inch line will be connected to the 12-inch effluent line at elevation 160'.
- Residual pressure in water line with fire flow is 20 psi.

The energy equation:

$$\frac{p_1}{\gamma}+\frac{v_1^2}{2g}+z_1=\frac{p_2}{\gamma}+\frac{v_2^2}{2g}+z_2+h_f$$

1. Find pressure at 8-inch connection point (node 6).

Pipe diameter = 12 in.
Length = 2100 ft.
q = 2262.5 gpm
z_4 = 310 ft.
z_6 = 160 ft.
p_4 = 0 psi
p_6 = 20 psi
v_4 = 0 ft/sec
v_6 = ? ft/sec

Energy equation from node 4 to node 6:

$$\frac{p_4}{\gamma}+\frac{v_4^2}{2g}+z_4=\frac{p_6}{\gamma}+\frac{v_6^2}{2g}+z_6+h_f$$

$$0+0+310=\frac{20(144)}{62.4}+\frac{v_6^2}{2g}+160+h_f$$

$$f=0.2083\left(\frac{100}{110}\right)^{1.85}\frac{2262.5^{1.85}}{12^{4.8655}}=1.58$$

$$h_f=2100\left(\frac{1.58}{100}\right)=33.18 \text{ ft.}$$

$$0+310=\frac{20(144)}{62.4}+\frac{v_6^2}{2(32.2)}+160+33.18$$

v_6 = 67.46 ft/s

2. Find length of 8-inch pipe to loop through subdivision to maintain fire flow velocity below 10 ft/sec.

Pipe diameter = 8 in.
Length = ? ft.
q = 2262.5 gpm
z_6 = 160 ft.
z_7 = 160 ft.
p_6 = 20 psi
p_7 = 20 psi
v_6 = 67.46 ft/s
v_7= 10 ft/s

Energy equation from node 6 to node 7:

$$\frac{p_6}{\gamma} + \frac{v_6^2}{2g} + z_6 = \frac{p_7}{\gamma} + \frac{v_7^2}{2g} + z_7 + h_f$$

$$\frac{v_6^2}{2g} = \frac{v_7^2}{2g} + h_f$$

$$\frac{67.46^2}{2(32.2)} = \frac{10^2}{2(32.2)} + h_f$$

$$f = 0.2083\left(\frac{100}{110}\right)^{1.85}\frac{2262.5^{1.85}}{8^{4.8655}} = 11.33$$

$$h_f = L\left(\frac{11.33}{100}\right)$$

$$\frac{67.46^2}{2(32.2)} = \frac{10^2}{2(32.2)} + 0.1133L$$

L = 610 ft.

Therefore, need to loop about 610 feet of 8-inch pipe at elevation 160' to keep fire flow velocity through pipe less than 10 ft/sec.

CHECK RESERVOIR CAPACITY

CRITERIA

- Meet max. daily consumption with full reservoir and no source input.
- Meet max. daily rate plus fire flow with reservoir ¾ full at start of fire.

Determine if reservoir meets criteria.

Max. Daily Consumption = 1.5 x Ave. Daily Demand

Light Industry = 4000 gal/acre

Ave. Daily Demand = 4000(63) = 252,000 gal/d

Max. Daily Consumption = 1.5(252,000) = 378,000 gpd

Since the max. daily consumption is less than 1,000,000 gallons, the capacity is adequate.

Max. Daily Rate plus Fire Flow

Max. Daily Rate = 378,000 gpd

Fire Flow (2 hrs) = 2000(120) = 240,000 gpd

Reservoir ¾ Capacity = 0.75(1,000,000) = 750,000 gallons

Max. Daily Rate + Fire Flow = 618,000 gallons

Since the max. daily rate plus fire flow is less than 750,000 gallons, the reservoir capacity is adequate.

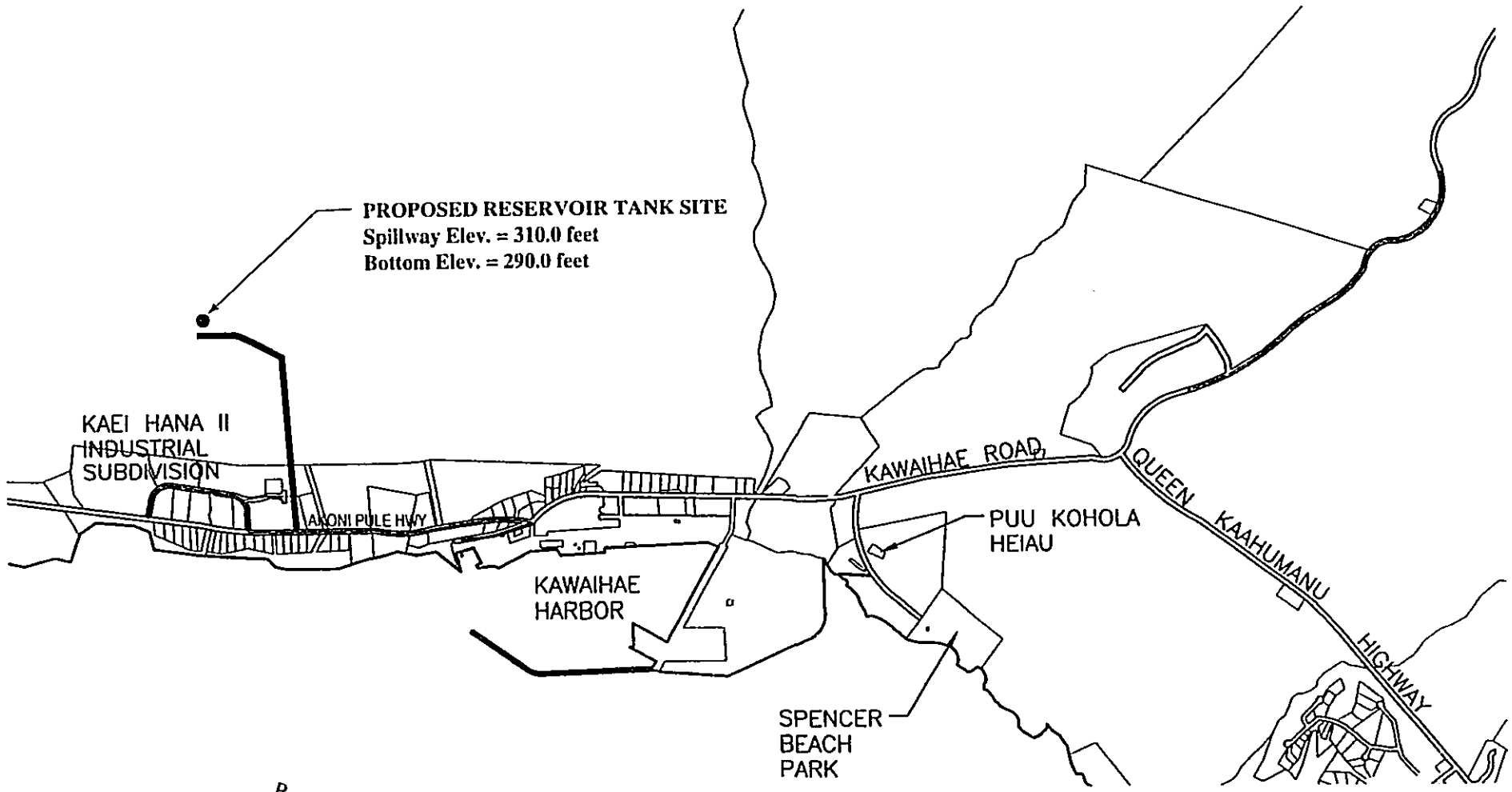

Figure 1-2
Vicinity Map

0 2000 4000
FEET

KAWAIHAE 1.0 MG TANK

R. M. TOWILL CORPORATION
August 2001

transmission main within the Akoni Pule Highway. The 8-inch transmission main connects to a 6-inch transmission main that follows Kawaihae Road in a southerly direction. The 6-inch transmission main then connects to a 12-inch transmission main. This 12-inch transmission main connects to a 250,000 gallon source tank to the east (See **Figure 1-3**). The tank has a spillway elevation of 596 feet and a bottom elevation of 580 feet.

The County of Hawaii, Department of Water Supply (DWS) is currently planning to upgrade approximately 9,000 feet of the existing 6-inch water main to a 12-inch main. The upgrade is planned to start at the Queen Kaahumanu Highway intersection and end in the vicinity of the Kawaihae Small Boat Harbor. The DWS is scheduled to complete construction of the proposed 12-inch water line by the Spring of 2001. Therefore, the upgrade should be completed prior to construction of the proposed 1.0 mg reservoir. Upon completion, the water tank and appurtenances will be conveyed to the DWS for operation and maintenance via license agreement.

In order to determine the ability of the existing system to meet County standards a Water System Study was prepared in February 1999 (See Appendix A, Water System Study). The following DWS criteria was utilized for the basis of the study:

- Maximum Daily Demand = 1.5 x Average Day
- Peak Hour = 5 x Average Day
- Fire Demand = Fire Flow + Max. Daily Demand with residual pressure of 20 psi
- Peak Hour Demand = Peak hour flow with residual pressure of 40 psi

According to County requirements and discussions with DWS staff in August 1998, the fire flow and peak hour demands for the Industrial Subdivision and surrounding areas are as follows:

- Average Daily Demand is 56.6 gpm (gallons per minute)
- Peak Hour Flow is 283 gpm
- Maximum Daily Demand is 85 gpm
- Pressure at Node 1 is 30 psi

APPENDIX B

ARCHAEOLOGY - CULTURAL SURVEYS HAWAII

ARCHAEOLOGICAL ASSESSMENT OF PROPOSED WATER LINE CORRIDORS AND A RESERVOIR SITE IN KAWAIHAE 1 *AHUPUA`A*, SOUTH KOHALA DISTRICT, ON THE ISLAND OF HAWAI`I (TMK 6-1-06: por. 2, 3, 7; 6-1-01: por. 3)

by

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Prepared for

R.M. Towill Corporation

Cultural Surveys Hawai`i
October 2000

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I. INTRODUCTION

A. Project Background

At the request of R.M. Towill Corporation, Cultural Surveys Hawai`i has completed an archaeological assessment for a proposed water line and water tank project on land owned by the Department of Hawaiian Home Lands (DHHL) in Kawaihae 1 *ahupua`a*, South Kohala District, on the island of Hawai`i (TMK 6-1-06: por. 2, 3, 7; 6-1-01: por. 3) (Figures 1& 2). The project includes the construction of a one-million gallon reservoir just below the 300-ft. elevation. An approximately 3,200-ft. long, six-inch wide water line and access road are to extend south from the reservoir to Akoni Pule Highway. Additionally, an approximately 2500-ft. long, 12-inch wide water line is to extend southwest from the proposed water tank to an existing line at the Kaei Hana II industrial subdivision. The proposed reservoir and water lines are located between Makahuna Gulch and Honokoa Gulch.

B. Project Area Description

The project area in Kawaihae 1 *ahupua`a* lies within the Waiaka slightly dissected upland physiographic province on the southwest side of the Kohala volcanic shield. The slight degree of dissection is due both to low rainfall (under 15 inches per year) and to the fact that, on these western slopes of older Polulu volcanic lavas, "erosion was constantly interrupted and its damages repaired by repeated lava flows of the Hawi series" (Macdonald and Abbott, 1971: 299).

The soils in the project area belong to the Kawaihae series and are characterized as "somewhat excessively drained, extremely stony soils that formed in volcanic ash"; specifically, the soils are very rocky, very fine, sandy loam with 10% to 20% rock outcrops (Foote *et al.*, 1973:26).

Vegetation is of limited diversity, largely limited to buffel grass (*Cenchrus ciliaris*) and *kiawe* (*Prosopis pallida*) trees, with scattered *koa haole* (*Leucaena glauca*), *`ilima* (*Sida fallax*) and *`uhaloa* (*Wlatheria americana*).

C. Scope of Work

The scope of work for this assessment was prepared after consultation with Dr. Pat McCoy, Hawai`i Island archaeologist for the State Historic Preservation Division (SHPD). Since an archaeological inventory survey report of DHHL parcels — including the present project area — in Kawaihae 1 *ahupua`a* (Hammatt *et al.*, 1991) has already been reviewed and accepted by the SHPD, it is the SHPD's judgement that an archaeological assessment study would be acceptable for the present project area. The specific concern of the SHPD is that the proposed corridors and reservoir site avoid impact to archaeological sites (including possible burial sites) in the immediate area.

The scope for the assessment includes:

1) Consultation with the State Historic Preservation Division.

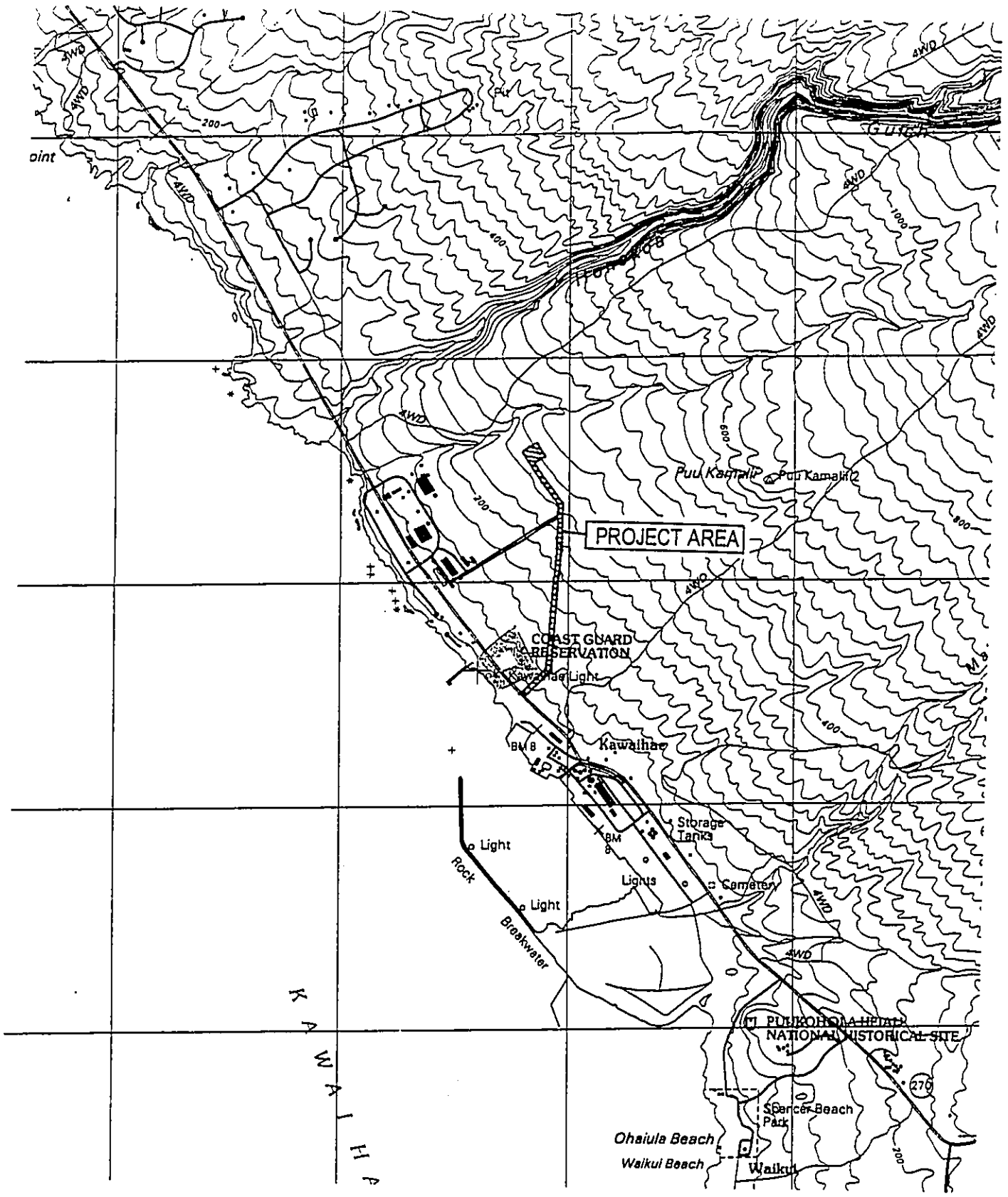


Figure 1 Portion of USGS topographic map, Kawaihae Quadrangle, showing project area (hatched)

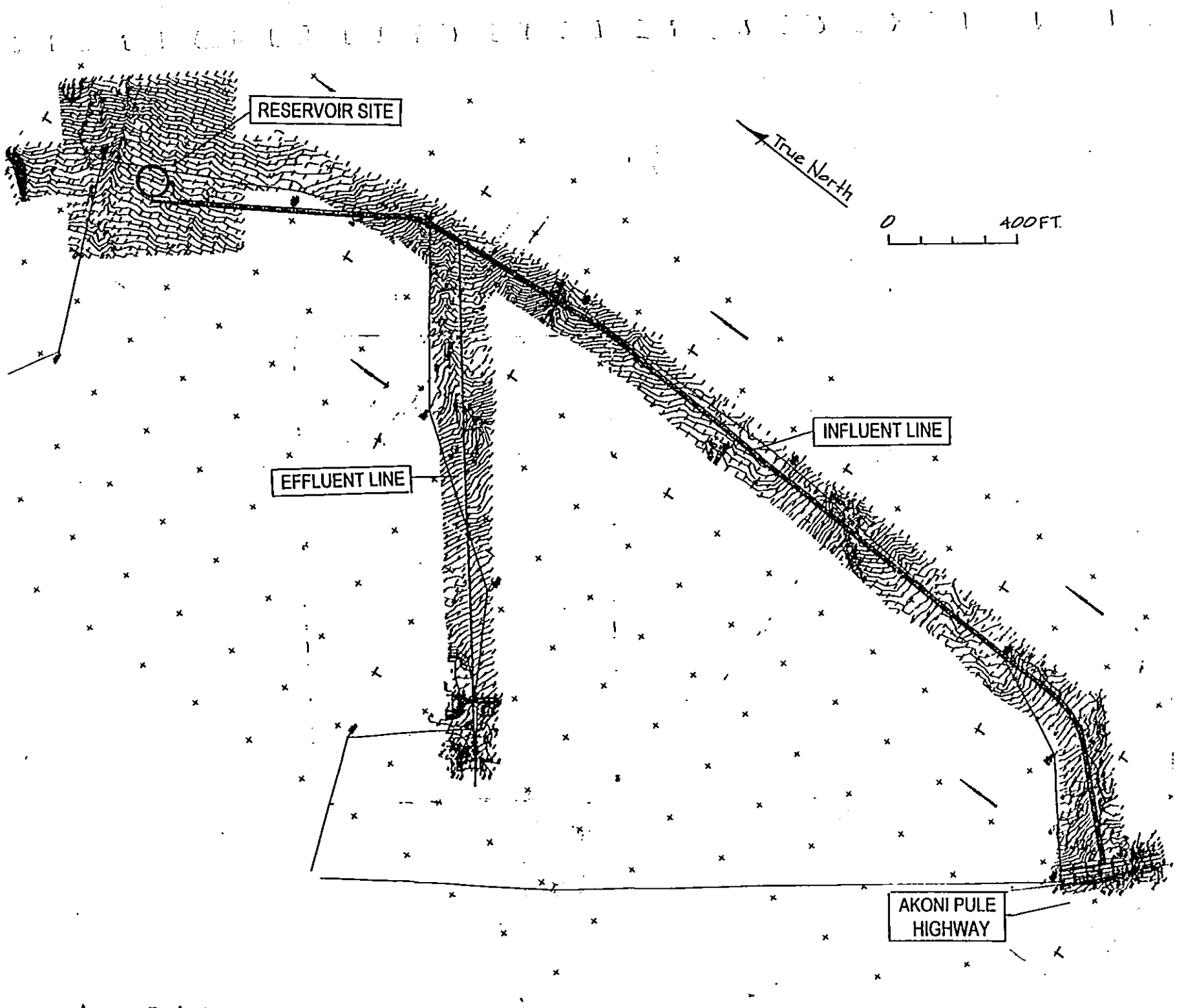


Figure 2 Project area

2) Background research to briefly summarize the major archaeological research already accomplished in Kawaihae I *ahupua`a* that is directly relevant to the present project area. The proposed water-line corridors and reservoir site would be plotted on site location maps in previous archaeological reports to determine the possible proximity of any previously-recorded sites and features.

3) Field inspection, directed by a senior author of the 1991 inventory survey report by Cultural Surveys Hawai`i, to include staking of the limits of any significant sites and features within or adjacent to the proposed corridors and reservoir site. Also, if deemed necessary, subsurface testing by hand would be undertaken to assess the possible presence of human burials within or adjacent to the project area.

4) An assessment report to detail results of the background research and fieldwork.

D. Methodology

Background Research

Background research included a review of previous archaeological studies of Kawaihae 1 *ahupua`a* on file at the State Historic Preservation Division of the Department of Land and Natural Resources. Specific interest focused on previously recorded archaeological sites within and in the vicinity of the present project area.

Fieldwork

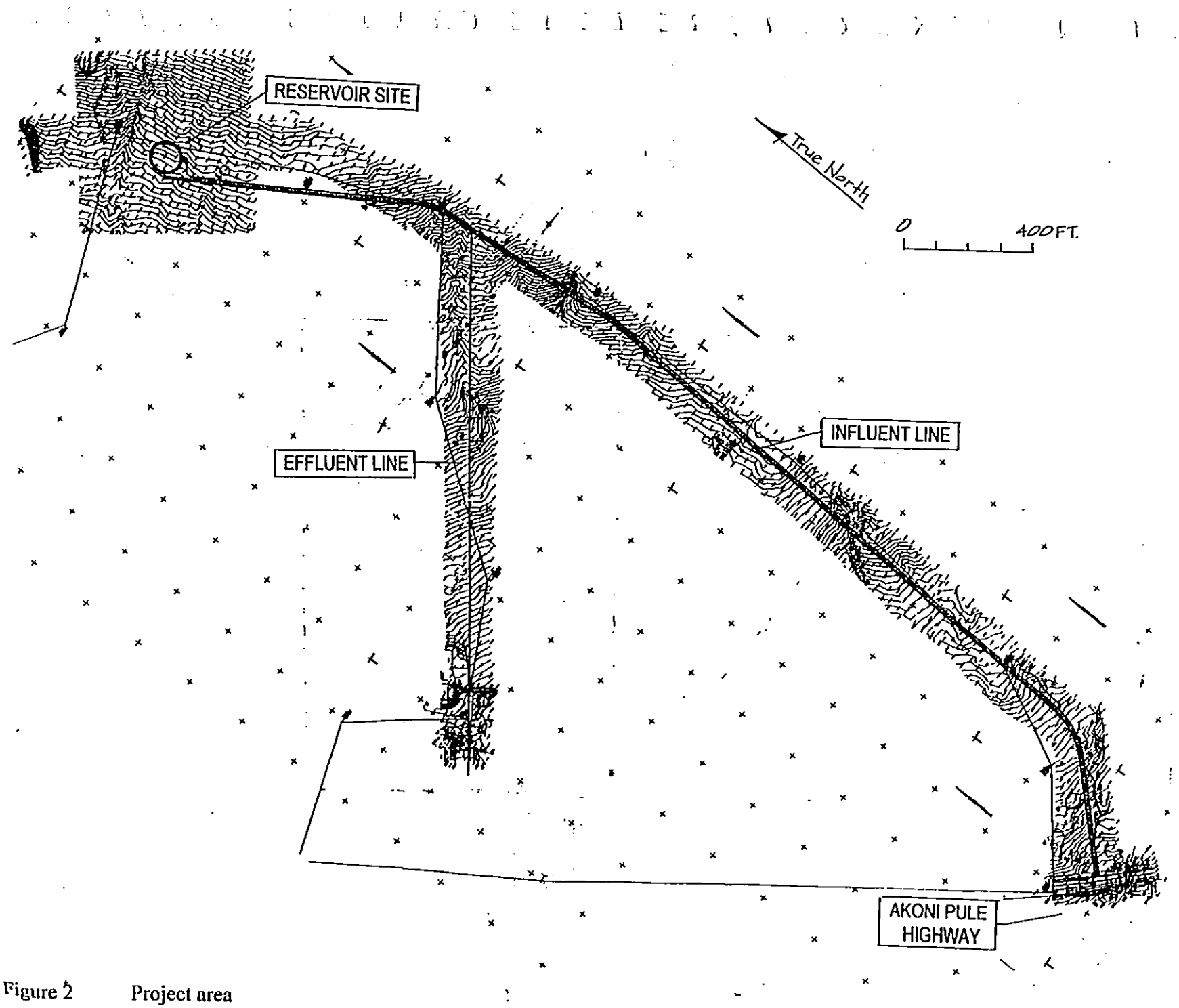
The project area was inspected on October 12, 2000 by Douglas Borthwick, a senior author of the 1991 inventory survey report, and Brian Colin. R.M. Towill supplied project-specific topographic maps (1in.=40ft.) which greatly facilitated accurate and thorough coverage during the field inspection.

Utilizing the topographic project area maps, the proposed influent line/access road corridor, reservoir tank site, and effluent line corridor were surveyed on foot. The survey was initiated at the proposed intersection of the access road and Akoni Pule Highway. The survey proceeded northward to the proposed tank site, then backtracked to the effluent line corridor, then proceeded *makai* or westward downslope to the effluent line terminus at the existing industrial subdivision. The archaeologists were spaced at five to ten meter intervals on either side of each corridor centerline. The tank site required two north/south-oriented sweeps to completely cover the area.

Vegetation was sparse throughout, except for the area adjoining Akoni Pule Highway which had a moderate cover of kiawe trees. The ground visibility was excellent, even adjacent to Akoni Pule Highway, allowing for accurate survey results. No subsurface testing was undertaken.

CORRECTION

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



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II. OVERVIEW OF PREVIOUS ARCHAEOLOGICAL RESEARCH RELEVANT TO THE PRESENT PROJECT AREA

The present project area has been the focus of numerous archaeological surveys. In the early 1970s, two Bishop Museum studies covered the southeastern portion of the project area (Barrera and Kelly, 1974; Luscomb, 1974). The Barrera and Kelly (1974) work was for the proposed Mudlane-Waimea-Kawaihae Road alignment. In addition to a reconnaissance field survey, the study included an historic background section with interviews of knowledgeable local informants.

As part of a more detailed study of the proposed highway corridor, the Bishop Museum undertook survey and data recovery work in the late 1970s and early 1980s (Clark and Kirch, 1983). In the mid-1980s Bishop Museum undertook further survey work for the Department of Hawaiian Home Lands (DHHL) in Kawaihae, including the area within which the present project is situated (Allen, 1987). In 1989 Cultural Surveys Hawai`i conducted an inventory survey of some 2000 acres of DHHL Kawaihae lands which, in part, included the present project area (Hammatt et al., 1991).

Each of the above-referenced reports had scopes-of-work related to either geographical or site-specific limitations that have made site correlations for the present project area difficult. However, based on the review of past research, a variety of site types were anticipated in the project area. The anticipated sites include: enclosures with associated burials (50-10-05-5998)), temporary habitation complexes (e.g., Sites 50-10-05-13,725; -13,726; -13,913) and possible burials site (Site 50-10-05-13,910A and B). The sites are generally located below the 200 ft. contour with much fewer sites at higher elevations.

The reports also indicate that the portion of the project area closest to Akoni Pule Highway has a fairly extensive midden and artifact surface scatter. The surface scatters are related to the previous habitational use of this portion of the project area. Additionally, bulldozing in the area, mainly for fire-fighting activities, has also damaged sites and dispersed associated cultural deposits. Based on background data, the enclosures of Site 50-10-05-5998 were constructed in recent times specifically to prevent bulldozing on the known burial features (Barrera and Kelly 1974; Clark and Kirch 1983).

III. FIELD INSPECTION RESULTS

During the field inspection, four known sites were re-identified and additional unrecorded features were observed in the most *makai* (southern) portion of the proposed access road (Figure 3). No sites were observed in the access road corridor beyond the first 800 feet, the 1mg tank locale, or the 12" water line corridor. Based on the field observations, the only problematic portion of the project area is the *makai*-most 800 feet of the proposed access road/6" water line.

The presently planned access road intersects Akoni Pule Highway approximately 900 ft. from Port of Laau Fish Market. The access road corridor (ca. 40 feet wide) then extends north some 3200' feet to the proposed 1mg tank locale. In the first 800 feet *mauka* (northeast) from Akoni Pule Highway, the access road corridor passes through four previously-documented site areas and additional — apparently unrecorded — site areas. The four previously-documented sites include 50-10-05-5998, 50-10-05-13725, 50-10-05-13726, and 50-10-05-13913. Site -5998 consists of surface scatter of midden and artifacts, two enclosures, and associated burial features. Sites -13725, -13726, and -13913 are groupings of associated temporary habitation features. Site descriptions and maps of the four sites — as recorded in previous surveys of Kawaihae — are presented in Appendix A.

The unrecorded features are mostly small c-shaped, oval and rectangular enclosures similar to those documented at sites -13725, -13726, and -13913. Additionally, a surface scatter of midden and artifacts — ranging from sparse to fairly dense — covers virtually the entire *makai* area through which the proposed access road passes.

Based on site locations and field observations, the planned access road will adversely affect some of the observed sites. Additional survey time was spent in this *makai* area looking for an alternative route where no sites would be affected. The surveyed area was expanded to include some 100 to 150 feet on either side of the proposed center line. No clear alternative was found though the known burial site -5998 could be avoided.

The field investigation of this portion of the project area confirmed previously-identified site patterning models for Kawaihae. Site density is high immediately inland of the existing highway(s) and existing structures of Kawaihae Town (e.g. La`au's Fish Market). Sites in this zone consist of a variety of habitations (temporary and permanent), and marked and unmarked burials.

No sites were observed in the access road corridor beyond site -13725 which is at roughly 110 feet amsl and 800 feet *mauka* of Akoni Pule Highway. The proposed access road extends north beyond site -13725 for some 2,400 feet to the proposed tank locale at 290 feet amsl. The ground visibility was excellent and all road stakes were relocated, indicating excellent survey coverage for the present field inspection.

No sites were observed within the proposed 12" water line corridor from the proposed access road to an existing line with the Kaei Hana II light industrial subdivision. The water line meets the access road at 270 feet amsl some 2,500 feet from the coast. The light industrial

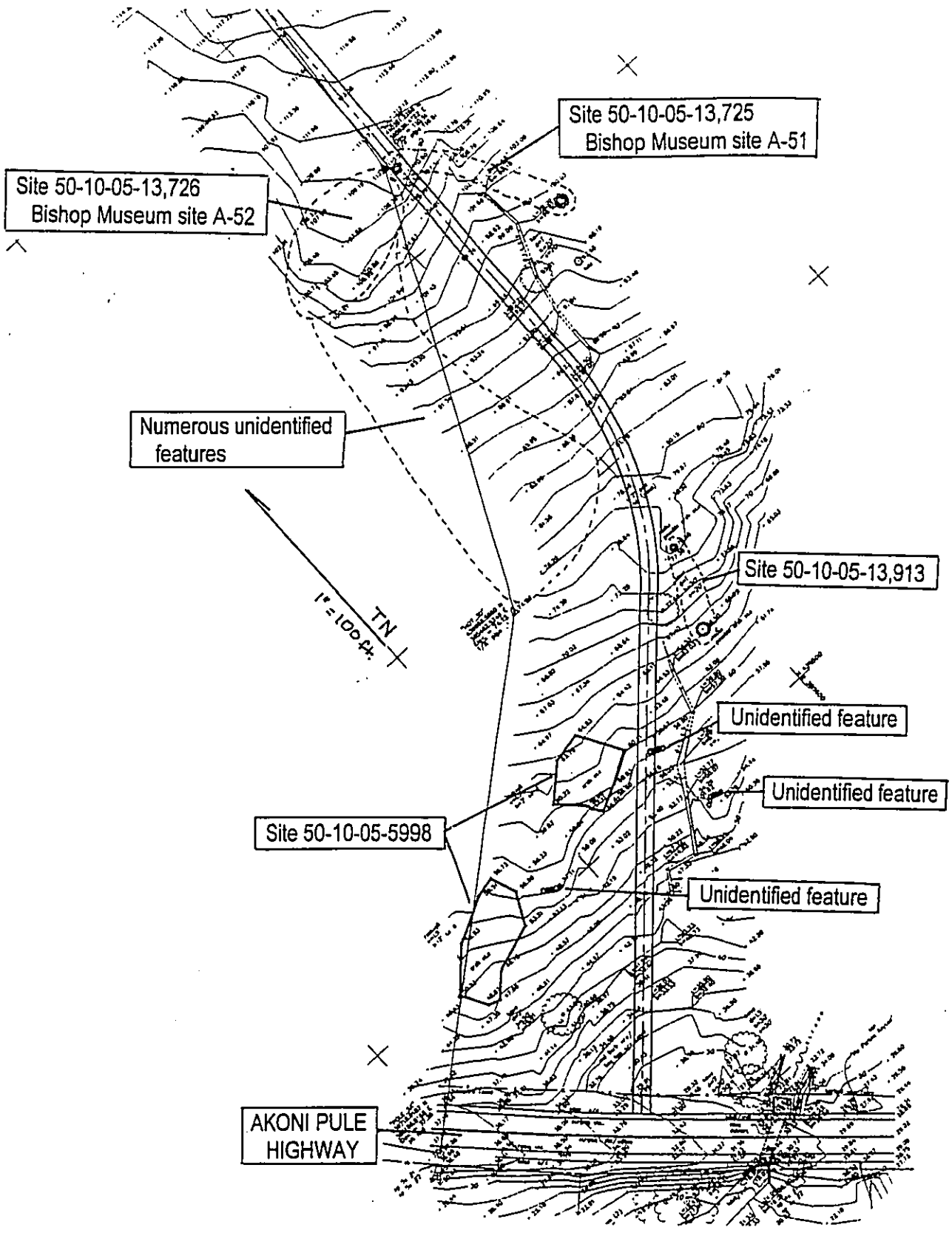


Figure 3 *Makai* portion of access road showing locations of archaeological sites andfeatures

subdivision end of the water line is at 100 feet amsl at the southern end of a newly-paved roadway.

Though sites have been recorded in the general vicinity of the upper section of the access road, tank, and water line, none were observed within the parameters of the survey area. The site patterning model for Kawaihae includes a diminution of site density with increased elevation and distance from "central Kawaihae". Site density decreases markedly with elevation until ca. 1200-1400 ft. amsl in the uplands. Thus the bulk of the present project area is within a relatively low site density zone, except for the most *makai* portion of the access road.

IV. SUMMARY AND RECOMMENDATIONS

The present project is an archaeological assessment of a proposed undertaking that includes an approximately 3,200 ft. long by 12 ft. wide access road and 6" water line, 1mg water tank locale, and a 2,500 ft. long by 12 ft. wide 12" waterline corridor. The archaeological methodology of conducting an assessment was agreed upon by SHPD/DLNR staff. The assessment approach was deemed sufficient to address site-specific impacts in an area that had been previously surveyed (Barrera and Kelly 1974; Luscomb 1974; Clark and Kirch 1983; Allen 1987; Hammatt *et al.* 1991).

Prior to the archaeological field inspection.portion of the assessment the project area (i.e., access road, tank locale, and water line) was surveyed to create a detailed topographic map for planning and engineering purposes. The detailed topographic survey included a swath approximately 150 feet wide or 75 feet on either side of the proposed centerlines of the access road, and an area of approximately 500 ft. by 500 ft. for the tank locale. Though the proposed undertakings were indicated to affect narrower corridors and a smaller tank locale, the entire area that was topographically surveyed was subjected to archaeological field investigation for this assessment.

The literature review for the assessment focused on research specific to the present project area. The background research indicated that site density would be highest in the *makai* portion of the project area just *mauka* of Akoni Pule Highway. Site types most likely to be encountered would include burials and temporary habitation complexes.

The sites identified during field inspection included 50-10-05-5998; 50-10-05-13725; 50-10-05-13726; and 50-10-05-13913. Additionally, previously unrecorded features in the immediate vicinity of these four sites were also observed. The four sites and the unrecorded features are situated within the *makai* (southern) most section of the proposed access road. The section with the sites is roughly 800 ft. long (NE/SW) and extends beyond the limits of the area topographically surveyed. Associated with the sites is a surface scatter of midden and artifacts. The surface scatter concentrations range from sparse shell midden to areas of fairly dense midden with occasional artifacts (e.g. volcanic glass flakes and fine-grained basalt flakes).

The previously identified sites have been functionally interpreted as burial features with associated enclosures for sites 50-10-05-5998 and temporary habitation for sites 50-10-05-725, 50-10-05-13726, and 50-10-05-13913. The apparently unrecorded features include possible burials in the vicinity of site 50-10-05-5998, and temporary habitation features in proximity to sites 50-10-05-13725 and 50-10-05-13726.

No sites were observed in the remaining portions of the entire project area. No sites were observed in the road corridor inspected beyond the site area of 50-10-05-13725. The access road extends north beyond site -13725, away from "central Kawaihae", whence gains in elevation and distance from the coast indicate a lower site density zone.

The 1mg tank locate is situated some 2,600 feet from the coast and at 290 ft. amsl. The field inspection included not only the specific area proposed for the tank but areas to the north

and west towards a large unnamed Gulch. No sites were observed and the area close to the gulch contained evidence of extensive bulldozing. The bulldozing continues downslope to the old "Pioneer" warehouse in the light industrial subdivision.

The 12" water line corridor was also found to be void of archaeological sites. The *makai* end of the line connects to existing asphalted roadway within the industrial subdivision.

Based on the field inspection and background studies, the *makai*-most (800 ft. long) portion of the proposed access road is the main area of archaeological concern. The section contains the only sites observed in the entire project area. It is possible that recorded burial features could be avoided by a realigned access road in the vicinity of the presently-proposed road. However, based on field observation, there is no way to construct a road that avoids all archaeological sites within the topographically and archaeological surveyed area. If, however, avoidance of all known archaeological sites is the goal, then an alternative access road alignment is necessary. In terms of the present investigation, use of the proposed 12" water line corridor as the access road to the proposed tank locale would avoid known archaeological sites.

V. REFERENCES

Allen, Melinda S.
1987 *Archaeological Inventory Survey of Department of Hawaiian Home Lands, Hawaihae 1, South Kohala, Hawai`i*, MS. 073187. Bernice Pauahi Bishop Museum.

Barrera, William Jr., and Marion Kelly
1974 *Archaeological and Historical Surveys of the Waimea to Kawaihae Raod Corridor, Island of Hawaii: Archaeological Survey and Historical Survey.* Departmental Report Series 74-1. Dept. Of Anthropology, B.P. Bishop Museum.

Clark, Jeffrey T. and Patrick V. Kirch (*editors*)
1983 *Archaeological Investigations of the Mudlane-Waimea-Kawaihae Road Corridor, Island of Hawai`i: An Interdisciplinary Study of an Environmental Transect.* Department of Anthropology, Bernice Pauahi Bishop Museum.

Foote, Donald E., Elmer L. Hill, Sakuichi Nakamura, and Floyd Stephens
1973 *Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii.* Soil Conservation Service, U.S. Department of Agriculture.

Hammatt, Hallett H., David W. Shideler, Douglas K. Borthwick, Mark Stride, Matt McDermott, Kristie Nakamura
1991 *Archaeological Survey and Testing Kawaihae 1 (Komohana), South Kohala, Hawai`i.* Cultural Surveys Hawai`i, Inc.

Luscomb, Margaret L.K.
1974 "Archaeological Walk-Through Survey of Proposed Kawaihae and Kukuipahu Power Plant Areas, Island of Hawai`i." Department of Anthropology, B.P. Bishop Museum, Honolulu.

MacDonald, Gordon A. and Agatin T. Abbott
1971 *Volcanoes in the Sea.* Honolulu: The University Press of Hawaii.

APPENDIX A: SITE DESCRIPTIONS

Four previously-recorded archaeological sites — 50-10-05-5998, 50-10-05-13725, 50-10-05-13726, and 50-10-05-13913 — were identified within or in the immediate vicinity of the proposed access road/influent line corridor during the field inspection. Presented below are the four sites' descriptions (with accompanying figures) extracted from the reports in which they were originally recorded (Clark and Kirch 1983; Allen 1987; Hammatt *et al.* 1991).

Site 50-10-05-5998
(from Clark and Kirch, 1983: 66-69)

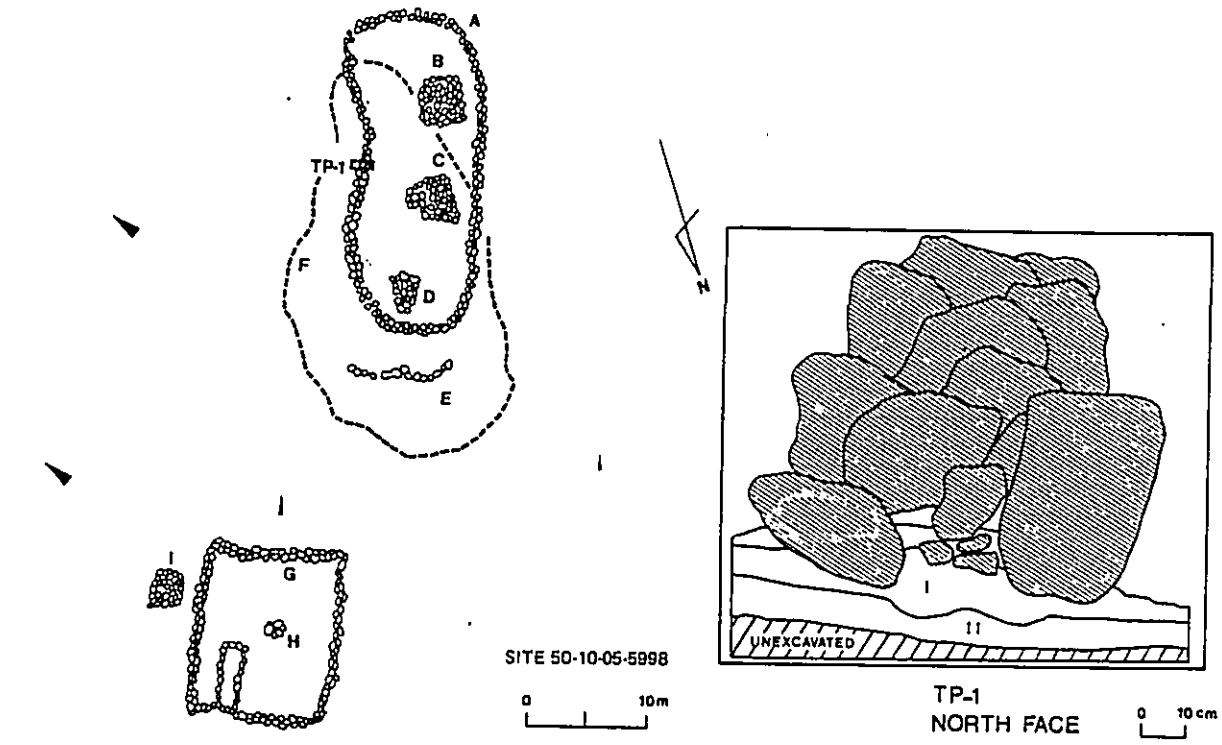


Fig. 4.2. PLAN VIEW OF SITE 50-10-05-5998 AND CROSS SECTION OF TP-1 IN FEATURE A.

This is the northernmost site in the project area, and is the nearest to the old shoreline. It is composed of nine features: four burial platforms (Features B, C, D, and I); a boulder-and-cobble mound that also may be a burial monument (Feature H); an oval enclosure wall (constructed of stacked boulders and cobbles) that surrounds three of the platforms (Feature A); a rectangular enclosure that is possibly residential (Feature G); a double-arc boulder alignment just beyond and parallel to the *mauka* end of Feature A (Feature E); and a midden and lithic surface scatter (Feature F) that covers a large area inside and outside of Feature A and around Features B through E (Fig. 4-2).

This site is situated on the *mauka* side of the highway centerline with only a portion of one feature (A) extending into the ROW. Much of the ground surface at this location is

exposed bedrock and throughout the area are scars of past bulldozing. Due to these conditions, extensive excavation was deemed unnecessary. Instead, a single unit, 1.0 by 0.5 m in size, was established across the west wall of Feature 5998-A in order to determine the relationship between this feature and the midden and lithic scatter (Feature 5998-F).

Excavation

The stratigraphy was quite simple, consisting of two layers capped by a few centimeters of wind-blown organic matter. The top soil layer (I), 5 to 15 cm of dark-brown (7.5YR3/4) sandy loam, contained what little cultural deposit was present. The second layer (II), of compact, strong brown (7.5YR4/6) sandy loam, was culturally sterile.

Cultural Content

The surface midden at Feature 5998-F comprised a variety of shellfish groups but was deominated by *Cyopraea* and *Nerita* with a scattering of *Drupa, Morula, Cellana,* urchin, *Conus,* and others. The midden remains collected through excavation reflect the composition observed in the surface scatter, with the main difference being the subsurface presence of bivalves (Table 4.3†).

During the initial survey, 27 artifacts were collected from the surface at this site (Barrera and Kelly 1974). We supplemented this number with an additional 15 surface specimens and seven items from excavation, all from Feature 5998-F.

Of the seven excavated artifacts, five are small volcanic-glass flakes and two are basalt flakes. From the surface collection, 24 pieces are volcanic-glass flakes or shatter and five are volcanic-glass cores. Only one of the flakes showed edge damage. Of the 12 basalt flakes from the surface, four had one or two polished surfaces indicating the reworking of previously completed adzes. One of the polished flakes has post-detachment retouch on one end, and microscopie examination showed evidence of an axial rotation motion indicative of use as a drill. Three adze fragments were collected from the surface. Two of these are butt portions of small, thin (1 cm) tools, rectangular in cross section, while the other specimen is the middle portion of a large, tanged adze, square in cross section. Other tools collected include four scoriaceous lava abraders, six coral abraders, and two sea-urchin-spine file fragments, both badly eroded.

All of the basalt material is very dark gray to dark gray in color and fine to medium-fine grained. Three pieces show cortex, one clearly from a waterworn cobble. These materials are clearly different from the basalts in the immediate vicinity but the precise sources are unknown. Both trachytic and basaltic volcanic glass (see Report 12) are present, indicating that at least one source (trachyte from Pu`u Wa`awa`a) is not local.

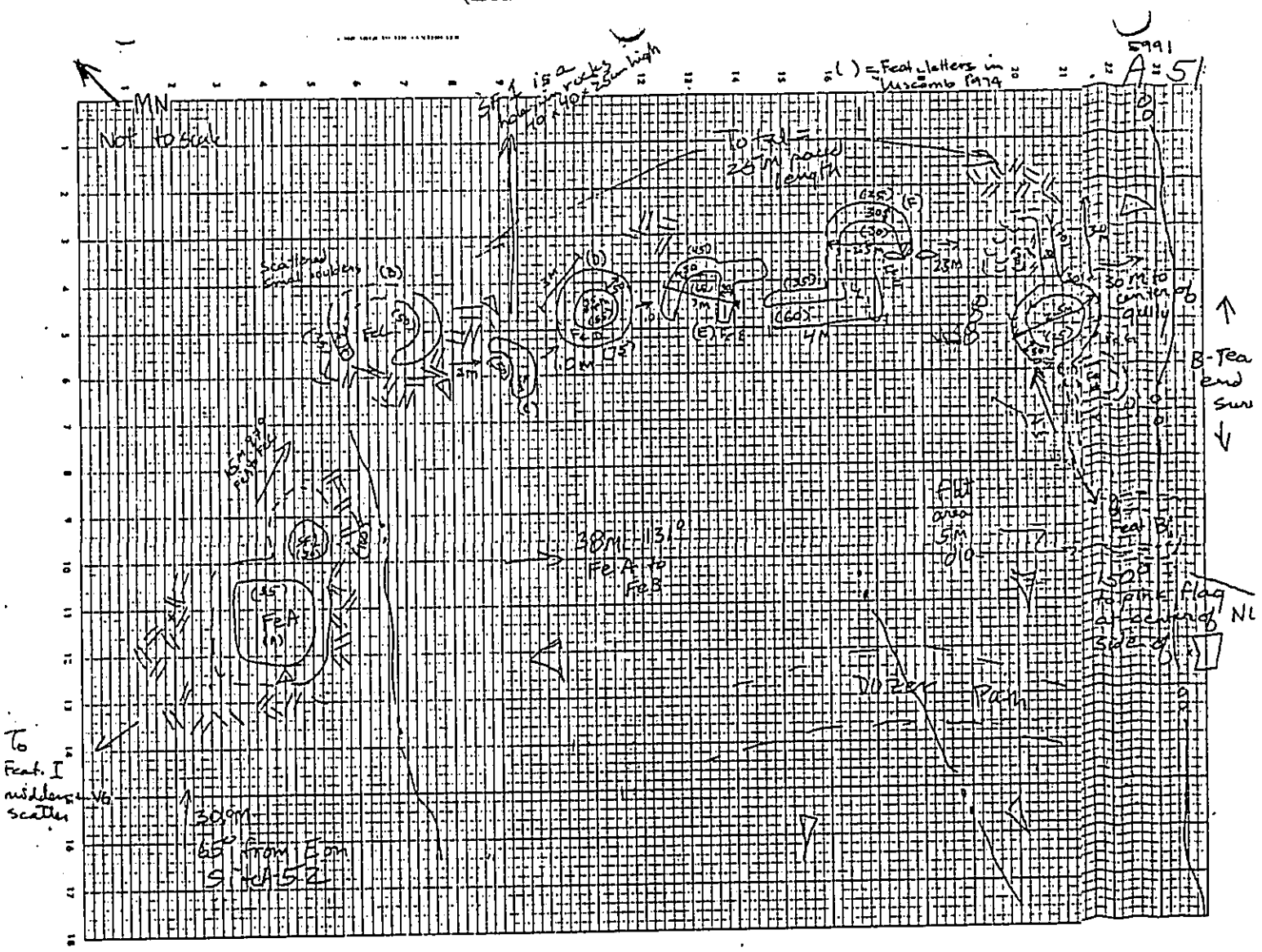
Two pieces of volcanic glass from the surface were submitted for alteration measures. Both pieces indicate a late prehistoric age, ca. A.D. 1600 to 1800. Barrera had earlier submitted a single piece of volcanic glass to Maury Morgenstein, who reported a measurement that falls within the time-range indicated above (Barrera and Kelly 1974:62), but we do not know the type of material (trachytic or basaltic) or the type of measurement (alteration, hydration, or both) so this determination must be used with caution.

Discusssion

Excavation across the wall of Feature 5998-A showed that the base of the wall lay very near the ground surface and was clearly built over the cultural deposit. Unweathered breaks and scrapes on some of the rocks used for the wall suggest a relatively recent date of construction. The following sequence of events is proposed for Features A through F at this site. Due to lack of investigations at Features G through I, nothing more can be said of those structures.

Residential activity began at this location in the late prehistoric period. Features 5998-E and 5998-F are the vestiges of that occupation. If other structures were present at one time, subsequent bulldozing and dismantling for the construction of Features A through D erased any traces. The length of occupation is unknown but the range of artifacts and, to a lesser extent, of midden, suggests more than a short-term encampment. The lava abraders — likely to have been brought in from farther south in Waikoloa along with coral abraders and sea-urchin-spine files, demonstrate some sort of manufacturing activity, possibly of fishhooks. Broken adzes plus the debitage from reworking adzes, as well as abundant volcanic glass (including several cores) also suggest activities taking place over a period of time. Presumably after or just prior to the abandonment of residential occupation, burials were established at this location. By comparison with other burial monuments in this region, the structures at Site 5998 would appear to be historic. In more recent times, bulldozers have been active in this area. The enclosure wall of Feature 5998-A was constructed to protect the burial monuments from destruction.

Site 50-10-05-13725
(from Allen 1987: 99-100)



SITE COMPLEX A-51 — SHELTER/ AGRICULTURAL COMPLEX

Comparison of our site map with that in Luscomb (1974) indicates that this site, located at ca. 100-ft elevation, is most likely 5991. As with Site A-46, Luscomb's feature designations are indicated in brackets in the discussion below. Overall the site measures roughly 25 m (northwe st-southeast) by 20 m. The features form a semi-circle across the slope, while the downslope area is an open space, free of structures; there is some evidence of bulldozing in this open area.

Nine features were identified in the present survey. Feature A [A] consists of two contiguous circular enclosures built on bedrock outcrop. A shelter function is postulated. The site tag was placed on the interior edge of the southwest wall of Feature A. Feature B [none]

is a U-shaped structure open on the northwest side; the structure is very deteriorated. Feature C [B] is a circular enclosure with a small opening on the west side. The adjacent downslope area is bedrock. Two meters to the southeast is a hole in the rocks, which measures 40 cm by 40 cm by 25 cm deep. Feature D [D] is a circular enclosure. Feature E [E] is a C-shaped structure with a 2.5 m long arm extending of the southeast end (parallel to the coast). Feature F [F] is a C-shaped structure. The northwest arm is the longer of the two sides and a wall segment (3.0 m long) perpendicular to the slope joins this longer arm at a right angle. Feature G [none] is a circular enclosure with an extension running directly upslope off the backside of the enclosure for 3.0 m. Feature H [none] is a very deteriorated, roughly circular enclosure with a tumbled wall extending seaward off of its northwest side. Feature I is a scatter of marine shell midden, volcanic glass, flaked basalt, and coral pebbles in a relatively flat area to the west of Feature A. Two pieces of volcanic glass were collected for dating (Acc. #14). One of these provided a date of A.D. 1723 ± 7 years.

All of the features are generally of stacked stone construction. Either agricultural or shelter functions are suggested.

Feature	Length (m)	Width (m)	Height (int/ext)	Condi-tion	Long Axis	Midden	Deposit (cm)
A	5.0	4.0	30 to 50	fair	NE/SW	I	10
B	3.5 diameter	--	35	fair	--	--	--
C	3.0 diameter	--	50/35	fair	--	--	5
D	3.0 diameter	--	55/75	fair	--	--	35
E	3.0 diameter	--	65/45	fair	--	--	--
F	2.5 diameter	--	30/25	fair	--	--	--
G	2.5 diameter	--	25/30	fair	--	--	--
H	no measure-ments taken	--	--	deterio-rated	--	--	--
I	5.0 diameter	--		good	--	F	none

Site 50-10-05-726
(from Allen 1987: 100-101)

SITE COMPLEX A-52 — SHELTER/AGRICULTURAL COMPLEX

This set of features compares well with Luscomb's (1974) description of Site 5994 (Features B, E, F, H, M, N, and possibly K) at an approximate 80-ft elevations. Much of the area in and around the site has been bulldozed since her survey in 1974. Luscomb's Features A, G, and H are within the Coast Guard Reserve, an area not covered in the present survey. Features C and D may have been destroyed by bulldozing, as they were not relocated. Feature L was apparently either overlooked or destroyed. As with Sites A-46 and A-51, her feature designations are indicated in brackets in the discussion below. No site tag was placed during the present survey.

Feature A [B] is a square enclosure. Feature B [F] consists of two contiguous C-shapes and an associated light surface scatter of marine shell midden. The C-shapes are open on the downslope side. A shelter function is likely. Feature C [K?] is a U-shaped structure with three uprights in the upslope interior wall. The structure is open to the sea and bedrock is exposed along this downslope side. A shelter function is also postulated for this structure. Feature D [N] is a double C-shape with one C-shape located upslope of the other. Both have openings on the south side. Upslope of the structure is a light scatter of midden. This compound structure may also have had a shelter function. Feature E [M] is a depression filled with rocks and an asphalt shingle. There is a crude wall around the southwest to southeast end. This is most likely a recent trash pit. Feature F [H], which is located within the Coast Guard Reserve, is a well-constructed enclosure with an internal terrace. A residential function is probable. Feature G [E] is a circular enclosure that has deteriorated on the upslope side. Feature H was not identified by the Luscomb survey. It is a small C-shape open on the ocean side, possibly used for planting. All of the structures are generally of stacked stone construction.

Feature	Length (m)	Width (m)	Height (int/ext)	Long Axis	Midden	Condition
A	3.0	3.0	30/100	--	--	fair
B	4.0	2.0	30/50	NW/SE	F	fair
C	5.0	3.0	60	NW/SE	--	fair
D	6.0	4.0	100/50	NE/SW	F	fair
E	5.0	--	--	--	--	deterio-rated
F	no measure-ments taken	--	--	--	--	good

G	2.0 diameter	--	25/30	--	--	deterio-rated
H	3.0 diameter	--	40	--	--	deterio-rated

Site 50-10-05-13913
(from Hammatt *et al.* 1991: VIII-132 - VIII135)

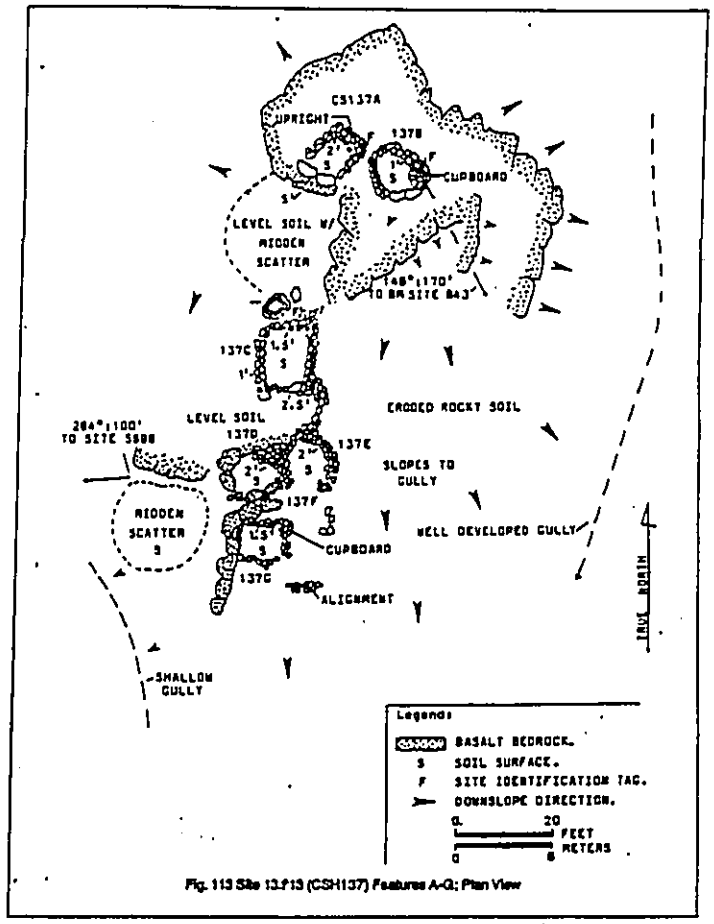


Fig. 113 Site 13-f13 (CSH137) Features A-G; Plan View

VIII-134

Located along the boundary of Lots 12 and 15 at approximately the 60' elevation, this site complex runs downslope from a rise *makai* along a gully which lies to the S/SW of the complex. The complex consists of seven features: A is a C-shape; B is a circular enclosure; C is a rectangular enclosure; Features D,E, and F are C-shapes also; and G is a small rectangular enclosure.

Feature A is a C-shape located at the top of a small rise at approximately the 60' elevation and consists of a C-shape that opens to the SW. The dimensions of this feature are NW/SE 2.1 m. exterior, 1.4 m. interior, and NE/SW 2.1 m. exterior, 1.2 m. interior. The structure is composed of boulders and cobbles. The average wall dimensions are .5 m. high and .6 m. wide. The interior is made up of soil and the soil retention seems to be good. Two pieces of midden were observed. This single use shelter is fairly well preserved and excavation potential is fair. The site marker is placed in the east corner of the structure.

Feature B is located slightly to the SE of Feature A on the same rise and consists of a circular enclosure which has a slight opening to the SE. This feature measures E/W 1.8 m. exterior, 2.1 m. interior and N/W 4. M. exterior, and 2.3 m. interior. The walls consist of stacked boulders and cobbles 1-2 courses high and are .3-.5 m. in height and .3-.6 m. in width. There is a collapsed cupboard in the SE corner of the structure adjacent to the opening. The cupboard measures .5 m. by .5 m. and .3 m. deep. The interior of the structure is bedrock and some soil. A few pieces of midden were observed, however, research potential for this recurrent use shelter is poor. The marker was placed inside the cupboard.

Feature C is located 11 m. downslope (SW) beneath a *kiawe* tree and consists of a rectangular enclosure made up of stacked boulders and cobbles with a few larger rocks/boulders. The structure measures N/S 4 m. exterior, 2.7 m. interior and E/W 3.7 m. exterior, 2.4 m. interior. The walls are .3-.5 m. wide and .3-.5 m. high. The interior consists of grass and soil which slopes towards the sea. The *kiawe* trees lies adjacent to the north side of the enclosure and the marker is also placed on the north side of the structure. Excavation potential for this single use shelter is fair.

Feature D is a C-shape which adjoins Feature C and opens to the west. This feature is composed of stacked boulders and cobbles and its dimensions are E/W 2.4 m. on the exterior, 1.8 m. on the interior and N/S 4 m. on the exterior, 2.4 m. on the interior. The walls are.3-.5 m. high and .3-.6 m. wide. The interior of this feature is grass and *kiawe*. No midden or artifacts were observed. The excavation potential of this single use shelter is poor and the marker was placed in the north corner.

Feature E is a C-shape which adjoins D to the SE. This structure opens to the S/SW and the dimensions are NE/SW 3.3 m. on the exterior, and 2.7 m. on the interior. The walls are stacked boulders and cobbles 3 courses high and measure .5-.8 m. high and .3-.6 m. wide. The interior of the feature is soil and loose rock. A few pieces of midden were observed inside the feature, but because of erosion the excavation potential of this feature is poor. The marker was placed in the north corner of this single use shelter.

Feature F is a C-shape that adjoins Feature E to the west. This feature opens to the west and measures E/W 2.7 m. on the exterior, 2.1 m. on the interior and N/S 3.7 m. on the exterior, and 2.7 m. on the interior. The walls are constructed of large boulders on the west side and the rest of the structure is constructed of average boulders and cobbles. The walls are .3-.6 m. wide and .3-.6 m. high. The interior of the feature is composed of some soil and loose rocks and bedrock toward the feature opening. Some midden was observed (a few pieces) to the west of the structure. The research potential for this single use shelter is low and the marker was placed in the north corner of the feature.

Feature G is located just south of Feature F and consists of a small rectangular enclosure. It measures NE/SW 2.7 m. on the exterior, 1.5 m. on the interior and NW/SE 4 m. on the exterior, 2.7 m. on the interior and the walls are .3-.6 m. high and .3-.6 m. wide. The walls are composed of boulders with bedrock and the NW wall. The *makai* wall is partly eroded and the south and east sides of the structure are pedestalled and slightly collapsed downslope due to this same erosion. The interior of the structure is composed of soil and loose rocks and some midden was observed both inside and outside downslope. The only other artifact or midden observed was bottle glass (Twin Falls) which was found downslope to the SE. The research potential for this single use shelter is fair to poor and the marker was placed in the north corner of this feature.

APPENDIX B: FIELD INSPECTION PHOTOGRAPHS

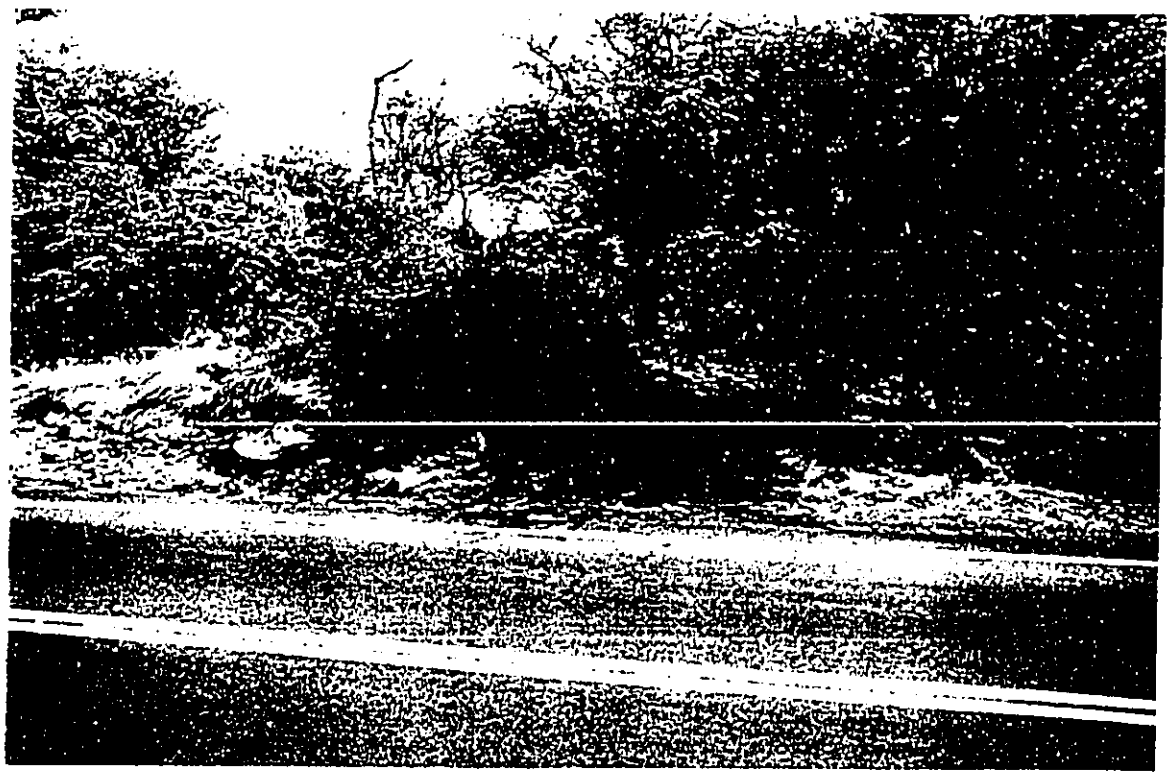


Figure 4 Location of proposed access road and Akoni Pule Highway intersection (View to NE

Figure 5 Site 50-10-05-5998. feature A enclosure. proposed access road would be on left side of enclosure (view makai or south)

Figure 6 Proposed 12" water line corridor looking *makai* (southwest) towards light industrial subdivision (View SW)

Figure 7 *Makai* terminus of proposed 12" water line at Industrial Subdivision (View SW)

APPENDIX C

CULTURAL RESOURCES - CULTURAL SURVEYS HAWAII

A NATIVE RIGHTS ASSESSMENT FOR PROPOSED WATER LINE CORRIDORS AND A RESERVOIR SITE IN THE *AHUPUA`A* OF KAWAIHAE 1, SOUTH KOHALA DISTRICT, ISLAND OF HAWAI`I

(TMK 6-1-06: por. 2, 3, 7; 6-1-01: por. 3)

by

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Prepared for

R. M. Towill Corporation

Cultural Surveys Hawai`i
March, 2001

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I. INTRODUCTION

At the request of R. M. Towill Corporation, Cultural Surveys Hawai`i conducted a Native Rights Assessment for proposed water lines and a water reservoir tank site on land owned by the Department of Hawaiian Home Lands (DHHL) in the *ahupua`a* of Kawaihae 1, South Kohala District, on the island of Hawai`i (TMK 6-1-06: por. 2, 3, 7; 6-1-01: por. 3) (Figures 1 & 2). This report presents the findings of this Native Rights Assessment.

This assessment is intended to be informational for the purpose of disclosing any cultural impacts to native rights and practices the proposed development might have on Hawaiian culture. The Scope of Work (SOW) was designed to meet the cultural impact assessment requirements of the Office of Hawaiian Affairs (OHA), the Office of Environmental Quality Control (OEQC) and any other state and county agencies involved in the review process for the proposed project.

In brief, the Hawai`i State Constitution, Article XII, Section 7 protects "all rights" of native Hawaiians that are "customarily and traditionally exercised for subsistence, cultural and religious purposes". In addition, the 20th Legislature passed H.B. No. 2895, approved as Act 50 by Governor Cayetano, which states:

> "... the past failure to require native Hawaiian cultural impacts assessments has resulted in the loss and destruction of many important cultural resources and has interfered with the exercise of native Hawaiian culture. The legislature further finds that due consideration of the effects of human activities on native Hawaiian culture and the exercise thereof is necessary to ensure the continued existence, development, and exercise of native Hawaiian culture."

Act 50 mandates that "... environmental assessments or environmental impact statements should identify and address effects on Hawai`i's culture, and traditional and customary rights."

Project Background and Location

The project includes the construction of a 1.0 mg reservoir just below the 300-ft. elevation. In addition, an approximately 3200 ft. long, six-inch water line and access road are to extend south from the reservoir to Akoni Pule Highway and an approximately 2500 ft. long, 12-inch water line is to extend southwest from the proposed reservoir tank to an existing line at the Kaei Hana II industrial subdivision. The proposed reservoir and waterlines are located between Makahuna Gulch and Honokoa Gulch (Figures 1 & 2), which are the southeast and northwest boundaries respectively for the *ahupua`a* of Kawaihae 1.

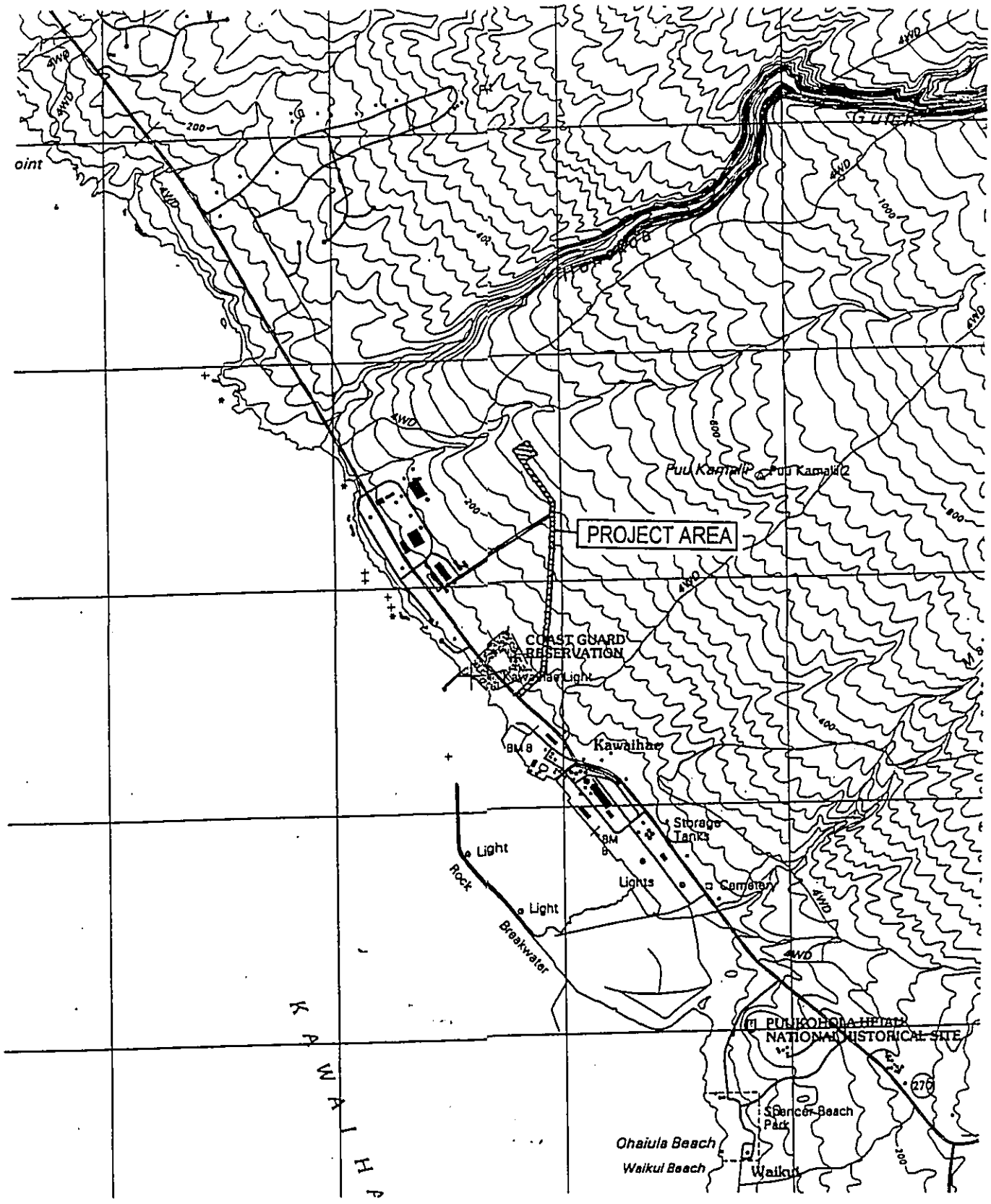


Figure 1 Portion of USGS topographic map, Kawaihae Quadrangle, showing project area (hatched)

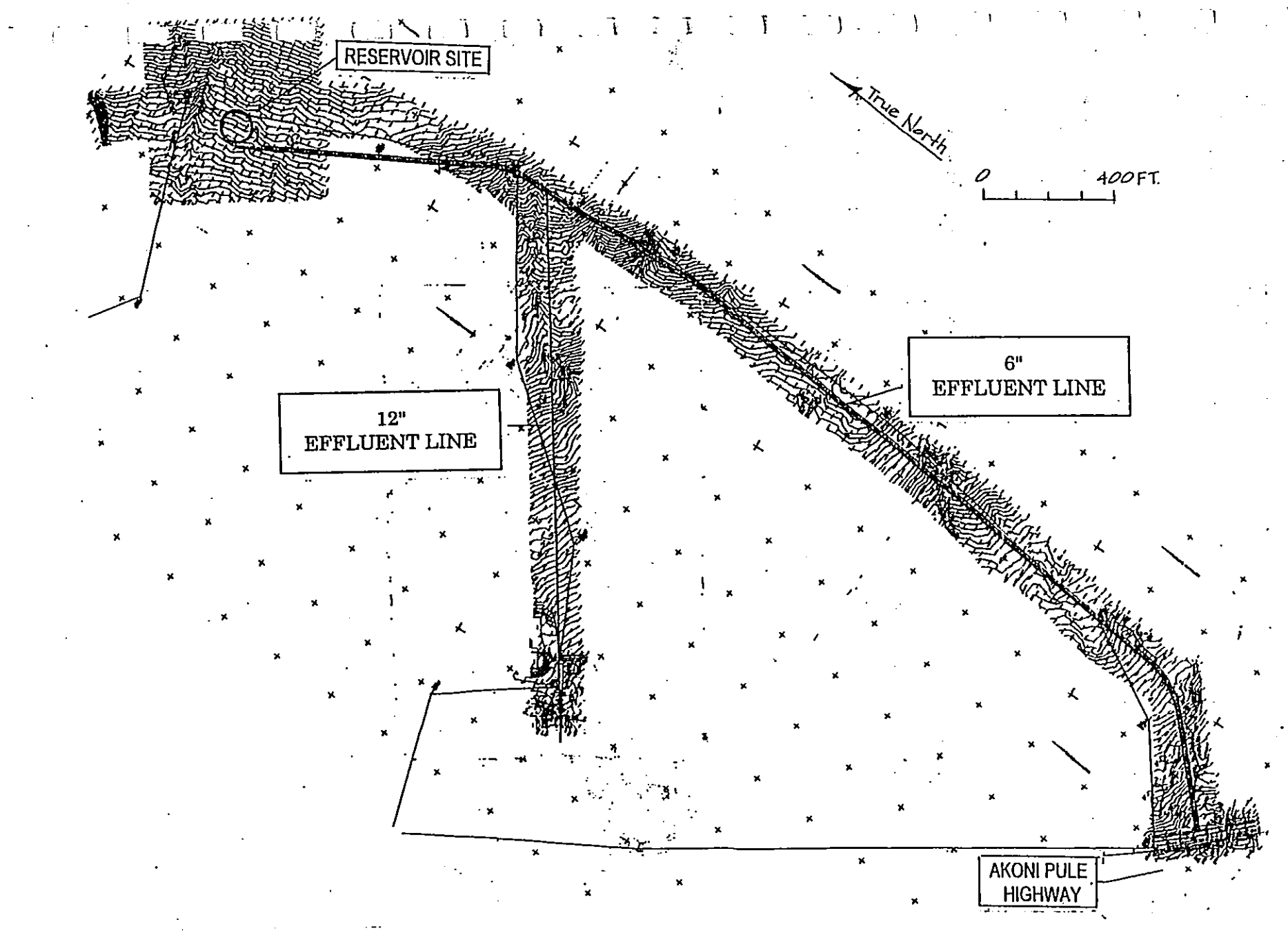


Figure 2 Sketch of the project area showing the proposed access road and proposed water lines

Scope of Work

The following specific tasks were determined to constitute an appropriate scope of work (SOW) for this project:

1. Conduct a limited review of the existing archaeological information pertaining to the specific sites in the project area as they may address traditional land use activities and identify and describe the cultural resources, practices and beliefs associated with the parcel and identify present uses, if appropriate.

2. Conduct limited consultations with persons who are knowledgeable about the historic and traditional practices in the project area and regions.

3. Prepare a report on items 1 and 2 summarizing and incorporating the results of the reconnaissance survey, the information gathered related to traditional practices and land use. In addition, the report will assess the impact of the proposed action on the cultural practices and features identified.

Methodology

Historical documents, maps and reports were researched at the Hawai`i State Libraries, Hamilton Library and Map Collection at the University of Hawai`i at Mānoa, the library at Cultural Surveys Hawai`i and the State Historic Preservation Division (SHPD) library. The Waihone *`Āina* Database was utilized to extract Land Commission Awards and Boundary Commission records.

Hawaiian organizations, agencies, and community members were contacted to identify knowledgeable individuals with cultural expertise and/or knowledge of the project area and sites therein. The organizations contacted were: the Office of Hawaiian Affairs (OHA), Alu Like, Inc., Hawaiian Civic Clubs, the Kawaihae Homestead Association, the Hawai`i Island Burial Council, the State Historic Preservation Department (SHPD) staff.

The recurring family names identified as possible informants were: Akau, Doi and Lā`au. The Doi and Lā`au families were contacted by phone. A site visit and an informal "talk-story" session was arranged on February 6, 2001 with William Akau Jr. and several other Kawaihae residents whom Mr. Akau gathered together of his own accord. Throughout the session various family and community members entered into the conversation. Detailed notes were taken. Mr. Akau was kind enough to walk through the entire project area with the Cultural Surveys Hawai'i representative. Another homestead resident, Yvonne Lee, accompanied us through half of the project area.

Description of the Project Area

The *ahupua`a* of Kawaihae 1 is situated on the southwestern slopes of the Kohala Mountains. The project area is characterized as "gently sloping to moderately sloping" from the coast to about 300 ft AMSL (Sato, *et al.*, 1973:26; USGS Map, Kawaihae Quad., 1995). Geologically, the Kohala volcanic shield is composed of two volcanic series: the Pololū series and the Hawī series. The older Pololū volcanic lavas underlie most of the project area (Juvik, *et al.*, 1998:43; Macdonald, *et al.*, 1983:350-351).

The climate in Kawaihae has a clearly defined summer (dry) and winter (wet) season with the average annual rainfall being 5 to 10 inches, most of which falls during the winter months (Juvik, *et al.*, 1998:57-59). There are no perennial streams within Kawaihae 1 (Wilcox, *et al.*, 1990:7-12, 44).

The soils in the project area consists of the Kawaihae series, specifically classified as "Kawaihae very rocky very fine sandy loam (KOC)". This soil is "extremely stony very fine sandy loam, 6 to 12 percent slopes, except that rock outcrops occupy 10 to 20 percent of the surface" (Sato, *et al.*, 1973:26). Land areas consisting of this soil are used mainly for pasture.

The vegetation is of limited diversity and consists predominantly of buffel grass (*Cenchrus ciliaris*), fingergrass (*Chloris Sw.*) and *kiawe* (*Prosopis pallida*), with scattered *koa haole* (*Leucaena leucocephala*), *`ilima* (*Sida fallax*) and *`uhaloa* (*Waltheria indica* var. *americana*).

Prior to human settlement, the native ecosystem of the project area consisted of lowland dry shrubland and grassland and rising to lowland dry and mesic forest, woodland and shrubland. Today, the ecosystem is characterized as "nonnative lands transformed by human activity" (Juvik, *et al.*, 1998:122-123).

II. CULTURAL SETTING

Traditional Land Tenure

It is not certain when the system of dividing the islands into major land units (*moku*) came about. Some say the system was already in place at the time of Līloa, `Umi's father. Others say that `Umialīloa was the first to establish this tradition. When `Umi became king, he divided the island of Hawai`i into six major districts among the lesser chiefly lineages who helped him in his rise to power. His rationale for doing so was that the chiefs would remain loyal to him if they owed him an obligation — mainly, their political and social status (Kamakau 1992:1; Kame`eleihiwa 1992:53-54). When Kamehameha became king, he followed in this same tradition and maintained the major divisions of Hāmākua, Hilo, Puna, Ka`ū, Kona and Kohala. These land divisions were carried forward into the *Māhele* (formal land division of 1848) and up to the present day with the following exceptions. In 1859, Kona and Kohala were divided into North and South districts. In 1886, Hilo was likewise divided into North and South districts (King *in* Coulter 1935:214-224). Within each major land unit, smaller divisions of *ahupua`a, `ili, lele, mo`o, paukū, kīhāpai and kō`ele* were made. During the *Māhele, kuleana* or native tenant rights were also acknowledged. The district of South Kohala is comprised of seven *ahupua`a*: Kawaihae 1, Kawaihae 2, `Ōuli, Lālāmilo, Kalāhuipua`a, Waikaloa and `Anaeho`omalu. The project area under discussion is situated in Kawaihae 1.

The *ahupua`a* is usually described as a pie-shaped piece of land extending from the sea to the mountains. Ideally, each *ahupua`a* was comprised of all the major environmental zones (marine, agricultural, forest) and was self-sustaining. However, this was not always so and there were no specific rules that determined the size of an *ahupua`a*.

Looking at Kawaihae as we know it today, it is difficult to imagine what it may have looked like during traditional times and a couple of hundred years before contact. It is probable that, at one time, the native forest once extended from the lower mountain slopes of Kawaihae all the way to the Waimea plains. The dry lowlands which comprise the project area was *pili* grass and open grasslands which early visitors to Kawaihae describe as "barren" and "treeless" (McEldowney 1983:414-415); Cuddihy and Stone 1993:23). Above the *pili* was the cultivated *kula* lands and above this, an area called *ulu lā`au* "in which fields and homes were scattered among native trees, probably *`ōhi`a* (*Metrosideros polymorpha*) (Cuddihy and Stone 1993:23).

Traditional and Legendary Associations to Kawaihae

Much has been written about Kawaihae (Barrere *in* Clark and Kirch 1983; Kelly, 1974) and it is not the intent here to rewrite what has already been written. Rather, this is a brief summary of the traditional and legendary associations of Kawaihae to give the project area a frame of reference as to cultural importance and use during traditional times.

The name *Kawaihae* means "water [of] wrath", a reference to a pool where people fought over the water in this arid area (Pukui, *et al*, 1976:97). Poetically, Kawaihae is often referred to as *"Ke kai hāwanawana"* or "the whispering sea" due to its proximity to the shore and the "soft noise" made by the ocean and the beach pebbles (Pukui 1983:178, O.N. #1647; 185, O.N. #1719; Judd 1988:59). The long, black sand beach that once

stretched from Pelekāne, fronting Mailekini Heiau at the Pu`ukoholā Heiau National Historic Site, to the northern end of Kawaihae Harbor no longer exists. The shoreline was altered when the harbor was dredged and developed in the 1950's (Clark 1985:137).

The two winds of Kawaihae, the *mumuku* and the *nāulu* are referred to in the Hawaiian proverb *"Nā makani paio lua o Kawaihae" (the two conflicting winds of Kawaihae)*: the *mumuku* from the uplands and the *nāulu* at the shore (Pukui 1983:247, O.N. #2258). *Nāulu* is also the name of the rain at Kawaihae. It is said to be a rain that ". . . often surprises visitors because it seems to come out of a cloudless sky." (*Ibid.*:172, O.N. #1588).

Kawaihae was where chiefs played in the ancient surf of *Kapua`ilima* (`Ī`ī 1959:135). John Papa `Ī`ī, the 19th century historian, noted that Kamehameha was especially proficient at canoe surfing. He wrote:

> There are many ways to show skill in canoe surfing. The king [Liholiho] was especially noted for it, and so was his pupil Gideon La`anui. They were often seen together gliding on the surf outside of Haleumiumiiole at Kawaihae and at Kapuni, outside of Kiikiiakoi. (*Ibid.135, 137*)

This "Kapuni" is not the Kapuni surf at Waikīkī, O`ahu which `Ī`ī also speaks of (*Ibid.*:135). Instead, it seems to be associated with Haleokapuni, which was an off-shore *heiau* having a connection to sharks and shark worship (Apple 1969:17). In the story of Keōuakū`ahu`ula's fateful landing at Kawaihae, Stephen Desha wrote:

> Keōua's canoe moved in near the landing place which was that deep harbor at a place called Kikiako`i and Haleokapuni, a deep channel where a small schooner could enter. (Desha 2000:330)

The Kapuni surf at Kawaihae seems to be associated in location with Kikiako`i and Haleokapuni, below Mailekini and Pu`ukoholā *heiau* (Fornander 1917:4, 324).

The chiefs also favored Kawaihae for several bathing pools. `Ī`ī, in speaking of the chief, Keli`imaika`i, wrote

> . . . whatever he dedicated became very kapu. If it was a bathing pool, it became so kapu that men were not allowed to bathe there with malos on. Because of this rule, a bathing pool in the upland of Kawaihae was called Keliialaalahoolaawai (The chief who roused to dedicate the water). Also in Kawaihae was a kapu bathing pool called Alawai. (`Ī`ī 1959:59)

Kawaihae was a traditional landing place for canoes, which provided access to the inland areas of Waimea and Kohala. It was also the site of battles between warring chiefdoms. Kamalālāwalu, the Maui chief who battled against the Kohala chiefs, landed his war canoes at Kawaihae (Kamakau 1992:58). He was defeated by Lonoikamakahiki, *mo`i* (ruling chief) of the island (Kamakau 1992:58-60; Fornander 1917:4, 322-330, 342-350). Likewise, Keōuakū`ahu`ula and his party landed at Kawaihae, where he was killed

and his body offered to the gods to consecrate Kamehameha's *heiau* of Pu`ukoholā (*Ibid.*:156-157). Another Maui chief, Kekaulike, ". . . so delighted in war that he sailed to attack Hawai`i." He plundered the Kona and Kohala coasts and ". . . at Kawaihae he cut down all the coconut trees" (*Ibid.*: 66). Kawaihae is also mentioned as one of the battle sites associated with Kalani`ōpu`u, ". . . the battle of Pu`uki`ilili` [*sic.*] on the plains of Kawaihae (*Ibid.*: 110-111).

Kawaihae was the residence of chiefs. When in ill-health at the end of his reign, Chief Alapa`inui retired to Kawaihae ". . . for he recalled the warm sands of this land, where he had lived and loved, the 'land of the whispering sea'" (`Ī`ī 1959:4). At various stages of his life, Kamehameha I also resided at Kawaihae for extended periods of time and especially during the reconstruction of Pu`ukoholā *Heiau*, whose work he oversaw (Desha 2000:161, 192, 303). After Kamehameha's death, Liholiho stayed at Kawaihae for a time before returning to Kona (*Ibid.*:501).

No doubt, the presence of two major *heiau*, Mailekini and Pu`ukoholā and a third smaller one, Haleokapuni, in the adjacent *ahupua`a* of Kawaihae 2 was a focus for cultural and religious activities and events during traditional and early historic times and impacted traditional life at Kawaihae 1 as well.

III. HISTORICAL SETTING

Kawaihae in the Early Historic Period

During the latter part of the 18th century, Kawaihae became the focal point of activities related to Kamehameha's wrest for political power to consolidate the Hawaiian Islands under one ruler. As with other port towns during this time period, Western contact was another major catalyst for changes to Kawaihae.

The earliest western description of Kawaihae was given by Lt. James King of the *Resolution*, a British vessel sailing with the *Discovery* and under the command of Captain James Cook. On February 6, 1779, both ships were sailing north from Kealakekua Bay. Upon reaching Kawaihae Bay, Lt. King made the following observations:

> Although the northeastern part of the bay which (the whole or part) is call'd Toe-yah-ya looks green and pleasant, yet as it is neither wooded or hardly any signs of culture, and a few houses, It has certainly some defect, and does not answer the purposes of what the natives cultivate. (Beaglehole 1955:525)

The ships were in search of water and shelter, which Captain Cook had been told could be found there. Unable to locate a fresh water source on land, and with the foremast of the *Resolution* damaged by strong gales off Kawaihae, the disappointed Captain Cook sailed back to Kealakekua Bay. It was on this return to Kealakekua that Captain Cook was killed on February 14, 1779.

The next description of Kawaihae was given by Captain George Vancouver, who anchored in the bay on March, 1792 and February, 1793 in hopes of restocking the ship *Discovery* with supplies and water, which did not flow year-round (Vancouver *in* Kelly 1974:28). Of Kawaihae Village, he writes that it consisted of:

> ". . . only of straggling houses, of two classes; those appropriated to the residence of the inhabitants were small, mean, miserable huts; but the others, allotted to the purposes of shading, building, and repairing their canoes, were excellent in their kind; in these occupations several people were busily employed, who seemed to execute their work with great neatness and ingenuity . . ." (Vancouver 1967:2, 116)

On Vancouver's second visit in 1793, Archibald Menzies, a surgeon and naturalist aboard the *Discovery*, took a botanical excursion inland from Kawaihae toward the Waimea plains. He wrote:

> I travelled a few miles back . . through the most barren, scorching country I have ever walked over, composed of scorious dregs and black porous rocks, interspersed with dreary caverns and deep ravines, evidently indicating the volcanic revolution which the country at no very distant period had undergone. The herbs and grasses which the soil produced in the rainy seasons were now mostly in a shrivelled state, thinly scattered and by no means sufficient to cover the surface from the sun's powerful heat, so that I met with very few plants in flower in this excursion. (Menzies 1920:55-56)

Menzies also noted that further inland he could see ". . . in the verge of the woods, several fine plantations, and my guides took great pains to inform me that the inland country was very fertile and numerously inhabited . . ." and he met with "a number of people . . . loaded with the produce of their plantations and bringing it down to the water side to market" where a "concourse of people which curiosity [about the British ship] brought into the vicinity of the bay" (*Ibid.* 56). On both of Vancouver's visits, Ke`eaumoku, Kamehameha's father-in-law, was living in residence at Kawaihae.

Both Vancouver and Menzies describe the contiguous areas around Kawaihae as being "luxuriant" and "fertile". This is a recurring theme of early western descriptions. Kawaihae is described as being "desolate" and "barren" while the adjacent lands of Kohala and Waimea are described as "lush" and "verdant".

Vancouver's visit is also remembered for the introduction of cattle to Hawai`i, sometime between 1793 and 1794. The cattle were presented to Kamehameha as a gift from Vancouver who requested that a ten-year *kapu* be put on them. The cattle were taken to a large penned area in "...the upland plain of Waimea, to the eastward of Kawaihae..." (Kuykendall 1965:28, 40-41). Along with cattle, other early western visitors introduced sheep, goats, new pig breeds and vegetable, fruit and plant varieties (*Ibid.*).

Shortly after 1800, the Hawaiian Islands began exporting sandalwood to the Orient. Trade in sandalwood was the strict monopoly of the *ali`i* beginning with Kamehameha. At the height of the sandalwood boom, Kamehameha was buying foreign ships, including six vessels between 1816 and 1818, in order to transport his own wood to the Orient (Kuykendall 1965:87). After Kamehameha's death in 1819, Liholiho (Kamehameha II) allowed his chiefs to share in the sandalwood trade, resulting in an unrestrained demand on the stocks of the wood and upon the commoners who did the harvesting. The commerce flourished until the supply dwindled in the mid-1830's.

At Kawaihae, John Young supervised royal warehouses that were the central depository for the wood brought in from the surrounding district. A description of the magnitude of labor involved was witnessed by Rev. William Ellis during an 1823 visit to Kawaihae. He wrote:

> Before daylight on the 22d [*sic.*], we were roused by vast multitudes of people passing through the district from Waimea with sandal-wood, which had been cut in the adjacent mountains for Karaimoku [Kalanimoku], by the people of Waimea, and which the people of Kohala, as far as the north point, had been ordered to bring down to his storehouse on the beach [at Kawaihae], for the purpose of its being shipped to O`ahu. There were between two and three thousand men, carrying each from one to six pieces of sandal wood, according to their size and weight. It was generally tied on their backs by bands made of *tī* leaves, passed over the shoulders and under the arms, and fastened across their breast. When they had deposited the wood at the storehouse, they departed to their respective homes. (Ellis 1969:397)

In March of 1820, the first company of American missionaries arrived at Kawaihae on the brig *Thaddeus*. At the time, Liholiho and his chiefs were residing in Kona and the ship only stopped at Kawaihae briefly before sailing on to Kailua. From this first company, Elisha Loomis was the first missionary to establish a mission station at Kawaihae in the summer of 1820. Supported by Kalanimoku, who was the governing chief of Kawaihae, Loomis was given a house to live in and a school house, "where he had charge of teaching Kalanimoku and his family School" (Hawai`i Mission Children's Society 1969:140). Loomis' stay at Kawaihae was brief. In November, he and his pupils were relocated to Honolulu. However, the schoolhouse at Kawaihae may represent the first missionary-run school in the Hawaiian Islands.

Other missionaries followed and left behind their impressions of Kawaihae in the 19th century. Rev. William Ellis visited Kawaihae in 1823 and noted that in the early 1820's, the village contained one hundred houses (1969:399). He commented on the manufacturing of salt and the salt pans for which Kawaihae was well-known:

> The natives of this district manufacture large quantities of salt, by evaporating the sea water. We saw a number of their pans, in the disposition of which they display great ingenuity. They have generally one large pond near the sea into which the water flows by a channel cut through the rocks, or is carried thither by the natives in large calabashes. After remaining there some time, it is conducted into a number of smaller pans, about six or eight inches in depth, which are made with great care, and frequently lined with large evergreen leaves [probably *tī* leaves], in order to prevent absorption. Along the narrow banks or partitions between the different pans, we saw a number of large evergreen leaves placed. They were tied up at each end, so as to resemble a shallow dish, and filled with sea water, in which the crystals of salt were abundant.
>
> The Sandwich Islanders eat salt very freely with their food, and use large quantities in preserving their fish. (Ellis 1969:397-398)

In addition to everyday use, salt was manufactured in large quantities and the surplus was sold to ships and some of it was even "export[ed] to the Russian settlements on the north-west coast of America, where it is in great demand for curing fish, etc" (*Ibid*:398).

In 1826, Artemas Bishop reported preaching to "a congregation of more than ten thousand listening hearers" from Kohala and Hāmākua who had gathered at Kawaihae, along with Ka`ahumanu and other chiefs (Bingham 1847:299).

Lorenzo Lyons, stationed at the Waimea mission in the 1830's, described Kawaihae as "about as desolate a place as I have ever seen, nothing but barrenness, with here and there a native hut" (Doyle 1945:41).

In 1832, the Protestant missionaries recorded the first census of the Hawaiian Islands which indicated there were 8,679 people in the Kohala District. Three years later, in 1835, the Kohala population had dropped to 6,175. The 1835 census also indicated the

population for Kawaihae was 150 adult males, 178 adult females and 109 children (Schmitt 1973:27, 39). In September, 1837, Lyons also reported:

> Something like a famine has been raging for about a year. The common food of the people has failed and they have been compelled to resort to the use of roots such as grow wild in woods and mountains, and yielding but very little nourishment, just enough to prevent starvation and enable the people to walk about some and attend to some of their ordinary business. The famine does not arise from the indolence of the people, but from the ravages of a worm that abounds in Waimea. As soon as food begins to sprout the worm commences the work of destruction. The famine does not prevail in all parts of the field. But the people are very poor. (*Ibid.*:101)

In 1838, William French, one of the first western entrepreneurs, opened a store on land he acquired from Governor Kuakini on condition that he build a pier for landing canoes at the bay. French built the pier and was given the land. His store appears to be the first commercial building in the village. It was the only one there in 1840 when a visitor found Kawaihae "barren and almost destitute of inhabitants . . . A well-built sotre and a few houses constituted the only appearance of a town. There was no vegetation to be seen" (Jarves 1844:218-219). Through French's endeavors, Kawaihae became firmly established as the major shipping center on the northwest side of the island. The growth of business in Waimea — agricultural crops as well as ranching, and proximity to Kawaihae also attributed to the use of Kawaihae as a trade port.

The California Gold Rush impacted the economy of Hawai`i in a positive way. In December, 1849, Lorenzo Lyons wrote:

> A great call for potatoes from California.
>
> Never so much cash before! Large quantities of sweet potatoes brought to light, hitherto concealed - growing wild for years unknown. The demands have revealed them. People took to it like good fellows to get a few dollars each. Some never had so much cash before - never had any before! Many natives growing rich. Potatoes bring 4 or 5 $ cash per bbl. (*Ibid.*:151)

Other vegetables, along with sugar, molasses and coffee were also exported (Kuykendall 1965:321).

Early on, in the first half of the 19th century, Kawaihae had established itself as a center for commerce. Kawaihae was the only trading port along the northwest coast of Hawai`i Island. The village at Kawaihae not only served the sandalwood trade, it served as a trading center for four Waimea villages stretching from Waikea to Pu`ukapu. The surplus taro and vegetables raised at these villages were brought for trade to the coast at Kawaihae. Whaling ships also traded for vegetables, salt, beef, hides and tallow, which were all in high demand for restocking ship supplies.

Māhele and Land Commission Award Documentation

The Organic Acts of 1845 and 1846 initiated the process of the *Mahele* - the division of Hawaiian lands - which introduced private property into Hawaiian society. In 1848 the crown and the *ali`i* (royalty) received their land titles. Kawaihae Komohana (Kawaihae 1st) was retained by the monarch.

Kuleana awards for individual parcels within the *ahupua`a* were subsequently granted in 1850. These awards were presented to tenants - native Hawaiians, naturalized foreigners, non-Hawaiians born in the islands, or long-term resident foreigners - who could prove occupancy on the parcels before 1845 (Apple 1978:45). Nine Land Commission Awards (LCAs) for individual parcels were recorded in Kawaihae Komohana (Kawaihae 1st).

KAWAIHAE KOMOHANA (Kawaihae 1st)

LCA#	AWARDEE	*`ILI*	AREA	# PIECES
3668	Manuia, D		3.28 Acres	2
3669	Makahi		.253 Acre	1
3826	Punihaniha		.58 Acre	1
4091	Kane		1.54 Acres	2
4094	Kepaimaka		1.1 Acres	1
4101	Kahananui		.19 Acre	1
4884	French, Wm.		1.34 Acres	1
8513	Lincoln, Lorenzo B		5.2 Acres	1
9971	Leleiōhoku, W.P.	Kaaiao Pohua 1	.06 Acre .49 Acre	1 1

APPENDIX A presents the *Māhele* and Land Commission Award documentation for these awards on file at the State of Hawai`i Archives. These records include volumes of the Foreign Testimony which were recorded in English, and modern translations into English of volumes of the Native Register and Native Testimony which were originally recorded in Hawaiian.

The above nine *kuleana* awardees do not reflect the total population of Kawaihae 1. As Apple notes:

> They probably represent the local elite, those who could afford the survey and commutation [that were part of the award procedure], had proper authority for permanent occupancy, had reputable witnesses to sustain both the authority [to occupy] and continuous use [of the parcel], and who chose to apply. (*Ibid.*:62)

However, the records associated with these awards illuminate the character of the settlement within the *ahupua`a* at the mid-19th century.

With one exception, LCA 8513, all of the claimed and awarded parcels in Kawaihae Komohana are located along the bay at Kawaihae village. LCA 8513 to Lorenzo B. Lincoln is located approximately 8 kilometers *mauka* of the coast in Kawaihae Komohana (Kawaihae 1) along its boundary with Kawaihae Hikina (Kawaihae 2), outside the boundaries of the project area. Witnesses testifying on Lincoln's behalf, describe his claim to the parcel:

> L. Kaauwai Sw. I took testimony on this Claim in 1848. I know the origin of this claim. Lincoln had it through his wife still living, and she from her ancestors - and they have lived upon and cultivated part of it in peace without dispute to this day. Keawewai is the name of the land I refer to as this estate of his wife. The land of John Young's mother Koanaea [Ka`oana`eha] bounds it on the Kona side. Govt Kula [pasture land] on Makai. Leleiōhoku's heirs on Kohala. Mountain on Mauka.
>
> To this there is no dispute. The right is with this wife of L.B. Lincoln. The greater part of this land was given to Clᵗ by Kuakini, and did not belong to his wife. He earned it by long services for Kuakini in tanning leather. It is all known as Keawewai and including all under that name. I know of no other land to which he has any claim. Mr. Lincoln has always been a good resident. (Foreign Testimony vol.3, pg.203)
>
> Oct. 7, 1848
>
> Kimo Fay sworn and stated: "I have known this land to be for Kuakini. It is at Keawewai, an ili land with weeds, in the Kawaihae-uka *ahupuaa*. Mauka and all around is for Kuakini. I have not known how big it is; however, Kuakini had requested that he build a stone altar. Three houses are standing on this land where it has been enclosed. There are also 2 corrals in this ili land and he received this place from Kuakini in 1839. I have personally seen and heard this grant made by Kuakini. I had seen Kinilau living there at that time, Kuakini had given this land permanently for him [Lincoln] as a place for him to farm. I have not heard that anyone has objected to him to this day. This was given at Kamakahonu in Waimea."
>
> Kinilau sworn and stated: "I had heard later about Kuakini giving this land to him [Lincoln]." (Native Testimony v.4 pg.144-145)

The two Kawaihae Komohana parcels comprising LCA 9971 were awarded to William Pitt Leleiōhoku, the son of Kalanimoku. Leleiōhoku was born on Maui and, after Kalanimoku's death in 1827, was adopted by Kuakini, governor of Hawai`i Island. He died at Hilo in 1848 during an epidemic of measles. The Kawaihae Komohana parcels had been granted to Leleiōhoku by Kuakini in 1844.

LCA 4884 to William French comprises the parcel French had received from Kuakini on condition that he "build a pier for the canoes to land" in 1838 (Native Testimony vol.2 pg.

503). The witnesses testify that French built the pier and had constructed "storage and other houses too" on the parcel.

The remaining Land Commission Awards in Kawaihae Komohana were granted to Hawaiians, some claiming residency on their lands back to the time of Kamehameha (LCAs 3826, 4091, and 4094). The house lots contain from one to four houses. Three of the awards - LCAs 3668:2, 3826, and 4091 - were located adjacent to the salt pans at Kawaihae village; the awardees may have been the operators of the Kawaihae salt works in the mid-19th century.

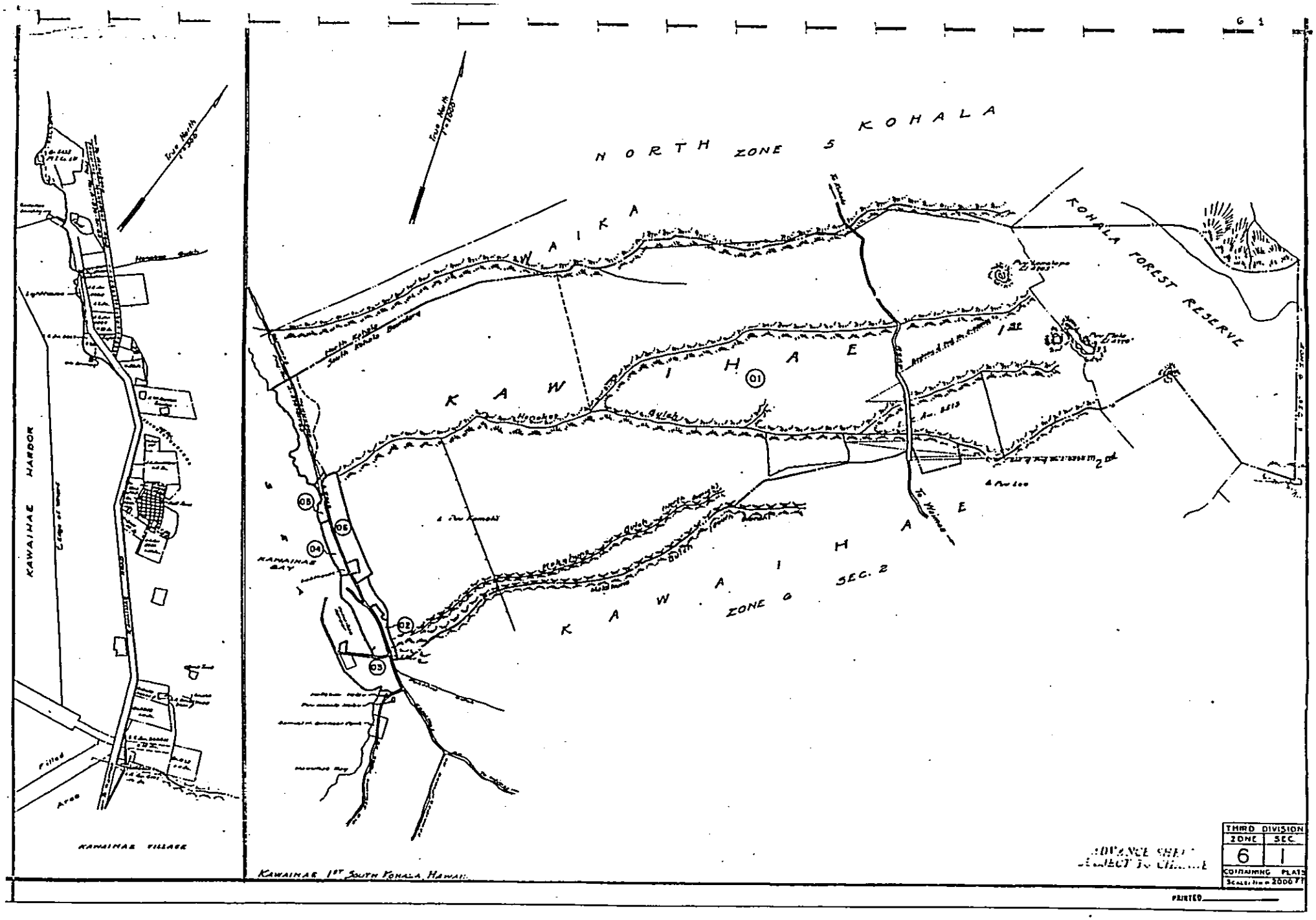


Figure 3 Tax Map (6-01) showing locations of Land Commission Awards in Kawaihae 1 *ahupua`a*

Mid 19th Century - the Present

In the 1850's, Frank Spencer, a rancher, opened a store in Kawaihae Village. But, the village itself remained little changed since the previous decade as documented through the eyes of one visitor in 1853:

> Kawaihae is a small, dreary village, on the shored of Kawaihae Bay, without the least object to attract a resident. Excepting a few sickly cocoa-nut trees which stood near the tide-mark, I found scarecly a piece of foliage in the entire region. Hot, dry, and dusty, it is a perfect Saraha . . . (Bates 1854:391)

The physical desolation at Kawaihae in 1853 was amplified by the epidemic that had reached Hawai`i Island that year. Lorenzo Lyons recorded:

> Smallpox, Kohala, Kona, Hilo. One case in Waimea, two in Hāmākua, very many at Kawaihae. Rode over to Kohala to get vaccination matter. I am vaccinating many here . . .
>
> Kawaihae. Meeting house most desolate. As I gazed on the few that had escaped the pestilence, I could not refrain from tears. Where were the aged? Where were the young? Smallpox has carried off nearly three thousand from the Islands . . . (Doyle 1945:157)

Kawaihae's position as a commerce center for inter-island trade was detailed in the January 29, 1857 edition of the *Pacific Commercial Advertiser*:

> KAWAIHAE is a small village in the bay of the same name in the western shore of Hawai`i . . . It derives its importance from being the port of the rich and extensive grazing uplands of Waimea, one of the finest agricultural districts of the islands, which has not yet developed its full resources . . . Forty or fifty whale ships have annually visited this port for the last few years, to procure salted beefs and Irish potatoes, which are considered the finest produced in the islands.

The whaling industry reached its peak in 1859 and five years later, the prices for whale oil collapsed. Since the 1840's, the Hawaiian economy had been dependent primarily on supplying whale ships during their long layovers in the islands. As the number of whale ships dwindled during the 1860's, cattle ranchers and other entrepreneurs in Waimea who could not find new markets were forced out of business.

An 1861 description of Kawaihae Village as a commercial center was given by Charles de Varigny, the secretary of the French Consulate in Honolulu.

> The village consists chiefly of a single large wooden structure which serves as a country store and warehouse for the products of the district. Around the shop are clustered several makeshift buildings providing annexes for further storage. Scattered along the seashore are a few *kanaka* grass houses, about twenty. The setting is desolate: not a blade of grass, not a tree, except for the infrequent coconut palms, nor a stream. Enormous volcanic rocks, jagged and cinder-black, lie strewn

> across the ground, and a fine dusty sand covers the beach. A small wharf serves for the departure and landing of travelers. At a short distance from shore floats an old stripped-down vessel, its melancholy hull balancing at anchor and providing storage for products arriving from Honolulu. It was difficult for me to imagine a more arid and barren setting . . . (1981:72)

As the whaling industry and ship trade declined in the 1860's, businesses in Waimea collapsed and the population diminished to 400. In addition, the Kawaihae *uka* and Hāmākua mountain potatoes were "few and poor and dear". Waimea now depended on Waipi`o for food supplies (Doyle 1945:194). Likewise, Kawaihae Village must have been affected by the surrounding circumstances and also declined. Natural disasters escalated the distress. In April 1868, Lorenzo Lyons recorded:

> Earthquakes last night very severe. Tumbled down some fathoms of stone wall. People frightened.. The sea at Kawaihae receded, leaving rocks and fish bare. Then returned with great ferocity, beyond its bounds. Such fearful earthquakes never before experienced in this region. (Doyle 1945:197)

Four years later, in January of 1872, a great storm swept away all the wharves at Kawaihae: "Such a sea not known by [the] oldest inhabitants" (*Ibid.*:200).

An 1883 map drawn by the surveyor George Jackson identifies the structures and features comprising Kawaihae Villiage. Beginning at the northernmost extent and moving south along the coast, the village included: the Kawaihae lighthouse; a cattle pen; "Macy's Grave" (probably George Macy, one of the early entrepreneurs in Waimea); an enclosed complex consisting of a jetty, woodshed, and storehouse; a "native store"; a jail; a boathouse; salt pans; "Davis' Grave (George Hū`eo Davis who died in 1873); a church; the "S. Parker residence"; "ruins of Lyons' house"; and "John Young's old house". The grave sites and house ruins suggest the passing of a phase in Kawaihae's history. The structures in active use during the 1880's reflect Kawaihae Village's continued dependence upon the economy of Waimea. Typical of the commercial schemes involving Kawaihae was a projected railroad line across North Hawai`i extnding from Pā`auhau Landing on the Hāmākua Coast, through Waimea, and terminating at Kawaihae. A group of businessmen commissioned a preliminary survey. The estimated cost for construction of the line was half a million dollars; it was never built (Kuykendall 1967:98).

The coastline and Kawaihae Bay were drastically altered in the 20th century. The long stretch of black sand beach mentioned by early visitors no longer exists. A pier was erected in 1937 where inter-island steamers could tie up. Facilities built to support the pier included a wharf and storage area. In 1950, Congress authorized a deep-water harbor be dredged. Construction was completed in 1959. The new facilities included: "an inter-island terminal barge wharf, an overseas terminal wharf, a military cargo ramp, storage areas, a small boat harbor, two small craft moorage areas, and a large harbor basin with a wide entrance channel, all protected from the open ocean by a breakwater and an extensive landfill" (Clark 1985:137).

Today, besides being used primarily as a commercial deep-water port, the harbor and shoreline is used by local residents for recreational activities: fishing, sailing, swimming, canoe paddling, wind surfing and picnicking.

IV. PREVIOUS ARCHAEOLOGICAL RESEARCH RELEVANT TO THE PROJECT AREA

The present project area has been the focus of numerous archaeological surveys. In the early 1970's, two Bishop Museum studies covered the southeastern portion of the project area (Barrera and Kelly, 1974; Luscomb, 1974). The Barrera and Kelly (1974) work was for the proposed Mudlane-Waimea-Kawaihae Road alignment. In addition to a reconnaissance field survey, the study included an historic background section with interviews of knowledgeable local informants.

As part of a more detailed study of the proposed highway corridor, the Bishop Museum undertook survey and data recovery work in the late 1970's and early 1980's (Clark and Kirch, 1983). In the mid-1980s Bishop Museum undertook further survey work for the Department of Hawaiian Home Lands (DHHL) in Kawaihae, including the area within which the present project is situated (Allen, 1987). In 1989 Cultural Surveys Hawai`i conducted an inventory survey of some 2000 acres of DHHL Kawaihae lands which, in part, included the present project area (Hammatt et al., 1991).

Each of the above-referenced reports had scopes-of-work related to either geographical or site-specific limitations that have made site correlations for the present project area difficult. However, based on the review of past research, a variety of site types were anticipated in the project area. The anticipated sites include: enclosures with associated burials (50-10-05-5998), temporary habitation complexes (e.g., Sites 50-10-05-13725; -13726; -13913) and possible burials site (Site 50-10-05-13910A and B). The sites are generally located below the 200 ft. contour with much fewer sites at higher elevations.

The reports also indicate that the portion of the project area closest to Akoni Pule Highway has a fairly extensive midden and artifact surface scatter. The surface scatters are related to the previous habitational use of this portion of the project area. Additionally, bulldozing in the area, mainly for fire-fighting activities, has also damaged sites and dispersed associated cultural deposits. Based on background data, the enclosures of Site 50-10-05-5998 were constructed in recent times specifically to prevent bulldozing on the known burial features (Barrera and Kelly 1974; Clark and Kirch 1983).

On October 12, 2000, an archaeological assessment and site inspection was conducted by Cultural Surveys Hawai'i archaeologists (Borthwick, *et al.* 2000). The inspection identified four previously known archaeological sites as well as additional unrecorded features (Figure 4). All of the sites and features were located in the southern-most (*makai*) portion of the proposed access road. No sites were observed in the access road corridor beyond the first 800 feet, the 1mg tank locale, or the 12" water line corridor. Based on the field inspection, the only problematic portion of the project area is the *makai*-most 800 ft. of the proposed access road/6"water line. See the *Summary and Recommendations* section of this report for discussion.

Previously Identified Archaeological Sites in the Project Area

The October, 2000 field inspection, conducted by Cultural Surveys Hawai`i , re-identified four archaeological sites within or in the immediate vicinity of the proposed

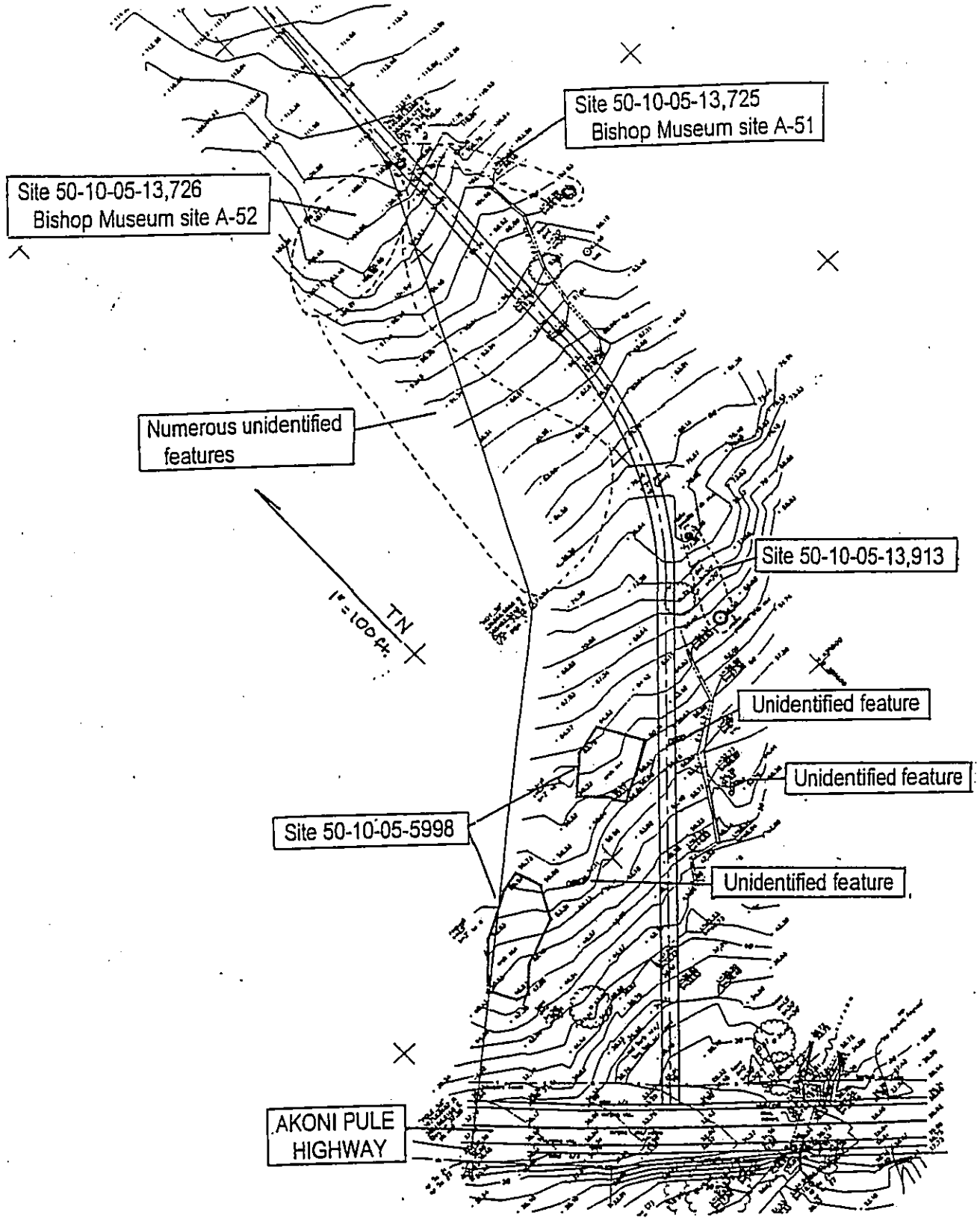


Figure 4: *Makai* portion of access road showing locations of archaeological sites andfeatures

access road/influent corridor. The sites are located in the southern-most (*makai*) portion of the proposed access road (Figure 4). Following are the four site descriptions (with accompanying figures) extracted from the reports in which they were originally recorded (Clark and Kirch 1983; Allen 1987; Hammatt *et al.* 1991).

Site 50-10-05-5998
(from Clark and Kirch 1983:66-69)

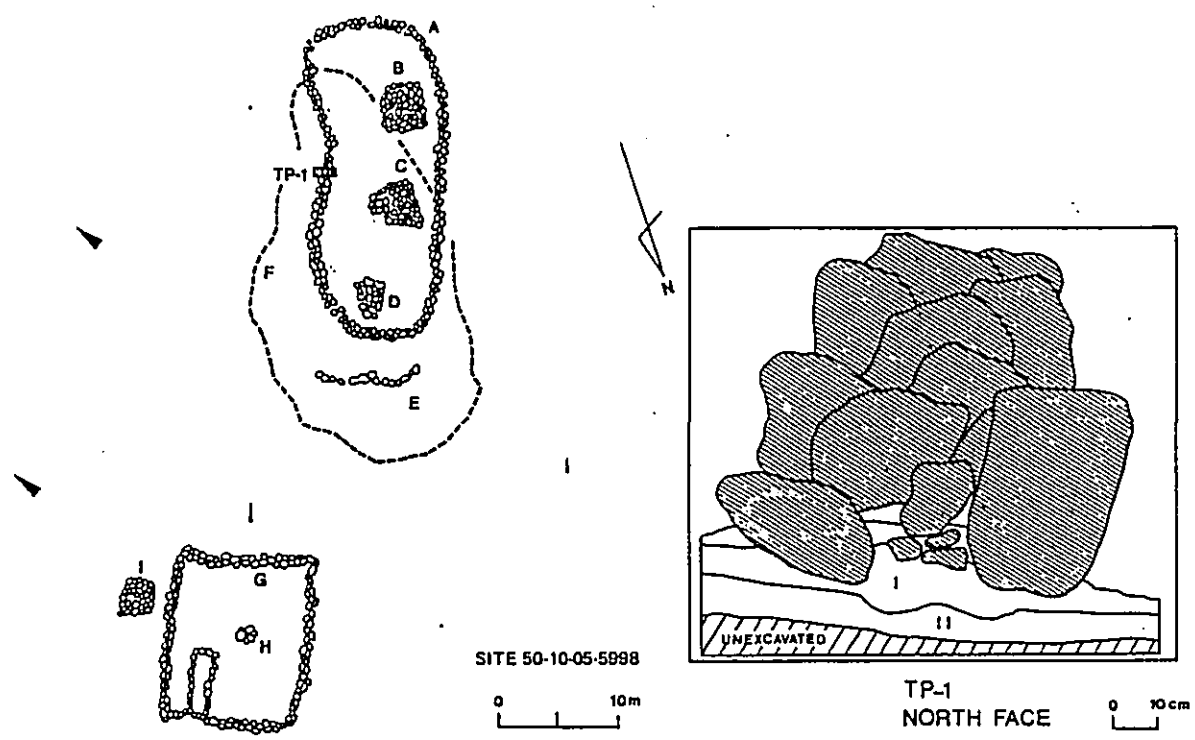


Fig. 4.2. PLAN VIEW OF SITE 50-10-05-5998 AND CROSS SECTION OF TP-1 IN FEATURE A.

This is the northernmost site in the project area, and is the nearest to the old shoreline. It is composed of nine features: four burial platforms (Features B, C, D, and I); a boulder-and-cobble mound that also may be a burial monument (Feature H); an oval enclosure wall (constructed of stacked boulders and cobbles) that surrounds three of the platforms (Feature A); a rectangular enclosure that is possibly residential (Feature G); a double-arc boulder alignment just beyond and parallel to the *mauka* end of Feature A (Feature E); and a midden and lithic surface scatter (Feature F) that covers a large area inside and outside of Feature A and around Features B through E (Fig. 4-2).

This site is situated on the *mauka* side of the highway centerline with only a portion of one feature (A) extending into the ROW. Much of the ground surface at this location is exposed bedrock and throughout the area are scars of past bulldozing. Due to these conditions, extensive excavation was deemed unnecessary. Instead, a single unit, 1.0 by 0.5 m in size, was established across the west wall of Feature 5998-A in order to determine the relationship between this feature and the midden and lithic scatter (Feature 5998-F).

Cultural Content

The surface midden at Feature 5998-F comprised a variety of shellfish groups but was dominated by *Cyopraea* and *Nerita* with a scattering of *Drupa, Morula, Cellana,* urchin, *Conus,* and others. The midden remains collected through excavation reflect the composition observed in the surface scatter, with the main difference being the subsurface presence of bivalves (Table 4.3†).

During the initial survey, 27 artifacts were collected from the surface at this site (Barrera and Kelly 1974). We supplemented this number with an additional 15 surface specimens and seven items from excavation, all from Feature 5998-F.

Of the seven excavated artifacts, five are small volcanic-glass flakes and two are basalt flakes. From the surface collection, 24 pieces are volcanic-glass flakes or shatter and five are volcanic-glass cores. Only one of the flakes showed edge damage. Of the 12 basalt flakes from the surface, four had one or two polished surfaces indicating the reworking of previously completed adzes. One of the polished flakes has post-detachment retouch on one end, and microscopic examination showed evidence of an axial rotation motion indicative of use as a drill. Three adze fragments were collected from the surface. Two of these are butt portions of small, thin (1 cm) tools, rectangular in cross section, while the other specimen is the middle portion of a large, tanged adze, square in cross section. Other tools collected include four scoriaceous lava abraders, six coral abraders, and two sea-urchin-spine file fragments, both badly eroded.

All of the basalt material is very dark gray to dark gray in color and fine to medium-fine grained. Three pieces show cortex, one clearly from a waterworn cobble. These materials are clearly different from the basalts in the immediate vicinity but the precise sources are unknown. Both trachytic and basaltic volcanic glass (see Report 12) are present, indicating that at least one source (trachyte from Pu`u Wa`awa`a) is not local.

Two pieces of volcanic glass from the surface were submitted for alteration measures. Both pieces indicate a late prehistoric age, ca. A.D. 1600 to 1800. Barrera had earlier submitted a single piece of volcanic glass to Maury Morgenstein, who reported a measurement that falls within the time-range indicated above (Barrera and Kelly 1974:62), but we do not know the type of material (trachytic or basaltic) or the type of measurement (alteration, hydration, or both) so this determination must be used with caution.

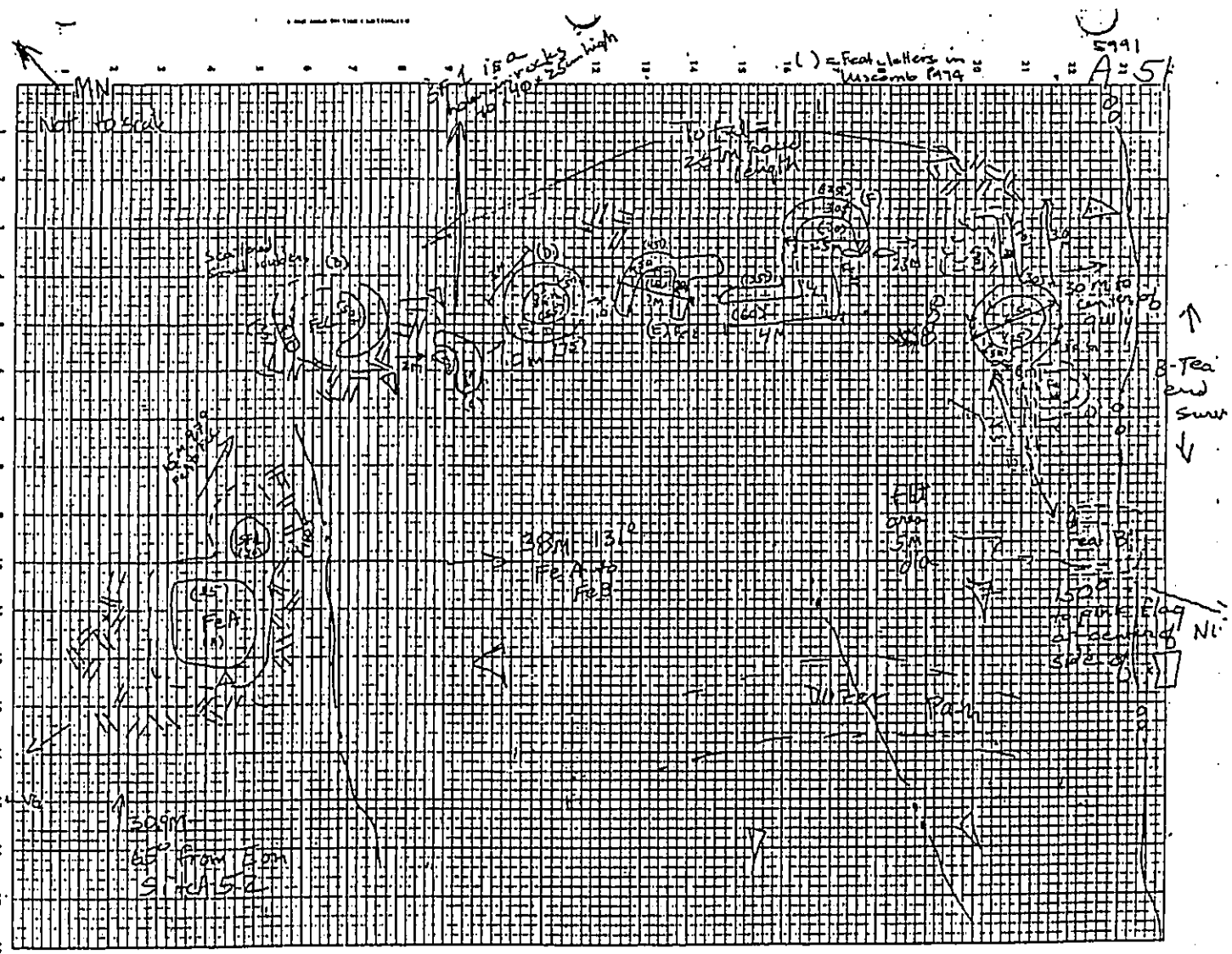
Discusssion

Excavation across the wall of Feature 5998-A showed that the base of the wall lay very near the ground surface and was clearly built over the cultural deposit. Unweathered breaks and scrapes on some of the rocks used for the wall suggest a relatively recent date of construction. The following sequence of events is proposed for Features A through F at this site. Due to lack of investigations at Features G through I, nothing more can be said of those structures.

Residential activity began at this location in the late prehistoric period. Features 5998-E and 5998-F are the vestiges of that occupation. If other structures were present at one time, subsequent bulldozing and dismantling for the construction of Features A through D erased any traces. The length of occupation is unknown but the range of artifacts and, to a

lesser extent, of midden, suggests more than a short-term encampment. The lava abraders — likely to have been brought in from farther south in Waikoloa along with coral abraders and sea-urchin-spine files, demonstrate some sort of manufacturing activity, possibly of fishhooks. Broken adzes plus the debitage from reworking adzes, as well as abundant volcanic glass (including several cores) also suggest activities taking place over a period of time. Presumably after or just prior to the abandonment of residential occupation, burials were established at this location. By comparison with other burial monuments in this region, the structures at Site 5998 would appear to be historic. In more recent times, bulldozers have been active in this area. The enclosure wall of Feature 5998-A was constructed to protect the burial monuments from destruction.

Site 50-10-05-13725
(from Allen 1987:99-100)



SITE COMPLEX A-51 — SHELTER/AGRICULTURAL COMPLEX

Comparison of our site map with that in Luscomb (1974) indicates that this site, located at ca. 100-ft elevation, is most likely 5991. As with Site A-46, Luscomb's feature designations are indicated in brackets in the discussion below. Overall the site measures roughly 25 m (northwest-southeast) by 20 m. The features form a semi-circle across the slope, while the downslope area is an open space, free of structures; there is some evidence of bulldozing in this open area.

Nine features were identified in the present survey. Feature A [A] consists of two contiguous circular enclosures built on bedrock outcrop. A shelter function is postulated. The site tag was placed on the interior edge of the southwest wall of Feature A. Feature B [none] is a U-shaped structure open on the northwest side; the structure is very deteriorated. Feature C [B] is a circular enclosure with a small opening on the west side. The adjacent downslope area is bedrock. Two meters to the southeast is a hole in the rocks, which measures 40 cm by 40 cm by 25 cm deep. Feature D [D] is a circular enclosure. Feature E [E] is a C-shaped structure with a 2.5 m long arm extending of the southeast end (parallel to the coast). Feature F [F] is a C-shaped structure. The northwest arm is the longer of the two sides and a wall segment (3.0 m long) perpendicular to the slope joins this longer arm at a right angle. Feature G [none] is a circular enclosure with an extension running directly upslope off the backside of the enclosure for 3.0 m. Feature H [none] is a very deteriorated, roughly circular enclosure with a tumbled wall extending seaward off of its northwest side. Feature I is a scatter of marine shell midden, volcanic glass, flaked basalt, and coral pebbles in a relatively flat area to the west of Feature A. Two pieces of volcanic glass were collected for dating (Acc. #14). One of these provided a date of A.D. 1723 ± 7 years.

All of the features are generally of stacked stone construction. Either agricultural or shelter functions are suggested.

Feature	Length (m)	Width (m)	Height (int/ext)	Condition	Long Axis	Midden	Deposit (cm)
A	5.0	4.0	30 to 50	fair	NE/SW	I	10
B	3.5 diameter	--	35	fair	--	--	--
C	3.0 diameter	--	50/35	fair	--	--	5
D	3.0 diameter	--	55/75	fair	--	--	35
E	3.0 diameter	--	65/45	fair	--	--	--
F	2.5 diameter	--	30/25	fair	--	--	--

Feature	Length (m)	Width (m)	Height (int/ext)	Condi-tion	Long Axis	Midden	Deposit (cm)
G	2.5 diameter	--	25/30	fair	--	--	--
H	no measure-ments taken	--	--	deterio-rated	--	--	--
I	5.0 diameter	--		good	--	F	none

Site 50-10-05-13726
(from Allen 1987:100-101)

SITE COMPLEX A-52 — SHELTER/AGRICULTURAL COMPLEX

This set of features compares well with Luscomb's (1974) description of Site 5994 (Features B, E, F, H, M, N, and possibly K) at an approximate 80-ft elevations. Much of the area in and around the site has been bulldozed since her survey in 1974. Luscomb's Features A, G, and H are within the Coast Guard Reserve, an area not covered in the present survey. Features C and D may have been destroyed by bulldozing, as they were not relocated. Feature L was apparently either overlooked or destroyed. As with Sites A-46 and A-51, her feature designations are indicated in brackets in the discussion below. No site tag was placed during the present survey.

Feature A [B] is a square enclosure. Feature B [F] consists of two contiguous C-shapes and an associated light surface scatter of marine shell midden. The C-shapes are open on the downslope side. A shelter function is likely. Feature C [K?] is a U-shaped structure with three uprights in the upslope interior wall. The structure is open to the sea and bedrock is exposed along this downslope side. A shelter function is also postulated for this structure. Feature D [N] is a double C-shape with one C-shape located upslope of the other. Both have openings on the south side. Upslope of the structure is a light scatter of midden. This compound structure may also have had a shelter function. Feature E [M] is a depression filled with rocks and an asphalt shingle. There is a crude wall around the southwest to southeast end. This is most likely a recent trash pit. Feature F [H], which is located within the Coast Guard Reserve, is a well-constructed enclosure with an internal terrace. A residential function is probable. Feature G [E] is a circular enclosure that has deteriorated on the upslope side. Feature H was not identified by the Luscomb survey. It is a small C-shape open on the ocean side, possibly used for planting. All of the structures are generally of stacked stone construction.

Feature	Length (m)	Width (m)	Height (int/ext)	Long Axis	Midden	Condition
A	3.0	3.0	30/100	--	--	fair
B	4.0	2.0	30/50	NW/SE	F	fair
C	5.0	3.0	60	NW/SE	--	fair
D	6.0	4.0	100/50	NE/SW	F	fair
E	5.0	--	--	--	--	deterio-rated
F	no measure-ments taken	--	--	--	--	good
G	2.0 diameter	--	25/30	--	--	deterio-rated
H	3.0 diameter	--	40	--	--	deterio-rated

Site 50-10-05-13913
(from Hammatt *et al.* 1991:VIII-132 - VIII135)

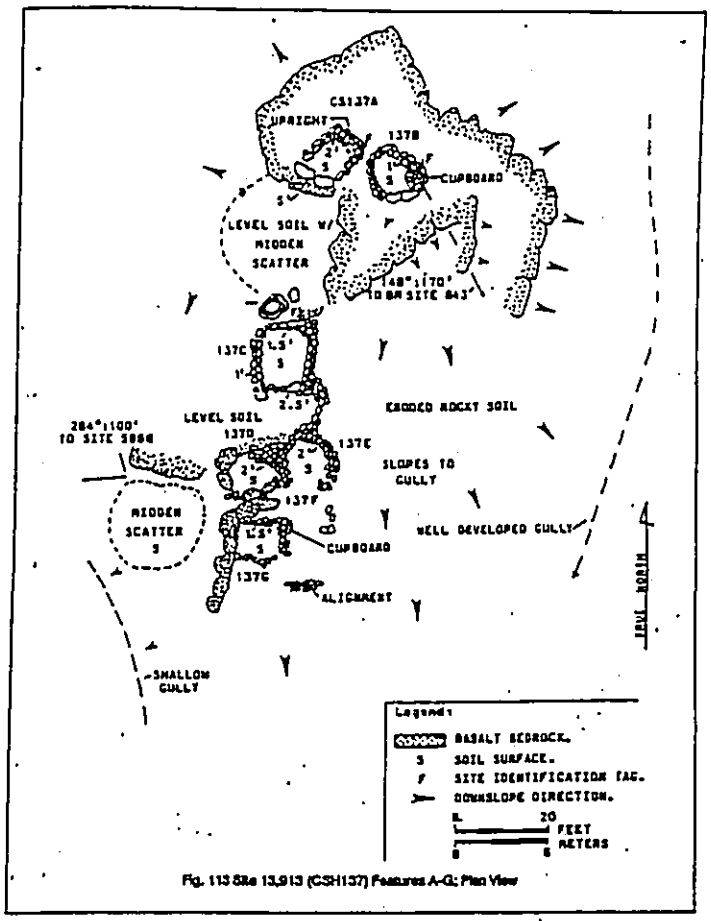


Fig. 113 Site 13,913 (CSH137) Features A-G; Plan View

Located along the boundary of Lots 12 and 15 at approximately the 60' elevation, this site complex runs downslope from a rise *mckai* along a gully which lies to the S/SW of the complex. The complex consists of seven features: A is a C-shape; B is a circular enclosure; C is a rectangular enclosure; Features D, E, and F are C-shapes also; and G is a small rectangular enclosure.

Feature A is a C-shape located at the top of a small rise at approximately the 60' elevation and consists of a C-shape that opens to the SW. The dimensions of this feature are NW/SE 2.1 m. exterior, 1.4 m. interior, and NE/SW 2.1 m. exterior, 1.2 m. interior. The structure is composed of boulders and cobbles. The average wall dimensions are .5 m. high and .6 m. wide. The interior is made up of soil and the soil retention seems to be good. Two pieces of midden were observed. This single use shelter is fairly well preserved and excavation potential is fair. The site marker is placed in the east corner of the structure.

Feature B is located slightly to the SE of Feature A on the same rise and consists of a circular enclosure which has a slight opening to the SE. This feature measures E/W 1.8 m. exterior, 2.1 m. interior and N/W 4. M. exterior, and 2.3 m. interior. The walls consist of stacked boulders and cobbles 1-2 courses high and are .3-.5 m. in height and .3-.6 m. in width. There is a collapsed cupboard in the SE corner of the structure adjacent to the opening. The cupboard measures .5 m. by .5 m. and .3 m. deep. The interior of the structure is bedrock and some soil. A few pieces of midden were observed, however, research potential for this recurrent use shelter is poor. The marker was placed inside the cupboard.

Feature C is located 11 m. downslope (SW) beneath a *kiawe* tree and consists of a rectangular enclosure made up of stacked boulders and cobbles with a few larger rocks/boulders. The structure measures N/S 4 m. exterior, 2.7 m. interior and E/W 3.7 m. exterior, 2.4 m. interior. The walls are .3-.5 m. wide and .3-.5 m. high. The interior consists of grass and soil which slopes towards the sea. The *kiawe* trees lies adjacent to the north side of the enclosure and the marker is also placed on the north side of the structure. Excavation potential for this single use shelter is fair.

Feature D is a C-shape which adjoins Feature C and opens to the west. This feature is composed of stacked boulders and cobbles and its dimensions are E/W 2.4 m. on the exterior, 1.8 m. on the interior and N/S 4 m. on the exterior, 2.4 m. on the interior. The walls are.3-.5 m. high and .3-.6 m. wide. The interior of this feature is grass and *kiawe*. No midden or artifacts were observed. The excavation potential of this single use shelter is poor and the marker was placed in the north corner.

Feature E is a C-shape which adjoins D to the SE. This structure opens to the S/SW and the dimensions are NE/SW 3.3 m. on the exterior, and 2.7 m. on the interior. The walls are stacked boulders and cobbles 3 courses high and measure .5-.8 m. high and .3-.6 m. wide. The interior of the feature is soil and loose rock. A few pieces of midden were observed inside the feature, but because of erosion the excavation potential of this feature is poor. The marker was placed in the north corner of this single use shelter.

Feature F is a C-shape that adjoins Feature E to the west. This feature opens to the west and measures E/W 2.7 m. on the exterior, 2.1 m. on the interior and N/S 3.7 m. on the exterior, and 2.7 m. on the interior. The walls are constructed of large boulders on the west side and the rest of the structure is constructed of average boulders and cobbles. The walls are .3-.6 m. wide and .3-.6 m. high. The interior of the feature is composed of some soil and loose rocks and bedrock toward the feature opening. Some midden was observed (a few pieces) to the west of the structure. The research potential for this single use shelter is low and the marker was placed in the north corner of the feature.

Feature G is located just south of Feature F and consists of a small rectangular enclosure. It measures NE/SW 2.7 m. on the exterior, 1.5 m. on the interior and NW/SE 4 m. on the exterior, 2.7 m. on the interior and the walls are .3-.6 m. high and .3-.6 m. wide. The walls are composed of boulders with bedrock and the NW wall. The *makai* wall is partly eroded and the south and east sides of the structure are pedestaled and slightly collapsed downslope due to this same erosion. The interior of the structure is composed of soil and loose rocks and some midden was observed both inside and outside downslope.

The only other artifact or midden observed was bottle glass (Twin Falls) which was found downslope to the SE. The research potential for this single use shelter is fair to poor and the marker was placed in the north corner of this feature.

Unidentified Archaeological Features in the Project Area

Three unrecorded features and one larger area with numerous unidentified features were identified during the field inspection conducted by Cultural Surveys Hawai'i (Borthwick *et al.* 2000). One feature lies in the access road corridor and the other three feature areas are in close proximity to the corridor.

Most of the unrecorded features are small c-shaped, oval and rectangular enclosures similar to those documented at sites -13725, -13726 and -13913. In addition, a surface scatter of midden and artifacts, ranging from sparse to fairly dense, covers virtually the entire *makai* area through which the proposed access road passes.

A Model of Site Patterns for Kawaihae

The field inspection confirmed previously identified site patterning models for Kawaihae. Site density is high immediately inland of the existing highway(s) and the existing structures of Kawaihae Town (i.e., Lā`au's Fish Market). Sites in this zone consist of a variety of habitations, temporary and permanent, and both marked and unmarked burials.

V. INFORMAL "TALK-STORY" WITH KAWAIHAE RESIDENTS

In past historical research (Kelly 1974) two Kawaihae informants were instrumental in providing oral history accounts of the area, William Akau Sr. and Eddie Lā`au Sr. Both of these *kūpuna* (elders) died in the early-mid 1970's. Today, 26 years later, there are few, if any, surviving *kūpuna* who know Kawaihae so intimately. It was hoped there would be someone to interview who could provide specific knowledge about the sites in the project area. This did not bear out to be true.

Cultural Surveys Hawai'i (CSH) representative, Ka`ohulani Mc Guire spent a day in the field with William Akau Jr. who ,like his father, was the former harbor master for Kawaihae. William Jr. can trace his familial ties to Kawaihae going back to his great-great-grandmother who was born in Kawaihae in 1829. Mr. Akau has been extensively interviewed by other CSH representatives (Chiogioji and Hammatt 1997; Hammatt *et al.* 1991) for past projects regarding Kawaihae history and it was hoped he could offer specific details about sites in the project area and that his memory would be jogged by seeing them.

Mr. Akau and the CSH representative walked through the whole project area and relocated the sites identified in the archaeological assessment (Borthwick, *et al.* 2000). Mr. Akau acknowledged that he did not realize these sites were even there and he indicated he had no prior knowledge about them and could not offer any insight as to their function and history. This is consistent with a prior CSH report which stated, "Notably, Mr. Akau [Jr.] and Mr. Lā`au [Jr.] knew very little about archaeology upslope of their ancestral homes" (Hammatt *et al.* 1991:VI-4). Mr. Akau does not remember hearing anything specific about the project area and the respective sites from his father, other family members or other *kūpuna*. Mr. Akau recalls that the areas just *mauka* of Akoni Pule Highway mainly consisted of *pili*, a native grass, *`ilima*, and *`uhaloa*. Other residents recalled the area *mauka* of the Akoni Pule Highway being used for pasture lands for cattle.

Conversations with residents like Pua and Louis Tavares, Nelson Doi, the Lā`aus, and Yvonne Lee did not yield any new information about archaeological sites, trails, possible burial features or history of the project area in general.

For most residents, their general knowledge of Kawaihae history focuses on the coast which was the center of activities, both commercial and recreational. The coast was also where the main settlement was located. This talk-story session and consultation with community members did not yield any information regarding traditional and modern-day cultural practices specific to the project area (i.e., gathering *`ilima* for *lei* and/or *hula*, gathering *`uhaloa* for medicinal or cultural purposes) and, of most concern, the burial features.

VI. PAST CULTURAL PRACTICES ASSOCIATED WITH THE PROJECT AREA

Gathering for Plant Resources

No specific documentation was found in regards to gathering of plant resources in the project area. However, archaeological studies have shown that wood-charcoal samples from a hearth dated to A.D. 1400 - 1515 were identified as *lama* (*Diospyros*), *kauila* (*Colubrina*), *alahe`e* (*Canthium*), and *`aiea* (*Nothocestrum*) (Murakami *in* Allen 1987:13). Native woods would have been utilized for tools, implements, weapons, and every-day use. In addition, the project area was at one time comprised of primarily *pili* grasslands. One of the most common uses of *pili* is thatching for houses. The project area does presently contain scattered *`uhaloa* and *`ilima*, which have medicinal uses. Both of these plants are neither rare nor endangered and they can be easily found at coastal and low elevations throughout Hawai`i. During this assessment, there were no current practices related to traditional gathering rights identified.

Hunting

Boundary commission records mention bird hunting for *`ua`u* (dark-rumped petrel). At one time, the *`ua`u* bred throughout the island of Hawai`i. *`Ua`u* nesting sites do not pose a danger as, presently, known nesting sites on the island of Hawai'i can only be found at high elevation slopes of 7,000-10,000 ft. (Hawai`i Audubon Society 1975:14). Probably, other birds were hunted in the Kawaihae grasslands, but documentation for this through written and oral sources was not found.

Archaeological Sites

Previous archaeological studies indicate portions of the project area were used for temporary and permanent habitation. In addition, some of the c-shapes possibly had an agricultural function (Clark 1983). Manufacturing of tools (i.e., volcanic glass and basalt flakes, adzes, sea urchin spines) and, possibly fishhooks, occurred as well. Indicative of a coastal lifestyle, shell midden (utilized for implements and food) was also documented at various sites. "Talk-story" with Kawaihae residents did not shed any light on the sites in the project area and most were unaware they existed.

Burials

In 1994, the Department of Hawaiian Home Lands (DHHL) made plans to develop 130 acres of land (of the 10,000 acres it owns in Kawaihae) for industrial use. In conjunction with the planned development, an archaeological survey (Hammatt *et al.*) identified 27 unmarked burial sites. Due to collapse, erosion and danger of being disturbed by bulldozers and fires, the DHHL decided to excavate and reinter the remains in a five-acre preserve further *mauka*. The burial preserve site was selected with the help of "Papa" Henry Auwae who was designated the spokesperson by "more than one hundred lineal descendants with ancestral links in Kawaihae" (Plan for Excavation and Re-interment 1994:30). Henry Auwae recently passed away.

In connection with the residential complex at Site 50-10-05-5998 are burials thought to be historic (Clark 1983:69). No lineal descendants are known to be directly connected to the burial platforms at this site or any other possible burial sites in the immediate project area (Pers. Comm.: Ululani Garmon, Hawai`i Island Burial Council, December, 2000;

William Akau Jr., 2/6/2001). This does not mean lineal descendants do not exist, but only that, up to this time, none have come forward.

Hawaiian Trails

There is little documentation of trails in South Kohala, but from the air, the beach trail "can be followed from the air as one continuous trail through both districts [Kona and South Kohala] (Apple 1965:10). Another known trail was the "Kawaihae Uka"trail leading inland from the coast (A. B. Loebenstein map, 1903). Branching off from the coastal trail, this inland trail curved *mauka* and went past Davis' grave and the old church. Probably a pre-historic trail, this trail was also used by the cowboys to bring cattle down from Waimea (Pers. Comm.: William Akau Jr.,2/6/01). Another "ancient trail" to Kawaihae Uka is noted on Loebenstein's map, but this trail begins much farther *mauka*, outside of the project area under discussion. Apple also notes that from the air, there is some evidence of other coastal-inland trails, but documentation of them seems to be lacking (Apple 1965:10). It is probable that other trails did exist as Kawaihae was an important port of commerce and trails would have been utilized to carry goods and transport cattle from Waimea to trading ships at Kawaihae Bay. The Kawaihae to Pu`uhue Trail lies well outside of the project area on the North Kohala side of Keanahalululu Gulch (Hammatt, *et al.* 1991:VIII-13). The boundary commission records indicate "an old bird catchers trail to Puuwau, a hill where they used to catch the uwau" (11/25/1873). Though not for certain exactly where this is, by following the place names given, one can ascertain this trail lies well beyond the boundaries of the project area.

Religious Sites

No religious sites were identified in the project area through previous archaeology or "talk-story" with local residents. The mention of "*ahu*" in the boundary commission records give no indication as to specific function, and these are probably boundary markers rather than religious shrines.

VII. SUMMARY AND RECOMMENDATIONS

Summary

In pre-historic times, Kawaihae Village was a coastal settlement focused on marine resource exploitation. It's advantage was its deep channels and a safe landing place for canoes. Kawaihae played an important part in battles between warring chiefdoms, probably due to its strategic location. It was the home of chiefs and became particularly important in the political career of Kamehameha I and his rise to power. Integral to the history of Kawaihae are its two major *heiau*, Mailekini and Pu`ukoholā, in the adjacent *ahupua`a* of Kawaihae 2. Early descriptions of Kawaihae by western visitors present a bleak and dismal picture of the landscape and settlement. By contact, most of the dryland forest and native landscape had already been altered.

After contact, Kawaihae became a center for commerce, being the only port on the northwest side of Hawai`i Island. The port contributed to entrepreneurship as people looked to develop new ways to support their changing lifestyle from traditional to non-traditional. Activities such as victualing ships with fruits and vegetables grown in Waimea, as well as supplying cattle for beef and exporting salt to places as far away like Russia, became common place in the early history of Kawaihae after contact.

A review of historical sources indicate there seems to be a void in the historical documentation of the area between Akoni Pule Highway and Kawaihae Uka (where the project area is situated). Knowledge regarding cultural use, land use and traditional activities in this area is generally sparse. In addition, not much has been documented for the early 20th century regarding changes in land use. Perhaps, this is where the role of archaeology can play an important part.

Previous archaeology has been conducted for this particular project area (Barrera and Kelly, 1974; Luscomb, 1974; Clark and Kirch, 1983; Allen 1987; Hammatt *et al.* 1991). A recent archaeological assessment (Borthwick 2000) re-identified four known sites (50-10-05-5998; 50-10-05-13725; 50-10-05-13726; 50-10-05-13913) and noted additional unrecorded features in the *makai*-most (southern) portion of the proposed access road corridor. The unrecorded features are predominantly small enclosures of oval, rectangular or c-shapes and a surface scatter of midden and artifacts. Possible unrecorded burials are in the vicinity of site 50-10-05-5998 which is a known burial site.

The assessment and talk-story with local Kawaihae residents did not reveal any new information regarding the project area, or archaeological sites and features. No cultural practices were identified within the present project area and no known cultural practitioners were identified. It should be noted that when DHHL excavated and reinterred burials to a permanent preserve *mauka*, over 100 lineal descendants with familial ties to Kawaihae came forward. It was beyond the scope of work for this project to contact all of these descendants. Many of the older *kūpuna* and knowledgeable informants, once relied upon for oral history information, are no longer living.

As currently planned, the proposed access road will impact archaeological sites and possible burial features.

Recommendations

Based on the field inspection, location of the sites and previous studies, the approximately 800 ft. length of the southern-most (*makai*) portion of the proposed access road poses the highest concerns. This section contains the only sites observed in the entire project area. It should also be noted that based on field observations and the archaeological assessment, realigning the road in the same vicinity to avoid all archaeological sites does not seem a viable option.

As planned, the proposed access road will adversely affect some, but not all, of the observed sites. The following alternatives are presented: 1) Realign the access road in the same vicinity to avoid adversely impacting burial features at site 50-10-05-5998, but possibly destroying other archaeological sites such as enclosures and temporary habitations; 2) Move the proposed access road closer to the Kaei Hana Industrial area and realign the road with the proposed 12" water line corridor leading to the water tank locale, thus avoiding all known archaeological sites.

Residents in the "talk-story" session, expressed their opinion that moving the access road closer to the industrial area and avoiding the sites would be a better option. It is recommended that option #2, which does not impact any known archaeological or cultural sites be considered.

VIII. REFERENCES

Allen, Melinda S.
1987 *Archaeological Inventory Survey of Department of Hawaiian Home Lands, Hawaihae 1, South Kohala, Hawai`i*, MS. 073187. Bernice Pauahi Bishop Museum.

Apple, Russell A.
1978 *Pahukanilua: Homestead of John Young, Kawaihae, Kohala, Island of Hawai`i.* Honolulu: National Park Service, Hawai'i State Office.

Apple, Russell A.
1969 *A History of Historic Structures, Kawaihae, South Kohala, Hawai'i Island.* Pp. 10-29. *IN* D. Cluff, *et al. Archaeological Surface Survey of Pu`ukoholā Heiau and Mailekini Heiau. "Hawai`i State Archaeological Journal* 69-3. Honolulu: Dept. of Land and Natural Resources, Division of State Parks.

Apple, Russell A.
1965 *Trails, From Steppingstones to Kerbstones.* Bernice P. Bishop Museum Special Publication 53. Honolulu, Hawai`i: Bishop Museum Press.

Barrera, William Jr., and Marion Kelly
1974 *Archaeological and Historical Surveys of the Waimea to Kawaihae Raod Corridor, Island of Hawaii: Archaeological Survey and Historical Survey.* Departmental Report Series 74-1. Dept. Of Anthropology, B.P. Bishop Museum.

Barrère, Dorothy
1983 *Notes on the Lands of Waimea and Kawaihae. IN* J. T. Clark and P. V. Kirch, eds., *Archaeological Investigations of the Mudlane-Waimea-Kawaihae Road Corridor, Island of Hawai`i*, pp. 407-448. Departmental Report Series 83-1. Honolulu: Dept. of Anthropology, Bernice P. Bishop Museum.

Bates, G. W.
1854 *Sandwich Islands Notes by a Hcole.* New York: Harper.

Beaglehole, J. C. (Editor)
1955 *The Journals of Captain James Cook on His Voyages of Discovery*, Vol. III. Cambridge: University Press.

Bingham, Hiram
1847 *A Residence of Twenty-One Years in the Sandwich Islands.* Hartford: Hezekiah Huntington.

Clark, Jeffrey T. and Patrick V. Kirch (*editors*)
1983 *Archaeological Investigations of the Mudlane-Waimea-Kawaihae Road Corridor, Island of Hawai`i: An Interdisciplinary Study of an Environmental Transect.* Department of Anthropology, Bernice Pauahi Bishop Museum.

Clark, John R. K.
1985 *Beaches of the Big Island.* Honolulu: University of Hawai`i Press.

Cuddihy, Linda W. and Charles P. Stone
1993 *Alteration of Native Hawaiian Vegetation: Effects of Humans, Their Activities and Introductions.* Honolulu: University of Hawai'i Press.

Desha, Stephen L.
2000 *Kamehameha and His Warrior Kekūhaupi`o.* Honolulu: Kamehameha Schools Press.

Doyle, Emma Lyons
1945 *Makua Laiana: The Story of Lorenzo Lyons.* Honolulu: Honolulu Star-Bulletin.

Ellis, William
1969 *Polynesian Researches: Hawai`i.* Rutland, Vt.: Charles E. Tuttle

Foote, Donald E., Elmer L. Hill, Sakuichi Nakamura, and Floyd Stephens
1973 *Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii.* Soil Conservation Service, U.S. Department of Agriculture.

Fornander, Abraham
1917-1918 *Collection of Hawaiian Antiquities and Folklore*; T. G. Thrum, editor. Memoirs of the Bernice Pauahi Bishop Museum (Vol. IV & V). Honolulu, Hawai`i: Bishop Museum Press.

Hammatt, Hallett H., David W. Shideler, Douglas K. Borthwick, Mark Stride, Matt McDermott, Kristie Nakamura
1991 *Archaeological Survey and Testing Kawaihae 1 (Komohana), South Kohala, Hawai`i.* Cultural Surveys Hawai`i, Inc.

Hawai'i Audubon Society
1975 *Hawai`i's Birds.* Honolulu, Hawai`i: Hawai'i Audubon Society.

Hawai'i Mission Children's Society
1969 *Missionary Album: Portraits and Biographical Sketches of the American Protestant Missionaries to the Hawaiian Islands.* Honolulu: Hawaiian Mission Children's Society.

`Ī`ī, John Papa
1959 *Fragments of Hawaiian History.* Honolulu, Hawai`i: Bishop Museum Press.

Jarves, James
1844 *Scenes and Scenery of the Sandwich Islands, and a Trip Through South America, 1837 - 1842.* Boston: James Munroe and Company.

Judd, Henry P.
1988 *Hawaiian Proverbs and Riddles.* (Originally published in 1930 by Bishop Museum.) Bernice P. Bishop Museum Bulletin 77. Mill wood, N.Y.: Kraus Reprint.

Juvik, Sonia P. and James O., Editors.
1998 *Atlas of Hawai`i.* Third Edition. Honolulu: University of Hawai`i Press.

Kamakau, Samuel M.
1992 *Ruling Chiefs of Hawai`i.* (Revised Edition.) Honolulu: Kamehameha Schools Press.

Kame`eleihiwa, Lilikalā
1992 *Native Land and Foreign Desires.* Honolulu, Hawai`i: Bishop Museum Press.

Kelly, Marion
1974 *Historical Survey of the Waimea to Kawaihae Road Corridor Island of Hawai`i.* Hawai'i Historic Preservation Report 74-1. Honolulu Hawai`i: Department of Transportation, State of Hawai'i in Cooperation with the Federal Highway Administration, U. S. Department of Transportation and Department of Land and Natural Resources, State of Hawai`i.

King, Robert D.
1935 *"Districts in the Hawaiian Islands." In* John W. Coulter *A Gazetteer of the Territory of Hawai`i,* pp. 214-224. Honolulu: University Press of Hawai`i.

Kuykendall, Ralph
1967 *The Hawaiian Kingdom, Vol. III: 1874-1893, the Kalākaua Dynasty.* Honolulu: University of Hawai'i Press.

Kuykendall, Ralph
1965 *The Hawaiian Kingdom, Vol I: 1778-1854, Foundation and Transformation.* Honolulu: University of Hawai`i Press.

Luscomb, Margaret L.K.
1974 "Archaeological Walk-Through Survey of Proposed Kawaihae and Kukuipahu Power Plant Areas, Island of Hawai`i." Department of Anthropology, B.P. Bishop Museum, Honolulu.

MacDonald, Gordon A., Agatin T. Abbott and Frank L. Peterson
1983 *Volcanoes in the Sea.* (Second Edition.) Honolulu: University of Hawai`i Press.

McEldowney, Holly
1983 *A Description of Major Vegetation Patterns in the Waimea-Kawaihae Region During the Early Historic Period. IN* J. T. Clark and P. V. Kirch, eds., *Archaeological Investigations of the Mudlane-Waimea-Kawaihae Road Corridor, Island of Hawai`i*, pp. 407-448. Departmental Report Series 83-1. Honolulu: Dept. of Anthropology, Bernice P. Bishop Museum.

Menzies, Archibald
1920 *Hawai`i Nei: 128 Years Ago.* Honolulu: W. F. Wilson.

Mission Station Reports, Waimea, Hawai`i, 1832-1870. *IN* Marion Kelly *E Hoolono i Ke*
1974 *Kai Hawanawana*, Listen to the Whispering Sea. Honolulu, Hawai`i: Department of Anthropology, Bernice P. Bishop Museum.

Pukui, Mary Kawena
1983 *`Ōlelo No`eau, Hawaiian Proverbs and Poetical Sayings.* Bernice P. Bishop Museum Special Publication No. 71. Honolulu: Bishop Museum Press.

Pukui, Mary Kawena, Samuel H. Elbert and Esther T. Mo`okini
1976 *Place Names of Hawai`i.* Honolulu: Bishop Museum Press.

Sato, Harry H., *et al.*
1973 *Soil Survey of the Island of Hawai`i, State of Hawai`i.* Soil Conservation Service, University of Hawai`i Agricultural Experiment Station.

Schmitt, Robert C.
1973 *The Missionary Censuses of Hawai`i.* Honolulu: Bishop Museum.

Vancouver, George
1967 *A Voyage of Discovery to the North Pacific Ocean and Round the World in the Years 1790, 1791, 1793, 1794, and 1795.* Three vols. New York: Da Capo Press.

Varigny, Charles de
1981 *Fourteen Years in the Sandwich Isiands 1855 - 1868.* Honolulu: University Press of Hawai`i.

Waihona `Āina Corporation
2000 *Māhele* Database, <waihona.com>

Wilcox, Carol and Sallie Edmunds, Project Coordinators
1990 *Hawai`i Stream Assessment.* State of Hawai`i Department of Land and Natural Resources, Commission on Water Resource Management Division of Water and Land Development, National Park Service Rivers and Trails Conservation Assistance Program and Western Region Natural Resources and Research Division.

APPENDICES

APPENDIX A: LAND COMMISSION AWARDS FOR KAWAIHAE 1

LCA 3668, LCA 3669

No. 3668 D. Manuia Hawaii 28 Dec. 1847
Native Register vol. 8 pg.1

Greetings to the Land Commissioners, William L. Lee ma: Here is my claim which I got from the ali`i, Kaoanaeha Kuamoo, and Puna, on March 31, 1847. It is a small lot at Kawaihae, which is named Koleaka. Below is the diagram and its circumference.

[Lot measures 34 fathoms (south side), 34 fathoms (west side), 53 fathoms (north side, 53 fathoms (east side)]

The circumference of this lot is 214 fathoms. With thanks, I am your obedient servant.
DAVIDA MANUIA

No. 3668 Manuia, D. Kawaihae, Sept. 11, 1848
Native Testimony vol.4 pg.1

Puna sworn and stated: "I have seen Manuia's place at Koleaka in Kawaihae, Hawaii. One house-lot with 4 houses on it, 2 of which are for Manuia, 1 for Nahina and 1 for the government. The boundaries are: mauka, a government pasture; Puako, a stream named Pakiahua; makai, Kalamau's lot and the beach; Kohala, Kekuawahine's lot. It has been enclosed. It had been from Kaonaeha in 1840; no one has objected to this day."

Kahananui sworn and stated: "I have known just as Puna has stated here."

No. 3669 Makahi Kawaihae, Jan. 12, 1847
Native Register vol. 8 pg.2

Greetings to you, William L. Lee, and the Land Commissioners: This is my lot at Kawaihae, whose diagram and description are below:

[Lot measures 12 fathoms (south side), 19 fathoms (west side), 5 fathoms (north side, 17 fathoms (east side)]

As directed, I submit my claim, which was from Kekuawahie [*sic*] in 1841. With thanks,
MAKAHI

No. 3669 Makahi Kawaihae September 11, 1848
Native Testimony vol.4 pg.1-2

Kekuawahine sworn and stated: "I have seen Makahi's place at Pahonu in Kawaihae, Hawaii. There is a house site which has been fenced with two houses in it and they are for Kale, who is Makahi's brother-in-law. This is Kale's interest and Makahi is under him. Mauka, a trail path to Mr. French's lot; Puako, the sea and makai, the same; Kohala, Mr. French's lot. I had given it to him in 1841. No one has objected to him to this day. I do not feel to protest against him."

LCA 3826, LCA 4091

No. 3826 Punihaniha Kawaihae, January 13, 1848
Native Register vol.8 pg.5

Greetings to William L. Lee, and the Land Commissioners: Concerning my claim for houselot at Kawaihae, whose boundaries and diagram are shown below:

[Lot is 24 fathoms (south), 24 fathoms (west), 24 fathoms (north), 24 fathoms (east)]

The name of this place is Kahawai. The circumference of the lot is 96 fathoms. I got this houselot a long time ago, in the time of Kamehameha I. With aloha,

PUNIHANIHA

No. 3826 Punihaniha Kawaihae September 11, 1848
Native Testimony vol.4 pg.5-6

Naniu sworn and stated: "I have seen Punihaniaha's house site [called] Kahapaakai in Kawaihae, Hawaii in one section and it has been enclosed with two houses in it. There are some salt beds outside of the house site. Mauka, a pasture for the ahupuaa, also Puako and makai; Kohala, Paimaka and Kawai's land. This is very ancient land from the grandparents' time. Kahapana is the grandfather of Punihaniha and Mii is his father. Mii had died during the time of Kamehameha I and Punihaniha had acquired this land. The enclosure is new. No one has objected except for the government who has protested for the houses there."

Paimaka sworn and stated: "I have known exactly the same as Niniu has just related here. No one has objected with the exception of the government only."

No. 4091 Kaue Kawaihae, January 13, 1847
Native Register vol.8 pg.3

Greetings to you, William L. Lee, and the Land Commissioners: I hereby state my claim for a houselot; its diagram and description follow:

[Lot measures 30 fathoms (north), 63 fathoms (east), 30 fathoms (south); on the west side is a "salt lot"]

The circumference of this lot is 157 fathoms. I got this houselot from Kamehameha I. With thanks, I am,

KAUE

LCA 4091 (cont.), LCA 4094

No. 4091 Kaue Kawaihae 11 Sept. 1848
Native Testimony vol.4 pg.3

Naniu sworn and stated: "I have seen the house-lot of Kaue at Kahapaakai in Kawaihae, Hawaii in one section with three houses on it, two of which are for Kane and one for the government. I[t] has no fence and there are three salt beds. Mauka, an ahupuaa; Puako, Kahapaakai; makai, the ahupuaa, Kalaeone; Kohala, a heiau, Kauhuhue. This is an ancient place from the grandparents to the parents that Kahue received in 1840; no one has objected."

Paimaka sworn and stated: "I have known just as Naniu has stated here; no one has objected to this day."

No. 4094 Kepaimaka Kawaihae, Jan. 13, 1848
Native Register vol.8 pg.5

Greetings to William L. Lee, and the Land Commissioners: This is my claim for a houselot whose boundaries and description follow:

[Lot is 30 fathoms on all sides]

On the south side, is Mr. Laiena [Lyons?] houselot, on the west side is the seashore, on the east side is unused kula [pasture land].
The circumference of this lot is 120 fathoms. This is a very old house lot, from Kalaiopuu and before that, and from Kamehameha I to this day. With thanks,

KEPAIMAKA

No. 4094 Kepaimaka Kawaihae Sept. 11, 1848
Native Testimony vol.4 pg.4-5

Naniu sworn and stated: "I have seen the houselot of Kepaimaka at Kaelepuhi in Kawaihae, Hawaii. A house lot with one house in it has not been enclosed. The house is for Kepaimaka. There are two sections and the boundaries of the first section are: mauka, the pasture for the ahupuaa; Puako, Mr. French's lot; makai, the sea; Kohala, vacant land; makai, Peleleu's land; Kohala, Pai's land. Kekuwahine had given him his land long before the konohiki had lived here in Kawaihae; no one has objected to this day."

Kekuawahine sworn and stated: "I have known just as they have related here. I am an overseer for them. Death has been their only obstacle."

LCA 4101, _____

No. 4101 Kahananui Kawaihae, January 12, 1848
Native Register vol.8 pg.4

Greetings to William L. Lee, and the Land Commissioners: This is my claim for a lot at Kawaihae, whose diagram and description follow:

[Lot measures 17 fathoms (west), 17 fathoms (north), 11 fathoms (east), 20 fathoms (south). Manuia's lot is to the north and east; a small stream is on the south,]

My interest was from the ali`i, Kaoanaeha, and Olohana [John Young]. Farewell and thanks.
KAHANANUI

No. 4101 Kahananui Kawaihae Sept. 11, 1848
Native Testimony vol.4 pg.3-4

Keliikaheaawa sworn and stated: "I have seen Kahananui's place at Kanaio in Kawaihae, Hawaii, of one section with three houses on it; two of which are for Kahananui and one for Kaheana. Mauka, Manuia's lot; Puako, Pokiahua; makai, the sea; Kohala, Manuia. I[t] has been enclosed and Kahananui's interest had been from me. Kahananui is my nephew. I have no claim in this place. Olohana had given me my interest during the time of Kuamoo. No one has objected to this day."

Puna sworn and stated: "I have known just as Keliikaheaawa has stated and I have also heard the same. Kuamoo has given this place to Kahananui."

No. 4884 - William Franch [French] Honolulu, Feb. 2, 1848
Native Testimony vol.2 pg.493

This land is at Kawaihae in Hawaii. It is a storage and there are other houses, too.

Samuel Rice sworn by the Word of God and stated, "I have seen this place which is at Kawaihae in Hawaii. It has been enclosed by a stone wall and that is its boundary [lines]. Kuakini told me as follows: "French had asked me for land in Kawaihae and I gave him land with the provision that he build a pier for the canoes to land." He received the land in the year 1838 and he did build the pier, also some houses and has lived there to the present time with no objections."

John G. Munu sworn by the Bible and stated, "My testimony is the same as S. Rice's testimony. Kuakini did say that if French would build a pier, he would give a parcel of land for him, just as Rice has stated here. French has lived well and peacefully; no one has objected to him."

LCA 8513

Rikana No. 8513 L.B. Lincoln Oct. 7, 1848
Native Testimony vol.4 pg.144-145

Kimo Fay sworn and stated: "I have known this land to be for Kuakini. It is at Keawewai, an ili land with weeds, in the Kawaihae-uka ahupuaa. Mauka and all around is for Kuakini. I have not known how big it is; however, Kuakini had requested that he build a stone altar. Three houses are standing on this land where it has been enclosed. There are also 2 corrals in this ili land and he received this place from Kuakini in 1839. I have personally seen and heard this grant made by Kuakini. I had seen Kinilau living there at that time, Kuakini had given this land permanently for him [Lincoln] as a place for him to farm. I have not heard that anyone has objected to him to this day. This was given at Kamakahonu in Waimea."

Kinilau sworn and stated: "I had heard later about Kuakini giving this land to him [Lincoln]."

No. 8513 Lorenzo B. Lincoln
Foreign Testimony vol.3 pg.203

L. Kaauwai Sw. I took testimony on this Claim in 1848. I know the origin of this claim. Lincoln had it through his wife still living, and she from her ancestors - and they have lived upon and cultivated part of it in peace without dispute to this day. Keawewai is the name of the land I refer to as this estate of his wife. The land of John Young's mother Koanaea bounds it on the Kona side. Gov[t] Kula [pasture land] on Makai. Leleiōhoku's heirs on Kohala. Mountain on Mauka.

To this there is no dispute. The right is with this wife of L.B. Lincoln. The greater part of this land was given to Cl[t] by Kuakini, and did not belong to his wife. He earned it by long services for Kuakini in tanning leather. It is all known as Keawewai and including all under that name. I know of no other land to which he has any claim. Mr. Lincoln has always been a good resident.

APPENDIX B: BOUNDARY COMMISSION RECORDS

Commission of Boundaries on Kawaihae 1st - November 25, 1873

The Ahupua`a of Kawaihae 1st District of
North Kohala, Island of Kawaii 3d J.C.

On this the 25th day of November AD 1873 the Commission of Boundaries for the Island of Hawaii 3d J.C. met at the house of Jas Woods Kohala Ranch North Kohala, on the application of J.O. Dominis Agent of Crown Lands for the settlement of the boundaries of Kawaihae 1st situated in the District of North Kohala island of Hawaii. Notice of hearing for the settlement of boundaries of lands in Hamakua and Kohala at the Court House in Waimea South Kohala on the [blank] served by publication in the Hawaiian Gazette of [blank] and Kuokoa of [blank] 1873 and continued at Kohala Ranch on the 24th and 25th instants. Due notice personally served on owners or agents of adjoining lands as far as known. Present Jas Woods for applicant and for J W Austin, G W D Halemanu for Her Majesty Queen Emma.

For Petition see Folio [blank] Book A.

Testimony.

Kahua[K] Sworn (Same witness as Kawaihae 2d)
I am a kamaaina of Kawaihae 1st my parents pointed out the boundaries to me.
It is bounded on the north side by Waikaa, at a place called Kamake, where there is an ahu on Waikaa. thence mauka along the pili to Oneloa, distance of about a mile, there is an ahu there. thence to Waiapua gulch, (the boundary runs from shore in a gulch,) Thence to Keanahalulu, in the gulch and by the Government road, on the Waimea side of the Catholic Church. (This is the same gulch that runs from shore) Thence up the gulch to Waipouli thence to a place called Pohoakala, thence the boundary leads into a new gulch, and runs off towards Kahua, cutting off Waikaa. thence easterly along the old bird catchers trail to Puuwau, a hill where they used to catch the uwau, Honokane pali does not reach to this hill. The land of Awini which is very narrow here joins Kawaihae at this kauhale. From thence to Moananuikelehua. this is along where you go down to Honokea, then boundary of Hamakua and Kohala. Thence the boundary keeps east to Waiohoolana the makai side belong to Waimanu, and this side to Kawaihae, here it runs to above Ulu; here it turns towards Kohala and runs along Kawaihae 2d to a place called Napoeaumihulumakaokalani. Kawaihae 2d runs along the kualapa which is very narrow on the east side of Waiahoolana; the slope towards Mana is Waimea. Kalualepo is on Kawaihae. Kawaihae 2d cuts across the heads of Waipio and Waimanu. The Boundary between the Kawaihaes runs over the hill of Napoeaumihulumakaokalani. Kaulanaahu is a ridge that runs from this ridge to Pali o Waiau. Keawewai gulch is on the Kohala side of the ridge the boundary runs down Keawewai gulch to Keanakawaha thence down the gulch to Pohakuloa and thence follows the gulch to the sea. Kawaihae 1st is bounded makai by the sea. Ancient fishing rights extending out to sea.

CX[d]
There is a place called Piipa mauka of Oneloa. I know the principal points only, of the boundary from the shore. There is a placed called Papalepo between Puuwau and Puupala. I was not told what lands run along there, but I know Waikaa does not reach there. I have never heard of a place called Puupili on Kawaihae. My parents told me the makai boundary but showed me the mauka one. I never heard of Waikaa running up to Waihoolana

(Note: See Evidence of Ohia on Waikaa).

I cannot say for certain that I can give makai boundaries correctly as I have never been there with my parents. I used to go bird catching with them, in the woods. I do not know but what I would make mistakes if I should try to point out places in the woods. I am certain I remember the names of the places. I can point out the hill. I do not think I have strength enough to get as far as the mauka boundaries as I am old, and the road is bad. Kahaau's father came from Waimea. I know a place called Hinamakanui it is an ahua on the ridge, the water that flows to Honokane gulch flows past this place. Kahuanui does not reach there. the old bird catchers road to Puuwau runs way makai of this place.
I am not certain as I remember all the points as I am old. I was not full grown when I went with my parents, and I have not been since.

Puhi[K] Sworn
I do not know anything about the boundaries of Kawaihae, save those adjoing Waikaa. I do not know anything about the boundaries of Kahua, except what join Waikaa.
CX[d]

Case continued until further notice to all interested parties.

R.A. Lyman
Commissioner of Boundaries 3[d]J.C.

Case continued on Folio 279.

Commission of Boundaries on Kawaihae 1st - June 10, 1874

The Ahupuaa of Kawaihae[1st] District of
North Kohala Island of Hawaii 3[d]J.C.

Case continued from November 25[th] A.D. 1873
See Folio 149 Book B

On this the 10[th] day of June AD 1874 the Commission of Boundaries for the Island of Hawaii 3[d] J.C. met at the house of Jas Wood Kohala Ranch North Kohala for the examination of witnesses as to the boundaries of Kawaihae[1st] Due notice personally served on all owners or agents of adjoining lands as far as known. Present Jas Woods for Government

Nahea[K] Sworn
I was born at Kawaihae during the reign of Kamehameha I. was very young when he died. I now live at Pololu have lived there for over twenty years before that I lived on Kawaihae and am a kamaaina of the land.

I used to go with Kuhekaa and Kanewa old bird catchers and they told me the boundaries. I do not know the boundary of Kawaihae[1st] at shore as I used to go on the mauka boundary. Waika bounds it on the north side commencing at a gulch at the Government road to Waimea, mauka and towards Waimea of the Catholic church thence along the gulch to the side of Pili, a hill on Waiaka Waipuoli and Pohoa are on the boundary below Pili. It is not very far from Pili to the end of Waika. Thence to a place called Naelemakule, thence towards a gulch to a large ohia tree at Papalepo, where they used to hide from the rain. Thence to the gulch Puuwau, thence across the gulch and along a trail towards Honokane to a place called Hinamakanui where we used to have our houses, situated at the head of Honokane pali thence to Moapo where it joins Waimanu thence across this head of Waimanu to Waipio to a place called Ulu. This is as far as I have heard or know the boundaries. never heard that Puukapu reaches to Honokane pali.

CX[d]
I know the place called Napoeaumi haleakalani, it is on Kawaihae[1st] but I do not know whether Kawaihae Hikina reaches there or not, know a place called Kaulanaahu, I think it is on the boundary between the Kawaihae[1st] and the Kawaihae[2d] but I am not sure.
Waihoolana may belong to both Kawaihaes. I do not know the boundaries between the Kawaihae[1st] and Kawaihae[2d]. Keawewai gulch is the boundary between Kawaihae[1st] and Kawaihae[2d].

APPENDIX D

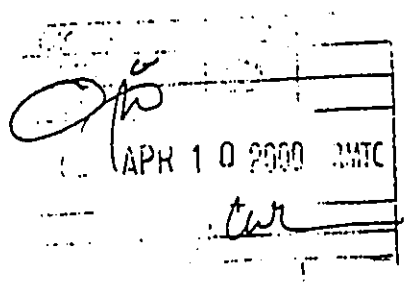
CORRESPONDENCE

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

REPLY TO
ATTENTION OF

April 7, 2000

Regulatory Branch



Mr. Craig W.L. Luke
Project Engineer
R.M. Towill Corporation
420 Waiakamilo Road, Suite 411
Honolulu, Hawaii 96817-4941

ATTENTION: Ms. Debra Tom

Dear Mr. Luke:

This acknowledges the additional information provided in your letter dated March 31, 2000 regarding the blowoff line for the 1MG Water Tank located at Kawaihae, Hawaii Island. Based on the information provided, the location and placement of the outlet is above, and outside of the unnamed dry gulch which has intermittent stream flow. In addition, any future ground disturbing, construction, or land alteration activity to install the blowoff line does not anticipate the disposal or placement of fill material into the dry gulch. Therefore, the Corps will not require a Department of Army permit for this planned activity.

Should the final engineering plans require a structure or fill be placed within the limits of the gulch, please contact Mr. Farley Watanabe of my staff at 438-7701 (FAX 438-4060) if you have any questions or need additional information to request a jurisdictional determination. Please refer to File Number 200000131 in any future correspondence with us.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

420 Waiakamilo Road
Suite 411
Honolulu Hawaii 96817-4941
Telephone 808 842 1133
Fax 808 842 1937
eMail rmtowill@hawaii.rr.com

R. M. TOWILL CORPORATION
SINCE 1930

Planning
Engineering
Environmental Services
Photogrammetry
Surveying
Construction Management

March 31, 2000

Mr. Farley Watanabe
Regulatory Branch
U.S. Army Corp of Engineers, Building 230
Fort Shafter, Hawaii 96858-5440

Subject: Project 200000131, Kawaihae 1.0 MG Tank

Dear Mr. Watanabe:

As you requested, we are submitting a general description of the blowoff line in connection with the subject Kawaihae 1.0 MG Tank.

The project site is located approximately 2,000 feet northeast of Akoni Pule Highway and approximately 2,500 feet from the shoreline. A gully and unnamed tributary are identified on the USGS quad map, approximately 370 feet north of the project. The proposed reservoir facility will include a concrete tank, blowoff line, effluent and influent water line improvements, chainlink fence surrounding the reservoir and an access road from the project to Akoni Pule Highway.

The blowoff line will be used in the event of an emergency or similar situation in which the reservoir must be partially or completely drained. According to Department of Water Supply standards, the blowoff line must be designed to empty the reservoir over a 12 hour period. The water will be directed through an underground pipe towards the natural gully north of the project site. The final location and dimension of the pipe will be determined upon the final design of the reservoir. Figure 1, Vicinity Map, shows the approximate location of the blowoff line in relation to the proposed reservoir.

Should you have any questions or require additional information, please do not hesitate to contact Debra Tom at 842-1133.

Very truly yours,

Craig W.L. Luke
Project Engineer

CWL/dt

Enclosure

cc: Mr. William Makanui, DHHL

BENJAMIN J. CAYETANO
GOVERNOR
SEIJI F. NAYA, Ph.D.
DIRECTOR
PHILIP J. BOSSERT
DEPUTY DIRECTOR
DAVID W. BLANE
DIRECTOR, OFFICE OF PLANNING

DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

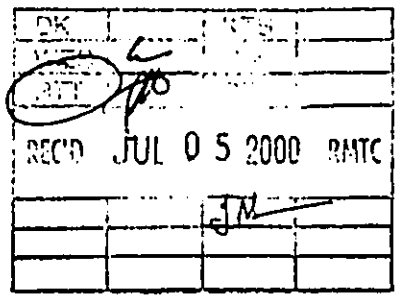
OFFICE OF PLANNING

235 South Beretania Street, 6th Floor, Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Telephone: (808) 587-2846
Fax: (808) 587-2824

Ref. No. P-8691

June 30, 2000



Mr. Jim Niermann
R.M. Towill Corporation
420 Waiakamilo Road, Suite 411
Honolulu, Hawaii 96817-4941

Dear Mr. Niermann:

Subject: Hawaii Coastal Zone Management (CZM) Program Federal Consistency Review for the Kawaihae 1.0 Million Gallon Reservoir Tank, South Kohala, Island of Hawaii

This responds to your letter dated June 26, 2000, requesting confirmation that a CZM federal consistency review for the Kawaihae 1.0 million gallon reservoir tank is not required. According to your letter, the project is located outside of the Special Management Area, has no federal involvement, requires no federal permit or approval, and uses no federal funds. On this basis, we confirm that a CZM consistency review is not required for this project. In addition, the Department of Hawaiian Home Lands is responsible for its actions related to this project to be compliant with the objectives and policies of the Hawaii CZM Program as required by Hawaii Revised Statutes, Chapter 205A.

This determination is not an endorsement of the project nor does it convey approval with any other regulations administered by any State or county agencies. Thank you for your cooperation in complying with Hawaii's CZM Program. If you have any questions, please call John Nakagawa of our CZM Program at 587-2878.

Sincerely,

David W. Blane
Director
Office of Planning

c: Planning Department, County of Hawaii

APPENDIX E

RESPONSES TO COMMENTS RECEIVED DURING THE DEA 30-DAY PUBLIC REVIEW PERIOD

JOJO TANIMOTO, president
KAWAIHAE HAWAIIAN HOMES
COMMUNITY ASSOCIATION
P.O. BOX 44337
KAWAIHAE, HI 96743
FAX NO.: (808) 326-7182

August 18, 2000

Mr. William Makanui
Department of Hawaiian Homelands
P.O. Box 1879
Honolulu, Hi 96805

Dear Mr. Makanui:

RE: REQUEST FOR SPECIAL MEETING INVOLVING THE KAWAIHAE WATER TANK EA.

Just a short note to formally request a special meeting be held with the Department, hopefully the Commissioners, and the Kawaihae interested community.

Attached is my submittal to the environmental process. As I explained, since there was no time to acquire consensus from the community in time for this process, I would be putting the question before our committees and membership.

Thank you again for the opportunity to participate in the environmental process.

Sincerely,

Jojo Tanimoto
President

cc: appropriately

JOJO TANIMOTO
P.O. BOX 44337
KAWAIHAE, HAWAII 96743
TELEPHONE: (808) 882-7623

August 18, 2000

Mr. William Makanui
Department of Hawaiian Homelands
P.O. Box 1879
Honolulu, Hi 96805

Dear Mr. Makanui:

The following are comments directed toward the Draft Environmental Assessment (D-EA) for the KAWAIHAE 1.0 MILLION GALLON (WATER) TANK, proposed to be located in South Kohala, Hawaii.

First, per our telephone conversation, I introduced myself as the president of the Kawaihae Hawaiian Homes Community Association (KHHCA). I requested a presentation regarding the EA documentation and you said this would probably not be possible prior to the commenting process. An opportunity may become available on August 28, 2000 when the Hawaiian Homes Commission (HHC) hold their scheduled meeting in Waimea. I take this opportunity to request for a small special meeting on that day. It is our hope that our grassroot community is informed and able to participate in the environmental process.

I am submitting the following as the first step in participating in the environmental process.

A. Obviously, my first concern is our level of understanding impacts to our communities' health and safety needs.

B. Concern that the factors used to determine the 1994 Kawaihae Master Plan (Master Plan) was generated with the perception that not many beneficiaries would participate in the environmental process. Though this tank is the first step in providing water resources for the area (and is primarily planned to upgrade the fire hydrant pressure), no mention is made that any updated calculations of the Master Plan will be included but still seem to be an integral document of information.

C. Great concern is expressed in the area of stockpiling. Kawaihae community is in the infant stages of developing quite a large scale of land masses.

1. It seems everytime a development project commences a new quarry is created from homestead land, and not only in Kawaihae.

2. It seems everytime mineral resources are stocked and piled, the developer drives away with the beneficiaries' valuable resources without compensation and; as primary recipients.

3. It seems everytime the developer deposit these mineral resources on other than homestead land, the environmental process does not extend to those areas, and then; the resources get lost from the inventory.

The beneficiaries of Kawaihae want accountability. The beneficiaries could use these construction resources to subsidize other needs and desires of the community association.

D. The Kawaihae Hawaiian Homes community is unique in many ways. One of the primary purposes for utilizing these lands at all, is to further self sufficiency and provide rehabilitation---for the blood quantum beneficiaries. Culturally, beneficiaries are caretakers of the land. Therefore, this is an objection to the manner in which information is provided.

For instance, the draft EA indicates that Kawaihae was the habitat for the Hawaiian hoary bats, the Hawaiian duck, the Hawaiian hawk and the anchatinellid land snail. Sometimes bats, and hawks are still seen---in the area. There seems no sensitivity toward initiating development in a manner that restores and revitalizes this unique habitat that connect our heritage, culture and present ventures. The timing is efficient to begin those practices and implement those changes.

E. Noise, Dust and Highway safety factor procedures seem to be improved since the development of the Master Plan. However, since the developer will be left with this responsibility; what mitigations will assure the residents in the community that accountability will be are provided during weekends, evenings, holidays, etc.?

F. Weather factors during the construction period may pose difficulties on the residents during the November to April months when rain and heavy wind patterns do change from tradewinds to phenomena scales. The soil is considered ash, it will tend to disburse whichever way the wind blows, therefore the concern seems to be with the construction and continual use of the roadway areas that may blow across the highway as they have done before.

The location of the roadway to Akoni Pule Highway is in such close proximity to the "camel's hump" between the lighthouse and the makai subdivision, that it is not clear how much impact or what mitigations will be utilized to properly drain flooding conditions on the highway. There is no mention of the camel's hump in the Master Plan nor the proposed EA.

Thank you for the opportunity to participate in the environmental process. I await your responses eagerly.

Sincerely,

Jojo Tanimoto

BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

RAYNARD C. SOON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

JOBIE M. K. M. YAMAGUCHI
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

October 11, 2000

Ms. Jojo Tanimoto
P.O. Box 44377
Kawaihae, Hawaii 96743

Dear Ms. Tanimoto:

Subject: Kawaihae 1.0 Million-Gallon Tank
Public Review of Draft Environmental Assessment (DEA)
Kawaihae, South Kohala, Island of Hawaii

Thank you for your letter dated August 18, 2000 regarding the DEA for the proposed Kawaihae 1.0 Million-Gallon (MG) Tank. A copy is attached for reference. In response to your comments (in italics) we offer the following information:

A. ***My first concern is our level of understanding impacts to our communities' health and safety needs.***

The Department of Hawaiian Home Lands (DHHL) shares your concern about impacts to the health and safety of the Kawaihae community and is committed to ensuring that its projects are conducted in a manner that is open to community review.

B. ***Concern the factors used to determine the <u>1992(4) Kawaihae Master Plan</u> (Master Plan) was generated with the <u>perception</u> that not many beneficiaries would participate in the environmental process.***

The Kawaihae Master Plan (KMP) was prepared with community input and states the need for continued public review of plan development and project design. DHHL welcomes participation of our beneficiaries in the planning and environmental review of DHHL projects. It is for that reason that copies of the DEA were forwarded to representatives of DHHL's Kawaihae community.

The Environmental Assessment process is by no means the only opportunity for public participation. Your suggestions on improving opportunities for beneficiaries' participation would always be welcomed.

Though this tank is the first step in providing water resources for this area (and is primarily planned to upgrade the fire hydrant pressure), no mention is made that any updated calculations of the Master Plan will be included but still seems to be an integral document of information.

The KMP was designed as a 10-year general "blueprint" for physical improvements proposed for the Kawaihae area. It is a reference document whose chief purpose was to envision future development of the Kawaihae community and establish the goals and objectives to help achieve that future. In conjunction with individual project plans, the KMP will continue to serve as a chief planning document for the Kawaihae area through its 10-year horizon. At the end of that time, the KMP may need to be updated to reflect existing conditions as a basis for charting future community needs.

As mentioned in the DEA, the tank's purpose is to bring the existing industrial subdivision into compliance with County fire protection requirements. Initiating new development in the Kawaihae area or conveying water to the mauka subdivision is not the intention of this project.

The KMP was mentioned solely for its use as a guide to select a tank site that could be integrated into the future development envisioned.

C. *Great concern is expressed in the area of stockpiling. Kawaihae community is in the infant stages of developing quite a large scale of land masses.*

1. *It seems every time a development project commences a new quarry is created from homestead land, and not only in Kawaihae.*

   Excavation for this project will be minimized and undertaken only within the project boundaries and only to the extent required by the tank and access road design. This project will not be undertaken as a pretense to develop quarry operations.

2. *It seems every time mineral resources are stocked and piled, the developer drives away with the beneficiaries' valuable resources without compensation and; as primary recipients.*

   Certain excavated materials will be unusable for this project. They include volcanic ash (difficult to compact to support roads

without water and additional effort), expansive soils, dirt with vegetative material, and large boulders. The contractor will be directed to use any usable material, materials exclusive of those mentioned above, for this project first. Leftover and unusable (excess) material might be temporarily piled near the project site as a normal product of earthmoving operations.

However, due to liability concerns over possible dust and silt accumulation impacts, excess material cannot remain piled longer than 28 days. Materials not used by that time for this project would be hauled off the site and disposed of.

Another reason excess materials are hauled away is that additional costs are involved in storing or stockpiling material. Extra plan and permit approvals are needed. The stockpiled material must be compacted and covered to comply with County and State regulations. The costs to stockpile excess material usually exceed those to haul it away.

3. ***It seems every time the developer deposit these mineral resources on other than homestead land, the environmental process does not extend to those areas, and then; the resources get lost from the inventory.***

State and County laws hold the landowner responsible for excess excavated material. Since material stockpiled on non-DHHL lands is the legal responsibility of that landowner (and the contractor) to conform to applicable environmental processes, it is generally less expensive to have the contractor dispose of excess material off Hawaiian Home Lands.

4. ***The beneficiaries want accountability. The beneficiaries could use these construction resources to subsidize other needs and desires of the community association.***

As a trust organization we are responsible for obtaining the highest benefits from money spent. We would not be able to jusitfy why funds were spent to store material rather than upgrade infrastructure (such as this project) or develop new lots for beneficiaries on the waiting list.

Given these constraints, the most economical choice for DHHL is to have excess material hauled away.

The Kawaihae Community is free to arrange discussions directly with the contractor regarding the excess material. Any eventual agreement would need to be on the condition that DHHL's liability and relationship with the contractor are protected and County and State regulations governing the placement and storage of the excess material are adhered to.

D. *The Kawaihae Hawaiian Home community is unique in many ways. One of the primary purposes for utilizing these lands at all, is to further self sufficiency and provide rehabilitation --- for the blood quantum beneficiaries. Culturally, beneficiaries are caretakers of the land. Therefore, this is an objection to the manner in which information is provided.*

The DEA has been prepared in compliance with state and federal laws and is limited by scope to activities solely related to this proposed water tank project.

However, your participation in the DEA review is a valuable part of a planning process and method of disseminating accurate information that benefits all parties.

For instance, the draft EA indicates that Kawaihae was the habitat for the Hawaiian hoary bat, the Hawaiian duck, the Hawaiian Hawk and the achatillenid land snail. Sometimes bats, and hawks are still seen --- in the area. There seems no sensitivity toward initiating development in a manner that restores and revitalizes this unique habitat that connect our heritage, culture, and present ventures. The timing is efficient to begin those practices and implement those changes.

The DEA acknowledges that the Hawaiian hoary bat, the Hawaiian duck, the Hawaiian Hawk and the achatillenid land snail are known from areas adjacent to the proposed tank and access road limits, particularly the more heavily vegetated forest lands at higher elevations. However, the site of the proposed water tank does not contain natural vegetative, aquatic, or topographical features characteristic of the habitat for these native animals.

As mentioned in the DEA, the tank's purpose is to bring the existing industrial subdivision into compliance with County fire protection requirements. Initiating new development in the area is not the intention of this project.

DHHL's current priorities for funding are developing homestead lots for beneficiaries on the waiting list or improving the immediate health and safety of lessees with new or replacement infrastructure such as with this project. There are insufficient funds to allot for habitat restoration.

You may be aware that our lessee community at Kahikinui on Maui entered into an agreement with DHHL to manage some unleased DHHL land in their area. Their management scheme includes a plan to restore portions of the native dry-land forest using their own labor, funds, and any grant money they can secure. The Kawaihae community may want to approach DHHL with a similar idea.

E. ***Noise, Dust and Highway safety factor procedures seem to be improved since the development of the Master Plan. However, since the developer will be left with this responsibility; what mitigations will assure the residents in the community that accountability will be are provided during weekends, evenings, holidays, etc.?***

Project activities will be limited to the hours of 7:30 a.m. to 3:30 p.m. and will not be permitted on weekends and State Holidays unless prior approval is given by DHHL. The contractor will be required to minimize disruption to traffic at Akoni Pule Highway.

Communication among DHHL lessees, the County, DHHL and DOT can be a vital tool in "policing" the project to ensure that appropriate measures are enforced to everyone's satisfaction.

F. ***Weather factors during the construction period may pose difficulties on the residents during the November to April months when rain and heavy wind patterns do change from tradewinds to phenomena scales. The soil is considered ash, it will tend to disburse whichever way the wind blows, therefore the concern seems to be with the construction and continual use of the roadway areas that may blow across the highway as they have done before.***

The contractor will be required to employ dust control measures during construction. Measures will include the use of dust screens and water sprinkling to minimize fugitive dust.

Again, communication among DHHL lessees in the area, the County, and DHHL can be a key means of "policing" the project to ensure that dust control is enforced.

The location of the roadway to Akoni Pule Highway is in such close proximity to the "camels's hump" between the lighthouse and the makai subdivision, that it is not clear how much impact or what mitigations will be utilized to properly drain flooding conditions on the highway. There is no mention of the camel's hump in the Master Plan nor the proposed EA.

The "camel's hump" area is an existing sag in the Akoni Pule Highway profile. The project was still at the planning stage and the "hump" was not identified since the conceptual layout was based on low resolution topographic survey maps not defined enough to reveal this feature. The formal design process, which includes detailed topographic mapping that would have revealed this feature, was not completed at the time the DEA was prepared.

The tank access road shown was a conceptual layout that will be "fine-tuned" during the formal design process and adjusted if drainage and sight distance conditions at the "hump" warrant it.

Both the water tank site and the tank access road will be designed to minimize alterations to existing drainage patterns using standard practices for drainage design. Dry wells will be included if necessary to prevent any runoff increase to the highway from this project.

Addressing existing flooding at Akoni Pule Highway is beyond the scope of this project and the DEA. However, DHHL will ensure that this project's affects to and from the "camel's hump" are minimized during the formal design process.

I hope these responses address your concerns. Should you have any questions, feel free to call Gerald Lee or William Makanui of our Design and Construction Branch, Land Development Division at 587-6447.

Aloha,

Raynard C. Soon, Chairman
Hawaiian Homes Commission

Attach.

c.(w/attach.): R.M. Towill Corporation

BENJAMIN J. CAYETANO
GOVERNOR

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

LETTER NO. (P)1449.0

AUG - 4 2000

TO: Mr. William Makanui
Department of Hawaiian Home Lands

SUBJECT: Public Review of Draft Environmental Assessment (DEA)
for Kawaihae
1.0 Million Gallon Reservoir Tank
South Kohala, County of Hawaii

We acknowledge the receipt of the above-mentioned exhibit on July 24, 2000. We appreciate the opportunity to review the DEA for this project.

Although this project is definitely within the Honokaa and Waimea School District, our review indicates that the Impacts and Mitigation Measures proposed to be utilized in your project are quite adequate and should not impact our facilities. Therefore, we have no comments to offer at this time.

If you have any questions, please feel free to call Mr. Alan Sanborn of the Planning Branch at 586-0499.

GORDON MATSUOKA
Public Works Administrator

RSY:mo
c: Office of Environmental Quality Control
Mr. Craig Luke, R.M. Towill Corp.

BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

RAYNARD C. SOON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

JOBIE M. K. M. YAMAGUCHI
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

October 11, 2000

To: Raymond Sato, Comptroller
Department of Accounting and General Services

From: Raynard C. Soon, Chairman
Hawaiian Homes Commission

Subject: Kawaihae 1.0 Million-Gallon Tank
Environmental Assessment (EA)
Kawaihae, South Kohala, County of Hawaii, Hawaii

Thank you for your memorandum dated August 4, 2000 regarding the subject Draft EA for the proposed Kawaihae 1.0 Million-Gallon Tank. We note that the Department of Accounting and General Services has no comments to offer at this time.

Should you have any additional questions or comments regarding the project, please call William Makanui of our Design and Construction Branch, Land Development Division at 586-3818.

c. R.M. Towill Corporation

BENJAMIN J. CAYETANO
Governor

JAMES J. NAKATANI
Chairperson, Board of Agriculture

LETITIA N. UYEHARA
Deputy to the Chairperson

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 South King Street
Honolulu, Hawaii 96814-2512

Mailing Address:
P.O. Box 22159
Honolulu, Hawaii 96823-2159

Fax: (808) 973-9813

July 26, 2000

Mr. William Makanui
Department of Hawaiian Home Lands
State of Hawaii
P.O. Box 1879
Honolulu, Hawaii 96805

Dear Mr. Makanui:

RE: Kawaihae 1.0 Million Gallon Tank, South Kohala

Thank you for giving us the opportunity to review the above project. The Department of Agriculture has no comment regarding the Draft Environmental Assessment dated July 2000.

Should you have any questions, please call Brian Kau at 973-9473.

Sincerely,

JAMES J. NAKATANI
Chairperson, Board of Agriculture

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BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

RAYNARD C. SOON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

JOBIE M. K. M. YAMAGUCHI
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

October 11, 2000

To: James Nakatani, Chairperson, Board of Agriculture
Department of Agriculture

From: Raynard C. Soon, Chairman
Hawaiian Homes Commission

Subject: Kawaihae 1.0 Million-Gallon Tank
Environmental Assessment (EA)
Kawaihae, South Kohala, County of Hawaii, Hawaii

Thank you for your letter dated July 26, 2000 regarding the subject Draft EA for the proposed Kawaihae 1.0 Million-Gallon Tank. We note that the Department of Agriculture has no comments to offer at this time.

Should you have any additional questions or comments regarding the project, please call William Makanui of our Design and Construction Branch, Land Development Division at 586-3818.

c. R.M. Towill Corporation

BENJAMIN J. CAYETANO
GOVERNOR

SHARYN L. MIYASHIRO
ACTING EXECUTIVE DIRECTOR

ROBERT J. HALL
ACTING EXECUTIVE ASSISTANT

STATE OF HAWAII
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT AND TOURISM
HOUSING AND COMMUNITY DEVELOPMENT CORPORATION OF HAWAII
677 QUEEN STREET, SUITE 300
Honolulu, Hawaii 96813
FAX: (808) 587-0600

IN REPLY REFER TO:
00:PEO/2104

August 17, 2000

'00 AUG 23 A11:06
DEPT OF HAWAIIAN HOME LANDS

Mr. William Makanui
Department of Hawaiian Home Lands
P.O. Box 1879
Honolulu, Hawaii 96805

Dear Mr. Makanui:

Subject: Draft Environmental Assessment for Kawaihae 1.0 Million Gallon Tank, South Kohala, County of Hawaii

We have reviewed the Draft EA and have no comments to offer.

Thank you for the opportunity to comment.

Sincerely,

Sharyn L. Miyashiro
Acting Executive Director

RECEIVED
LAND DEVELOPMENT
AUG 23 2 10 PM '00

BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

RAYNARD C. SOON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

JOBIE M. K. M. YAMAGUCHI
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

October 11, 2000

To: Dr. Seiji Naya, Director
Department of Business, Economic Development & Tourism

From: Raynard C. Soon, Chairman
Hawaiian Homes Commission

Subject: Kawaihae 1.0 Million-Gallon Tank
Environmental Assessment (EA)
Kawaihae, South Kohala, County of Hawaii, Hawaii

Thank you for your letter dated August 17, 2000 regarding the subject Draft EA for the proposed Kawaihae 1.0 Million-Gallon Tank. We note that the Department of Business, Economic Development and Tourism has no comments to offer at this time.

Should you have any additional questions or comments regarding the project, please call William Makanui of our Design and Construction Branch, Land Development Division at 586-3818.

c. R.M. Towill Corporation

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

BRUCE S. ANDERSON, Ph.D., M.P.H.
DIRECTOR OF HEALTH

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

In reply, please refer to:
File:

September 21, 2000

00-151/epo

Mr. William Makanui
Department of Hawaiian Homelands
State of Hawaii
P.O. Box 1879
Honolulu, Hawaii 96805

Dear Mr. Makanui:

Subject: Draft Environmental Assessment (DEA)
Kawaihae 1.0 Million Gallon Water Tank
South Kohala, Hawaii
TMK: 6-1-01:3

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

1. The Final Environmental Assessment should clearly indicate if the proposed reservoir and water system will be dedicated to the Hawaii County Department of Water Supply as indicated in the "Final Kawaihae 1.0 Million Gallon Tank Water System Study," dated February 1999.

   If the proposed reservoir is not dedicated to the Department of Water Supply, the Department of Hawaiian Homelands may be subject to compliance with Hawaii Administrative Rules, Title 11, Chapter 20, "Rules Relating to Potable Water Systems."

2. Page 35, Section 5.2.2, "Impacts and Mitigation Measures," states

   > "The proposed 1.0 mg reservoir, designed according to DWS standards, will be equipped with an underground blowoff line that will direct water towards the natural, unnamed gulch north of the project site."

   The water system operator must consult with the Department of Health, Clean Water Branch (telephone: (808)586-4309) prior to such discharges to determine if there are any permitting requirements.

If you should have any questions on these comments, please contact Stuart Yamada of the Safe Drinking Water Branch at 586-4258.

Polluted Runoff Control

Proper planning, design and use of erosion control measures and management practices will substantially reduce the total volume of runoff and limit the potential impact to the coastal waters from polluted runoff. Please refer to the *Hawaii's Coastal Nonpoint Source Control Plan*, pages III-117 to III-119 for guidance on these management measures and practices for specific project activities. To inquire about receiving a copy of this plan, please call the Coastal Zone Management Program in the Planning Office of the Department of Business, Economic Development and Tourism at 587-2877.

The following practices are suggested to minimize erosion during construction activities:

1. Conduct grubbing and grading activities during the low rainfall months (minimum erosion potential).

2. Clear only areas essential for construction.

3. Locate potential nonpoint pollutant sources away from steep slopes, water bodies, and critical areas.

4. Protect natural vegetation with fencing, tree armoring, and retaining walls or tree wells.

5. Cover or stabilize topsoil stockpiles.

6. Intercept runoff above disturbed slopes and convey it to a permanent channel or storm drain.

7. On long or steep slopes, construct benches, terraces, or ditches at regular intervals to intercept runoff.

8. Protect areas that provide important water quality benefits and/or are environmentally sensitive ecosystems.

9. Protect water bodies and natural drainage systems by establishing streamside buffers.

10. Minimize the amount of construction time spent in any stream bed.

11. Properly dispose of sediment and debris from construction activities.

12. Replant or cover bare areas as soon as grading or construction is completed. New plantings will require soil amendments, fertilizers and temporary irrigation to become established. Use high planting and/or seeding rates to ensure rapid stand establishment. Use seeding and mulch/mats. Sodding is an alternative.

The following practices are suggested to remove solids and associated pollutants in runoff during and after heavy rains and/or wind:

1. Sediment basins.

2. Sediment traps.

3. Fabric filter fences.

4. Straw bale barriers.

5. Vegetative filter strips.

Any questions regarding these matters should be directed to the Polluted Runoff Control Program in the Clean Water Branch at 586-4309.

Sincerely,

GARY GILL
Deputy Director
Environmental Health Administration

c: HDHO
Paul Okuna, West HI SDWB Sanitarian

BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

RAYNARD C. SOON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

JOBIE M. K. M. YAMAGUCHI
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

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July 27, 2001

To: The Honorable Bruce S. Anderson
Department of Health

Attn: Gary Gill, Deputy Director
Department of Health

From: Raynard C. Soon, Chairman
Hawaiian Homes Commission

Subject: Kawaihae 1.0 Million-Gallon Tank
Environmental Assessment (EA)
Kawaihae, South Kohala, County of Hawaii, Hawaii

Thank you for your letter dated September 21, 2000, responding to requests for comments on the Draft EA for the proposed Kawaihae 1.0 Million-Gallon Tank. In response to your comments (*in italic*) we offer the following information:

1. *The Final Environmental Assessment should clearly indicate if the proposed reservoir and water system will be dedicated to the Hawaii County Department of Water Supply...*

Upon completion, the water tank and appurtenances will be conveyed to the County of Hawaii, Department of Water Supply (DWS) for operation and maintenance via a license agreement. This information is included in Sections 1.3 and 2.2 of the Final EA.

2. *The water system operator must consult with the Department of Health, Clean Water Branch...prior to such* (blowoff line) *discharges to determine if there are any permitting requirements.*

The water system operator will consult with the Department of Health, Clean Water Branch prior to discharging the water tank blowoff line to determine if there are any permit requirements. This information is included in Section 5.2.2 of the Final EA.

3. *Please refer to the Hawaii's Coastal Nonpoint Source Control Plan...for guidance on these (erosion control) management measures and practices.*

Erosion control measures will be employed during all phases of construction. The contractor will be referred to Hawaii's Coastal Nonpoint Source Control Plan for guidance in developing runoff control measures and practices for specific project activities.

We hope that our responses satisfy your concerns. Should you have any questions regarding the contents or preparation of the EA, please contact Mr. Jim Niermann of the R. M. Towill Corporation at 842-1133.

Should you have any further questions or comments regarding the project itself, please call Gerald Lee of our Design and Construction Branch at 587-6447.

c: R. M. Towill Corporation.

BENJAMIN J. CAYETANO
GOVERNOR

GENEVIEVE SALMONSON
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

236 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186

August 22, 2000

Mr. Gerald Lee, Chief
State of Hawai'i - Department of Hawaiian Home Lands
Design and Construction Branch
1099 Alakea Street, 12th Floor
Honolulu, Hawai'i 96813

Dear Mr. Lee:

We have reviewed the draft environmental assessment for the Kawaihae 1.0 MG Tank, Kawaihae, District of South Kohala, Island of Hawai'i, TMK (3): 6-1-01:003, and 6-1-6:002, and 6-1-04:041, and offer the following comments for your consideration and response.

1. AMBIENT WATER QUALITY DATA: Please provide units for data for each of the chemical constituents (e.g., mg/L, mcg/L, ppm, ppt, etc.) as well as a reference maximum contaminant level (MCL) under the Safe Drinking Water Act for each chemical constituent (if any).

2. SEPARATELY BOUND VOLUMES AS INTEGRAL PARTS OF THE ENVIRONMENTAL ASSESSMENT: Page iii of the Table of Contents lists two studies, a March 7, 1994, Waimea Wastewater Treatment Plant Effluent Reuse/Disposal Alternative Study, and a December 9, 1994, Alternatives Study for the Disposal of Effluent from Waimea Wastewater Treatment Plant via Injection Wells or Rapid Infiltration. Our Office has not received these separately bound volumes. If these are integral parts of the environmental assessment, copies must be submitted to our office, to your agency and to recepients of the draft environmental assessment, including the public library nearest the project site.

If there are any questions, please call Leslie Segundo at 586-4185. Thank you for the opportunity to comment.

Sincerely,

GENEVIEVE SALMONSON
Director

c: Mr. Craig W. Luke, Project Engineer
R. M. Towill Corporation

BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

RAYNARD C. SOON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

JOBIE M. K. M. YAMAGUCHI
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

October 11, 2000

To: Genevieve Salmonson, Director
Office of Environmental Quality Control
Department of Health

From: Raynard C. Soon, Chairman
Hawaiian Homes Commission

Subject: Kawaihae 1.0 Million-Gallon Tank
Environmental Assessment (EA)
Kawaihae, South Kohala, County of Hawaii, Hawaii

Thank you for your letter dated August 22, 2000 regarding the subject Draft EA for the proposed Kawaihae 1.0 Million-Gallon Tank. Based on information provided by Mr. Leslie Segundo of your office in a phone conversation on September 22, 2000, it is our understanding that the comments in your August 22 letter pertain to a separate project. Therefore no response to your letter is necessary.

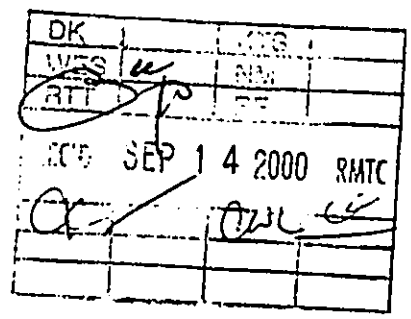
Should you have any additional questions or comments regarding the project, please call William Makanui of our Design and Construction Branch, Land Development Division at 586-3818.

c. R.M. Towill Corporation

PHONE (808) 594-1888

FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813



September 1, 2000

Mr. Craig W.L. Luke, P.E.
R.M. Towill Corporation
420 Waiakamilo Road, Suite 411
Honolulu, Hawai`i 96817-4941

EIS# 418

Subject: Draft Environmental Assessment for Kawaihae 1.0 Million Gallon Tank for Kawaihae, South Kohala, County of Hawai`i

Dear Mr. Luke,

Thank you for the opportunity to review and respond to the above-referenced document. The State of Hawai`i Department of Hawaiian Home Lands proposes to construct a 1.0 million gallon reservoir tank in order to increase the flow and pressure of the surrounding existing water system and provide adequate fire protection for the existing Kaei Hana II Industrial Subdivision.

The Office of Hawaiian Affairs has the following comments to offer:

- Effective April 26, 2000, Governor Cayetano signed into law Act 50 (HB 2895, HD1) requiring a cultural impact statement as part of all environmental assessments. Please include one in the Final EA.

- Please include the new archaeological survey and its assessment in the Final EA.

- We are relying on your commitment to have an archaeological monitor present during construction.

If you have any questions, please contact Ken R. Salva Cruz, Policy Analyst, at 594-1847.

Sincerely,

Colin C. Kippen, Jr.
Deputy Administrator

cc: Board of Trustees
Kona CRS
DHHL
OEQC
File

BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

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RAYNARD C. SOON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

JOBIE M. K. M. YAMAGUCHI
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

July 27, 2001

To: Mr. Colin C. Kippen, Jr., Deputy Administrator
Office of Hawaiian Affairs

From: Raynard C. Soon, Chairman
Hawaiian Homes Commission

Subject: Kawaihae 1.0 Million-Gallon Tank
Environmental Assessment (EA)
Kawaihae, South Kohala, County of Hawaii, Hawaii

Thank you for your letter dated September 1, 2000, responding to requests for comments on the Draft EA for the proposed Kawaihae 1.0 Million-Gallon Tank project. In response to your comments (*noted in italic*) we offer the following information:

Effective April 6, 2000, Governor Cayetano signed into law Act 50 (HB 2895, HD1) requiring a cultural impact statement as part of all environmental assessments. Please include one in the Final EA.

Cultural Surveys Hawaii completed a cultural impact assessment for this project in March 2001. The report is included in the Final EA as Appendix C, and summarized in Section 3.10, "Cultural Resources."

Please include the new archaeological survey and its assessments in the Final EA.

The final archaeological survey for this project is included in the Final EA as Appendix B, and summarized in Section 3.9, "Historic and Archaeological Resources."

We are relying on your commitment to have an archaeological monitor present during construction.

To prevent destruction of historic or archaeological resources during construction, work activities will be monitored by the project contractor and/or qualified personnel retained by the contractor and approved by DHHL. In the event that significant archaeological remains are encountered, work will cease in the immediate area and the Department of Land and Natural Resources, State Historic Preservation Division (SHPD) will be notified to determine significance and treatment of any findings.

We hope that our responses satisfy your concerns. Should you have any questions regarding the contents or preparation of the DEA, please contact Mr. Jim Niermann of the R. M. Towill Corporation at 842-1133.

Should you have any further questions or comments regarding the project itself, please call Gerald Lee of our Design and Construction Branch at 587-6447.

c: R. M. Towill Corporation.

BEN. AMIN J. CAYETANO
GOVERNOR OF HAWAII

TIMOTHY E. JOHNS, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES
JANET E. KAWELO

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND RESOURCES
ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND
STATE PARKS
WATER RESOURCE MANAGEMENT

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

July 27, 2000

Mr. William Makanui
Department of Hawaiian Homelands
State of Hawaii
P.O. Box 1879
Honolulu, Hawaii 96805

LOG NO: 25914
DOC NO: 0007PM23

Dear Mr. Makanui:

SUBJECT: Draft Environmental Assessment for 1 Million Gallon Tank
Kawaihae, South Kohala, Hawaii Island
TMK: 6-1-01:03; 6-1-06:02-07; 6-1-04:41

This is in reply to the letter from Craig Luke of R.M. Towill requesting our review and comments on the above referenced project.

An archaeological reconnaissance survey of the proposed project area was conducted in 1991. According to the Draft EA there are no known archaeological sites within the proposed 1 million gallon reservoir site. However, some sites may be located near the access road. The Draft EA also indicates that a new archaeological survey is being conducted in the proposed project area and that a copy of the report on this survey will be submitted to our office for review and approval.

We cannot comment on the effects of the proposed project on significant historic sites until our office has had an opportunity to review the report on the new archaeological survey.

If you have any questions please contact our Hawaii Island archaeologist, Patrick McCoy (692-8029).

Aloha,

DON HIBBARD, Administrator
State Historic Preservation Division

PM:an

BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

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RAYNARD C. SOON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

JOBIE M. K. M. YAMAGUCHI
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN ~~HOME LANDS~~
P.O. BOX 1879
HONOLULU, HAWAII 96805

July 27, 2001

To: The Honorable Gilbert S. Coloma-Agaran, Chairperson
Board of Land and Natural Resources

Attn: Don Hibbard, Administrator
State Historic Preservation Division

From: Raynard C. Soon, Chairman
Hawaiian Homes Commission

Subject: Kawaihae 1.0 Million-Gallon Tank
Environmental Assessment (EA)
Kawaihae, South Kohala, County of Hawaii, Hawaii

Thank you for your letter to our consultant, Mr. Craig Luke of the R. M. Towill Corporation, dated July 3, 2001 commenting on the Archaeological Assessment Study and Native Rights Assessment Study prepared for the proposed Kawaihae 1.0 Million-Gallon Tank project.

We note your determination that the Native Rights Assessment Study constituted a good faith effort to identify and contact individuals who could have traditional and cultural knowledge of the project area. We further note your agreement that the individuals interviewed identified no additional historic properties and that their preference for relocating the access road has been taken into consideration.

Regarding your concern about the potential effects of the influent line on historic sites, we wish to clarify that both the access road and the 6-inch water influent line will be realigned to follow the proposed 12-inch effluent line adjacent to the Kaei Hana Industrial Area. Based on the findings of the Archaeological Assessment, this alignment will avoid all known

archaeological sites. This information is included in the Final EA.

We hope that our response satisfies your concerns. Should you have any questions regarding the contents or preparation of the EA, please contact Mr. Jim Niermann of the R. M. Towill Corporation at 842-1133.

Should you have any further questions or comments regarding the project itself, please call Gerald Lee of our Design and Construction Branch at 587-6447.

c: R. M. Towill Corporation.

BENJAMIN J. CAYETANO
GOVERNOR

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

KAZU HAYASHIDA
DIRECTOR

DEPUTY DIRECTORS
BRIAN K. MINAAI
GLENN M. OKIMOTO

LEADING HAWAII INTO THE NEW MILLENNIUM
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AUG 15 2000

IN REPLY REFER TO:
HWY-PS
2.9671

DEPT OF HAWAIIAN HOME LANDS '00 AUG 16 A8:32

TO: WILLIAM MAKANUI
LAND DEVELOPMENT DIVISION
DEPARTMENT OF HAWAIIAN HOME LANDS

FROM: GARY C. P. CHOY, ACTING ADMINISTRATOR
HIGHWAYS DIVISION

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT, KAWAIHAE 1.0 MILLION GALLON WATER STORAGE TANK, SOUTH KOHALA
TMK: 6-1-01: 03, 6-1-06: 02 - 07; 6-1-04: 41

The proposed water storage tank, appurtenant facilities, and access road will not impact Akoni Pule Highway, our State facility. Plans for construction within the State right-of-way must be submitted to the Highways Hawaii District Engineer for review and approval.

If there are any questions regarding these comments, please contact Ronald Tsuzuki, Head Planning Engineer, Highways Division, at 587-1830.

AUG 16 11:02 AM '00

BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

RAYNARD C. SOON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

JOBIE M. K. M. YAMAGUCHI
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

October 11, 2000

To: Kazu Hayashida, Director
Department of Transportation

From: Raynard C. Soon, Chairman
Hawaiian Homes Commission

Subject: Kawaihae 1.0 Million-Gallon Tank
Environmental Assessment (EA)
Kawaihae, South Kohala, County of Hawaii, Hawaii

Thank you for your letter dated August 15, 2000 regarding the subject Draft EA for the proposed Kawaihae 1.0 Million-Gallon Tank.

We note that the proposed project will not impact Akoni Pule Highway, which is a State route. However, any plans for construction within the State right-of-way at Akoni Pule Highway will be submitted to the Highways Hawaii District Engineer for review and approval.

Should you have any additional questions or comments regarding the project, please call William Makanui of our Design and Construction Branch, Land Development Division at 586-3818.

c. R.M. Towill Corporation

Stephen K. Yamashiro
Mayor

Virginia Goldstein
Director

Russell Kokubun
Deputy Director

County of Hawaii

PLANNING DEPARTMENT

25 Aupuni Street, Room 109 • Hilo, Hawaii 96720-4252
(808) 961-8288 • Fax (808) 961-8742

August 31, 2000

Mr. William Makanui
State of Hawaii
Department of Hawaiian Home Lands
P.O. Box 1879
Honolulu, HI 96805

Dear Mr. Makanui:

Public Review & Request for Comments:
Draft Environmental Assessment (DEA)(July 2000)
for Kawaihae 1.0 Million Gallon Water Reservoir Tank
w/ Access Road & Distribution Line
TMK: 6-1-01: 03 & TMK: 6-1-04: 41
TMK: 6-1-06: 02, 04, 05, 06, & 07

Thank you for requesting our participation to review and comment on the above DEA. Our comments generally pertain to the land use laws or designations of Hawaii County as discussed in the DEA. We wish to clarify certain land use designations and the applicability of Hawaii County's land use regulations to this project.

Land Status: Department of Hawaiian Home Lands (DHHL). The DEA states, and County real property tax records confirm, that the above parcels are under the ownership and therefore jurisdiction of the State DHHL. According to the State Department of the Attorney General, because of the state constitution and the Hawaiian Homes Commission Act (1920) (the Act) Hawaiian home lands are not subject to the County's land use regulations and its Special Management Area (SMA) rules.[1] In the coastal zone, furthermore, the control of Hawaiian home lands have not been preempted by the State

[1] Memorandum from State of Hawaii – Department of the Attorney General, John W. Anderson, Deputy Attorney General, to Roger A. Ulveling, Director – Department of Business & Economic Development (approved: Warren Price III, Attorney General)(October 23, 1987); Atty. Gen. Op. No.72-21 (October 2, 1972).

Coastal Zone Management Act[2], which is the enabling legislation for the County's SMA rules. Therefore, consistent with the Attorney General's opinion, please consider making changes in the DEA on page 27, the land use discussion, and on pages 48-51, the discussion on the relationship of county land use policies and controls of the affected area.

SMA Designation. The discussion in the DEA on page 49 is inaccurate on the location of the SMA boundary line in relation to the parcels of this project; however, the draft's discussion on the County zoning, the General Plan (GP) and state land use designations are accurate. None of the parcels abut the shoreline.

Although Hawaiian home lands are not subject to land use regulations, an Attorney General's opinion points out that county zoning criteria could apply to Hawaiian home lands where the Hawaiian Homes Commission determines that certain lands are not needed or required for the purpose of the Act.[3] For example, if a rezoning action was requested and initiated by the Commission that would be tantamount to a finding that the Hawaiian home lands in question were no longer needed or required for the purposes of the Act, according to the Attorney General's opinion[4]. The general industrial zoning of the Kaei Hana II Industrial Subdivision, however, was not requested and initiated by the Commission; instead, the zoning of this area was adopted by the County's board of supervisors[5]; and therefore, these lands continue to be needed or required for the purpose of the Act and are not subject to County zoning regulation.

For informational purposes, only, we wish to clarify the parcels that are in or not in the SMA.

Reservoir Site -	not in the SMA zone:	TMK: 6-1-01: 03
Access Road -	is in the SMA zone:	TMK: 6-1-04: 41 TMK: 6-1-06: 02
Effluent Lines -	are in the SMA zone:	TMK: 6-1-06: 04, 05, 06, & 07

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[2] Haw. Rev. Stat. Chapter 205A.
[3] Atty. Gen. Op. No. 72-21 at 4-5.
[4] Id.at 6 (citing the same preceding authority of note 3).
[5] Hawaii County Ordinance No. 109 (adopted: Dec.6, 1967)
(the original zoning of Hawaii County was adopted island-wide by zoning map).

Please discuss any questions or concerns on these comments with Earl Lucero of my staff at (808) 961-8288.

Sincerely,

for VIRGINIA GOLDSTEIN
Planning Director

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cc: Mr. Craig W. Luke, P.E., Project Manager
R.M. Towill Corporation
420 Waiakamilo Rd., Suite 411, Honolulu 96817-4941

BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

RAYNARD C. SOON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

JOBIE M. K. M. YAMAGUCHI
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

October 11, 2000

Ms. Virginia Goldstein, Director
Planning Department
County of Hawaii
25 Aupuni Street, Room 106
Hilo, HI 96720

Dear Ms. Goldstein:

SUBJECT: Kawaihae 1.0 Million-Gallon Tank
Environmental Assessment (EA)
Kawaihae, South Kohala, County of Hawaii, Hawaii

Thank you for your letter dated August 31, 2000 regarding the subject Draft EA for the proposed Kawaihae 1.0 Million-Gallon Tank. In response to your comments we offer the following:

- We note that according to the State Attorney General's opinion, Hawaiian Home Lands are not subject to the County's land use regulations and its Special Management Area (SMA) rules. In the coastal zone, furthermore, the control of Hawaiian Home Lands have not been preempted by the State Coastal Zone Management Act, which is the enabling legislation for the County's SMA rules.

- *Section 3.11, Land Use and Ownership,* and *Chapter 6, Relationship to Land Use Policies and Controls of the Affected Area,* will be revised to clarify the applicability of SMA and Coastal Zone Management land use controls and Hawaii County's land use regulations on the subject project.

- The location of the SMA boundary line will be corrected and the text revised to identify those portions of the proposed project occurring within the SMA.