EXECUTIVE CHAMBERS
HONOLULU

August 22, 1988

Marvin T. Miura, Ph.D.
Director
Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, Hawaii 96813

Dear Dr. Miura:

Based upon the recommendation of your office, I am pleased to accept the Final Environmental Impact Statement for the Kula Water System Improvements as satisfactory fulfillment of the requirements of Chapter 343, Hawaii Revised Statutes. This environmental impact statement will be a useful tool in the process of deciding whether the action described therein should be allowed to proceed. My acceptance of the statement is an affirmation of the adequacy of that statement under applicable laws, and does not constitute an endorsement of the proposed action.

When the decision is made regarding the proposed action itself, I expect the proposing agency to weigh carefully whether the societal benefits justify the environmental impacts which will likely occur. These impacts are adequately described in the statement, and, together with the comments made by reviewers, provide a useful analysis to the proposed action.

With kindest regards,

Sincerely,

JOHN WAIHEE

cc: The Honorable William Paty
FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE KULA WATER SYSTEM IMPROVEMENTS MAKAWAO, MAUI, HAWAII

Prepared For:
STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF WATER AND LAND DEVELOPMENT

Prepared By:
FUKUNAGA AND ASSOCIATES, INC.

AUGUST 1988
FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR THE
KULA WATER SYSTEM IMPROVEMENTS

This environmental document is prepared pursuant
to Chapter 343, Hawaii Revised Statutes

LOCATION: Upper Kula, Makawao
Island of Maui
State of Hawaii

PROPOSING AGENCY: Division of Water and Land Development
Department of Land and Natural Resources
State of Hawaii

RESPONSIBLE OFFICIAL: WILLIAM W. PATY
Chairperson of the Board
Board of Land and Natural Resources
Department of Land and Natural Resources
State of Hawaii

ACCEPTING AUTHORITY: Governor
State of Hawaii

ENGINEERING CONSULTANT: Norman Saito Engineering Consultants, Inc.
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Honolulu, Hawaii 96814

AUGUST 1988
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SUMMARY SHEET

1. Purpose of the Project

The main objective of this project is to provide a more dependable transmission line from the fresh water sources at Waikamoi to the treatment facilites at Olinda. The State of Hawaii, Department of Land and Natural Resources, Division of Water and Land Development proposes to install a new 36-inch water transmission line from the Kula Water System surface water sources at Waikamoi Stream and Reservoirs to the Olinda Water Treatment Plant. The new line will replace an existing cast-iron pipeline which is over 50 years old.

2. Proposed Improvements

The proposed improvements include the installation of a new 36-inch diameter transmission main connecting the Waikamoi Reservoirs to the Olinda Water Treatment Plant. The new line will replace the existing 12-inch/16-inch pipeline as the primary transmission conduit from the water source to the treatment facility. The proposed 36-inch pipeline will generally follow the alignment of the existing 12-inch/16-inch pipeline. The existing pipeline is programmed to remain as a back-up transmission line and as a supplementary source, collecting flows from five other existing intakes connected along the existing line.

Secondary improvements include reconstruction of damaged portions of an existing 24-inch corrugated metal pipe collector line and its existing four intakes. Replacement of the five feeder pipes from the existing 12-inch transmission line to its existing five intakes is also proposed. Minor reconstructive work at the intakes will be performed as needed.

3. Project Setting

The project is located along the slopes of Haleakala in the Makawao District on the island of Maui. The proposed improvements will extend from the Waikamoi Stream and reservoirs to the Olinda Water Treatment Plant and reservoir, generally within the 4000 ft. and 4400 ft. elevation contours along the northern slopes of Haleakala.

The project site passes through lands owned by Haleakala Ranch Co., State of Hawaii, Virginia C. Dubois Trust, Alexander and Baldwin, Inc. and East Maui Irrigation Co., Ltd. (TMK: 2-3-5:4, 2-3-6:6, 2-4-15:29, 2-4-16:1,2,3&4)
4. Probable Impacts

The major short term impacts which can be expected as a result of this project are all associated with construction activity necessitated by the proposed improvements. Increased traffic, construction noise, dust, mud, and vehicular and equipment emissions can be anticipated. Conscientious efforts to minimize disturbance of native flora and fauna are required during construction to protect valuable biological resources present in the area.

The major long term impact of the proposed project is the transformation of the existing transmission system into a more reliable and efficient water conveyance system and should result in increased productivity in the Upcountry Maui Water System service area.

5. Alternatives to the Proposed Action

Several alternatives to the proposed project have been considered. However, the alternatives were rejected on the basis of either economic infeasibility or more significant adverse environmental impacts.
I. DESCRIPTION OF THE PROJECT

A. Introduction

The reliability of water supply to Upcountry Maui has been a major problem for many years. Water use restrictions are a common occurrence. Crop and livestock losses during periods of drought are often high. The existing Upcountry water system has been unable to collect and store sufficient amounts of water during high rainfall periods for use during low rainfall periods. By direction of the Mayor of the County of Maui, the Steering Committee for the Water Resources Study for Upcountry Maui (WRSUM) was formed in 1985 to assess the water situation in Upcountry Maui. The Committee included representatives from various public and private organizations, including County, State and Federal government agencies, large plantations, and smaller-scale agricultural operations. The WRSUM Committee and Department of Water Supply County of Maui have proposed a general plan to improve the Upcountry Water System. Major improvements to the water system include replacement of the existing transmission main from the Waikamoi reservoirs to the Olinda Water Treatment Plant, additional storage reservoirs, and improvements to the distribution system. These major improvements are presently being formulated and evaluated by various agencies including the WRSUM Committee, the County of Maui Department of Water Supply, the State of Hawaii Department of Land and Natural Resources Division of Water and Land Development, and the U. S. Soil Conservation Service to implement recommendations developed by the WRSUM as a joint effort to increase the system reliability. State and County funding has been appropriated to replace portions of the existing Kula pipeline from the major sources at Waikamoi to the Olinda Water Treatment Plant as an initial effort to improve the system reliability.
elevation 4276 ft. The Waikamoi dam had an impoundment capacity of about 1.0 MG. The 6.0 MG Olinda reservoir was increased in capacity to 8.5 MG during 1933 by constructing vertical masonry walls around the perimeter of the structure. The Waikamoi dam was also raised in 1933 to a spillway elevation of 4282 ft. These storage facility improvements greatly improved the system reliability.

Subsequent improvements to the Upper Kula water system included the replacement of the original wood stave pipeline from Waikamoi dam to the Olinda storage constructed in 1912 with a cast iron pipe in 1934. The original wooden flume from Haipuena Stream to Waikamoi dam was also replaced in 1934.

Major improvements to the original Upper Kula water system since 1934 include the Waikamoi Arch Dam constructed in 1956 located approximately 400 feet upstream of the Waikamoi dam. The impoundment capacity of the Waikamoi Arch Dam is about 10 MG. Two 15 MG reinforced concrete open storage reservoirs were constructed at Waikamoi in 1959.

The existing Upper Kula water system is owned and operated by the County of Maui Department of Water Supply and presently serves approximately 1400 metered customers. Average daily consumption is estimated at 0.9 million gallons per day (MGD). Major components of the existing Upper Kula Water System include the Waikamoi Arch Dam, the Waikamoi Dam, two 15 MG concrete reservoirs at Waikamoi, 700 linear feet of 48-inch corrugated metal pipe from the Waikamoi Dam to the two 15 MG concrete reservoirs, 2000 linear feet of 24-inch corrugated metal pipe (CMP) from Kailua Stream tributary to the two 15 MG concrete reservoirs, and 17,000 linear feet of 12-inch and 16-inch cast iron pipe from the two 15 MG reservoirs to the Olinda Water Treatment Plant. Five small intakes intercept the flow from intermittent streams along the length of the 12-
EXISTING KULA WATER SYSTEM

12" CAST IRON PIPE
EXIST. PUMP HOUSE

16" CAST IRON PIPE
(to reservoir)

48" CMP

24" CMP
COLLECTOR
PIPE W/4 INTAKES

2-15 MG CONCRETE
RESERVOIRS

OLINDA WATER
TREATMENT PLANT

WAIKAMOI
ARCH DAM &
RESERVOIR

WAIKAMOI
DAM & RESERVOIR

5 INTAKES - WEST OF WAIKAMOI
(Approx. Location)

north

SCALE IN FEET

0 2000
inch transmission line. The existing system is shown on Figure I-2.

The major water sources for the Upper Kula water system are surface runoff collected from the Haipuena, Puohokamoa and Waikamoi Streams. Water from Haipuena and Puohokamoa Streams are transported to the Waikamoi Dam via a 24-inch by 12-inch redwood flume. Water from the Waikamoi Stream is collected by the Waikamoi Arch Dam and flows via a natural open channel into the Waikamoi Dam. Water from the Waikamoi Dam is piped into the two 15 MG concrete reservoirs via a 48-inch corrugated metal pipe. A 16-inch cast iron pipeline carries the water to the existing pumphouse and is reduced to a 12-inch cast iron pipeline from the pumphouse to the Olinda Water Treatment Plant. Treated water from the treatment plant is stored in a 3.0 MG steel tank located on the Olinda Plant site and then distributed to consumers via the County water distribution network.

D. Proposed Improvements

The improvements proposed in this project include the installation of approximately 16,700 linear feet of new 36-inch diameter transmission pipe connecting the Waikamoi Reservoirs to the Olinda Water Treatment Plant. The new line will replace the existing 12-inch and 16-inch pipeline as the main transmission line from the primary raw water sources east of Waikamoi to the Olinda water treatment facility. The proposed 36-inch pipeline will generally follow the alignment of the existing 12-inch and 16-inch pipeline. The proposed pipeline will have both exposed and buried reaches, depending upon the terrain encountered. The proposed alignment is shown in Figure I-3. The existing 12-inch and 16-inch cast iron pipeline is programmed to remain as a back-up transmission line and as a supplementary source, collecting flows from the five existing intakes west of Waikamoi.
Secondary improvements include reconstruction of damaged portions of the existing 24-inch CMP collector pipe and its existing four intakes. Replacement of the five feeder pipes from the existing 12-inch transmission line to its existing five intakes is also proposed. Minor reconstructive work at the intakes will be performed as needed.

No additional diversions of surface water or water source development are proposed in this project.

Future improvements include additional storage reservoirs and improvements to the water distribution network. Alternatives and details for these future improvements are currently being developed and studied and will be assessed as the proposals become more definite.

E. Project Funding

Funding for the design and construction of the proposed project is provided from two sources:

1. State of Hawaii

2. County of Maui

F. Project Schedule

If necessary approvals for the project are obtained, construction of the proposed pipeline is tentatively scheduled to begin in October 1988. Construction period for the project is scheduled to take one and a half years (540 days); completed by March 1990.
II. PROJECT SETTING

A. Physical Characteristics

1. Project Location

The project site is located along the slopes of Haleakala in the Makawao District on the island of Maui as shown in Figure I-1. The proposed improvements will extend from the Waikamoi Stream and reservoirs to the Olinda Water Treatment Plant generally within the 4000 ft. and 4400 ft. elevation contours along the northern slopes of Haleakala. (See Figure I-3.)

2. Geology

The predominant geologic feature of East Maui is the Haleakala Volcano. The volcano was built over three rift zones, i.e., the north, east and southwest rifts. The project site lies across the north rift zone. (See Figure II-1.)

Three major volcanic series are evident in East Maui. (See Figure II-2.) The initial phase was the Honomanu Volcanic Series occurring during the Tertiary Era. The Honomanu lavas consists of thin-bedded basaltic pahoehoe and aa flows that are very permeable. Overlying the Honomanu series is the Kula Volcanic Series which occurred during the Pleistocene Era. The Kula lavas are composed primarily of thicker andesitic aa flows which contain many interstratified, thin ash-soil layers. Many large cinder cones were built during this phase resulting in numerous ash beds. Some olivine basalts and picrite basalts occur in the Kula series. The Kula series is less permeable than the Honomanu series, but does contain perched water on the
interstratified soils, conglomerates and ash. A long, inactive period followed the Kula series which allowed the erosion of deep canyons in the volcano. The third phase, the Hana Volcanic Series followed, occurring only in the east and southwest rift zones. The Hana lavas are andesitic, picritic and olivine basalts that generally carry little water except where they have covered earlier perennial streams.

3. Soils

The soil types found in the vicinity of the project site include soils of the Hydrandepts-Tropaquods and the Laumaia-Kaipoioi-Olinda associations. The Hydrandepts-Tropaquods associations are characterized by gently sloping to steep, well-drained to poorly drained soils that have a moderately fine textured or fine textured subsoil or underlying material. The Laumaia-Kaipoioi-Olinda associations are characterized by deep, gently sloping to very steep, well drained soils that have a moderately fine textured or medium-textured subsoil. A General Soil Map is shown in Figure II-3.

Specific soil types found along the project site are shown in Figure II-4. The specific soil types are described below.

**Amalu peaty silty clay, 3 to 20 percent slopes (rAMD)**

"This soil is on high ridges and mountaintops. Included in mapping were small areas of Honomanu and Olokui soils and of steep gulches.

In a representative profile an organic layer of black peat, about 8 inches thick, overlies a layer of gray massive clay about 8 inches thick. The substratum is soft, weathered basic igneous rock capped by a horizontal ironstone sheet 1/8 to 1 inch thick. The

II-4
soil is extremely acid above the ironstone layer. Permeability is restricted by the ironstone sheet, which is impermeable except for cracks. Runoff is very slow, and the erosion hazard is no more than slight. Roots penetrate to a depth of 8 to 15 inches in places. This soil is used for water supply and wildlife habitat."

**Honomanu-Amalu association (rHR)**

"The soils in this association have the profiles described as typical of their respective series. The areas are almost inaccessible by vehicle or on foot. They are on gently sloping to moderately steep, intermediate uplands on East Maui. The Honomanu soils occupy the more sloping, better drained side slopes. The Amalu soils occur on the less sloping tops of ridges and interfluves. The Honomanu soils are well drained; the Amalu soils are poorly drained. Runoff is slow to very slow, and the erosion hazard is slight. Honomanu soils make up about 60 percent of the association, and Amalu soils about 40 percent. Included in mapping were small areas of Kailua soils and many small, very steep gulches.

This association is used for water supply and wildlife habitat. It is covered with dense rain forest vegetation."

**Olinda loam, 12 to 20 percent slopes (OND)**

"This soil is on smooth, intermediate to high mountain slopes. Included in mapping were small areas of Kaipoioi and Pane soils.

In a representative profile the surface layer is dark, reddish-brown loam about 6 inches thick. The subsoil, about 5 inches thick, is dark reddish-brown and yellowish-red silty clay loam that has subangular blocky structure. Below this is yellowish-red and reddish-brown silty clay loam and gravelly silty clay
loam. This is underlain by slightly weathered basic igneous rock. The soil is slightly acid in the surface layer and subsoil.

Permeability is moderately rapid. Runoff is slow to medium, and the erosion hazard is slight to moderate. The available water capacity is about 2.4 inches per foot in the surface layer and about 1.6 inches per foot in the subsoil. In places roots penetrate to a depth of 3 feet or more.

This soil is used for pasture, woodland, and water supply."

Olinda loam, 4 to 12 percent slopes (ONC)

"On this soil, runoff is slow and the erosion hazard is slight. Included in mapping were small, eroded spots.

This soil is used for truck crops and pasture. Small acreages are used for orchards."

Olinda loam, 20 to 40 percent slopes (ONE)

"This soil is subject to frequent fog and cloud cover. Small gullies are common. Runoff is medium to rapid, and the erosion hazard is moderate to severe. Included in mapping were small areas of rock outcrop and small, eroded spots.

This soil is used for pasture."

Rock Land (rRK)

"Rock land is made up of areas where exposed rock covers 25 to 90 percent of the surface. It occurs on all five islands. The rock outcrops and very shallow soils are the main characteristics. The rock outcrops are mainly basalt and andesite."

Rough Broken Land (rRR)

"Rough brokenland consists of very steep land broken by numerous intermittent drainage channels. In
GROUND WATER CONDITIONS

Legend:
- Basal water in lavas
- Basal water in sediments
- Water confined by dikes
- Water perched above basal water
- Tunnel recovering perched water
- Tunnel recovering confined water between dikes
- Basal water-table contour
- Inferred water-table contour

Map of Maui showing ground-water areas: 5- and 10-foot basal water-table contours, high-level tunnels, and sections shown below.

Simplified sections of West Maui (AB) and East Maui (CD) showing the source and disposal of rainfall:
A. Rainfall; B. Evaporation; C. Run-off; D. Recharge; E. Percolation from perched zone of saturation to basal water table. Shows the various high- and low-level springs and the bodies of rock saturated with ground water.
5. Climate

a. Rainfall

Rainfall varies significantly along the project site. Average annual rainfall near the Olinda Water Treatment Plant is about 70 inches per year. Rainfall increases to approximately 250 inches per year as one moves east along the project site to the Waikamoi Reservoirs. (See Figures II-7 and II-8.) Even higher rates, over 300 inches per year, are estimated in the watershed area feeding the Haipuena Stream and flume.

b. Temperature

Average temperatures in the area range between 50 and 70 degrees F. The relatively low temperature range can be attributed to the project area being situated at relatively high elevation (4200-4400 ft. MSL) on the windward side of the island.

c. Wind

The prevailing wind throughout the year in Hawaii is the northeasterly trade wind. Trade winds are more prevalent during the summer occurring nearly 90 percent of the time, while during the winter trade winds can be expected about 50 percent of the time. Wind gages and recorders at Kahului Airport indicate winds from the north to east northeast to be the prevailing wind accounting for nearly 70 percent frequency.
6. Flood/Tsunami Hazard

The project site is situated in areas of minimal flood and tsunami hazard based on information presented in the Flood Insurance Rate Maps of the island of Maui, prepared by the Federal Insurance Administration.

7. Seismic Risk

The island of Maui is in Seismic Zone 2, as established by the Uniform Building Code, indicating moderate damage risk from earthquake, corresponding to intensity VII of the Modified Mercalli Intensity Scale of 1931. Range of seismic risk varies from Zone 0, indicating no damage, to Zone 4, indicating major damage.

B. Biological Characteristics

1. Flora

Approximately 70 percent of the project site is situated in State Forest Reserve areas. These areas have been identified as native Koa (Acacia koa) and ohia (Metrosideros collina) forests. A detailed survey of plants along the proposed alignment was conducted by the Division of Forestry and Wildlife (DLNR-DOFAW). Results of the survey are included in Appendix A. About 145 species of plants were identified, including both native and introduced varieties. No threatened or endangered species were found along the project site. The existing pipeline corridor presently supports many exotic plant species which have probably been introduced into the area as a result of previous construction and maintenance work done on the existing line.
2. Fauna

a. Terrestrial

A detailed survey of terrestrial fauna was conducted by DLNR-DOFAW to identify bird and mammal species found along the project site. Results of the survey are included in Appendix A. The survey list is supplemented with species which have been seen in the past by DLNR-DOFAW personnel.

No threatened or endangered mammal species are known to inhabit the project areas. All mammal species identified are introduced species.

The forest reserve areas surrounding the project site has been identified as the habitat for three endangered species of native Hawaiian forest birds. The three species which have been sited in the forest reserve areas surrounding the project site include the Maui Parrotbill (*Pseudonestor xanthophyrs*), the Maui Akepa (*Loxops coccineus ochraceus*), and the Crested Honeycreeper (*Palmeria dolei*). Based on the terrestrial fauna survey, the Crested Honeycreeper, the Maui Parrotbill and the Hawaiian Goose, or Nene (*Nesochen sandvicensis*) which is on State and Federal Threatened and Endangered Species List, have been seen in the past along the pipeline corridor. However, sightings of these birds along the project site and existing jeep trail are rare.

The Hawaii Endangered Species Propagation (ESP) Facility has been established by the State DLNR-DOFAW at the Olinda State Facility site. The
ESP Facility is currently involved in breeding the endangered Hawaiian Crow, or Alala (*Corvus tropicus*) in captivity. Future expansion of the facility is in progress, ultimately to include other endangered species in their propagation programs. The ESP Facility is situated along the upper reaches of Olinda Road which is the primary access to the project site. (See Figure II-11.)

b. Aquatic

Previous aquatic biological surveys performed in the project area have not identified any endangered species of stream fauna. Fishlife in surrounding streams at that high elevation (+4000 ft MSL) has been limited or non-existent. The endemic shrimp, opae kalaole (*Atya bisulcata*) have been identified in perennial streams adjacent to and downslope of the project site.

A detailed survey of the aquatic macrofauna inhabiting streams along the project site was conducted by the Division of Aquatic Resources (DAR-DLNR). All of the streams along the project site are intermittent and are diverted further in downsteam areas. No threatened or endangered species of aquatic life were found. No native gobies (o'opu), shrimp (opae kalaole), neritid snail (hiihiwai) or any other "major" aquatic fauna were found in any of the streams. The only aquatic fauna observed were a few damselfly nymphs and other aquatic insects, indicating that the aquatic ecosystems are very pauperate. Results of the stream survey are included in Appendix B.
C. Archaeological Features

No known or recorded archaeological sites are believed to be endangered by the proposed project. Any site or artifacts which may have been present were probably destroyed or disturbed during the initial construction of the existing Upper Kula Water System and access roads. The proposed pipeline will generally follow the alignment of the existing 12-inch and 16-inch pipeline and/or the existing jeep trail.

A detailed archaeological surface survey along the proposed project alignment was conducted by the Historic Sites Section of the Division of State Parks, Historic Sites and Outdoor Recreation (DLNR). No evidence of historic sites was found. In general, historic sites in this type of environment are scarce and localized. The forest reserve would have provided a good resource base for bird feather, koa and other useful plants. If any evidence of the exploitation of these resources exists, it is more likely to be buried. The results of the archaeological survey are included in Appendix C. The proposed project will have "no effect" on significant historic sites.

D. Socio-economic Characteristics

1. Population

The Makawao District of the County of Maui has experienced substantial growth since 1970. Resident population in 1970 was 9,979. The population increased by 90.4 percent to 19,005 in 1980, and another 16.4 percent to 22,129 in 1985, making it one of the fastest growing districts in the State of Hawaii. See Figure II-9 for the Makawao District boundaries and Table II-1 for the district's growth relative to other areas in the State.
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The Census Tracts in the vicinity of the project site, including existing and future service areas are shown in Figure II-10, designated as Tracts 302, 303.01, 304.01 and 304.02. These areas had a cumulative resident population of 8,214 in 1970, increasing to 16,068 in 1980 (an increase of 95.6 percent).

Population projections by the State Department of Planning and Economic Development anticipates a population increase of 42 percent for Maui County from 1980 to 1990. However, population growth in the project area may be more significantly governed by the County’s Makawao-Pukalani-Kula Community Plan which directs land use and growth in the Upcountry Maui region. The Community Plan uses a projected resident population of 17,000 to 20,000 over the next 20 years.

2. Regional Economy

Agriculture is the dominant economic activity in the Upcountry area. Primary crops include head cabbage, head lettuce, and round onions. Production of ornamental flowers, including carnations and protea, is also a major activity. The majority of crop and flowers farms are small operations, typically 5 to 10 acres in size. The Kula area is a major truck crop and flower producing area in the State of Hawaii. Cattle ranching is also prevalent in the Upcountry region, primarily in the Ulupalakua area.
*Includes the Islands of Kahoolawe and Molokini (not shown).

1980 CENSUS TRACTS - ISLAND OF MAUI
E. Project Area Infrastructure

1. Electrical Power and Telephone

Electrical power and telephone service is available at the west end of the project site at the Olinda Water Treatment Plant. An overhead electrical power line also feeds the existing booster pumphouse located midway along the project site.

2. Potable Water

The proposed pipeline will serve as the raw water supply to the Olinda Treatment Plant. The project site is situated upstream of the Upper Kula Water Distribution System and is therefore not serviced with treated potable water.

3. Wastewater Collection and Disposal

There are no sewage collection or disposal facilities serving the project site. The agricultural and residential areas in the vicinity of the project site, including Makawao town use cesspools for domestic wastewater disposal. Portions of Pukalani are served by County-owned sewers. Sewage is treated at a privately-owned sewage treatment plant.

4. Solid Waste Disposal

Solid wastes generated from the project will be disposed at the County-operated Central Maui Landfill located at Puunene. A solid waste disposal facility is located at Makawao, however its use is restricted to non-commercial users only.
F. Public Service Facilities

1. Police Protection

The project area is situated in secured private lands or State controlled Forest Reserve areas. Surrounding areas are patrolled by forces of the County Police Department. The nearest police station is the Wailuku Station, the headquarters office of the Police Department.

2. Fire Protection

The nearest County fire station is the Makawao Fire Station located in Makawao town, approximately 5 miles from the project site.

3. Emergency Medical Services

Emergency medical services are coordinated through Maui Memorial Hospital located in Wailuku. A paramedic unit is stationed at the Makawao Fire Station and is in constant communication with the Hospital.

4. Schools

Educational institutions in the vicinity of the project site include Makawao School, Haiku School, Pukalani Elementary School, Kula Elementary School, Kalama Intermediate School, St. Joseph School and Seabury Hall.
5. Public Access

Primary access routes to the project site from the Kahului-Wailuku area include the Hana Highway, Haleakala Highway, Makawao Avenue, Olinda Road, and Piilolo Road. (See Figure II-11.) Access roads leading to and within the project site are secured private roadways with several locked gates to control public vehicular access.

G. Land Use Plans, Policies, and Controls

1. Land Ownership

The project site passes through lands owned by various private owners and the State of Hawaii. The various land owners and land parcels are listed in Table II-2. The locations of the various parcels in relation to the project site are shown in Figure II-12.

2. State Land Use Designation

Most of the proposed improvements are situated in land designated for Conservation use by the State Land Use Commission. (See Figure II-13.) The project site passes through the Makawao and Koolau Forest Reserves. The Makawao Forest Reserve and the western portion of the Koolau Forest Reserve is designated as a Resource Subzone by DLNR. The eastern portion of the Koolau Forest Reserve is designated as a Protective Subzone. The Conservation District Subzones are shown in Figure II-14. The western reaches of the project site, from the Makawao Forest Reserve to the Olinda Water Treatment Plant are in lands designated for Agricultural use.
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<td>2-4-16:3</td>
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3. Makawao-Pukalani-Kula General Plan

The Makawao-Pukalani-Kula Community Plan, adopted in October 1981, is the primary decision making tool used by the County for implementing the County General Plan within the Upcountry region of Maui. The Community Plan establishes land use and population growth policies within the area. The Makawao-Pukalani-Kula Planning Region is shown in Figure II-15.

Several basic principles were used in the development of the Community Plan. The principles were based on Maui County's General Plan Objectives and Policies, and the desires of the community as expressed through a Citizens Advisory Committee. The basic principles were:


Underlying this principle is the desire to maintain the open space and rural character of the "up-country" communities. This implies maintaining the country atmosphere, preservation of ranching and agriculture and accommodation of residential growth consistent with the form and character of the various "up-country" communities.

2. Protection of the agricultural land base.

Ranching and crop production are important economic activities for the "up-country" communities and the County as a whole. Protection of this land base from conversion to other uses is critical to preserving the "up-country" atmosphere and way of life.
LEGEND:
A = Agricultural
C = Conservation
R = Rural
U = Urban
= Planning Region Boundary

MAKAWAO-PUKALANI-KULA PLANNING REGION
3. Guide the majority of future growth in an efficient and economical manner.

The majority of future residential growth should occur as contiguous expansion and infill in Pukalani and Makawao. The necessary supporting infrastructure can more readily and economically accommodate future expansion, as opposed to a more dispersed pattern.

4. Protection of Environmental Quality.

The protection of open space, improvements to water supply and quality, and respect for land resources are critical concerns to be addressed by the Community Plan."

One of the major concerns identified in the Community Plan is the Upcountry water supply and quality. A major goal of the plan is to insure the adequate supply and quality of water to meet the demands of both agricultural and domestic uses. Specific recommendations stated in the Community Plan regarding Water Distribution are as follows:

"Insure the adequate supply and quality of water. The combined demands of agriculture and domestic users served by one system is inefficient. Separating these systems will be more cost-effective by reducing treatment and pumping costs. The following improvements should therefore be implemented:

a. Establish separate domestic and irrigation water systems.

b. Treatment of domestic supply.
c. Develop catchment reservoirs at higher elevations to serve agricultural lands.

d. Increase the pumping capacity from Waioa Ditch to upper areas to supplement the surface water supply.

e. Establish a program to systematically improve older, deteriorating distribution lines.

f. Regulate the sequence of future growth in upcountry communities to the expansion of water supply and distribution systems."

The proposed project addresses initial needs of the Upper Kula Water System by replacing the existing old, deteriorating transmission line from system's primary source of water. Establishing a reliable supply line is vital to the successful operation of the water system.

4. Water Resources Study for Upcountry Maui

The Steering Committee for the Water Resources Study for Upcountry Maui (WRSUM) was formed in 1985 as a result of a request by the Mayor of the County of Maui to assess the water situation in Upcountry Maui. The Committee is composed of representatives from various public and private organizations, including County, State and Federal government agencies, large plantations, and smaller agricultural operations. The objective of the WRSUM was to provide adequate and sufficient water to meet the needs in the Upcountry Maui area. A major concern of the WRSUM committee was to confine urbanization except family subdivisions, that would not be compatible with the agricultural
pursuits within this area. Agricultural pursuits include ranching, truck, and other diversified crop activities, as well as sugar, pineapple, and dairy pursuits. Top priority in this study is supplying water to the Department of Hawaiian Home Lands project in Keokea.

The proposed project addresses the immediate needs of the Upcountry Water System by establishing a more reliable source collection and transmission system. Future improvements including additional storage and distribution facilities are currently being studied by various agencies including the Maui Department of Water Supply, the State Department of Land and Natural Resources Division of Water and Land Development, and the U.S. Soil Conservation Service.

5. Upcountry Water System Improvements Master Plan

The "Upcountry Water System Improvements Master Plan" has been developed by the County of Maui, Department of Water Supply. The master plan, completed in September 1987, includes recommendations for improvements to the Upcountry Maui water systems to meet both domestic and agricultural water needs consistent with the Upcountry (Makawao-Pukalani-Kula) Community Plan. The recommended improvements also include considerations for a pipeline serving the Hawaiian Home Lands located at Keokea.

Specific recommendations for improvements to the Upper Kula Water System include:

a. The installation of a 36-inch pipeline from Waikamoi to Olinda to replace the existing 12-inch and 16-inch line which is old and deteriorating.
b. Repair intakes and collection line at Waikamoi as well as intakes west of Waikamoi.
c. Construct additional storage facilities.
d. Expansion of the Olinda Water Treatment Plant capacity from 1.7 MGD to 2.5 MGD.
e. Expansion of the distribution and pumping systems within the Upper Kula System.

The proposed project addresses the immediate needs of the Upper Kula Water system by establishing a more reliable source collection and transmission system. Future improvements are currently being studied by various agencies including the Maui Department of Water Supply, the State Department of Land and Natural Resources Division of Water and Land Development, and the U.S. Soil Conservation Service.

5. Interim Instream Flow Standards

Administrative Rules for the State Water Code are currently being processed by the State. When the State Water Code rules and regulations are in effect, interim instream flow standards will be established for streams of East Maui, as well as all other islands. The proposed project does not involve a change in the amount of water diverted from the streams.
III. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATIVE MEASURES

A. Short Term Impacts and Mitigative Measures

Short term impacts are those which are related and limited to the activities and duration of the construction period. Construction of the project is expected to take one and a half years (540 days).

1. Noise

Increased noise levels will be experienced during construction of the proposed improvements. Noise will be generated by heavy equipment required to haul materials to and within the project site, as well as equipment used for excavation and installation of the pipeline and appurtenances.

The contractor will be required to comply with the State Department of Health's regulations for vehicular noise control. The contractor will be responsible for properly maintaining construction equipment to minimize noise levels. Equipment mufflers or other noise attenuating equipment may be necessary if noise levels are determined to be excessive. Construction activities will be limited to daylight hours only.

2. Air Quality

Ambient air quality will temporarily decrease as a result of construction activities. The contractor will be responsible for minimizing dust generated during construction, particularly during earth-moving operations including trenching, excavating and road clearing, as prescribed in the State Department of Health Public Health Regulations, Chapter 60 on Air Pollution Control. The contractor will be required to
implement precautions to prevent particulate matter from becoming airborne, such as water sprinkling.

Emissions from construction equipment and other motor vehicles involved in construction activities may adversely affect ambient air quality. The contractor shall minimize these impacts by properly maintaining construction equipment and vehicles.

3. Water Quality

Some soil runoff into existing water courses can be expected from areas requiring excavation and vegetation removal. Soil runoff can be minimized through strict adherence to erosion control procedures and minimal disturbance of ground surfaces and vegetative cover.

4. Traffic

During the construction period, increased traffic along existing roadways leading to the project site can be anticipated. Vehicles carrying materials, equipment and construction workers will increase traffic volumes. These impacts are unavoidable since alternate routes to the site are limited. The contractor will be responsible for providing traffic control measures and safety precautions to minimize adverse effects.

5. Waste Disposal

Solid waste generated by the construction activities shall be disposed of at the County-operated sanitary landfill at Puunene. Completely contained chemical toilets will be provided for construction workers, and the contractor shall dispose the waste in accordance with State and County regulations.
6. Biological Resources

Construction activities will undoubtably have some impact on the plant and animal life along the project site. Clearing of vegetation will be required to install the proposed pipeline and appurtenances. Vegetation removal should be kept to the extreme minimum to limit adverse effects, especially in the forest reserve areas. Removal of native plant life shall be minimized since infiltration of exotic species will most likely occur, displacing the native varieties. It should be noted that many exotic species of plant life have already been introduced into and now occupy the pipeline corridor as a result of previous construction and maintenance activities. The Maui Forest Manager shall be consulted for the selection of plant species required for any revegetating efforts.

Threatened and endangered native birds have occasionally been seen in the vicinity of the project site. These birds will probably avoid the area during the construction period, but should return upon completion of the project. Impacts on these birds shall be minimized by minimizing vegetation removal, construction noise, and vehicular emissions.

The Hawaii Endangered Species Propagation (ESP) Facility is located along the upper reaches of Olinda Road. Noise and emissions from construction vehicles passing the ESP Facility are of primary concern. The sensitive breeding period of the Hawaiian Crow (Alala) is between mid-February to July. As a mitigative measure to minimize disturbance of the Alala population at the Facility, the contractor shall be required to use an alternate access route (Piiholo Road) during the sensitive breeding period.
No significant adverse impacts are anticipated affecting aquatic life in and around the project site. The proposed pipeline alignment crosses several intermittent stream channels. Some work will be required in these channels. Erosion control measures shall be employed to minimize sediment discharge into the streams.

7. Archaeological Resources

No known archaeological sites are located along the project site. However, if evidence of any archaeological resource is discovered during construction, the State Historic Preservation Officer shall be notified and work in the area shall cease until the site has been studied and appropriate measures are implemented. Based on the archaeological survey performed for this project the existence of historic sites in this area is unlikely.

8. Economic

Proceeding with the proposed project will have short term impacts on the local economy. The project will provide job opportunities for local workers employed in the construction industry. The increased construction activities will also benefit local material suppliers and retail businesses.

9. Public Health and Safety

Appropriate measures to assure public health and safety will be one of the contractor's prime concerns and responsibility during all phases of construction. The construction site shall be secured during non-work hours as required by State and County regulations.
B. Long Term Impacts and Mitigative Measures

Long term impacts are those which will result from the implementation and operation of the proposed improvements.

1. Biological Resources

Upon completion of the proposed improvements, natural revegetation of disturbed areas will occur. It is likely that exotic varieties of plants will outgrow native species, thus resulting in a dominance of exotic plant life along the pipeline corridor. As stated earlier, many exotic species of plant life have already been introduced into and now occupy the existing pipeline corridor as a result of previous construction and maintenance activities. As a mitigative measure, vegetation removal should be kept to the extreme minimum to limit adverse effects, especially in the forest reserve areas. Removal of native plant life should be minimized since infiltration of exotic species will most likely occur, displacing the native varieties.

Restoration of the forested areas to its near-original condition should encourage the return of birds and other animals into the project area. Threatened and endangered native birds that have occasionally been seen in the vicinity of the project site, should return upon completion of the project. Impacts on these birds shall be minimized by minimizing vegetation removal.

No adverse long term impacts affecting aquatic life in and around the project site are anticipated since no additional diversion of streamflow will result from this project.
2. Economic Impacts

Long term economic impacts of the proposed project include increased productivity within the service area of the Upper Kula Water System. No new water sources will be developed as a result of this project, however, the reliability of the water system will be enhanced. Crop and livestock losses resulting from drought conditions should decrease. Future improvements to the system will hopefully provide even better water service to the project area.

Population growth and land use patterns in the area are controlled primarily by the County General Plan and the Makawao-Pukalani-Kula Community Plan. The proposed improvements are in concert with these planning documents.
IV. ALTERNATIVES TO THE PROPOSED ACTION

A. No Action Alternative

Acceptance of a "No Action" alternative would result in a continued exposure of Upcountry residents to water restrictions and subsequent loss of productivity. The existing cast iron pipeline from Waikamoi to the Olinda WTP is over 50 years old and is overdue for replacement. Replacement of the existing pipeline is of immediate concern as stated in the Maui Department of Water Supply (DWS) Master Plan.

B. Alternate Pipeline Alignment

The proposed pipeline alignment follows the existing pipeline as closely as practical (without disrupting the water service through the existing line) to minimize the need to encroach and disturb additional forest reserve lands. Implementation of alternate alignments from the raw water sources at Waikamoi would involve disturbance, i.e., vegetation removal, of native forest areas and result in more significant environmental impacts.

C. Alternate Source Development

The existing surface water sources available at Waikamoi are good sources of both agricultural and domestic water. To abandon these sources would be a waste of an excellent water resource. The development of an alternate source in lieu of continued use of the existing sources would be economically unsound. However, the investigation and development of alternate water sources to supplement the existing sources does warrant further consideration. Preliminary studies by the County DWS indicate a need for increased water supplies to meet future water demands, for both domestic and agricultural uses.
D. Pumping from Existing Sources at Lower Elevations

The pumping of water from lower reaches of the Upcountry Water System as well as from the East Maui Irrigation System is currently being done during emergency conditions. The employment of a permanent pumping system as the primary water supply to the Upper Kula System would result in significant operational and maintenance costs. The existing system which collects water at higher elevations and transmits it downstream by gravity is a more reliable and efficient means of providing source water to the Upper Kula System.
V. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The installation of the proposed pipeline will involve the irretrievable commitment of State and County funds, labor, materials, and fuel. Labor, materials and fuel will also be required for the operation and maintenance of the new pipeline.
VI. THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The short-term effects of the proposed improvements on man's environment are expected to be minimal in comparison to the long-term benefits to be gained. The construction activities involved with this project will cause disruptions and nuisances in the vicinity of the project site. Implementation of prudent construction methods and careful monitoring of construction related activities should minimize adverse short-term impacts.

Long-term benefits resulting from the proposed project include a more reliable transmission line from the Upcountry water sources to the County's treatment/distribution facilities. Water service to both domestic and agricultural consumers would therefore be enhanced and should result in increased agricultural productivity. Future improvements to the Upcountry water system are currently being jointly planned by several agencies including the Maui Department of Water Supply, the State Department of Land and Natural Resources, and the U.S. Soil Conservation Service and when implemented will ultimately transform the entire system into one capable of providing reliable, efficient water service to the Upcountry Maui service area.
VII. LIST OF NECESSARY APPROVALS

FEDERAL GOVERNMENT
Department of the Army
- Department of the Army Nationwide Permit

STATE OF HAWAII

Department of Land and Natural Resources
- Conservation District Use Permit

COUNTY OF MAUI

Department of Water Supply
- Construction Plan Approval
VIII. REFERENCES


IX. ORGANIZATIONS AND PERSONS CONSULTED IN THE PREPARATION OF THIS DOCUMENT

FEDERAL AGENCIES

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

U.S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

STATE AGENCIES

DEPARTMENT OF AGRICULTURE

DEPARTMENT OF HAWAIIAN HOME LANDS

DEPARTMENT OF HEALTH

DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF AQUATIC RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
DIVISION OF STATE PARKS, OUTDOOR RECREATION AND HISTORIC SITES
DIVISION OF WATER AND LAND DEVELOPMENT

OFFICE OF ENVIRONMENTAL QUALITY CONTROL

COUNTY AGENCIES

DEPARTMENT OF PUBLIC WORKS

DEPARTMENT OF WATER SUPPLY
X. DRAFT ENVIRONMENTAL IMPACT STATEMENT COMMENTS AND RESPONSES

The following agencies and organizations provided comments on the Draft Environmental Impact Statement. The comment and response letters are reproduced in this section.

FEDERAL AGENCIES
DEPARTMENT OF THE ARMY 7/08/88
DEPARTMENT OF THE NAVY 6/07/88*
U.S. DEPARTMENT OF THE INTERIOR 7/12/88
FISH AND WILDLIFE SERVICE

STATE OF HAWAII
DEPARTMENT OF AGRICULTURE 7/25/88*
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES 6/15/88*
DEPARTMENT OF BUSINESS AND ECONOMIC DEVELOPMENT 7/06/88*
DEPARTMENT OF DEFENSE
HAWAII AIR NATIONAL GUARD 6/08/88*
DEPARTMENT OF HEALTH 7/06/88*
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF STATE PARKS 6/22/88
DEPARTMENT OF TRANSPORTATION 7/28/88*

COUNTY OF MAUI
DEPARTMENT OF PARKS AND RECREATION 6/14/88*
DEPARTMENT OF PUBLIC WORKS 6/24/88*
DEPARTMENT OF WATER SUPPLY 6/16/88
OFFICE OF ECONOMIC DEVELOPMENT 6/06/88*

PRIVATE ORGANIZATIONS AND INDIVIDUALS
MAUI ELECTRIC COMPANY, LTD. 7/11/88
MAUI PINEAPPLE COMPANY, LTD. 7/18/88

* Responded to solicitations for comments on the Draft EIS, but did not require substantive responses.
Flushing Branch

Dr. Marvin Miura
Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, Hawaii 96813

Dear Dr. Miura:

Thank you for the opportunity to review the Draft Environmental Impact Statement (DEIS) for the Kulo Water System Improvements, Makawao, Maui, Hawaii. The following comments are offered:

a. The proposed project would involve fill in Opaekua Gulch and would therefore require a Department of the Army permit. The project may be covered by a Department of the Army nationwide permit. For further information, the applicant should contact Operations Branch (telephone 458-9258).

b. The project site is in an area for which no Flood Insurance Rate Map (FIRM) panels have been printed. The pipeline alignment is located generally in areas of minimal flooding; however, where stream crossings are encountered, evaluation of flood hazard impacts must be developed by the applicant.

Sincerely,

Kisuk Cheung
Chief, Engineering Division

Copy furnished:
Mr. Gordon Akita
Division of Water and Land Development
State of Hawaii Department of Land and Natural Resources
P.O. Box 373
Honolulu, Hawaii 96809

cc: Fukuura & Associates

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

Dear Mr. Cheung:

Draft Environmental Impact Statement
Kulo Water System Improvements

Thank you for your comments on the Draft EIS.

The following information is provided in response to your comments:

1. The State will obtain the necessary permits in accordance with the Department of the Army requirements. We will contact the Operations Branch for further details.

2. We understand that the potential flood hazards have not been assessed in the project area by the Department of the Army. Therefore, the County of Maui, Department of Public Works will be consulted to verify that the project is in conformance with all County Flood Insurance Ordnances.

Sincerely,

Manabu Tagomori
Deputy for Water Resources Management
Dr. Marvin T. Miura, Director
Office of Environmental Quality Control
315 South King Street, Room 194
Honolulu, Hawaii 96813

Re: Draft Environmental Impact Statement, Kula Water System Improvements, Maui

Dear Dr. Miura:

We have reviewed the May 1988 draft Environmental Impact Statement for the proposed Kula Water System improvements and offer the following comments for your consideration.

We support the mitigation measure that would direct construction traffic away from the Hawaii Endangered Species Propagation Facility at Oliina during the alala breeding season. Where possible, we encourage the use of endemic plants for revegetating cleared areas in consultation with the Maui Forest Manager.

We appreciate the opportunity to comment.

Sincerely yours,

Ernest Komaka, Field Supervisor
Office of Environmental Services
Pacific Islands Office

cc: DLNR, Gordon Akita

Mr. Ernest Komaka
Field Supervisor
Office of Environmental Services
Pacific Islands Office
U.S. Dept. of the Interior
Fish and Wildlife Service
380 Ala Moana Blvd.
P. O. Box 50167
Honolulu, Hawaii 96850

Dear Mr. Komaka:

Draft Environmental Impact Statement
Kula Water System Improvements

Thank you for your comments on the Draft EIS.

Your concurrence regarding mitigative measures to protect the HESP Facility at Oliina and your recommendation to use endemic plants for revegetation will be noted and emphasized in the EIS.

Sincerely,

MANABU TAGOMORI
Deputy for Water Resource Management

cc: Fukunaga & Associates

Save Energy and You Serve America!
MEMORANDUM

TO: Marvin I. Miura, Executive Director
   Office of Environmental Quality Control

FROM: Ralston H. Nagata, State Parks Administrator

SUBJECT: Review of the Draft EIS for the Kula Water System
         Improvements, Kula, Makawao, Maui
         TMK 2-1-5:4, 2-3-6:6, 2-4-15:29, 2-4-16:1, 2-3:4

HISTORIC SITES SECTION CONCERNS:

On page 11-19 of this document, it mentions that an archaeological
survey was conducted by our office and that the report is attached
as Appendix C. Due to the absence of historic sites, we recommend
that a concluding statement that the project will have "no effect"
on significant historic sites be added under the section on
Archaeological Features.

RECREATION CONCERNS:

There are no state park concerns.

RALSTON H. NAGATA

cc: Gordon Akita
June 10, 1988

Dr. Marvin Miura
Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, Hawaii 96813

Dear Dr. Miura:

Subject: ENVIRONMENTAL IMPACT STATEMENT FOR KULA WATER SYSTEM IMPROVEMENTS

We wish to thank you for giving us the opportunity to review and comment on the Environmental Impact Statement for the Kula Water System Improvements.

The following comments are for your consideration:

1. Page 1, Paragraph 2, Line 4, should be reworded to, "The new line will replace the existing 12-inch/16-inch pipeline..."

   Present wording could mean two pipelines (12-inch and 16-inch).

2. Page 1-6, Last Paragraph, should be reworded to "No additional diversions are proposed in this project".

3. Page 11-19, Paragraph 3, Line 6, the word "counties" should be replaced with "districts".

4. Page 11-24, Item 4 - Solid Waste Disposal

   Please note that the nearest solid waste disposal for the proposed project site is Wailuku and not Paunene.

5. Page 11-36, Item d, should be changed to 1.7 mgd.

"By Water, All Things Find Life"
August 8, 1988

Mr. Vince Sagoyo, Jr.
Director
Department of Water Supply
County of Maui
P. O. Box 1199
Wailuku, Maui 96793

Dear Mr. Sagoyo:

Draft Environmental Impact Statement
Kula Water System Improvements

Thank you for your comments on the Draft EIS. The final EIS will be revised to incorporate your comments.

Sincerely,

Manabu Tagomori
Deputy for Water Resource Management

cc: Fukunaga & Associates
July 11, 1988

Mr. Marvin T. Miura  
State of Hawaii  
Office of Environmental Quality Control  
465 South King Street  
Honolulu, Hawaii 96813

Dear Mr. Miura:

Subject: Draft Environmental Impact Statement (EIS) for the Kula Water System Improvement

We have reviewed the subject draft EIS and and offer the following comments:

1. Although we do have distribution facilities along portions of the pipeline between the Ginda Treatment Plant and the Wailuku Dam, we do not anticipate any major problems with the subject pipeline project. However, because of the heavy construction that is anticipated on this project, Maui Electric would like to be notified whenever construction is performed in close proximity to our overhead lines. Also, we would appreciate a copy of the final construction drawings before construction starts.

2. Based on the scope of the pipeline project, we are not required to make any modifications or improvements to our facilities within the project area.

Thank you for the opportunity to comment on the subject draft EIS. Should you have any questions on this matter, please call me at 872-2341.

Sincerely,

Neal Shinya

Neal Shinya, Staff Engineer  
Engineering Department

cc: C. Kuwanoe (MEO)  
G. Akita (DLNR)

Mau Electric Company, Ltd., 2310 Waihee Industrial Way, Suite 100, Kapalua, Maui 96761-2303

Mr. Neal Shinya  
Staff Engineer  
Engineering Department  
Mau Electric Company, Ltd., 2310 Waihee Industrial Way, Suite 100, Kapalua, Maui 96761-2303  
August 8, 1988

Mr. Neal Shinya  
Staff Engineer  
Engineering Department  
Mau Electric Company, Ltd., 2310 Waihee Industrial Way, Suite 100, Kapalua, Maui 96761-2303  
P.O. Box 390, Kahului, Maui 96732-0390

Dear Mr. Shinya:

Draft Environmental Impact Statement  
Kula Water System Improvements

Thank you for your comments on the Draft EIS. Maui Electric will be notified whenever construction is to be performed in close proximity of your overhead lines. A set of final construction drawings will be sent to you before construction of this project commences.

Sincerely,

Mau Electric Company, Ltd., 2310 Waihee Industrial Way, Suite 100, Kapalua, Maui 96761-2303

HY:fc

cc: Fukunaga & Associates  
Design & Construction
July 18, 1988

Department of Land & Natural Resources
Division of Water and Land Development
P. O. Box 621
Honolulu, Hi

Gentlemen:

I would like to comment on the Environmental Impact Statement for the Kula Water System Improvements.

The improvements in the catchment intakes on the Upper Opana Stream may have a negative impact on the agricultural community making up the intake.

At present Opana Stream is diverted through a tunnel system to Awalau, where the water is harvested and used by a number of agricultural operations. The largest user of this water is Maui Pineapple Company, which stores water from this diversion in two reservoirs. One is a ten-million gallon storage at Kalihihi and the other, Puuooa, is somewhat smaller, located on Haleakala Highway. This source supplies the primary irrigation needs for over 4,000 acres.

The second major user of water from this diversion is Haleakala Dairy. This water is used for the water troughs across the up-country area, as well as being the primary source of water for the dairy's operating facility.

The third user of water is Kaonouli Ranch. The Ranch uses this water for its water troughs, as well as a number of domestic services.

July 18, 1988

It might also be noted that the County of Maui uses approximately one million gallons a day from the Opana diversion for its Makawao System. This diversion supplies most of the domestic needs of the town of Makawao.
Consequently, should any changes be made on any of the present intakes, this change should be addressed, as it may qualify as Additional Diversion under the present State Water Code.

Other areas which should be addressed are:

1. There is inadequate storage included in the Environmental Impact Statement. Further note should be made of this, as this is only Phase I of a number of phases needed to supply adequate water for the up-country area.

2. There should be some consideration given to the future cost of water for agricultural purposes, as this will have a major impact on agriculture in the up-country area.

Your consideration will be greatly appreciated.

Sincerely,

L. D. Haccius
Plantation Manager

LDH/sj

cc: Central File
H'maile Kalihiili Water System
H'maile Up-Country Water
AUG 5 1998

Mr. L. D. MacCluer  
Mau Pineapple Company, Ltd.  
Harimaule Division  
976 Harimaule Highway  
Harimaule, Maui  96768  

Dear Mr. MacCluer:

Draft Environmental Impact Statement  
Kula Water System Improvements

Thank you for your comments on the Draft EIS. We understand your concern regarding potential impacts to water users downstream of the proposed project. The improvements proposed in this project are not intended to divert additional water from the upland stream reaches. The scope of work is limited to minor repair and reconstruction work to intakes and replacement pipes.

Future improvements to the Upcountry Water System, including additional storage facilities and expansion of the distribution network, are currently being studied and alternatives will be evaluated and assessed as they become more definite. Your comments and questions will be noted and considered for future developments.

Very truly yours,

WILLIAM W. PATY Chairperson  
Board of Land and Natural Resources
Mr. Marvin T. Miura
Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, HI 96813

Dear Mr. Miura:

DRAFT ENVIRONMENTAL IMPACT STATEMENT
KULA WATER SYSTEM IMPROVEMENTS

The Draft Environmental Impact Statement for the Kula Water System improvements has been reviewed and we have no comments to offer. Since we have no further use for the EIS, it is being returned to your office.

Thank you for the opportunity to review the Draft.

Sincerely,

W.K. Li
Assistant Deputy Civil Engineer
By direction of the Commander

Enclosure

Copy to:
Mr. Gordon Akita
DLNR, Division of Water and Land Development
P.O. Box 373
Honolulu, Hawaii 96809

Dr. Marvin T. Miura, Interim Director
Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, Hawaii 96813

July 25, 1988

Dear Dr. Miura:

Subject: Draft Environmental Impact Statement (DEIS)
Kula Water System Improvements
TMK: 2-3-514
Kula, Maui
2-3-616
2-4-15139
2-4-1611, 2, 3 & 4

The Department of Agriculture has reviewed the subject document and supports the construction of a new 36-inch water transmission line from the Kula Water System surface water sources at Waianae Stream and Reservoirs to the Olihia Water Treatment Plant would benefit Hawaiian agriculture by increasing the agricultural productivity of that area.

Thank you for the opportunity to comment.

Sincerely,

Suzanne D. Peterson
Chairperson, Board of Agriculture

cc: Mr. Gordon Akita, DLNR
Dr. Marvin Miura  
Interim Director  
Office of Environmental Quality Control  
465 South King Street, RM 104  
Honolulu, Hawaii 96813  

Dear Dr. Miura:  

Subject: Draft Environmental Impact Statement  
for the Kula Water System Improvements  

We have reviewed the subject document and have no comments to offer.  

Very truly yours,  

[Signature]  

TEUANE TOMISASA  
State Public Works Engineer  

X-11  

Ref. No. P-8524  
July 6, 1988  

MEMORANDUM  

TO: Dr. Marvin T. Miura, Director  
Office of Environmental Quality Control  

FROM: Roger A. Ulveling  

SUBJECT: Environmental Impact Statement, Kula Water System Improvements,  
Wailuku, Maui  

We have reviewed the subject document and do not have any comments to offer.  

Thank you for the opportunity to review this document.  

[Signature]  

cc: Mr. Gordon Akita  
DOWAI, I.M.A.
MEMORANDUM

To: Dr. Marvin T. Miura, Director
Office of Environmental Quality Control

From: Deputy Director for Environmental Health

Subject: Draft Environmental Impact Statement (DEIS) for Kula Water System Improvements, Makawao, Maui, Hawaii

Thank you for allowing us to review and comment on the subject DEIS. We have no comments at this time.

Yours truly,

[Signature]

Jerry M. Matsuda
Major, Hawaii Air National Guard
Contr & Engr Officer

cc: Gordon Akita, DLNR

cc: Mr. Gordon Akita, DLNR
July 28, 1988

Dr. Marvin Miura, Director
Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, Hawaii 96813

Dear Dr. Miura:

Draft Environmental Impact Statement
Proposed Kula Water System Improvements

We have no objection to the proposed Kula Water System Improvements project.

Thank you for this opportunity to provide comments.

Very truly yours,

Edward Y. Hirata
Director of Transportation

cc: STF(dt)
   _MR. Gordon Akita, DLNR

June 14, 1988

Mr. Marvin T. Miura
Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, Hawaii 96813

Dear Mr. Miura:

SUBJECT: HIS FOR KULA WATER SYSTEM IMPROVEMENTS

We have reviewed the above referenced report and have no comments on the matter.

Please feel free to contact me should you have any questions.

Very truly yours,

Edward Y. Hirata
Director of Transportation

cc: Gordon Akita, DLNR.
Mr. Marvin T. Miura
Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, HI 96813

Dear Mr. Miura:

Subject: Draft Environmental Impact Statement for the Kula Water System Improvements.

The Office of Economic Development have reviewed the subject environmental impact statement and find that, in general, it has adequately identified and assessed the major environmental impacts which can be anticipated to result from the proposed project.

We have no other comments to offer at this time; however, we thank you for the opportunity to review the environmental impact statement.

Sincerely,

FRED MATSUMOTO
Economic Development Coordinator

cc: Mr. Gordon Akita
Dept. of Land & Natural Resources
Division of Water & Land Development
P.O. Box 273
Honolulu, HI 96809

Mr. Marvin T. Miura
Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, HI 96813

Attn: Mr. Gordon Akita

Department of Land and Natural Resources
Division of Water and Land Development
P.O. Box 373
Honolulu, Hawaii 96809

June 24, 1988

Mr. Marvin T. Miura
Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, HI 96813

Attn: Mr. Gordon Akita

June 24, 1988

Gentlemen:

Re: Environmental Impact Statement Review for the Kula Water System Improvements, Makawao, Maui.

We have reviewed the above request and have no comments to offer at this time.

If you have any questions, please call the Land Use and Codes Administration at 244-7760.

Very truly yours,

ALVIN K. FUKUNAGA
Director of Public Works

June 6, 1988

HANNIBAL TAKARES
MAYOR

FRED MATSUMOTO
Coordinator

OFFICE OF ECONOMIC DEVELOPMENT

COUNTY OF MAUI
OFFICE OF ECONOMIC DEVELOPMENT

COUNTY OF MAUI

June 6, 1988
XI. LIST OF PREPARERS OF THIS DOCUMENT

FUKUNAGA & ASSOCIATES, INC.

Jon K. Nishimura, Civil Engineer
University of Hawaii, BSCE, 1975
University of Hawaii, MSCE, 1978
Registered Professional Engineer, State of Hawaii, 1980

Alyson K.L. Yim, Civil Engineer
University of Hawaii, BSCE, 1984
Engineer-In-Training, Part I, 1980

Edlyn K. Hayashida, Graphic Artist
APPENDIX A

SURVEY OF PLANT, BIRD AND MAMMAL SPECIES FOUND ALONG PROPOSED PIPELINE CORRIDOR
KULA WATER SYSTEM IMPROVEMENTS
KULA, MAUI, HAWAII
SURVEY OF PLANT, BIRD AND MAMMAL SPECIES FOUND ALONG PROPOSED PIPELINE CORRIDOR KULA WATER SYSTEM IMPROVEMENTS KULA, MAUI, HAWAII

I. INTRODUCTION

A survey of plant, bird and mammal species found along the proposed pipeline alignment for the Kula Water System Improvements project was conducted during March 1988. Survey team members included Forester Robert Hobdy and Biologist Meyer Ueoka of the Division of Forestry and Wildlife (DOFAW). The survey data is supplemented by information compiled from past observations by DOFAW personnel.

II. OBJECTIVE

The objective of the survey is to assist the Division of Water and Land Development (DOWALD) in obtaining qualitative data on the terrestrial flora and fauna existing in the project area.

III. DESCRIPTION OF THE PROJECT AREA

The proposed project area shown in Figure 1 extends from the Waikamoi Stream to the Olinda Water Treatment Plant. It is understood that the proposed pipeline will generally follow the alignment of the existing pipeline. The proposed pipeline corridor will pass through the Makawao and Koolau Forest Reserves.

IV. METHODOLOGY

The survey of the terrestrial flora and fauna was accomplished by DOFAW personnel who walked along the proposed pipeline corridor and existing jeep trail. Plant, bird and mammal species observed were identified and recorded. The list of species found during the survey was supplemented with species which have been seen in the past by DOFAW personnel.
V. FINDINGS AND DISCUSSION

The lists of plant, bird and mammal species found within the proposed Pipeline Project Right-of-Way in the Makawao and Koolau Forest Reserves, East Maui, are presented in Tables I, II and III respectively. The lists include just about all the species of plants and wildlife in the pipeline corridor. In the project area there are no known listed threatened and endangered (T & E) plants and three species of birds (Crested Honeycreeper, Hawaiian Goose, and Maui Parrotbill) listed as a T & E species. However, these birds are only rarely seen in this area and may not be impacted by this project.

The major impact of this project will be on the native plant life in the area particularly those that will be removed or damaged in the construction phase. In a native forest of this type, when native plants are removed and the forest floor is exposed to light, an invasion by exotic species normally occurs. Blackberry, kikuyu, paspalum and other grasses generally outgrow the native species and eventually occupies the site permanently. Presently because of the previous construction and maintenance work done on the existing line, the area supports many exotic species. It is anticipated that this project will accelerate the spread of exotic species within the project corridor. As a result, some areas will be converted totally to exotic species as exemplified in some areas along the existing pipeline where earlier disturbance occurred.

VI. RECOMMENDATIONS

It is recommended that should this project be permitted to proceed all cutting, removal, and unnecessary destruction of vegetation in the pipeline corridor and adjacent areas shall be kept to an extreme minimum.

Further, should any landscaping or revegetating in the project area be required, the Maui Forestry Manager shall be consulted for species selection.
<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Bracken Fern</td>
<td>Pteridium decompositum</td>
</tr>
<tr>
<td>2. Uluhe</td>
<td>Dicranopteris linearis</td>
</tr>
<tr>
<td>3. Hoio</td>
<td>Diplazium sandwichianum</td>
</tr>
<tr>
<td>4. Kilau</td>
<td>Dryopteris hawaiiensis</td>
</tr>
<tr>
<td>5. Laukahia</td>
<td>Dryopteris glabra</td>
</tr>
<tr>
<td>6. Dryopteris wallichiana</td>
<td></td>
</tr>
<tr>
<td>7. 8.</td>
<td>Dryopteris fusco-atra</td>
</tr>
<tr>
<td>9. Kilau</td>
<td>Dryopteris tetrapinnata</td>
</tr>
<tr>
<td>10. Dryopteris uniformis</td>
<td></td>
</tr>
<tr>
<td>11. Dryopteris sandwicensis</td>
<td></td>
</tr>
<tr>
<td>12. Cystopteris douglasii</td>
<td></td>
</tr>
<tr>
<td>13. Iwaiwa</td>
<td>Asplenium adiantum-nigrum</td>
</tr>
<tr>
<td>14. Asplenium macraei</td>
<td></td>
</tr>
<tr>
<td>15. Asplenium normale</td>
<td></td>
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<tr>
<td>16. Asplenium contiguum</td>
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<tr>
<td>17. Asplenium polyodon</td>
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<tr>
<td>18. Piipiilaumanamana</td>
<td>Asplenium jobulatum</td>
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<td>19. Asplenium sphenotomum</td>
<td></td>
</tr>
<tr>
<td>20. Asplenium acuminatum</td>
<td></td>
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<tr>
<td>21. Pamoho</td>
<td>Asplenium unilaterale</td>
</tr>
<tr>
<td>22. Ctenitis rubiginosa</td>
<td></td>
</tr>
<tr>
<td>23. Ctenitis honoluluensis</td>
<td></td>
</tr>
<tr>
<td>24. Loulu</td>
<td>Coniogramme pilosa</td>
</tr>
<tr>
<td>25. Hypolepis punctata</td>
<td></td>
</tr>
<tr>
<td>26. Hapuu</td>
<td>Cibotium glaucum</td>
</tr>
<tr>
<td>27. Hapuu ii</td>
<td>Cibotium chamissoi</td>
</tr>
<tr>
<td>28. Palaa</td>
<td>Sphenomeris chinensis</td>
</tr>
<tr>
<td>29. Amaumau</td>
<td>Sadleria cytathoides</td>
</tr>
<tr>
<td>30. Amau</td>
<td>Sadleria pallida</td>
</tr>
<tr>
<td>31. Sadleria souleyetiana</td>
<td></td>
</tr>
<tr>
<td>32. Sadleria squarossa</td>
<td></td>
</tr>
<tr>
<td>33. Palapalai</td>
<td>Microlepia strigosa</td>
</tr>
<tr>
<td>34. Wahine nohomauna</td>
<td>Adenophorus pinnatifidus</td>
</tr>
<tr>
<td>35. Adenophorus tamariscinus</td>
<td></td>
</tr>
<tr>
<td>36. Adenophorus tamariscinus</td>
<td></td>
</tr>
<tr>
<td>37. Pae</td>
<td>Adenophorus hymenophylloides</td>
</tr>
<tr>
<td>38. Kahi</td>
<td>Xiphopteris saffordii</td>
</tr>
<tr>
<td>39. Grammitis hookeri</td>
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</tr>
<tr>
<td>40. Kolokolo</td>
<td>Grammitis tenella</td>
</tr>
<tr>
<td>41. Ekaha Akolea</td>
<td>Pleopeltis thunbergii</td>
</tr>
<tr>
<td>42. Kilau</td>
<td>Vandenboschia davallioides</td>
</tr>
<tr>
<td>43. Pali hinahina</td>
<td>Sphaerocionium lanceolatum</td>
</tr>
<tr>
<td>44. Ohiaku</td>
<td>Mecodium recurvum</td>
</tr>
<tr>
<td>45. Gonocormus prolifer</td>
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</tr>
<tr>
<td>46. Ekaha</td>
<td>Elaphoglossum hirtum</td>
</tr>
<tr>
<td>47. Ekaha</td>
<td>Elaphoglossum wawrae</td>
</tr>
<tr>
<td>48. Sticherus owyhiensis</td>
<td></td>
</tr>
<tr>
<td>49. Diplopteridium pinnatum</td>
<td></td>
</tr>
<tr>
<td>50. Pala</td>
<td>Marattia douglasii</td>
</tr>
<tr>
<td>Common Name</td>
<td>Scientific Name</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>------------------------------------------------------</td>
</tr>
<tr>
<td>51. Ae</td>
<td>Polypodium pellucidum</td>
</tr>
<tr>
<td>52. Wawaeiole</td>
<td>Lycopodium cernuum</td>
</tr>
<tr>
<td>53. Wawaeiole</td>
<td>Lycopodium polytrichoides</td>
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<tr>
<td>54. Wawaeiole</td>
<td>Lycopodium venustum</td>
</tr>
<tr>
<td>55. Akolea</td>
<td>Athyrium microphyllum</td>
</tr>
<tr>
<td>56.</td>
<td>Doodya kunthiana</td>
</tr>
<tr>
<td>57.</td>
<td>Stegnogramma sandwicensis</td>
</tr>
<tr>
<td>58. Palapalai o kaumaapua</td>
<td>Amauropelta globulifera</td>
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<tr>
<td>59.</td>
<td>Pseudophytopteris keraudreniana</td>
</tr>
<tr>
<td>60.</td>
<td>Selaginella arbuscula</td>
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<tr>
<td>61. Waimakanui</td>
<td>Pteris excelsa</td>
</tr>
<tr>
<td>62. Owaliu</td>
<td>Pteris cretica</td>
</tr>
<tr>
<td>63. Nianiau</td>
<td>Nephrolepis cordifolia</td>
</tr>
<tr>
<td>64. Pipi</td>
<td>Psilotum complanatum</td>
</tr>
<tr>
<td>65. Kikuyugrass</td>
<td>Pennisetum clandestinum*</td>
</tr>
<tr>
<td>66. Vaseygrass</td>
<td>Paspalum urvillei*</td>
</tr>
<tr>
<td>67. Carpetgrass</td>
<td>Axonopus compressus*</td>
</tr>
<tr>
<td>68. Velvetgrass</td>
<td>Holcus lanatus*</td>
</tr>
<tr>
<td>69. African dropseed</td>
<td>Sporobolus africanus*</td>
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<tr>
<td>70. Annual bluegrass</td>
<td>Poe annua*</td>
</tr>
<tr>
<td>71. Mauu</td>
<td>Deschampsia australis</td>
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<tr>
<td>72. Sweet vernalgrass</td>
<td>Anthoxanthum ordoratum*</td>
</tr>
<tr>
<td>73. Loblolly pine</td>
<td>Pinus taeda*</td>
</tr>
<tr>
<td>74. Monterey cypress</td>
<td>Cupressus macrocarpa*</td>
</tr>
<tr>
<td>75. Gum myrtle</td>
<td>Angophora lanceolata*</td>
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<tr>
<td>76. Port Orford cedar</td>
<td>Chamaecyparis lawsoniana*</td>
</tr>
<tr>
<td>77. American ash</td>
<td>Fraxinum americana*</td>
</tr>
<tr>
<td>78. Methley plum</td>
<td>Prunus cerasifera*</td>
</tr>
<tr>
<td>79. Sydney bluegum</td>
<td>Eucalyptus saligna*</td>
</tr>
<tr>
<td>80. Hawaiian sedge</td>
<td>Carex alligata</td>
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<td>81.</td>
<td>Cyperus polystachyus</td>
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<tr>
<td>82. Uki</td>
<td>Machaerina angustifolia</td>
</tr>
<tr>
<td>83. Rush</td>
<td>Juncus planifolius*</td>
</tr>
<tr>
<td>84. Rush</td>
<td>Juncus polyanthemus*</td>
</tr>
<tr>
<td>85. Painiu</td>
<td>Astelia degeneri</td>
</tr>
<tr>
<td>86. Hoi kuahiwi</td>
<td>Smilax sandwicensis</td>
</tr>
<tr>
<td>87. White ginger</td>
<td>Hedychium coronarium*</td>
</tr>
<tr>
<td>88. Kahili ginger</td>
<td>Hedychium garderianum*</td>
</tr>
<tr>
<td>89. Alaalawaiuni</td>
<td>Peperomia cockei</td>
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<td>90. Alaalawaiuni</td>
<td>Peperomia hirtipetiola</td>
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<tr>
<td>91. Alaalawaiuni</td>
<td>Peperomia subpetiolata</td>
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<tr>
<td>92. Alaalawaiuni</td>
<td>Peperomia waikamoiana</td>
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<td>93.</td>
<td>Pilea peioides</td>
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<tr>
<td>94. Mamaki</td>
<td>Pipturus rockii</td>
</tr>
<tr>
<td>95. Opuehe</td>
<td>Urera sandwicensis</td>
</tr>
<tr>
<td>96. Hulumoa</td>
<td>Korthalsella complanata</td>
</tr>
<tr>
<td>97. Hulumoa</td>
<td>Korthalsells degeneri</td>
</tr>
<tr>
<td>98. Popolo-ku-mai</td>
<td>Phytolacea sandwicensis</td>
</tr>
<tr>
<td>99. Kanawao</td>
<td>Broussaisia arguta</td>
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<tr>
<td>100. Hoava</td>
<td>Pittosporum insignis</td>
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<tr>
<td>Common Name</td>
<td>Scientific Name</td>
</tr>
<tr>
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<td>----------------------------------</td>
</tr>
<tr>
<td>101. Akala</td>
<td>Rubus hawaiensis</td>
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<tr>
<td>102. Blackberry</td>
<td>Rubus argutus*</td>
</tr>
<tr>
<td>103. Koa</td>
<td>Acacia koa</td>
</tr>
<tr>
<td>104. Trefoil</td>
<td>Lotus angustissimus*</td>
</tr>
<tr>
<td>105. Mamane</td>
<td>Sophora chrysophylla</td>
</tr>
<tr>
<td>106. White clover</td>
<td>Trifolium repens*</td>
</tr>
<tr>
<td>107. Gorse</td>
<td>Ulex europaeus*</td>
</tr>
<tr>
<td>108. Alani</td>
<td>Pelea clusiaefolia</td>
</tr>
<tr>
<td>109. Alani</td>
<td>Pelea hawaiensis</td>
</tr>
<tr>
<td>110. Alani</td>
<td>Pelea melokaiensis</td>
</tr>
<tr>
<td>111. Kawau</td>
<td>Ilex anomala</td>
</tr>
<tr>
<td>112. Olomea</td>
<td>Perottetia sandwicensis</td>
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<tr>
<td>113. Ohia</td>
<td>Metrosideros collina</td>
</tr>
<tr>
<td>114. Olapa</td>
<td>Cheirodendron trigynum</td>
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<tr>
<td>115. Ohe</td>
<td>Tetrasandra meiandra</td>
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<tr>
<td>116. Ohelo</td>
<td>Vaccinum calycinum</td>
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<tr>
<td>117. Pukiawe</td>
<td>Styphella taejameiae</td>
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<td>118.</td>
<td>Embelia pacifica</td>
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<tr>
<td>119. Kolea</td>
<td>Myrsine lessertiana</td>
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<tr>
<td>120. Kolea</td>
<td>Myrsine emarginata</td>
</tr>
<tr>
<td>121. Kolea</td>
<td>Myrsine sandwicensis</td>
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<tr>
<td>122. Kamakahala</td>
<td>Labordia venosa</td>
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<tr>
<td>123. Maile</td>
<td>Alyxia olivaeformis</td>
</tr>
<tr>
<td>124.</td>
<td>Phyllostegia ambiguus</td>
</tr>
<tr>
<td>125. Self-heal</td>
<td>Prunella vulgaris*</td>
</tr>
<tr>
<td>126.</td>
<td>Stenogyne kamehameho</td>
</tr>
<tr>
<td>127. Corn speedwell</td>
<td>Veronica arvensis*</td>
</tr>
<tr>
<td>128. Kanawao keokeo</td>
<td>Cyrtandra platyphylla</td>
</tr>
<tr>
<td>129. Pilo</td>
<td>Coprosma foliosa</td>
</tr>
<tr>
<td>130. Pilo</td>
<td>Coprosma ochracea</td>
</tr>
<tr>
<td>131. Manono</td>
<td>Hedvotis affinis</td>
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<tr>
<td>132. Manono</td>
<td>Hedvotis axillaris</td>
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<tr>
<td>133.</td>
<td>Hedvotis centranthoides</td>
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<tr>
<td>134. Kopiko</td>
<td>Psychotria mauiensis</td>
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<tr>
<td>135. Ohawai</td>
<td>Clermontia kakeana</td>
</tr>
<tr>
<td>136. Ahawai</td>
<td>Clermontia arborescens</td>
</tr>
<tr>
<td>137. Hahanui</td>
<td>Cyanea aculeatiflora</td>
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<td>138. Haha</td>
<td>Cyanea maceldownyi</td>
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<td>139. Haha</td>
<td>Cyanea bishopii</td>
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<tr>
<td>140. Haha</td>
<td>Cyanea macrostegia</td>
</tr>
<tr>
<td>141. Naupaka kuahiwi</td>
<td>Scaevola chamissoniana</td>
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<tr>
<td>142. Naenae</td>
<td>Dubautia plantaginea</td>
</tr>
<tr>
<td>143. Kupuaa</td>
<td>Dubautia scabra</td>
</tr>
<tr>
<td>144. Maui Pamakani</td>
<td>Ageratina adenophora*</td>
</tr>
<tr>
<td>145. Nipplewort</td>
<td>Lapsana communis*</td>
</tr>
</tbody>
</table>

* Introduced species
** Listed on State and Federal T & E Species List
**TABLE II - BIRD SPECIES OCCURRING ALONG THE WAIKAMOI PIPELINE CORRIDOR**

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Crested Honeycreeper</td>
<td><em>Palmeria dolei</em>**</td>
</tr>
<tr>
<td>2. Iiwi</td>
<td><em>Vestiaria coccinea</em></td>
</tr>
<tr>
<td>3. Apapane</td>
<td><em>Himantion sanguinea</em></td>
</tr>
<tr>
<td>4. Amakihi</td>
<td><em>Hemignathus virens wilsoni</em></td>
</tr>
<tr>
<td>5. Maui Creeper</td>
<td><em>Paroreomyza montana newtoni</em></td>
</tr>
<tr>
<td>6. Hawaiian Owl (Pueo)</td>
<td><em>Asio flammeus sandwichensis</em></td>
</tr>
<tr>
<td>7. Lesser Golden-plover</td>
<td><em>Pluvialis dominica</em></td>
</tr>
<tr>
<td>8. Red-billed Leiothrix</td>
<td><em>Leiothrix lutea</em></td>
</tr>
<tr>
<td>9. Melodious Laughing-thrush</td>
<td><em>Garrulax canorus</em></td>
</tr>
<tr>
<td>10. Japanese White-eye</td>
<td><em>Zosterops japonicus</em></td>
</tr>
<tr>
<td>11. House Finch</td>
<td><em>Carpodacus mexitanusi</em></td>
</tr>
<tr>
<td>12. Common Myna</td>
<td><em>Acridotheres tristis</em></td>
</tr>
<tr>
<td>13. Spotted Dove</td>
<td><em>Streptopelia chinensis</em></td>
</tr>
<tr>
<td>14. Nutmeg Mannikin (Rice bird)</td>
<td><em>Lonchura punctulata</em></td>
</tr>
<tr>
<td>15. Northern Cardinal</td>
<td><em>Cardinalis cardinalis</em></td>
</tr>
<tr>
<td>16. Red Avadavat (Strawberry Finch)</td>
<td><em>Amandava amandava</em></td>
</tr>
<tr>
<td>17. Eurasian Skylark</td>
<td><em>Alauda arvensis</em></td>
</tr>
<tr>
<td>18. Ring-necked Pheasant</td>
<td><em>Phasianus colchicus</em></td>
</tr>
<tr>
<td>19. Hawaiian Goose (Nene)</td>
<td><em>Nesochen sandvicensis</em>*</td>
</tr>
<tr>
<td>20. Maui Parrotbill</td>
<td><em>Pseudonester xanthophrys</em>*</td>
</tr>
</tbody>
</table>

* Introduced species
** Listed on State and Federal T & E Species List

**TABLE III - MAMMAL SPECIES OCCURRING ALONG THE WAIKAMOI PIPELINE CORRIDOR**

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Feral pig</td>
<td><em>Sus scrofa</em></td>
</tr>
<tr>
<td>2. Feral cat</td>
<td><em>Felix catus</em></td>
</tr>
<tr>
<td>3. Feral dog</td>
<td><em>Canis familiaris</em></td>
</tr>
<tr>
<td>4. Mongoose</td>
<td><em>Herpestes auropunctatus</em></td>
</tr>
<tr>
<td>5. Roof rat</td>
<td><em>Rattus rattus</em></td>
</tr>
<tr>
<td>6. Polynesian Rat</td>
<td><em>Rattus exulans</em></td>
</tr>
<tr>
<td>7. House Mouse</td>
<td><em>Mus musculus</em></td>
</tr>
</tbody>
</table>

* Introduced species
** Listed on State and Federal T & E Species List
BOTANICAL & BIOLOGICAL REFERENCE BOOKS


APPENDIX B

SURVEY OF THE FRESHWATER AQUATIC FAUNA IN THE STREAMS
OF THE UPPER KULA WATER SYSTEM
ISLAND OF MAUI
State of Hawaii
Department of Land and Natural Resources
DIVISION OF AQUATIC RESOURCES

Survey of the Freshwater Aquatic Fauna in the Streams
of the Upper Kula Water System
Island of Maui

INTRODUCTION

A survey of the aquatic macrofauna in the perennial and intermittent streams of the Upper Kula Water System, Maui, was conducted on May 19, 1988, by Division Aquatic Biologists Dennis Shinno and Skippy Hau.

OBJECTIVE

To assist the Division of Water and Land Development in obtaining quantitative and qualitative data on aquatic macrofauna and ecosystem to assess potential effects of a proposed project to install a new 36-inch diameter water transmission line connecting the Waikamoi Reservoirs to the Olinda Water Treatment Plant.

PROCEDURES AND DESCRIPTION OF AREA

The project area follows the 4,400 to 4,200 feet elevation contours along the northern slopes of Haleakala. The other streams or stream reaches which supplement the System, and located in the project area are all intermittent and include tributaries of the Kailua Stream, Opana Gulch, Waiohiwi Gulch and Kahakapao Gulch (Figure 1). The primary water source, the perennial Haipuaena and Waikamoi Streams are located to the east of the subject project. Also, all of the subject Streams are diverted further in downstream areas.

Surveys of the macrofauna were conducted by visual and snorkeling observations. Samples for identification purposes were collected with a net.

FINDINGS

No native gobies (o'opu), shrimp (opae kalaole) or neritid snail (hiihiwai) or any other "major" aquatic fauna were found in any of the streams. The only aquatic fauna observed were a few damselfly nymphs and other aquatic insects, indicating that the aquatic ecosystems are very depauperate.

CONCLUSION

The proposed project will not significantly affect aquatic resources values in the streams of the Upper Kula Water System.
FIGURE 1. UPPER KULA WATER SYSTEM, MAUI.
APPENDIX C

AN ARCHAEOLOGICAL SURFACE SURVEY OF THE PROPOSED KULA WATER SYSTEM IMPROVEMENTS
KULA, MAKAWAO, MAUI
AN ARCHAEOLOGICAL SURFACE SURVEY OF THE PROPOSED KULA WATER SYSTEM IMPROVEMENTS
Kula, Makawao, Maui
TMK 2-3-5:4, 2-3-6:6, 2-4-15:29, 2-4-16:1-4

Agnes Estioko-Griffin
Division of State Parks, Historic Sites and Outdoor Recreation
Department of Land and Natural Resources

April 27, 1988
Introduction

As requested by Division of Water and Land Development, an archaeological survey was conducted of the proposed 36" waterline on April 25, 1988. I was accompanied to the project site by Mr. Herbert Kogasaka of Norman Saito Engineering Consultants, Inc.

The purpose of the survey was to determine the presence/absence of significant historic sites in the project area. If significant historic sites are present, mitigation measures will be recommended.

The proposed project includes the replacement of the existing 17,000 linear feet of 12-inch and 16-inch pipelines connecting the Waikami Reservoirs to the Olinda Water Treatment Plant with a 36-inch pipeline (map 1). As shown in map 2, the section of the new pipeline in the forest reserve will generally follow the existing waterline. Only about 2,000 feet along the west end outside of the forest reserve will the new pipeline be far from the existing one.

The pipeline generally follows the 4200 ft. contour line. The section outside the forest reserve (west end) is being used for pasture. It is characterized by gently sloping ridges, and covered with low grass. This area must have been previously forested, but has been cleared for pasture. The ground is clear of any rocks indicating extensive ground disturbance. The forest reserve, on the other hand, is steep and dissected by numerous intermittent streams. Ohia (Metrosideros collina), the native koa (Acacia koa), and numerous species of shrubs and grasses comprise the plant cover.

Previous archaeological work

A review of records at the Historic Sites Section indicates the absence of known historic sites in the area. Also, no previous archaeological work has been conducted in this part of the Kula region.

The Survey

It was my initial plan to focus the survey on the portion of the new pipeline that will be away from the existing one (west end), since this area is suspected to be still undisturbed. However, this portion was found to be also previously disturbed. Thus, the survey was done from the vehicle. Because the existing pipeline generally follows the access road, it was felt that this was the most efficient way. Any historic sites that may have been present would have been destroyed or disturbed by the existing pipeline and access roads.
The Findings

No evidence of historic sites was found. In general, historic sites in this type of environment are scarce and localized. The forest reserve would have provided a good resource base for bird feather, koa and other useful plants. If any evidence of the exploitation of these resources exists, it is more likely to be buried.