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# Draft Environmental Assessment

## Kailua Reservoir Dam Alteration Waimanalo, Koolaupoko, Island of Oahu Tax Map 4-1-10: 69

February 2000

Prepared for:

State of Hawaii  
Department of Agriculture  
1428 South King Street  
Honolulu, Hawaii 96826

Prepared by:

R.M. Towill Corporation  
420 Waiakamilo Road, Suite 411  
Honolulu, Hawaii 96817  
RMTC Ref 1-18306-O

**Draft Environmental Assessment**

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Waimanalo, Koolaupoko, Island of Oahu  
TMK 4-1-10: 69**

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## PROJECT SUMMARY

Project	Kailua Reservoir Dam Alteration
Proposing Agency	State of Hawaii Department of Agriculture 1428 South King Street Honolulu, Hawaii 96826
Accepting Authority	State of Hawaii Department of Agriculture 1428 South King Street Honolulu, Hawaii 96826
TMK	4-1-10: 69
Location	Waimanalo, Koolaupoko, Island of Oahu
Project Area	2.6 acres
EA Preparer	R. M. Towill Corporation 420 Waiakamilo Road, Suite 411 Honolulu, Hawaii 96817 Chester Koga, AICP
County Zoning	AG-2, General Agricultural District
State Land Use	Agriculture
Existing Use	Abandoned Irrigation Reservoir and Stream Channel
Proposed Action	Breaching of Kailua Reservoir Dam
County Permits Required	Special Use Permit Building and Construction Permits
State Permits Required	National Pollutant Discharge Elimination System (NPDES) Permit Stream Channel Alteration Permit (SCAP) ACOE Permit Section 404 Department of Health Section 401, Water Quality Certification

# CHAPTER 1

## PURPOSE AND NEED FOR ENVIRONMENTAL ASSESSMENT

### 1.1 PROJECT OVERVIEW

The existing Kailua Reservoir is located in Waimanalo Valley, in the Koolaupoko district of Oahu (Figure 1-1, Location Map and Figure 1-2, Street Map). This parcel and the reservoir is owned by the State of Hawaii (Figure 1-3, Tax Map). The Reservoir, which currently serves as a catchment for rainwater, is part of the Maunawili and Kailua Ditch system that once served the old Waimanalo Plantation. The Kailua Reservoir is no longer being used as an irrigation facility for agricultural purposes and remains as an aging and dysfunctional structure. The State Department of Agriculture (DOA) proposes to breach the Reservoir embankment to eliminate impoundment along the stream.

### 1.2 PURPOSE OF THE ENVIRONMENTAL ASSESSMENT

Since State of Hawaii lands and funds will be used for the proposed project, it is subject to the preparation of an environmental assessment according to requirements of Chapter 200, Title 11, Hawaii Administrative Rules (HAR), and Chapter 343, Hawaii Revised Statutes (HRS). This assessment will provide analysis of the project's impacts to water quality, air quality, existing utilities, noise levels, archaeological sites, wildlife habitat and mitigation methods. All required environmental documents will be filed by the State Department of Agriculture.

It has been preliminarily determined that an Environmental Impact Statement (EIS) will not be required, and a determination of Finding of No Significant Impact (FONSI) is anticipated for this project.

This Environmental Assessment will address the environmental and social impacts anticipated from development of the proposed project. The purpose of this Draft Environmental Assessment is to inform interested parties of the proposed alterations to the existing Kailua Reservoir Dam. It is the intent of this Draft Environmental Assessment

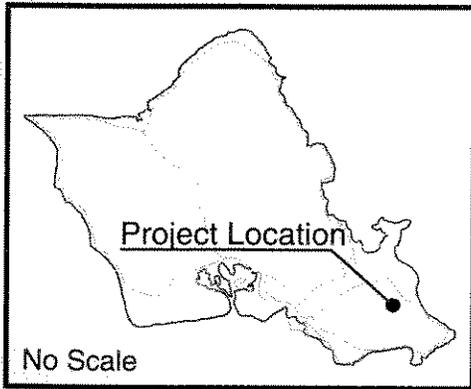
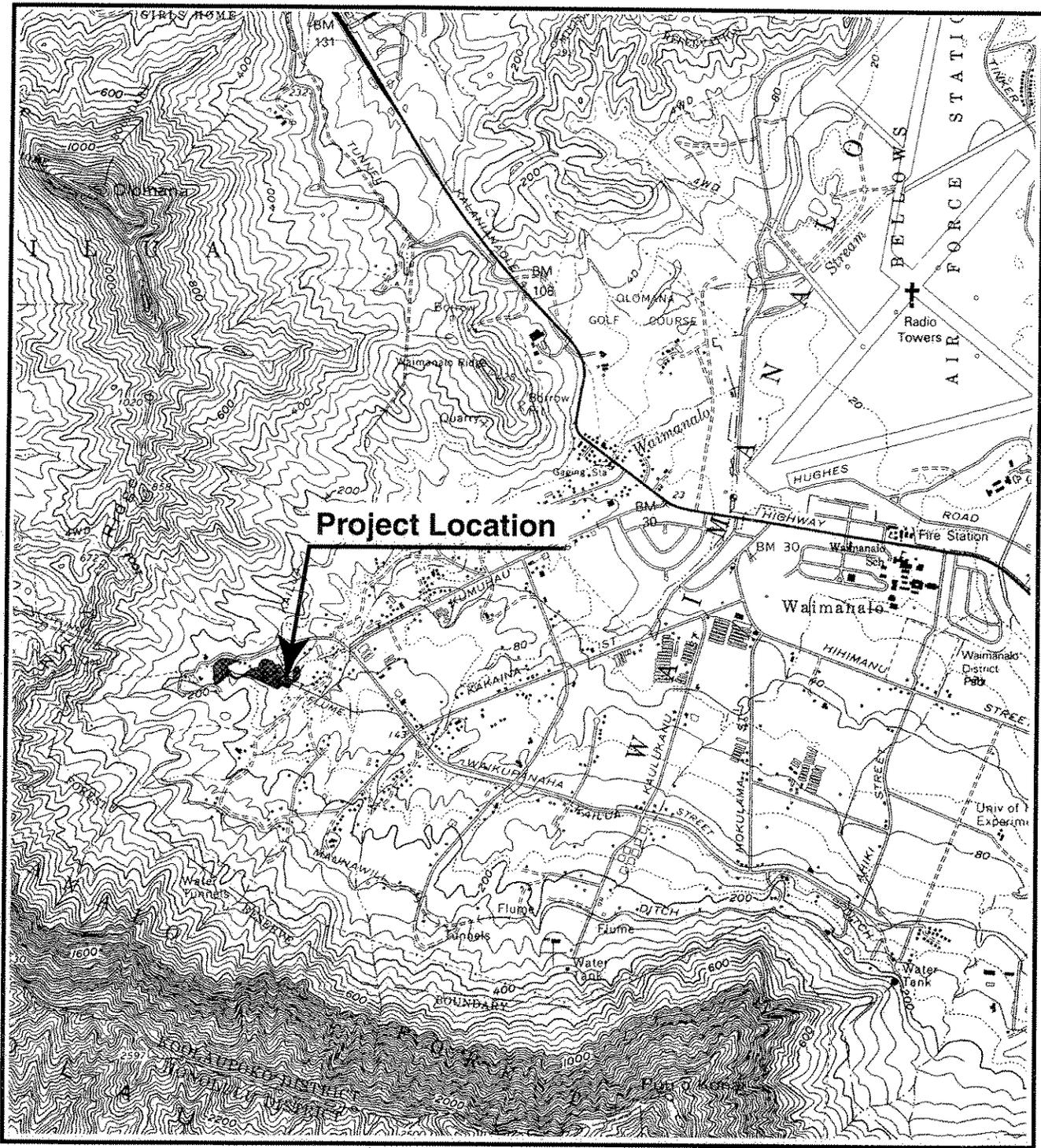
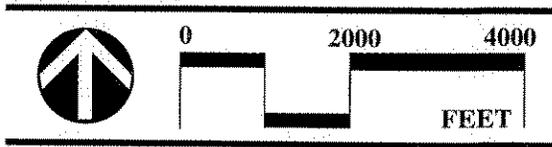


Figure 1-1  
Location Map



**KAILUA RESERVOIR DAM  
Environmental Assessment**

**R. M. TOWILL CORPORATION**  
February 2000

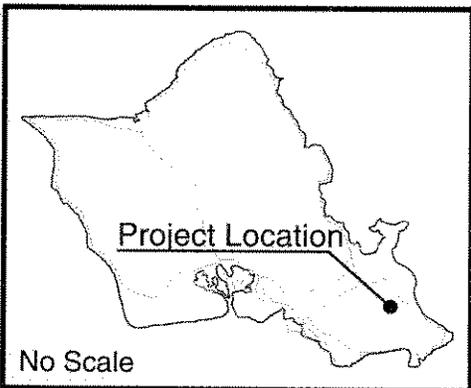
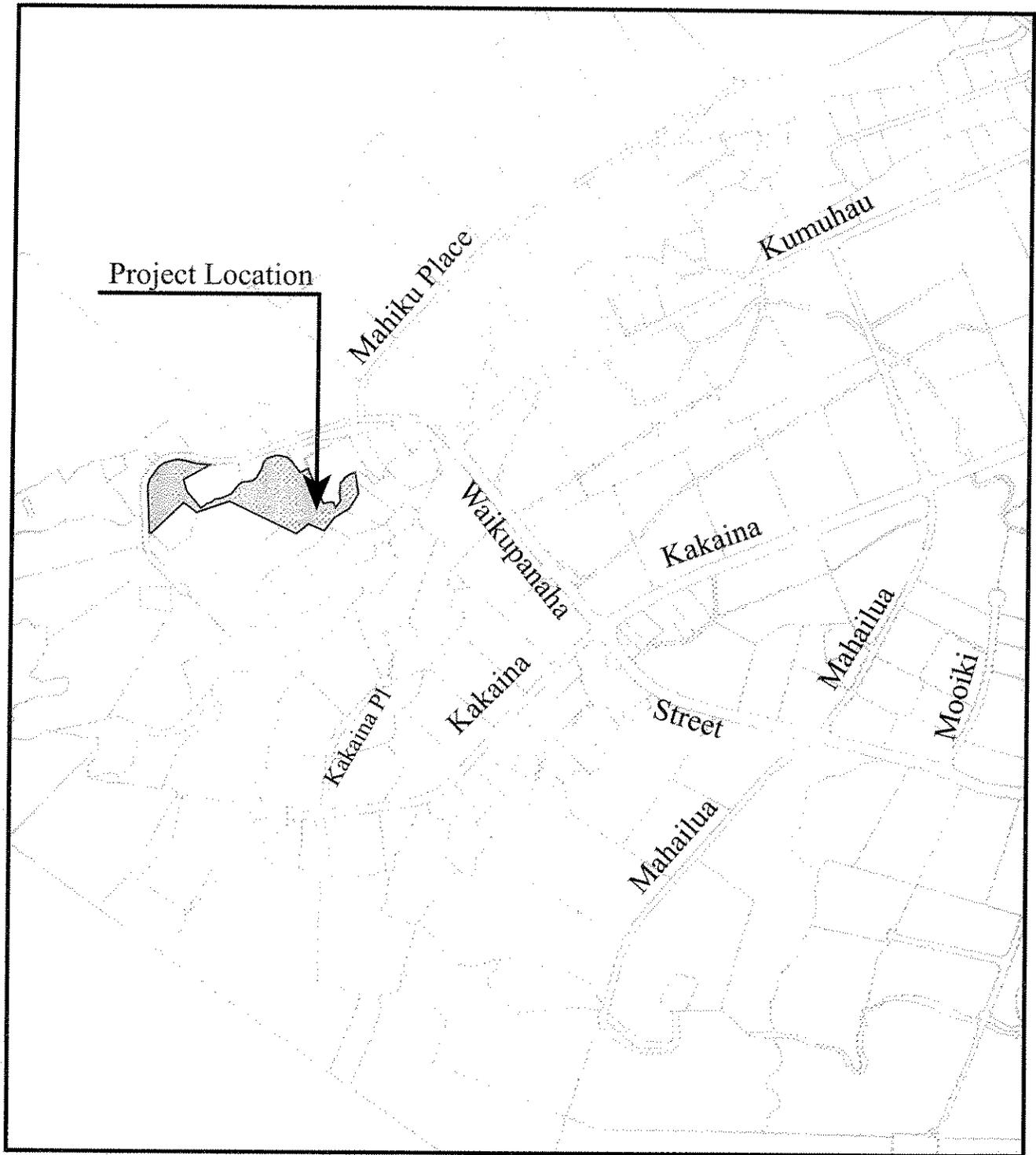


Figure 1-2  
Street Map



Not to Scale

KAILUA RESERVOIR DAM  
Environmental Assessment

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February 2000



to seek input on subject areas which should be addressed in the forthcoming Final Environmental Assessment.

### **1.3 PURPOSE AND NEED FOR THE PROJECT**

The proposed project will restore the stream path by eliminating the abandoned Kailua Reservoir and dam. The Kailua Reservoir was originally built around the 1930's as a part of the irrigation system for the former Waimanalo Plantation. Currently the Reservoir serves as a part of the Maunawili and Kailua Ditch System, which transports surface water flows from Maunawili Valley into Waimanalo thru the Ainoni Tunnel. Portions of the Maunawili and Kailua Ditch Systems, have been replaced by an underground closed conduit pipe system. When this portion of the Maunawili and Kailua Ditch System was replaced with a pipe system, the Reservoir was abandoned and over the years has severely deteriorated. The Kailua Reservoir is no longer being used as an irrigation facility for agricultural purposes and remains as an aging and dysfunctional structure. The dam is located on-stream and therefore receives uncontrolled amounts of storm runoff from the watershed. The existing reservoir has insufficient impoundment capacity for normal flood control and there is potential for embankment overtopping or failure under severe conditions. Stream capacities downstream are very limited and is inadequate to contain significant storm flows. A detailed assessment of downstream flooding is beyond the scope of this DEA.

Since it was classified by the State as an abandoned distributor or irrigation facility, and with no obligation to preserve the reservoir, little was done to maintain or repair the reservoir and dam. Due to its abandoned state, the dam has deteriorated to unsafe conditions. The reservoir's emergency spillway is presently situated such that flooding would occur to downstream dwellings if it became activated.

When originally constructed around the 1930's, the reservoir was able to contain approximately 6 million gallons, but due to the accumulation of silt and debris, the reservoir now only holds approximately 4 million gallons (State Department of Land and Natural

Resources (DLNR), 1996). The State Department of Agriculture proposes a controlled breach of the existing reservoir embankment to allow the natural flow of water to travel downstream and avoid the possible damages to life or property from a catastrophic failure of the dam during a severe storm.

#### **1.4 ALTERNATIVES**

As part of the analysis for this project, several alternatives were considered to address the needed alterations to the abandoned Kailua Reservoir area. The alternatives evaluated include No Action, Delay Action, Reconstruct Dam and Spillway, and Dam Breach with Channel.

##### **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 failure to address problems with storm waters overwhelming the reservoir's embankment or catastrophic failure of the dam and flooding adjacent homes and properties.

Currently the daily base flow of the stream is estimated at approximately 10 - 50 cubic feet per second (cfs). During the heavy rains of a 100-year flood, peak storm water runoff rates of 1,800 cfs to 2,200 cfs are predicted. Flooding in the area has been observed on numerous occasions by area residents. In 1993, full and turbulent discharges over the spillway was videotaped by one resident. Flood debris, including logs and even a refrigerator, have also been observed.

Due to the current abandoned state of the reservoir and dam, it is possible that a severe storm could cause waters to not only overflow the embankment, but to also completely breach the dam. Under this "No Action" option, the capacity and integrity of the reservoir and dam will continue to deteriorate unless maintenance and repair work takes place. As the capacity and integrity of the dam deteriorates, the possibility of the dam failing during

a severe storm is increased. An uncontrolled breach of the dam during a severe storm could cause a wave of water with catastrophic impacts.

A catastrophic failure of the dam could potentially cause a wave of water with a peak outflow of approximately 3,000 cubic feet per second (cfs) to Kalanianaʻole Highway bridge, according to the 1996 DLNR analysis. By comparison, the estimated 100-year peak flow at Kalanianaʻole Highway is 7,300 cfs.

According to the 1996 DLNR analysis, the reservoir has some flood control for smaller floods (less than 10 year recurrence), but the reservoir is too small to decrease the flood peak during significant (such as 50 or 100 year recurrence) floods. During 50 or 100 year recurrence floods, there is potential for overtopping of the embankment which can lead to complete failure of the dam itself.

Although this No Action Alternative would avert immediate environmental impacts resulting from construction activities, the reservoir and dam would remain without improvements and carry a high potential for catastrophic failure.

This No Action Alternative is therefore rejected due to the environmental and safety impacts that would occur should the reservoir and dam fail and cause storm waters to flash flood the area as described above.

#### **1.4.2 Alternative 2: Delayed Action**

The Delayed Action Alternative would result in similar environmental impacts as the "No Action" Alternative. By delaying the actions to remove the silt and debris deposits, the reservoir will continue to lessen in its capacity to control and direct flood waters during heavy rains. The delay in action will also result in continued degradation of the dam and surrounding embankments. As the capacity and integrity of the reservoir deteriorates the possibility of the dam and surrounding embankments failing during a 50 - 100 year flood is increased.

As discussed above (Section 1.4.1), due to the current state of the reservoir and dam, it is possible that a severe storm could cause waters to not only overflow the embankment, but to also completely breach the dam. As detailed, the uncontrolled breach of the dam during a significant flood could cause a wave of water with catastrophic impacts.

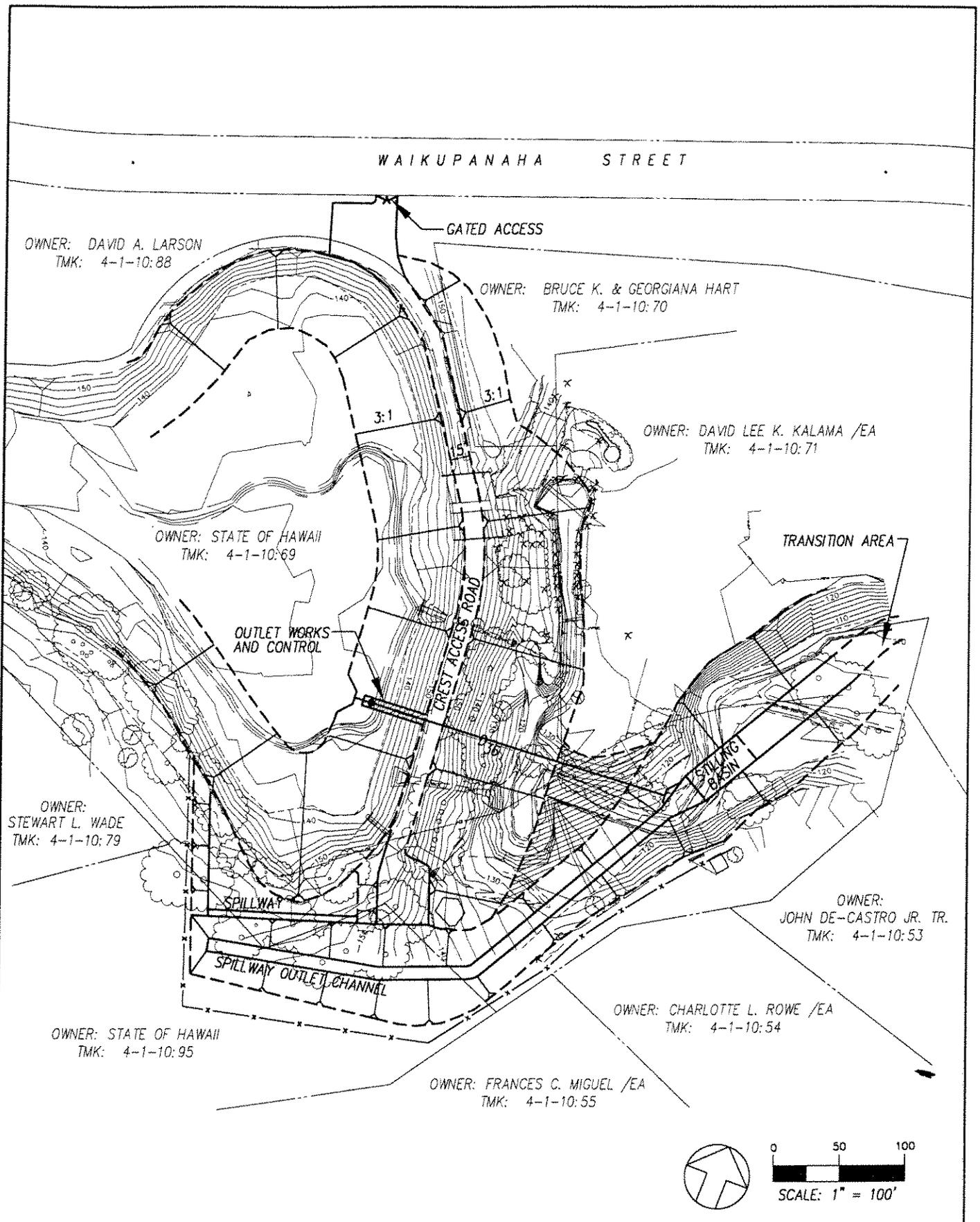
If delayed, the funds and scheduling time allocated for this project may be used for another project, and the State Department of Agriculture may take additional time to re-adjust their budget and project schedules. Continuing to delay this project would thereby increase the potential and opportunity for catastrophic failure of the dam.

Although the Delayed Action Alternative would avert immediate environmental impacts resulting from construction activities, the reservoir and dam would remain in an unsafe condition without improvements. Without vital improvements, there is a high potential for catastrophic failure of the dam. This Delayed Action Alternative is therefore rejected due to the various environmental and safety impacts that would occur should the reservoir and dam fail causing storm waters to flash flood the area as described above.

#### **1.4.3 Alternative 3: Reconstruct Dam and Spillway**

Under this alternative, the Kailua Reservoir would be reconstructed to meet State Department of Land and Natural Resource (DLNR) minimum requirements for dams and flood control structures. The improvements would require complete reconstruction of the facility, including enlargement of the reservoir, replacement of the embankment, and installation of new outlet piping, a spillway, an outlet channel, and other appurtenances (Figure 1-4, Alternative 3: Reconstruct Dam and Spillway).

Reconstruction would be required for two reasons: 1) The current reservoir size is too small for flood control of severe events and 2) The structural integrity of the embankment and sizing of appurtenances are inadequate to meet current regulatory requirements for flood control dams.



WAIKUPANAHA STREET

OWNER: DAVID A. LARSON  
TMK: 4-1-10:88

OWNER: BRUCE K. & GEORGIANA HART  
TMK: 4-1-10:70

OWNER: DAVID LEE K. KALAMA /EA  
TMK: 4-1-10:71

OWNER: STATE OF HAWAII  
TMK: 4-1-10:69

TRANSITION AREA

OUTLET WORKS  
AND CONTROL

OWNER:  
STEWART L. WADE  
TMK: 4-1-10:79

SPILLWAY

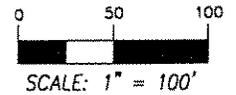
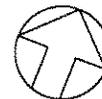
OWNER:  
JOHN DE-CASTRO JR. TR.  
TMK: 4-1-10:53

SPILLWAY OUTLET CHANNEL

OWNER: CHARLOTTE L. ROWE /EA  
TMK: 4-1-10:54

OWNER: STATE OF HAWAII  
TMK: 4-1-10:95

OWNER: FRANCES C. MIGUEL /EA  
TMK: 4-1-10:55



**KAILUA RESERVOIR DAM**



Planned - Engineering - Environmental Services - Photogrammetry - Surveying - Construction Management  
**R. M. TOWILL CORPORATION**  
808 842 1133 420 Waialeale Road Suite 411 Honolulu Hawaii 96817-4341

**ALTERNATIVE 3  
RECONSTRUCT DAM AND SPILLWAY**

**Figure  
1-4**

The current dam is not large enough to have any effect on storm flows in excess of a 10-year event. The rehabilitation being proposed here will increase the effectiveness of the dam to allow a 15% peak flow reduction of the 100-year event. The size may depend on risk assessment and cost-benefit analysis considering downstream properties saved from flooding.

Rehabilitation will involve digging and grading to remove the existing embankment and construction of a new, larger embankment. The new embankment would be constructed with an impervious core with subdrains installed at the toe of the embankment to control seepage. In addition, the base of the new embankment will require additional grading to set in and key the new embankment into the existing subgrade to prevent slippage.

Rip-rap will be installed on the upstream slope of the embankment to be protected from erosion. The downstream slope will be protected by grass or similar ground cover. Trees from the dam to 300 feet downstream will be removed and planting will be discouraged due to the long term potential of root cavity development.

A grouted rip-rap spillway and outlet channel will be constructed to direct storm water flows out of the reservoir and into the downstream channel. The spillway will be 140 feet wide and located at the south end of the dam. The spillway will flow into a new outlet channel which will be approximately 550 feet long and 50 feet wide, cut around and off to the side of the embankment. The new outlet channel will be designed to the size and dimensions required by the State DLNR. An energy dissipator, to reduce the force of flood waters, will be required at the terminus of the outlet channel to minimize erosion potential downstream.

Outlet piping will be constructed to handle daily low flows. The outlet piping will consist of a new 250 foot long, 36 inch diameter pipe extending from the reservoir to the downstream channel.

The new dam will be approximately 460 feet long (measured along the crest) and 35 feet high (measured from the downstream toe to the crest). The upstream and downstream slopes will be placed at 3:1 (horizontal : vertical).

The construction of a larger embankment will require acquisition of additional lands surrounding the reservoir as well as downstream from the embankment. The spillway will also require acquisition of land next to the dam. Access roads and trails along the dam crest and downstream toe will be required for periodic maintenance and dam safety inspections. Easements will also be required over adjoining parcels next to the dam. A total of approximately 4 properties will be affected by a larger embankment and improvements as well as access needed to maintain the facility.

The estimated construction cost for the rehabilitation of the embankment and surrounding area is approximately \$3.4 million.

The Reconstruct Dam and Spillway Alternative is therefore rejected due to environmental, safety, social and economic impacts that are required to construct an embankment which will maintain the effectiveness of the dam to allow a 15% peak flow reduction of the 100-year storm event.

#### **1.4.4 Alternative 4: Dam Breach with Channel**

Under this alternative, the reservoir would be regraded and breached along a portion of the embankment to create a controlled outlet for flood waters. As described earlier, without a controlled breach of the existing embankment, the possibility of a catastrophic failure of the 64 year old dam increases as the capacity and integrity of the dam diminishes.

This alternative proposes a controlled breach of the embankment which will involve erosion protection devices with minimal amounts of excavation. Breaching of the dam would require the removal of a portion of the existing embankment to allow unimpeded passage of watershed runoff. A trapezoidal channel with a bottom width that varies from 12 to 40

feet and 2:1 (horizontal : vertical) side slope will be cut through the embankment and situated in-line with the existing stream below. The upper portion of the channel from the reservoir to the bottom of the slope will be constructed of grouted boulders. The lower portion of the channel will be lined with ungrouted rip-rap and transition to the existing stream. The existing reservoir area will serve as a debris basin (Figure 1-5, Alternative 4, Dam Breach with Channel).

Although access roads and trails along the channel will be required for periodic maintenance and safety inspections approximately only 1 property will be affected by the proposed breach and channeling of the stream.

This is the preferred alternative since, breaching of the dam will remove the potential of catastrophic failure of the dam. The channel will be designed and constructed to direct and reduce the velocity of the flood waters headed downstream.

WAIKUPANAHA STREET

OWNER: DAVID A. LARSON  
TMK: 4-1-10:88

OWNER: BRUCE K. & GEORGIANA HART  
TMK: 4-1-10:70

OWNER: DAVID LEE K. KALAMA /EA  
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OWNER: STATE OF HAWAII  
TMK: 4-1-10:69

OWNER: STEWART L. WADE  
TMK: 4-1-10:79

OWNER: JOHN DE-CASTRO JR. TR.  
TMK: 4-1-10:53

OWNER: STATE OF HAWAII  
TMK: 4-1-10:95

OWNER: CHARLOTTE L. ROWE /EA  
TMK: 4-1-10:54

OWNER: FRANCES C. MIGUEL /EA  
TMK: 4-1-10:55

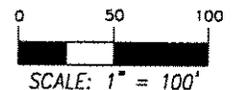
REGRADE BASIN

EXIST. SPILLWAY,  
ABANDON IN  
PLACE

PLUG-EXIST.  
PIPES, REMOVE  
CATWALK

DEBRIS  
BARRIER

GROUT THE BEYONDER  
CHANNEL



KAILUA RESERVOIR DAM



Planning - Engineering - Environmental Services - Photogrammetry - Surveying - Construction Management  
**R. M. TOWILL CORPORATION**  
808 842 1133 420 Waiakamilo Road, Suite 411 Honolulu, Hawaii 96817-4941

**ALTERNATIVE 4  
DAM BREACH WITH CHANNEL**

**Figure  
1-5**

## CHAPTER 2 PROJECT DESCRIPTION

### 2.1 PROJECT LOCATION AND SITE CHARACTERISTICS

The Kailua Reservoir is located in Waimanalo along the western end of Waikupanaha Street. Positioned near the intersection of Mahiku Street and Waikupanaha Street, the Reservoir sits near the foot of the Koolau Mountains. This area, lush with trees and brush, is within the Koolaupoko District, the wettest of eight (8) County Development Plan areas of the island.

### 2.2 RESERVOIR CHARACTERISTICS

The abandoned Kailua Reservoir, located along the western end of Waikupanaha Street was originally constructed as a part of the irrigation system serving the old Waimanalo Plantation. Due to an accumulation of silt deposits and debris, the 64 year old reservoir cannot maintain its original capacity. Once able to contain 6 million gallons, the capacity of the reservoir has been diminished to only 4 million gallons.

The reservoir receives water from an unnamed perennial stream which is a tributary to the Waimanalo Stream. The reservoir directs water flows through a 48-60 inch pipe system on the inclined inlet. The base flow of the stream is estimated at 10-50 cubic feet per second (cfs). During the heavy rains of a significant flood, peak storm water runoff rates of 1,800 cfs to 2,200 cfs are predicted.

Due to the poor condition of the abandoned reservoir and dam, the nearby residents are exposed to flooding during heavy rains. Many residents have experienced hundreds of dollars worth of damage to their homes or property over the years. Residents have witnessed or experienced the overflow of the reservoir causing flood debris, including logs and even a refrigerator, to be washed over the flooding spillway.

Without improvements to the existing embankment, silt and debris will continue to collect in the reservoir and stream channel. As the reservoir's capacity and structural integrity deteriorates the potential for dam failure and catastrophic damage increases.

The proposed project consists a controlled breach of the embankment which will involve erosion protection devices with minimal amounts of excavation. Breaching of the dam would require the removal of a portion of the existing embankment to allow unimpeded passage of watershed runoff. A trapezoidal channel with a bottom width that varies from 12 to 40 feet with 2:1 (horizontal : vertical) side slopes will be cut through the embankment and situated in-line with the existing stream below. The upper portion of the channel from the reservoir to the bottom of the slope will be constructed of grouted boulders. The lower portion of the channel will be lined with ungrouted rip-rap and transition to the existing stream.

A debris catchment will be located within the existing reservoir area, just upstream of the new channel to prevent large items from causing damage or harm downstream. An energy dissipator will be located at the bottom of the slope to minimize erosion potential. Periodic or as-needed maintenance will be required.

Although access roads and trails along the channel will be required for periodic maintenance and safety inspections approximately only 1 property will be affected by the proposed breach and channel.

This is the preferred alternative since breaching of the dam will remove the potential catastrophic failure of the dam. The channel will be designed and constructed to direct and reduce the velocity of the flood waters headed downstream.

### **2.3 CONSTRUCTION ACTIVITIES**

Construction activities will include clearing, grading, excavation, and dredging. Staging and stockpile areas shall be prepared as necessary with appropriate discharge pollution

prevention features, refuse containment, and parking areas for workers. During mobilization, ground disturbance shall be held to the minimum area necessary to accommodate heavy equipment and materials required for construction activities. This will insure protection of the site from storm generated run-off.

The development process of the proposed dredging and breaching will include, but are not limited to the following: mobilization, installation of discharge pollution prevention measures, clearing and grubbing of vegetation, excavation, grading and installation of erosion control devices, demobilization and restoration.

### **2.3.1 Mobilization**

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 both sides of the proposed trapezoidal channel.

Prior to mobilization, the project contractor will identify staging and stockpiling areas for construction equipment and materials and will obtain necessary rights of access through public or private properties.

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

### **2.3.2 Installation of Discharge Pollution Prevention Measures**

Discharge pollution prevention measures will be installed for each project action as required by the construction activities and project scheduling. Measures to prevent runoff and the release of sediment into the stream during construction will be in place and functional before project activities begin and will be maintained throughout the construction

period. Runoff and discharge pollution prevention measures will be incorporated into a site-specific Best Management Practices (BMP) plan by the project contractor. The contractor shall include, but not be limited to the following control measures in the BMPs.

- Compliance with the sequence of operation as recommended by the "Rules Relating to Soil Erosion Standards and Guidelines," provided by the City and County of Honolulu, Department of Planning and Permitting.
- Grassing (common Bermuda grass or Star grass cuttings at the rate of 50 bushels per acre or an average of 2 sprigs per square foot) of all exposed or graded areas shall be done immediately after final grades are established.
- Graded areas that are not at final grade and are expected to be exposed for more than 14 days, shall be mulched (at the rate of 45 cubic feet per 1,000 square feet) in order to prevent erosion and silt runoff.
- A silt screen shall be installed across the stream channel at selected locations, as designated by the officer-in-charge. The silt screen shall consist of a filter fabric combined with a layer of polyester netting for support. The screen shall remain in place for the duration of the project activities.

### **2.3.3 Clearing and Grading of Vegetation**

The area is heavily vegetated with vines, trees and various ground cover. The project will require removal of trees and other vegetation within the stream channel to minimize the long term potential for development of root cavities. Other areas to be cleared and graded include a portion of the existing reservoir and the downstream end of the channel for the erosion control device.

### **2.3.4 Excavation, Grading and Installation**

Excavation will involve the removal of a portion of the existing embankment to allow unimpeded passage of watershed runoff. A trapezoidal channel with a bottom width that varies from 12 to 40 feet and 2:1 (horizontal : vertical) side slopes will be cut through the embankment and situated in-line with the existing stream below. The upper portion of the

channel from the reservoir to the bottom of the slope will be constructed of grouted boulders. The lower portion of the channel will be lined with ungrouted rip-rap and transition to the existing stream.

A debris catchment will be located within the existing reservoir area, just upstream of the new channel. At the downstream end, the channel will terminate with an energy dissipator to minimize erosion potential.

### **2.3.5 Demobilization and Restoration**

Upon completion of the proposed improvements, the contractor shall restore the project site as much as possible to conditions prior to project implementation. This will include, but is not limited to, the following:

- 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.
- Roadways providing access to the site and surrounding areas 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.
- All areas damaged by construction staging shall be restored. Impacted pasturage, lawns, driveways or vegetated areas excluding of channel improvements shall be replanted and restored. Exposed ground areas shall be seeded or hydro-mulched as appropriate.

## **2.4 BEST MANAGEMENT PRACTICES**

A site-specific Best Management Practices (BMP) plan will be prepared by the project contractor as part of the project construction plan. The BMPs will include guidelines and

mitigation measures to prevent runoff, discharge pollution, and other detrimental impacts related to construction activities. BMPs will be designed and implemented for normal stream flow conditions at the project site and will include contingency plans to respond to heavy rainfall conditions and the possibility of an emergency release of water from Kailua Reservoir.

Regional and special conditions outlined by the Army Corps of Engineers (ACOE) and the State Department of Health (DOH) per requirements of Section 404 and 401 permits will also be addressed in the site-specific BMPs.

Mitigation measures, in addition to the discharge pollution controls described above, shall include, but not be limited to the following:

- Clearing and excavation shall be held to a minimum necessary to meet project design and construction plan requirements.
- Construction shall be phased to minimize the exposure time of cleared or excavated areas. Existing ground cover shall not be destroyed, removed or disturbed more than 20 calendar days prior to the start of construction.
- Stabilization shall be accomplished by temporarily or permanently protecting the disturbed surface from rainfall impacts and runoff.
- Storm water flowing toward active project areas shall be diverted as much as practicable using the appropriate controls, including berms and silt fences, as determined by the contractor according to site conditions.
- Areas that remain unfinished for more than 30 calendar days shall be hydro-mulched or seeded to provide temporary soil stabilization.
- The project contractor will select locations for stockpiling construction material. Stockpile sites will be identified in the site-specific BMPs and construction plans. A sediment retention berm or silt fence will be installed around the down-slope side of stockpile sites to retain sediment discharge during heavy rainfall.

- No fuel will be stored on the project site. Fueling of construction equipment will only be performed off-site or within an area designated by the contractor. Any site designated for refueling shall be located away from the stream, enclosed by a containment berm and constructed to contain spills and seepage and prevent storm water runoff from carrying pollutants into state coastal waters.
- If groundwater is encountered during excavation for the pier footings, dewatering will be required. Effluent water will be pumped from the excavation and routed by pipe through a filtration system before being discharged into Waimanalo Stream. The filtration system will consist of an enclosed box containing at least two filter screens comprised of a geotextile filter fabric that allows water to flow through while capturing soil particles up to #70 sieve size. The project contractor will monitor the filtration system for clogging or failure and immediately repair or replace any damaged or ineffective components.

The contractor, based on professional experience and expertise, may modify the proposed BMP mitigation measures as necessary to account for unanticipated or changed site conditions.

## **2.5 PROJECT SCHEDULE AND COST**

Construction for the proposed expansion is scheduled to begin once all permits are obtained, anticipated to be towards the end of the year 2000. The preliminary construction cost estimate for the entire project will be approximately \$880,000. This cost estimate includes the site preparation, excavation, demolition of existing structures, erosion control, and construction of the rip-rap channel. Funding for the project will be provided by the State Department of Agriculture budget.

## **CHAPTER 3**

### **ENVIRONMENTAL SETTING POTENTIAL IMPACTS AND MITIGATIONS**

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

#### **3.1 TOPOGRAPHY, CLIMATE, AND RAINFALL**

##### **3.1.1 Topography**

The project site, located adjacent to Waikupanaha Street in Waimanalo, consists of an unnamed perennial stream passing through the abandoned Kailua reservoir. The stream that flows into the reservoir runs in an east-west direction from the Koolau Mountains towards Waimanalo Bay. The abandoned reservoir is located near the intersection of Mahiku Street and Waikupanaha Street. The project area, at approximately 150 feet above mean sea level (msl), has steep slopes to the north and south.

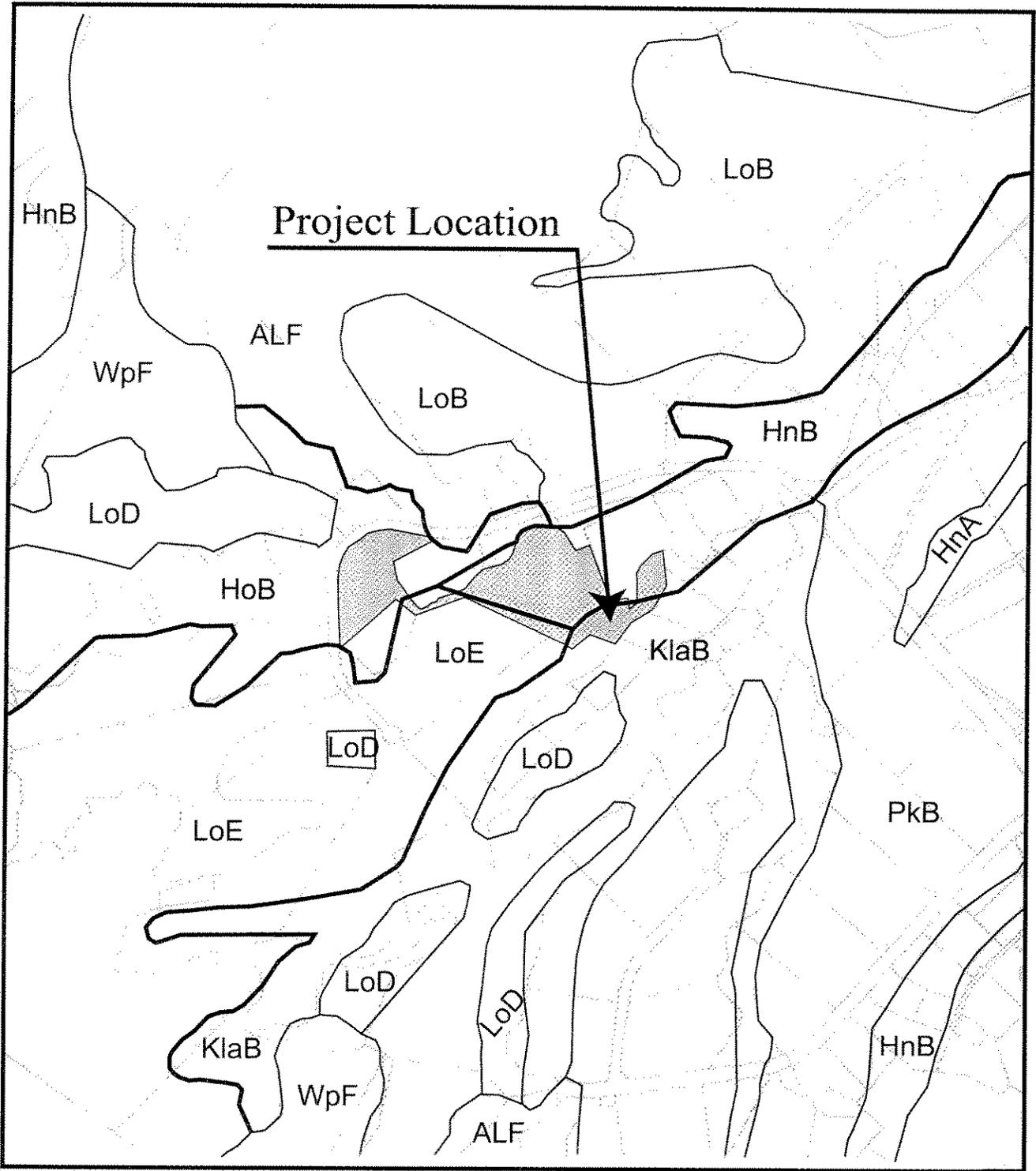
##### **3.1.2 Climate**

The project area, within the Koolaupoko district of the island, is lush with trees and bushes. This beautiful valley area receives an average of 75 inches of rainfall per year with temperatures ranging between 60° F and 80° F.

#### **3.2 GEOLOGY**

##### **3.2.1 Soils**

The soil at the project site consist of Hanalei Silty Clay (HnB), Hanalei Stony Clay (HoB), Lolekaa Silty Clay (LoE) and Kawaihapai Stony Clay Loam (KlaB) (Figure 3-1, Soils Map). The Hanalei Silty Clay soil has a runoff that is slow and a erosion hazard that is classified as slight. Hanalei Stony Clay soils are similar to the Hanalei Silty Clay except that it is stony where the stones hinder machine cultivation. These types of soils are generally used for sugarcane and pasture use. The natural vegetation consists of paragrass, sensitiveplant, honohono, Java plum, and guava.



**Legend**

- ALF Alaeloa Silty Clay 40% - 70%
- HnA Hanalei Silty Clay 0 - 2%
- HnB Hanalei Silty Clay 2% - 6%
- HoB Hanalei Stony Silty Clay, 2% - 6%
- KlaB Kawaihapai Stony Clay Loam 0% - 2%
- LoB Lolekaa Silty Clay 3% - 8%
- LoD Lolekaa Silty Clay 15% - 25%
- LoE Lolekaa Silty Clay 25% - 40%
- WpF Waikane Silty Clay 40% - 70%

Figure 3-1  
Soils Map



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The Lolekaa Silty Clay soil occurs along drainageways and on fans adjacent to the Koolau Range. Runoff for this soil is classified as medium to rapid and the erosion hazard moderate to severe. The Kawaihapai Stony Clay Loam soils are generally well-drained soils in drainageways and on alluvial fans on the coastal plains. This soil is classified as having slow runoff and only a slight erosion hazard.

### **3.3 SURFACE WATER AND HYDROLOGY**

#### **3.3.1 Surface Hydrology**

The project area, located in Waimanalo near the foot of the Koolau Mountains and Aniani Nui Ridge, is surrounded by various perennial and intermittent streams. The subject stream channel and abandoned reservoir directs and holds water an unnamed intermittent stream (Figure 3-2, Streams Map).

#### **3.3.2 Project Impacts**

The proposed project will help to remove the potential for catastrophic failure of the dam during heavy rains by removing a section of the embankment. The proposed breach of the embankment will provide a controlled outlet for the storm water to flow and reduce the velocity of water flows downstream. These improvements involve erosion protection devices with minimal amounts of excavation. The channel will be designed and constructed to reduce the flooding at the embankment and velocity of the flood waters headed downstream.

Because the proposed project involves construction activities within the stream channel and extensive work in proximity to the stream, the potential for discharge pollution entering State waters does exist. In-stream activity includes excavation and installation of grouted rip-rap features and staging and maneuvering of heavy equipment. Potential for pollutant discharge into State waters of Waimanalo Stream during construction would primarily result from release of silt and suspended sediments during excavation and grading activities or during extreme storm conditions.

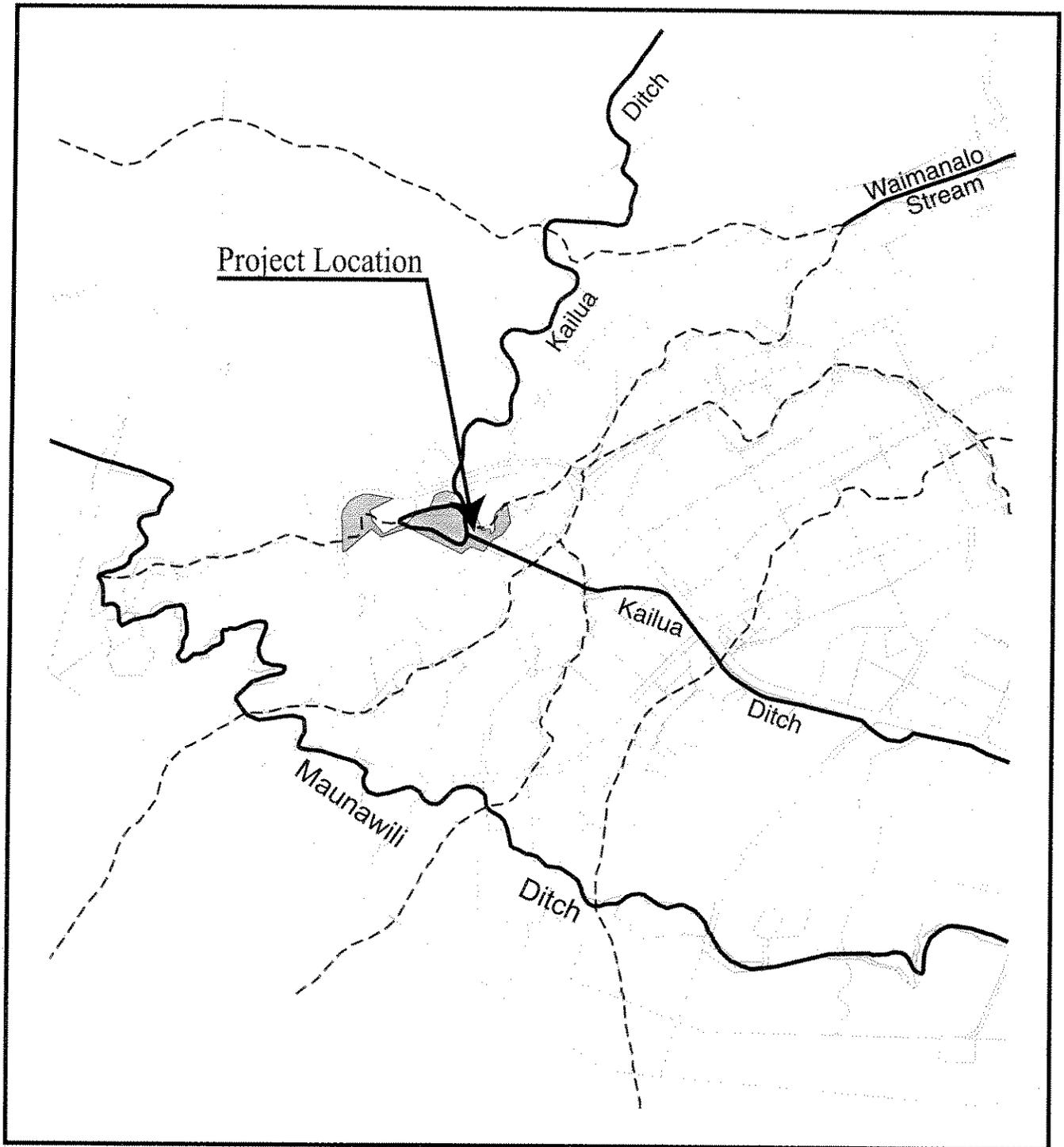
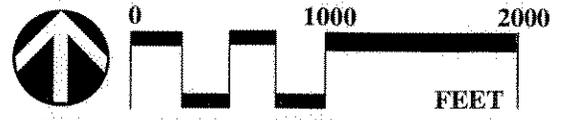


Figure 3-2  
Streams Map

- Perennial Stream or Ditch
- - - Intermittent Stream



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Materials that may potentially enter State waters due to construction activities include soil and vegetation from excavation activities, concrete, grouted rubble pavement (GRP), fuel and oil used by the construction equipment, and sediment carried in storm water runoff from areas exposed by construction grading or excavation. If dewatering becomes necessary, the effluent would be discharged into Waimanalo Stream, posing a potential source of sediment pollution if not filtered first. Additionally, debris dropped during demolition of the existing embankment is a potential source of discharge pollution. Materials to be placed temporarily in State waters include silt fencing with reinforcement netting, water monitoring devices, and heavy equipment used during excavation. Upon removal of the embankment, grouted rip-rap and similar devices will be constructed within the stream channel to reduce flow velocity.

### **3.3.3 Mitigation Methods**

Pursuant to Section 14-12.22 Revised Ordinances of Honolulu 1990, as amended, and Section of 401 of the Clean Water Act of 1977, DOA will obtain Water Quality Certification from the State Department of Health (DOH) in conjunction with the Department of the Army Nationwide Permit. During all phases of the project, the stream will be monitored for water quality as outlined in a Water Quality Monitoring Plan to be submitted for review by DOH.

Discharge pollution prevention measures will be employed in all phases of the project. Control measures will be in place and functional before construction activities begin, and will be maintained throughout the construction period. A site-specific plan to prevent runoff and discharge of other pollutants into State waters, including removal procedures for the construction site BMPs (Best Management Practices), will be prepared by the project contractor as part of the project construction plan. The construction plan will be submitted to the Director of the DOH, Clean Water Branch for review.

### **3.4 GROUNDWATER**

#### **3.4.1 Groundwater**

In Koolaupoko, municipal water is supplied primarily by the County Board of Water Supply (BWS). In 1990, the region consumed 19.2 million gallons per day (mgd) of potable water, or about 12% of the islandwide total. According to the BWS, Koolaupoko will need a total of approximately 19.9 mgd of potable water by the year 2020, in order to accommodate future residential and commercial growth. Some of the proposed BWS groundwater development projects are in the Koolaupoko and Waimanalo aquifers, which are located within the Koolaupoko Sustainable Communities Plan Area. The project area is not a source for groundwater.

#### **3.4.2 Project Impacts**

No water will be required for the proposed project and there are no plans by the BWS to develop the abandoned reservoir as a source for groundwater.

#### **3.4.3 Mitigation Measures**

Pursuant to Section 14-12.22 Revised Ordinances of Honolulu 1990, as amended, and Section of 401 of the Clean Water Act of 1977, DOA will obtain Water Quality Certification from the State Department of Health (DOH) in conjunction with the Department of the Army Nationwide Permit. During all phases of the project, the stream will be monitored for water quality as outlined in a Water Quality Monitoring Plan to be submitted for review by DOH.

Discharge pollution prevention measures will be employed in all phases of the project. Control measures will be in place and functional before construction activities begin, and will be maintained throughout the construction period. A site-specific plan to prevent runoff and discharge of other pollutants into State waters, including removal procedures for the construction site BMPs (Best Management Practices), will be prepared by the project contractor as part of the project construction plan. The construction plan will be submitted to the Director of the DOH, Clean Water Branch for review.

### **3.5 NATURAL HAZARDS**

#### **3.5.1 Flood Zones**

The proposed project area will be situated at an elevation of 150 feet above mean sea level (msl), within Waimanalo Valley. The Federal Emergency Management Agency (FEMA), Flood Insurance Rate Map (FIRM) identifies the proposed project site as lying within "Zone D" - an area in which flood hazards are undetermined (See Figure 3-3, Flood Map).

### **3.6 AIR QUALITY**

#### **3.6.1 Air Quality**

According to the State 1996 Data Book, the Waimanalo area has relatively good air quality. This area has the lowest annual maximum range for inhalable particulates of less than 10 micrograms and non-measurable amounts of sulfur dioxide.

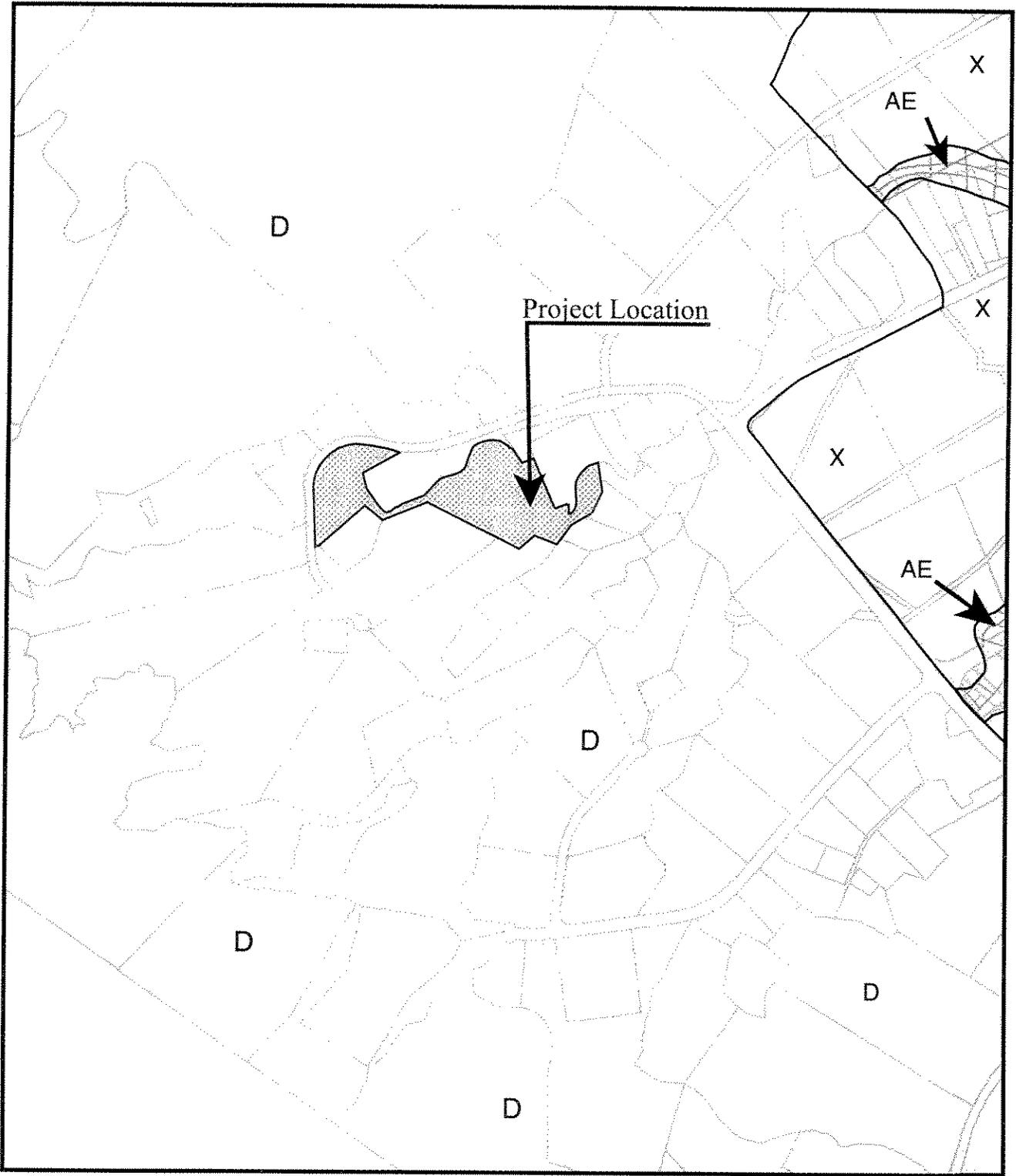
#### **3.6.2 Project Impacts**

During construction, the site will be cleared and dredged of debris. Dust may be generated during site excavation and grading. However, dust levels will be controlled by using standard water sprinkling methods. Air pollutants from construction equipment will be generated, but the amounts are expected to be insignificant.

#### **3.6.3 Mitigation Measures**

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.

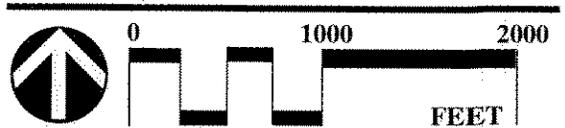
Fugitive dust emissions can be controlled to a large extent by watering of active work areas, using wind screens, and by covering open-bodied trucks. Exhaust emissions will be mitigated by ensuring that project contractors properly maintain their internal



**Legend**

- AE - Floodway District - Areas of 100-year flood.
- D - Areas in which flood hazards are undetermined.
- X - Areas determined to be outside the 500-year Flood Plain.

**Figure 3-3  
Flood Map**



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combustion engines and comply with DOH Rules Title 11, Chapter 60-1, regarding Air Pollution Control.

### **3.7 NOISE**

#### **3.7.1 Noise**

Ambient noise levels in the area are currently dominated by traffic on nearby streets - primarily on Waikupanaha Street and Mahiku Place. Other noise sources include the use of landscape and maintenance equipment in the area, including tractors, compressors, and hand-held gas-powered tools.

#### **3.7.2 Project Impacts**

The proposed improvements will have no increase in long-term noise impacts. Short-term noise impacts will be the result of construction related noise.

#### **3.7.3 Mitigation Measures**

In order to mitigate short-term construction related noise impacts, operators 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 during the operational hours (from 7:00 am to 4:30 pm daily) to avoid disturbing the surrounding area.

### **3.8 BIOLOGICAL RESOURCES**

#### **3.8.1 Flora**

The natural vegetation of this area includes guava, Christmas berry, Japanese tea, koa haole, and kikuyugrass.

#### **3.8.2 Fauna**

Domestic pets, feral animals, including cats and mongooses, livestock, and rodents are all present in the area and make use of the project site. All species noted above are common and occur widely throughout Waimanalo.

Introduced bird species, such as chickens, mynahs (*Acridotheres tristis*), doves (*Streptopelia chinensis*), ricebirds (*Padda oryzivora*), and house sparrows (*Passer domesticus*) are common in the Waimanalo area.

### **3.8.3 Project Impacts**

The proposed improvements will have short-term impacts to the flora and fauna in the area during construction. Once construction is complete the area will return to its original state.

### **3.8.4 Mitigation Measures**

There are no reasons to impose restrictions or impediments to the proposed project based on natural biological resources at the site. No mitigation measures are required or recommended for botanical and faunal resources.

## **3.9 HISTORIC AND ARCHAEOLOGICAL RESOURCES**

### **3.9.1 Historic Resources**

The Kailua Reservoir is located near the foot of the Koolau Mountains and Aniani Nui Ridge in Waimanalo. It is bounded by Waikupanaha Street to the north, east and west. There are no historical resources within the project site. Due to the substantial alteration during the initial development of the reservoir with no previous record of known historical resources, the project site is not expected to have archaeological resources.

### **3.9.2 Archaeological Resources**

A research of projects surrounding the site resulted in the determination that there are no significant archaeological sites within the project site. Due to substantial alteration during the initial development of the reservoir with no previous record of known archaeological resources, the project site is not expected to have archaeological resources.

### **3.9.3 Project Impacts**

The project involves the excavation of a man-made embankment and construction of erosion control devices within portions of the channel base. No adverse impacts to

cultural, historic, or archaeological resources are anticipated from the proposed alteration to the abandoned Kailua reservoir dam and stream channel.

#### **3.9.4 Mitigation Measures**

There is always the possibility that previously unknown or unexpected subsurface cultural features, deposits, or burials may be encountered. To ensure that no subsurface cultural features are destroyed during project construction, work within the project area will be monitored by the project contractor. In the unlikely event that archaeologically significant remains are encountered, work will cease in the immediate area and the DLNR, State Historic Preservation Division will be notified at (808) 692-8015 to determine significance and treatment of any findings. No additional archaeological work or other mitigation measures are recommended for this site.

### **3.10 SCENIC RESOURCES**

#### **3.10.1 Scenic Resources**

The project site, surrounded by trees and brush, is visible from the nearby residential properties. Lower portions of the stream channel are visible from sections of the Waikupanaha Street. The area has beautiful vistas of the Koolau mountains and Aniani Nui Ridge.

#### **3.10.2 Project Impacts**

The project site is visible from sections of Waikupanaha Street but will not significantly impact existing vistas. Although the views from nearby residential properties towards the Koolau mountains will include the trapezoidal channel through the existing embankment, the removal of the embankment will increase the visibility of the Koolau mountains for a few nearby properties.

#### **3.10.3 Mitigation Measures**

No mitigation measures are planned for the proposed project.

### **3.11 TRAFFIC AND ROADWAYS**

#### **3.11.1 Traffic and Roadways**

Access to the property is gained from Waikupanaha Street and private roadways which runs along the back of Waimanalo valley. Waikupanaha Street is a paved City owned road with a 44 foot right-of-way.

#### **3.11.2 Project Impacts**

The proposed project will result in short-term construction related impacts. Construction at the site will result in a temporary rise in heavy truck traffic on the surrounding streets, particularly during mobilization and demobilization of the construction area. Regular traffic will be impacted by the occasional presence of large, slow-moving vehicles on area streets and by increased traffic activity resulting from commuting construction crews. Upon completion of the proposed improvements, traffic impacts will be negligible, since the reservoir will be unmanned and require very little maintenance.

#### **3.11.3 Mitigation Measures**

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.

### **3.12 LAND USE AND OWNERSHIP**

As discussed earlier, the Kailua Reservoir was constructed around the 1930's for the irrigation of the Waimanalo Plantation. The project site, on a portion of an 8 acre parcel, is currently owned by the State of Hawaii and under the Department of Agriculture jurisdiction.

### **3.13 DEMOGRAPHICS**

#### **3.13.1 Demographics**

The project site is located in census tract 113.1 in the Waimanalo district of Koolau-poko. According to the U.S. Census (DBEDT 1996), this area has a population of 4,859 with 1,189 households in 1990. The project site is within City and County of Honolulu, Neighborhood Board Area No. 32 - Waimanalo.

#### **3.13.2 Project Impacts**

The proposed project is intended to address flooding hazards in the area surrounding the Kailua reservoir. The improvements proposed will help to alleviate flooding by controlling the outlet flow by breaching the embankment and permitting the natural water flow to continue to the stream below.

The proposed project is intended to address the need to provide sufficient drainage control of flood waters during heavy rains for homes and property adjacent to the reservoir. The project will not in itself result in increased development or population growth. Residential communities surrounding the project area are similarly not anticipated to be impacted since no displacement will be required.

#### **3.13.3 Mitigation Measures**

Mitigation measures described in this document will be implemented to minimize potential adverse impacts and to ensure the continued health and safety of area residents.

**CHAPTER 4**  
**RELATIONSHIP TO LAND USE AND POLICIES**

State and County land use plans, policies, and controls are established to guide development in a manner that enhances the overall environment of Hawaii, and to ensure that long-term social, economic, environmental, and land use needs of the people of Hawaii are met. The proposed alteration to the existing abandoned Kailua Reservoir dam will be consistent with State and County land use plans and policies, as discussed below.

**4.1 STATE**

**4.1.1 Hawaii State Plan**

The Hawaii State Plan, Chapter 226, Hawaii Revised Statutes (HRS), serves as a written guide for the future long range development of the State. The Plan identifies goals, objectives, policies, and priorities for the State.

The proposed alteration to the existing Kailua Reservoir Dam would be in conformance to the following State Plan objectives and policies for facility systems

"(a) Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives."

"(b) To achieve the general facility systems objective, it shall be the policy of this State to: (1) Accommodate the needs of Hawaii's people through coordination of facility systems and capital improvement priorities in consonance with the state and county plans." and "(3) Ensure that required facility systems can be supported within resource capacities and at a reasonable cost to the user" (HRS, Section 226-14).

#### **4.1.2 State Land Use**

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 project site is located within the State Agricultural District (See Figure 4-1, State Land Use Map).

Since the proposed site is located in the state Agriculture district, a State Special Use Permit must be obtained for the proposed improvements through the City and County of Honolulu, Department of Planning and Permitting. The State Special Use Permit will be submitted and processed through the City and County of Honolulu, Department of Planning and Permitting prior to construction.

#### **4.1.3 Coastal Zone Management**

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, 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.

The proposed improvements conform to the Coastal Zone Management Program Objective 1, Recreational Resources which calls for the provision of adequate, accessible, and diverse recreational opportunities in the Coastal Zone Management area. The proposed facility is not located on the coastline or shoreline and does not involve coastal resources. The site is not in a location to develop new shoreline recreational opportunities or to dedicate shoreline areas with recreational value.

The proposed improvement also conforms to the Coastal Zone Management Program Objective 2, Historic Resources, which ensures that new development will protect, preserve, and where desirable, restore those natural and manmade historic and prehistoric

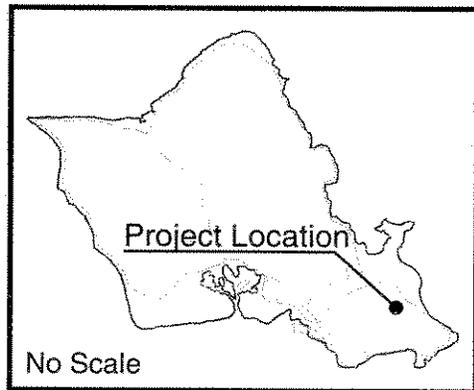
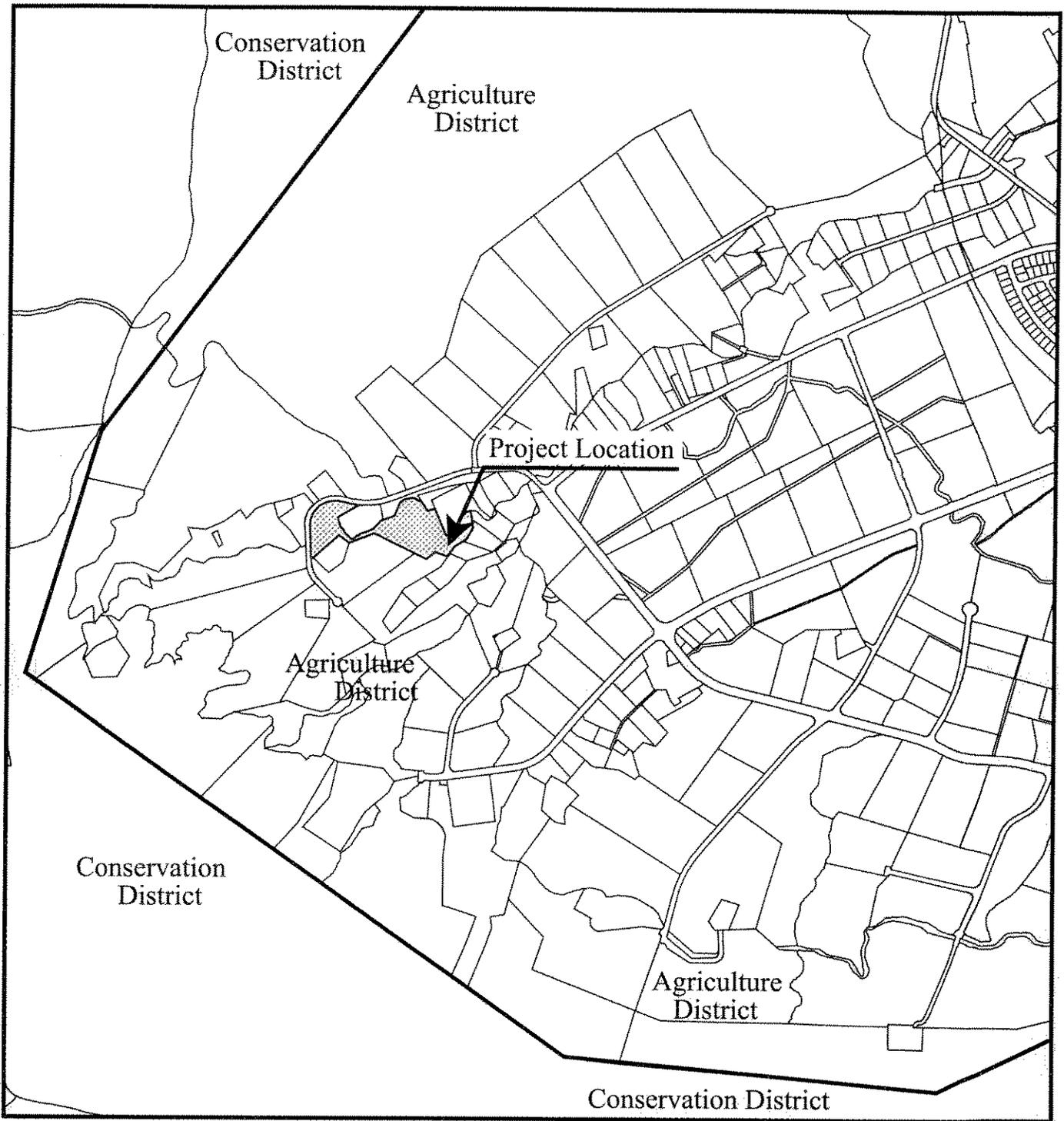
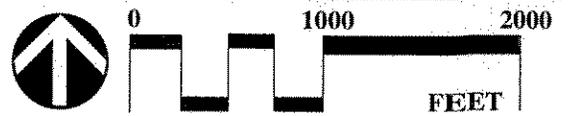


Figure 4-1  
State Land Use Map



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resources that are significant in Hawaiian and American history and culture. The proposed facility achieves this objective by reducing the frequency and severity of flooding for the homes and property adjacent to the Kailua Reservoir in a manner that will not negatively impact the coastline and its resources.

The proposed improvements conforms to the Coastal Zone Management Program Objective 3, Scenic and Open Space, which encourages new development to protect, preserve, and where desirable, restore or improve the quality of coastal scenic and open space resources. The propose improvement is compatible with this objective by designing and re-developing an existing Reservoir to minimize the alteration of undeveloped lands natural land forms and existing public views to and along the shoreline.

## **4.2 CITY AND COUNTY**

### **4.2.1 General Plan**

The City and County General Plan provides a statement of long range social, economic, environmental, and design objectives for the Island of Oahu and a statement of policies necessary to meet these objectives.

The proposed improvements meet the intent and objective of the General Plan's Natural Environment, Objective A, Policy 6 which protects and preserves the natural environment by designing surface drainage and flood-control systems in a manner which will help preserve their natural settings.

Comment: The proposed improvements will help to reduce potential flooding during heavy rains to the surrounding area. The breaching of the abandoned reservoir will help to control and direct storm waters safely to their natural flow downstream during heavy rains.

The proposed improvements meet the intent and objective of the General Plan's Public Safety, Objective B, Policy 3 which encourages the protection of the people of Oahu and

their property against natural disasters and other emergencies, by participating with State and Federal agencies in the funding and construction of flood-control projects.

Comment: The proposed improvements will remove the potential for catastrophic failure of the Kailua Reservoir dam. The breaching of the dam will include erosion control devices to provide a safe, directed channel for stream waters to flow. Upon completion, the channel will be designed and constructed to reduce the flooding at the embankment and velocity of the flood waters headed downstream.

#### **4.2.2 Development Plan**

The City and County of Honolulu Koolauapoko Development Plan designates the project site as within the Agriculture land use district. The proposed project, consistent with the purpose and intent of the Agricultural land use designation, will not reduce or degrade the quality or quantity of Agricultural designated lands.

The City and County of Honolulu Koolauapoko Sustainable Communities, final draft published in June 1999, designates this site as within the Agriculture land use district. The proposed improvements comply with the General Policies and Planning Principles of the Koolauapoko Sustainable Communities Plan.

##### General Policies:

- Promote drainage system design that emphasizes control and minimization of non-point source pollution and the retention of storm water on-site and in wetlands.
- Modification needed for flood protection should be designed and constructed to maintain habitat and aesthetic values, and avoid and/or mitigate degradation of stream, coastline and near shore water quality.
- Keep drainage ways clear of debris to avoid the flooding problems that have occurred in the past.

Planning Principles:

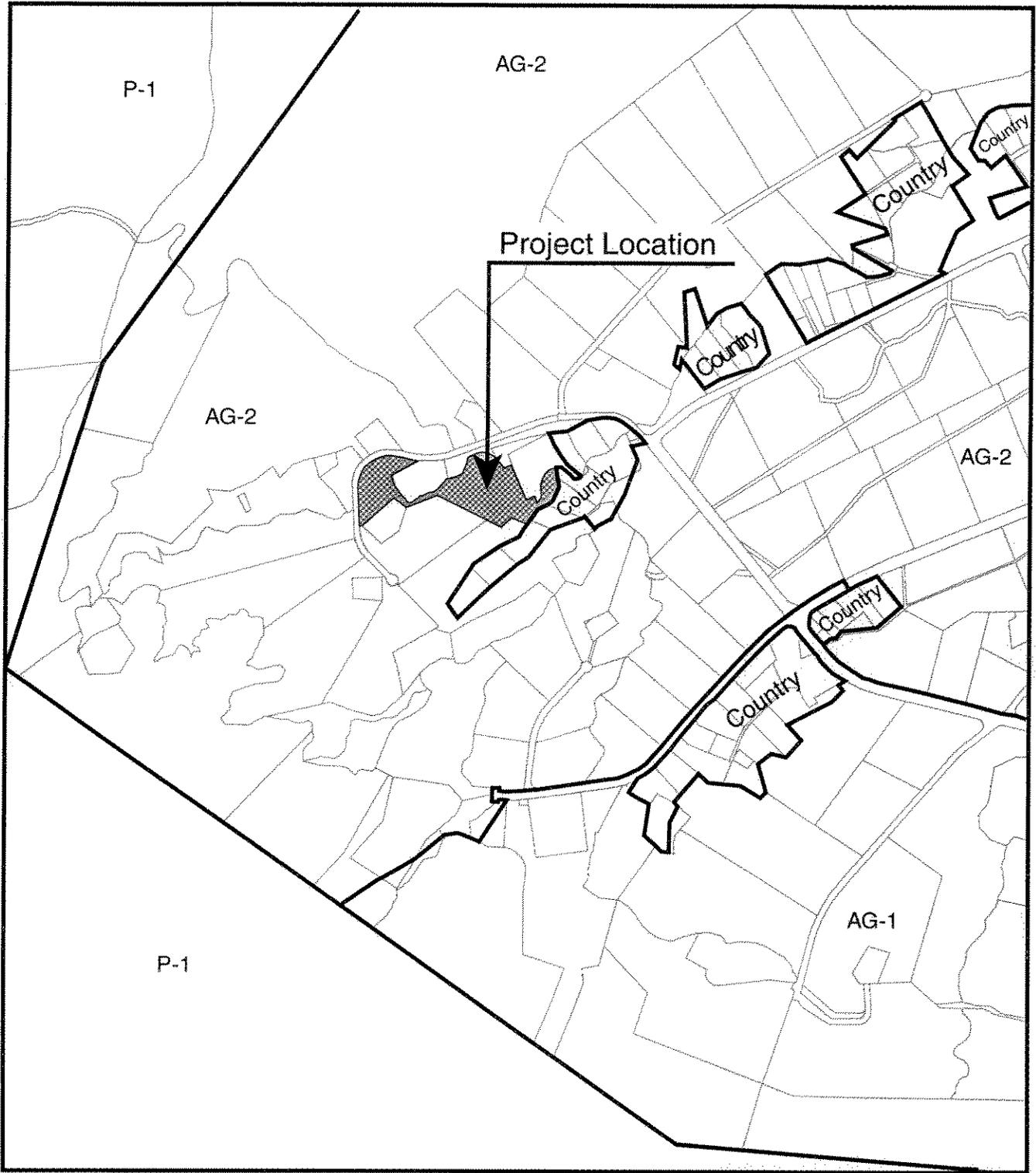
- **Stream Channel Improvements.** To the extent possible, integrate planned improvements to the drainage system into the regional open space network by emphasizing the use of retention basins, creation of passive recreational areas, and recreational access for pedestrians and bicycles without jeopardizing public safety. In places where the hardening of stream channels is unavoidable or highly desirable to prevent significant loss of property or threat to public health and safety, the improvements should be designed and made in a manner which protects natural resource and aesthetic values of the stream to the greatest extent possible, consistent with the guidelines expressed in Section 3.1.3.3.
- **Channel and Basin Management.** Emphasize periodic maintenance of stream channels and storm water detention basins, including natural wetlands, to improve and retain their capacity for flood conditions. Abandoned irrigation ditches and reservoirs should be recognized as important elements of flood control system and a government entity - e.g., the State of Hawaii Department of Land and Natural Resources - should assume responsibility for their maintenance.

**4.2.3 Zoning Designation**

The project site is designated AG-2 General Agricultural District on the City and County of Honolulu Zoning Map (See Figure 4-2, Zoning Map). The proposed improvements, consistent with the purpose and intent of the AG-2 zoning designation, will not reduce or degrade the quality or quantity of Agricultural designated lands.

**4.2.4 Special Management Area**

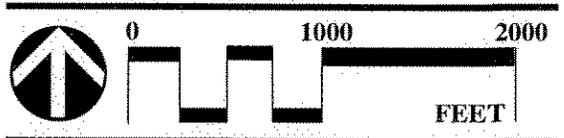
The City and County of Honolulu designates the shoreline and certain inland areas of Oahu as being within the Special Management Area (SMA). SMA areas are understood to have a sensitive environment and should be protected in accordance with the State's Coastal Zone Management policies. Since the project site is not within the SMA boundary, no SMA permit is required for the proposed improvements.



**Legend**

- AG-1 - Restricted Agriculture
- AG-2 - General Agriculture
- Country - Country
- P-1 - Restricted Preservation

Figure 4-2  
Portion of Zoning Map



**CHAPTER 5**  
**NECESSARY PERMITS AND APPROVALS**

**5.1 FEDERAL**

Army Corps of Engineers General Permit (Section 404 of Clean Water Act)

**5.2 STATE**

National Pollutant Discharge Elimination System (NPDES) , Notice of Intent (NOI),  
for Discharges of Storm Water Associated with Industrial Activities  
Stream Channel Alteration Permit (SCAP)  
Water Quality Certification (Section 401)

**5.3 CITY AND COUNTY OF HONOLULU**

Special Use Permit  
Grading Permit

## CHAPTER 6 DETERMINATION

### 6.1 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 improvements to the Kailua Reservoir have been assessed for short- and long-term and cumulative effects on the environment.

### 6.2 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;**

Research of flora and fauna, and historic and archaeological sites at and near the project area found no presence of natural or cultural resources that would be jeopardized by the proposed project. Due to the substantial alteration during the initial development of the reservoir with no previous record of known historical resources within the project site, the project site is not expected to significantly impact flora, fauna, historic or archaeological resources.

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

The project site is located at the back of Waimanalo near the foot of the Koolau Mountains. The site is currently an abandoned irrigation reservoir and overgrown with vegetation. Development of the site will not displace any residential structures 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 alteration to the Kailua Reservoir dam is expected to have a beneficial effect on the safety and economic welfare of the Waimanalo community. The proposed project will help to remove the potential of catastrophic failure of the dam during heavy rains by breaching a portion of the embankment to create a controlled outlet for flood waters. The proposed breach of the embankment will include erosion control devices to provide safe, directed channel for stream water to flow. The channel will be designed and constructed to reduce flooding at the embankment and velocity of the flood waters headed downstream.

**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 minimally affected with appropriate mitigation measures as detailed. Appropriate mitigation measures for short-term, construction-related impacts to noise levels, air quality, and water quality will be followed by the project contractor.

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

Development of the proposed project will not result in substantial secondary impacts to the natural or built environment, or to the social and economic community. The proposed project will not stimulate unexpected change in the population, but remove the potential for catastrophic flooding of homes and property adjacent to the reservoir.

**Criteria 7. Involves a substantial degradation of environmental quality;**

Analysis of air and water quality, noise levels, and land use associated with the proposed alteration to the Kailua Reservoir Dam has been determined that the proposed project will not substantially degrade environmental quality.

The proposed alteration to the Kailua Reservoir Dam is expected to have a beneficial effect on the environmental quality of the area . Project improvements will help to remove the potential for catastrophic failure of the dam during heavy rains by breaching a portion of the embankment. The proposed breach of the embankment will provide a controlled outlet for the storm water to flow. The improvements will also include erosion control devices to provide a safe directed channel for stream waters to flow. The channel will be designed and constructed to reduce the flooding at the embankment and velocity of the flood waters headed downstream.

**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 County Ordinances. The proposed alteration to the Kailua Reservoir Dam is a component of the Federal, State and County commitment to assure protection of the people of Hawaii and their property against natural disasters through funding and constructing of flood control projects. The proposed alteration is in response to the DLNR requirement for dam safety.

**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. Detrimently 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. Surface water sources will remain in the project area and development of the proposed site will not involve activities or future planned uses that would ordinarily impact ground water sources. 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. The proposed alteration to the Kailua Reservoir Dam is expected to have a beneficial effect on the safety of the surrounding Waimanalo community by removing the potential of catastrophic failure of the dam during significant storms. Project improvements will remove the potential for catastrophic failure by breaching a portion of the embankment and improvements within the stream channel. The proposed breach of the embankment will provide a controlled outlet for the storm water to flow. The improvements will include erosion control devices to provide direction and reduction in the velocity of storm water downstream.

**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 improvements will be visible from Waikupanaha Street but will not significantly impact existing vistas. Although views from nearby residential properties towards the Koolau mountains will include the trapezoidal channel through the existing embankment, the removal of the embankment will increase the visibility of the Koolau

mountains for a few nearby properties. Visual impacts associated with construction activities will be temporary.

**Criteria 13. Requires substantial energy consumption.**

Construction activities associated with the proposed improvements would require high, short-term energy use, however, daily operations will not require power supply.

**6.3 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 mitigated through actions detailed in this document or temporary and therefore will not adversely impact the environmental quality of the area.

It has been preliminarily determined that an Environmental Impact Statement (EIS) will not be required, and that a Finding of No Significant Impact (FONSI) is being considered for this project.

## REFERENCES

City and County of Honolulu, Department of Planning and Permitting, (1999) *Draft Koolaupoko Sustainable Communities Plan*, Honolulu, Hawaii.

City and County of Honolulu, Department of Planning and Permitting, (1992), *General Plan*, Honolulu, Hawaii.

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

State of Hawaii Department of Land and Natural Resources, Land Division Engineering Branch, Analysis dated October 28, 1996.

State of Hawaii, Office of the Governor, *The Hawaii State Plan Revised* (1986), Honolulu, Hawaii.

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

U.S. Department of Agriculture, Soil Conservation Service (1972) *Soil Survey of Islands of Kauai, Oahu, Hawaii, Molokai, and Lanai, State of Hawaii*, with University of Hawaii Agricultural Experiment Station, Honolulu, Hawaii.

U.S. National Park Service Western Region Natural Resources and Research Division Hawaii Cooperative Park Service Unit, (December 1990) *Hawaii Stream Assessment - A Preliminary Appraisal of Hawaii's Stream Resources Report*.