

JOHN WAIHEE
GOVERNOR OF HAWAII



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

197
KEITH W. AHUE, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

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STATE PARKS
WATER AND LAND DEVELOPMENT

REF:OCEA:BKW

FILE NO.: HA-2/4/94-577A
DOC. ID.: 4639

JUL 7 1994

MEMORANDUM

TO: Bruce Anderson, Acting Director
Office of Environmental Quality Control

FROM: Keith W. Ahue, Chairperson *KA*
Board of Land and Natural Resources

SUBJECT: Negative Declaration for the Oloa Flume Tunnel Improvement
Project, Kaumana, South Hilo, Hawaii, TMK: 2-5-01:13

The Department of Land and Natural Resources has reviewed the comments received during the 30-day public comment period which began on April 8, 1994. The DLNR has determined that this project will not have a significant environmental effect and has issued a negative declaration. Please publish this notice in the July 23, 1994 OEQC Bulletin.

We have enclosed a completed OEQC Publication Form and four copies of the Final EA.

Please contact Steve Tagawa of our Office of Conservation and Environmental Affairs at 587-0377, if you have any questions.

Enclosure

1994-07-23-HI-PEA-Olaa Flume
Tunnel Improvement

JUL 23 1994

RECEIVED

'94 JUN 27 AM 11:00

DLNR
OCEA

FINAL
ENVIRONMENTAL ASSESSMENT
OLAA FLUME TUNNEL IMPROVEMENT

DEPARTMENT OF WATER SUPPLY
COUNTY OF HAWAII
JUNE 1994

SUPPLEMENTAL INFORMATION REGARDING ROADWAY AND STORAGE AREA

To minimize physical disturbance of the area, only small equipment will be used to construct the gravel access road and storage area. As stated, the access road will follow an existing cleared footpath.

The vegetation to be cleared predominantly includes false staghorn fern. Some waiwi and ohia may be cleared. Cleared vegetation will be disposed at the County's Hilo Landfill.

ADDENDUM

Comments and Responses.

COMMENTS FROM CONCERNED AGENCIES AND RESPECTIVE RESPONSES BY
THE DEPARTMENT OF WATER SUPPLY

1. State of Hawaii Office of Hawaiian Affairs - by Dante Carpenter, Administrator.

Comment Date: March 22, 1994

DWS Response: None Required.

2. County of Hawaii Department of Public Works - by Galen Kuba, Acting Division Chief.

Comment Date: March 28, 1994

DWS Response: None Required.

3. County of Hawaii Planning Department - by Virginia Goldstein, Planning Director.

Comment Date: March 31, 1994

DWS Response: None Required.

4. State of Hawaii Department of Health - by John C. Lewin, M.D., Director of Health.

Comment Date: April 13, 1994

DWS Response: The Olaa Flume source was never taken out of service as incorrectly stated on Comment #2 of the DOH's memorandum. The proposed improvements are an alternative to replacing the source with a deepwell source or providing a filtration system. The Department understands that the source, with the proposed improvements, will be subject to the DOH's review and determination as to its compliance with current and future drinking water regulations.

5. State of Hawaii Department of Land and Natural Resources, Historic Preservation Division - by Don Hibbard, Administrator.

Comment Date: April 28, 1994

DWS Response: As requested, the Department will provide photographs and drawings of the tunnel prior to construction.

6. State of Hawaii Department of Land and Natural Resources, Commission on Water Resource Management (CWRM) - by Rae M. Loui, Deputy Director.

Comment Date: May 17, 1994

DWS Response: The Department will comply with Section 13-168-12, Hawaii Administrative Rules as necessary. Contact with CWRM will be maintained.

HAWAII CONFERENCE FOUNDATION
15 Craigside Place * Honolulu, Hawaii 96817 * (808) 537-9516 * fax 521-7196
20 May 1994

S/vs
larry
P. J.
info/file

Mr. H. William Sewake, Manager
Department of Water Supply
County of Hawaii
25 Aupuni Street
Hilo, HI 96720

re: Conservation District Use Application Olaa Flume Tunnel Improvement

Dear Mr. Sewake:

Many thanks for your letter of April 12, 1994 that indicated that the Department of Land and Natural Resources (DLNR) has received and accepted your application on the above subject.

You note that the DLNR requires an official letter by our organization concurring with this project.

Please consider this an official concurrence letter. Many thanks for all your help.

Sincerely,



James A. Richards
Executive Secretary

JAR:slc

hc\hola01.054

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'94 MAR 28 PM 2:24

DLNR
OOEA



STATE OF HAWAII
OFFICE OF HAWAIIAN AFFAIRS
711 KAPIOLANI BOULEVARD, SUITE 600
HONOLULU, HAWAII 96819-5249
PHONE (808) 594-1888
FAX (808) 594-1886

March 22, 1994

RECEIVED
OFFICE OF HAWAIIAN AFFAIRS
MARCH 21 1994

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

Re: CDUA, County of Hawaii, Department of Water Supply, HA-2/4/94-577A
Construction of the Oiaa Flume Tunnel Improvements,
Kaumana, South Hilo, Hawaii TMK:2-5-01:13 (lot 5-A)

Dear Mr. Ahue:

Thank you for the opportunity to review the above-referenced Conservation District Use Application. We have no concerns with this project.

If you have any questions please contact Lynn J. Lee, in our Land and Natural Resources Division at 594-1936.

Me ka 'oia'io

Dante K. Carpenter
Administrator

CEA

1460

Stephen K. Yamashiro
Mayor



Donna Fay K. Kiyosaki
Chief Engineer
Riley W. Smith
Deputy Chief Engineer

County of Hawaii
DEPARTMENT OF PUBLIC WORKS
25 Aupuni Street, Room 202 • Hilo, Hawaii 96720-4252
(808) 961-8321 • Fax (808) 969-7138

March 28, 1994

MR KEITH W AHUE
DEPARTMENT OF LAND AND NATURAL RESOURCES
P O BOX 621
HONOLULU HI 96809

SUBJECT: CONSERVATION DISTRICT USE APPLICATION
FOR CONSTRUCTION OF OLAA FLUME TUNNEL IMPROVEMENTS
Application No.: HA-2/4/94-577A
Location: Kaumana, South Hilo, Hawaii
TMK: 3rd Div./2-5-01: 13, Lot 5-A

We have reviewed the subject application and have no comments.

GALEN M. KUBA, Acting Division Chief
Engineering Division

STT:byf

cc: Planning Department

57

DLNR
OCEA

94 MAR 29 PM 1:10

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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
MAR 28 1994

Stephen K. Yamashiro
Mayor



Virginia Goldstein
Director

Norman Olesen
Deputy Director

cg/ky/lm

County of Hawaii

PLANNING DEPARTMENT

25 Aupuni Street, Room 109 • Hilo, Hawaii 96720-452
(808) 961-8288 • Fax (808) 961-9615

March 31, 1994

Mr. Keith W. Ahue, Chairperson
Board of Land and Natural Resources
P. O. Box 621
Honolulu, HI 96809

Dear Mr. Ahue:

CDUA File #HA-2/4/94-577A
Proposed Construction of Olaa Flume Tunnel Improvements
Tax Map Key: 2-5-1: 13; Kaumana, South Hilo, Hawaii

This is to acknowledge receipt of your March 17, 1994 letter, regarding the above-subject project. Please be informed that the subject property is situated outside the Special Management Area (SMA) boundaries. Therefore, the proposal is not subject to Chapter 205A, HRS, relating to Coastal Zone Management nor the Planning Commission Rule 9, Special Management Area Rules and Regulations.

Should you have any questions, please feel free to contact Alice Kawaha of our office.

Sincerely,

Virginia Goldstein
VIRGINIA GOLDSTEIN
Planning Director

AK:mjh
3237D

cc: Mr. William Sewake, Department of Water Supply

IS RECEIVED APR 06 1994

John
JOHN WAIHEE
GOVERNOR OF HAWAII



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

STATE OF HAWAII⁹⁴ APR 27 AM 11:54
DEPARTMENT OF HEALTH

P. O. BOX 3378
HONOLULU, HAWAII 96801

& NATURAL RESOURCES
STATE OF HAWAII
APR 13 1994

DLNR
OCEA

In reply, please refer to:
94-052/epo

To: The Honorable Keith W. Ahue, Chairperson
Department of Land & Natural Resources

From: John C. Lewin, M.D. *John C. Lewin*
Director of Health

Subject: Conservation District Use Application

Applicant: County of Hawaii, Department of Water Supply
File No.: HA-2/4/94 - 577A
Request: Construction of the Olaa Flume Tunnel Improvements
Location: Kaumana, South Hilo, Hawaii
TMK: 2-5-01: 13

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

1. We have no objections to the proposed tunnel improvements. According to the Environmental Assessment (EA), the purpose of this project is to seal the spring to minimize contamination due to surface water runoff. Improvements such as these are necessary in helping to maintain a safe drinking water source and are to be encouraged.
2. We would like to add to the discussion of regulatory compliance on page 14 of the Environmental Assessment by noting that the Olaa Flume was voluntarily removed from service prior to the Surface Water Treatment Rule compliance deadline of June 30, 1993. Thus, the source must either be modified to eliminate the surface influence or have an acceptable filtration and disinfection system in operation prior to being used again as a source of potable water.
3. While the proposed renovation is needed, the Department of Water Supply must be cautioned that these improvements will not guarantee full compliance with existing and future drinking water regulations. For instance, it is still possible that the Olaa Flume will be found to be a groundwater source under the direct influence of surface water, despite the good intent of this project. All such groundwater sources will be regulated like surface water sources, requiring proper filtration and disinfection.

If you should have any questions on this matter, please contact
Mr. William Wong, Chief, Safe Drinking Water Branch at 586-4258.

c: Safe Drinking Water Branch
Hawaii District Health Office

JOHN WAIHEE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

April 28, 1994

KEITH AHUE, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCE

DEPUTIES

JOHN P. KEFFELER II
DONA L. KANAKA

AQUACULTURE DEVELOPMENT
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CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
DIVISION
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

LOG NO.: 11217
DOC NO.: 9403co32

MEMORANDUM

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

From: Don Hibbard, Administrator
Historic Preservation Division *[Signature]*

Subject: Construction of the Olaa Flume Tunnel Improvements
TMK 2-5-01:13 (lot 5-A), South Hilo, Hawaii

Thank you for your memo dated March 17, 1994 regarding the Construction of the Olaa Flume Improvements. There is high probability that no archaeological sites will be affected by the proposed construction. The installation of the pipeline and bulkhead will affect an historic tunnel and we request that prior to the installation, the tunnel should be photo-documented and any original drawings of the tunnel be submitted to our office. Photographs shall be 8" X 10" fiber based paper prints from 4" X 5" fine grained negatives. Both negatives and prints shall be processed with archival quality control methods.

Thank you for the opportunity to comment.

CO:ab

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1994 MAY 2 11:15
DLNR
OCEA

DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
Honolulu, Hawaii

MAY 17 1994

S

MEMORANDUM

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

FROM: Rae M. Loui, Deputy Director *RML*
Commission on Water Resource Management

SUBJECT: Comments to CDUA, Construction of the Olan Flume Tunnel Improvements
(FILE. NO. HA-2-4-94-577A)

It appears that the proposed bulkhead and pipeline improvements will require a well construction permit pursuant to Section 13-168-12, Hawaii Administrative Rules.

For more information regarding well construction permit requirements, the applicant should call Ed Sakoda at 587-0225.

We appreciate the opportunity to review and comment on this CDUA.

DH:ko

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OOEA

ENVIRONMENTAL ASSESSMENT FOR
OLAA FLUME TUNNEL IMPROVEMENT

PROJECT: OLAA FLUME TUNNEL IMPROVEMENT
ENGINEERING WORK ORDER 91-094

LOCATION: KAUMANA, SOUTH HILO
ISLAND OF HAWAII
TAX MAP KEY 2-5-01:13

PROPOSING AGENCY: DEPARTMENT OF WATER SUPPLY
COUNTY OF HAWAII

APPROVING AGENCY: DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE OF HAWAII

Notice of Determination: Negative Declaration

For: Olaa Flume Tunnel Improvement

**By: Department of Water Supply
County of Hawaii**

The proposed action will have no significant effect on the environment and, therefore, does not require the preparation of an Environmental Impact Statement. This Notice of Determination and Environmental Assessment are being filed as a Negative Declaration.

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I. INTRODUCTION

Project Description

The Department of Water Supply, County of Hawaii, proposes to construct a spring collection enclosure (concrete bulkhead) and adjoining 18-inch pipeline in the existing tunnel structure. The construction of a service road running parallel to the existing tunnel alignment is also proposed along with a temporary materials storage area (see Figure 1, Olaa Flume Tunnel Improvement).

The purpose of the project is three fold:

- A) To sanitize the collection of spring water in the tunnel. There exists portholes in the tunnel that contributes to the contamination of the spring water.
- B) To maximize the collection of spring water in the tunnel. Rock fractures in the tunnel system contributes to water loss during the transport of the spring water from the spring origin to the existing 18-inch supply pipeline.
- C) To provide for a drinking water source which would be operational during power outages.

Project History

The Olaa Flume Spring Source, as described by William J. Hull, Appraisal of Olaa Flume Spring Source, November 1975, was created by the 1855 lava flow from Mauna Loa volcano. The tunnel was dug into this lava flow about 1900 and additional tunneling was completed in 1920. This source was abandoned in 1956 by Olaa Mill because economics forced a change from handcutting sugar cane to mechanical harvesting.

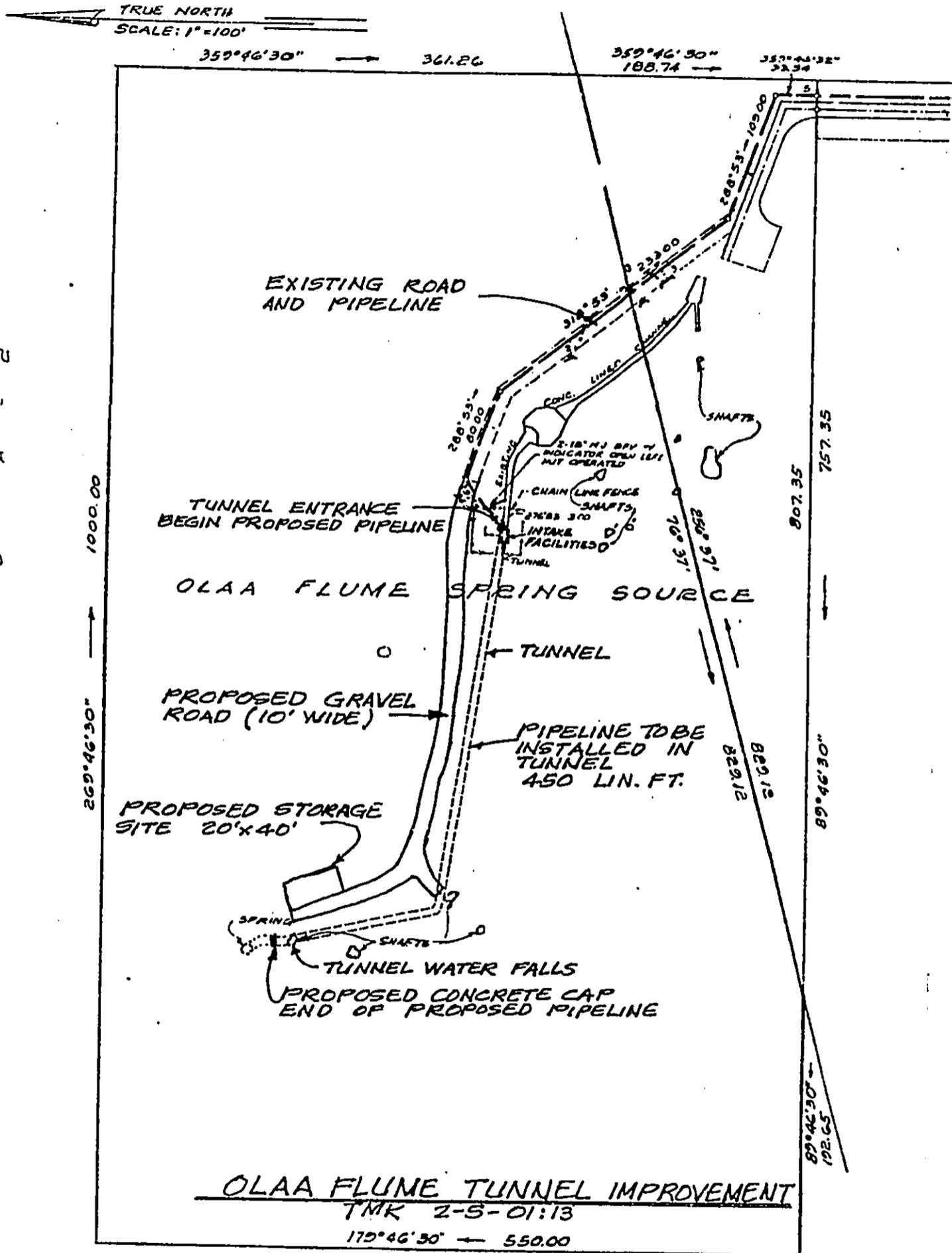
The Olaa Flume Spring Source, which was originally used to transport sugar via a flume system, was converted to a drinking water source in 1976.

A Conservation District Use Application was submitted in July 1974, for surveying, constructing pipeline, access road, and intake structure for the Olaa Flume Spring Source. This conversion project included the rehabilitation and reconstruction of the tunnel and intake structure and the construction of 3,500 linear feet of supply line and access road within the conservation district. The tank and the balance of the supply line was constructed on agriculture-zoned land.

The Surface Water Treatment (SWTR) an amendment of the Federal EPA's Safe Drinking water Act and Chapter 20, Rules Relating to Potable (State of Hawaii Revised Statutes), requires groundwater sources to be void of surface water

LAND COURT APPLICATION
 (Hawaii Conference of the United Church of Christ - Owner)

L O T S - A - 2



OLAA FLUME TUNNEL IMPROVEMENT
 TMK 2-5-01:13

FIGURE ONE

influence to avoid stringent filtration and disinfection requirements. This Rule and groundwater under the influence of surface water (GWI) requirements must be implemented and operational before July 1, 1993.

Present Project

The Olaa Flume Tunnel Improvement project will eliminate spring water contamination by surface water and maximize source water collection.

Due to the stringent SWTR requirements, the Department of Water Supply (DWS) may be compelled to abandon this source. The SWTR compliance actions requires extremely large expenditures. This project will allow DWS to save this source using *minimum* expenditure. Development of a replacement source for Olaa Flume Spring is cost prohibitive. Details of the economic impact are presented in the following sections.

II. DESCRIPTION OF PROPOSED ACTION

Project Area

The proposed project site is located on the eastern slope of Mauna Kea Mountain about 2.5 miles west of Hilo Town, Tax Map Key 2-5-01:31, Lot 5-A, Olaa Flume Spring Source (see Figure 2, Location Plan). The project is situated around elevation 1980-feet and the surrounding area has 6% to 20% slopes as indicated on Figure 3, U.S.G.S. Map, Pihonua Quadrangle.

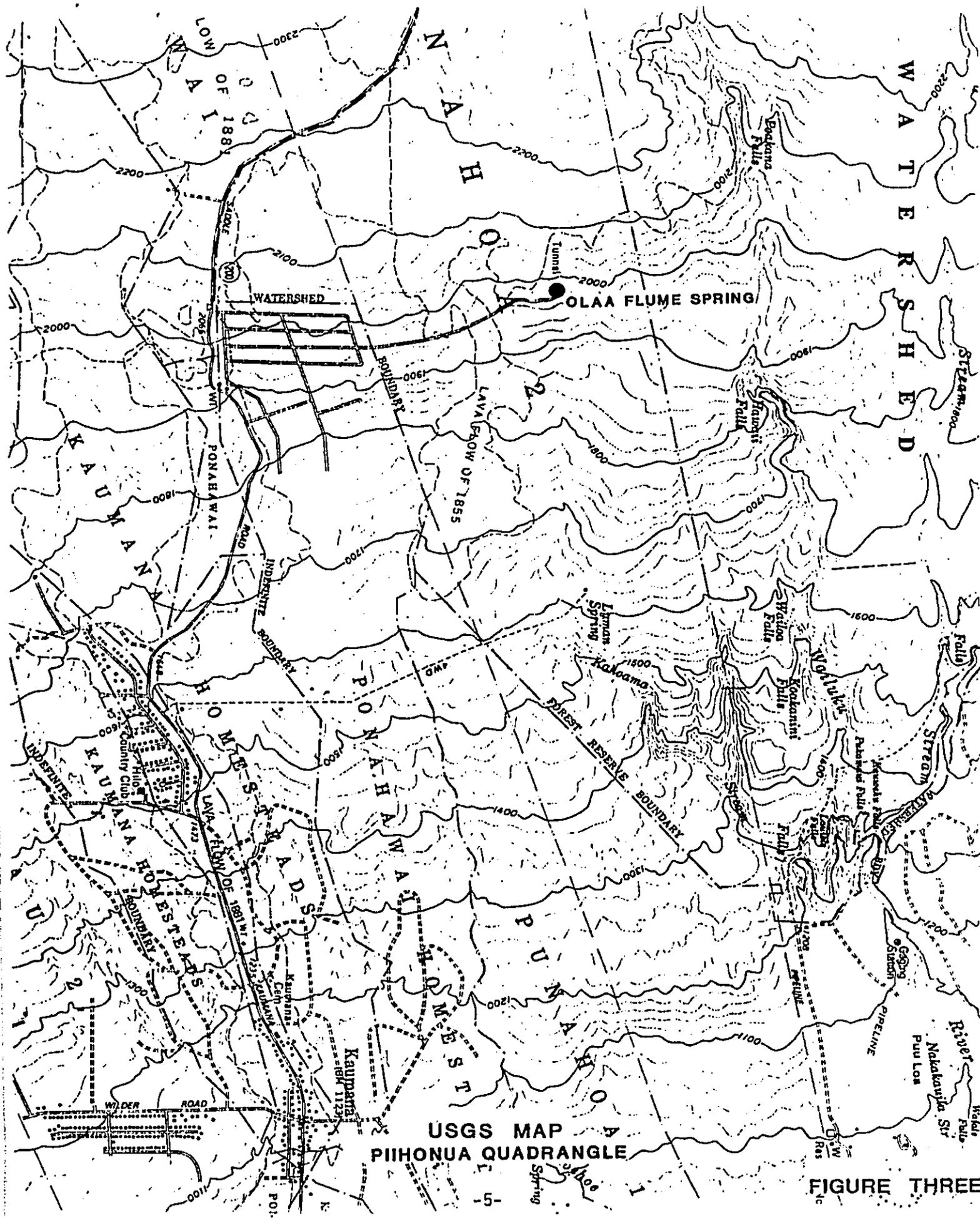
The project site is within the State Conservation District lands designated as subzone Protective (P) (see Figure 4, Conservation Zone Map). The area is within the Hilo Closed Watershed designation with restricted access. Since the surrounding areas of the project site are private lands, hunting is not allowed to the general public.

Project Description

The project consist of construction a concrete bulkhead at the spring location, installation of about 450 linear feet of pipeline in the tunnel from the concrete bulkhead to the existing 18-inch pipeline at the end of the tunnel, construction of about 430 linear feet of 10-foot wide gravel service road, and construction of a materials storage site about 20 feet wide and 40 feet long (see Figure 5, Olaa Flume Tunnel Improvement).

Concrete Bulkhead & Adjoining Pipeline

The construction of the concrete bulkhead is intended to completely seal the spring and eliminate contamination from the existing porthole and surface water intrusion (see Figure 6, Tunnel Sections and Figures 7 and 8, Tunnel Photos).



USGS MAP A
PIIHONUA QUADRANGLE

FIGURE THREE

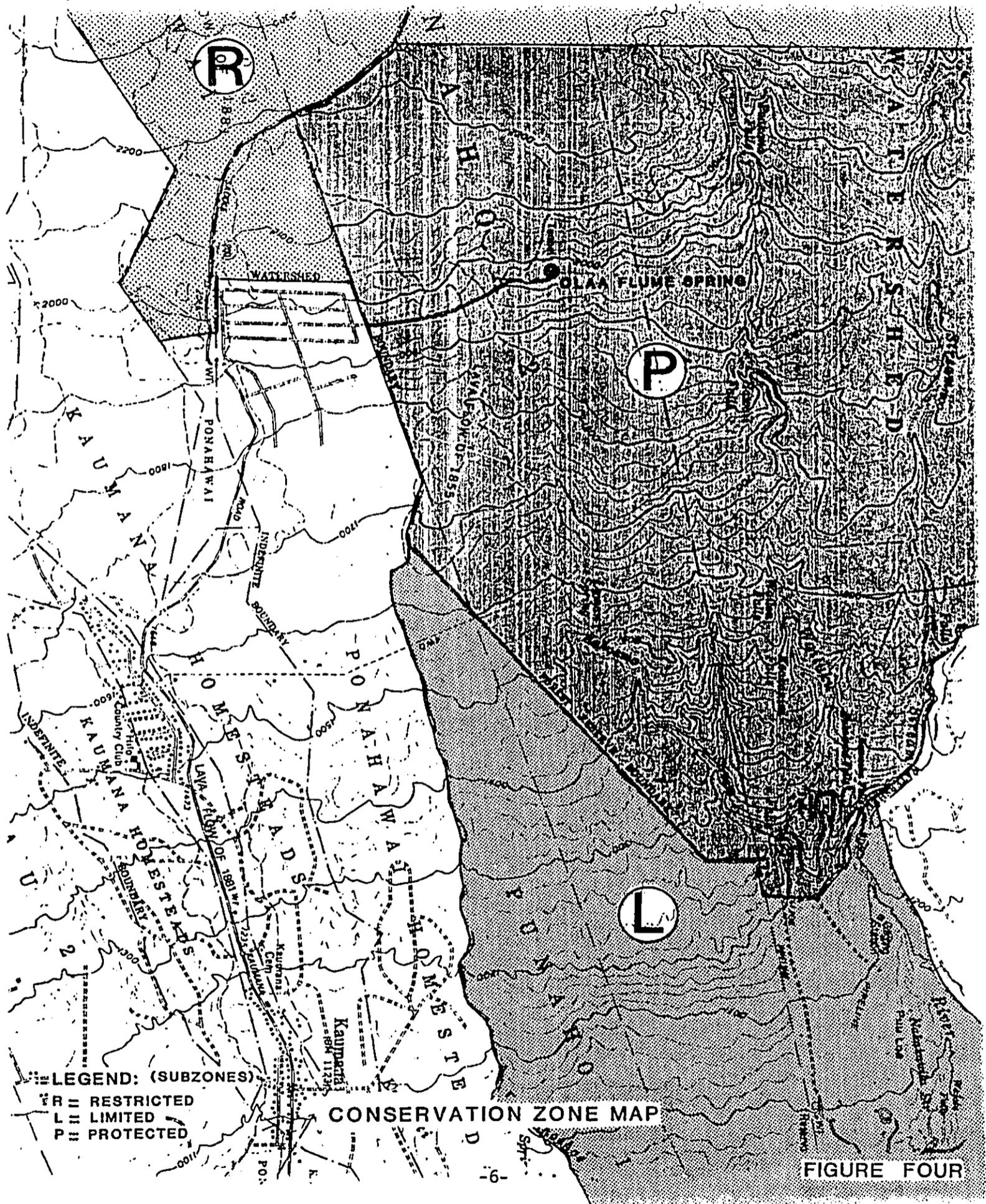


FIGURE FOUR

LAND COURT APPLICATION
 of the United Church of Christ - Owner
 (Hawaii Conference of the United Church of Christ)

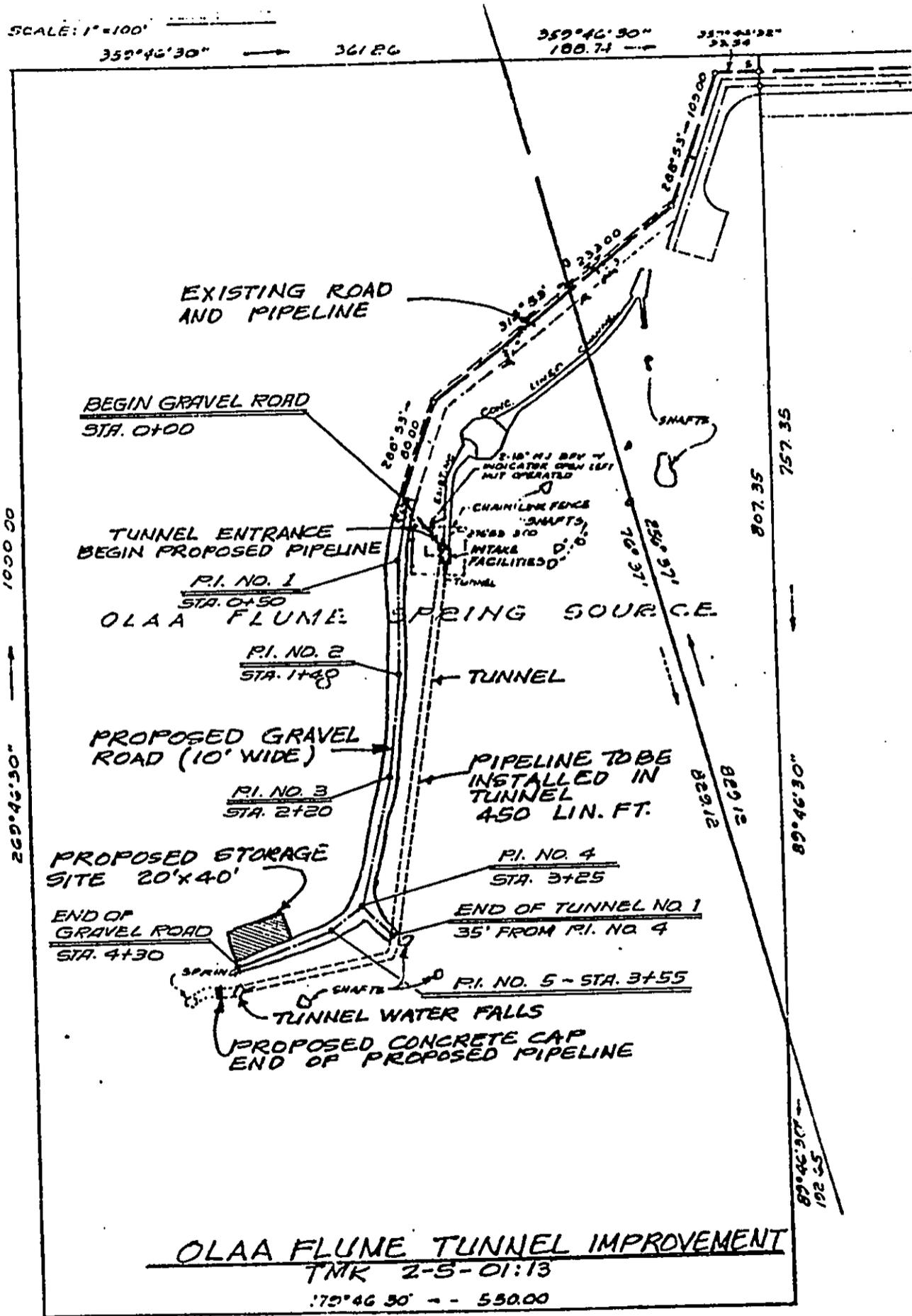
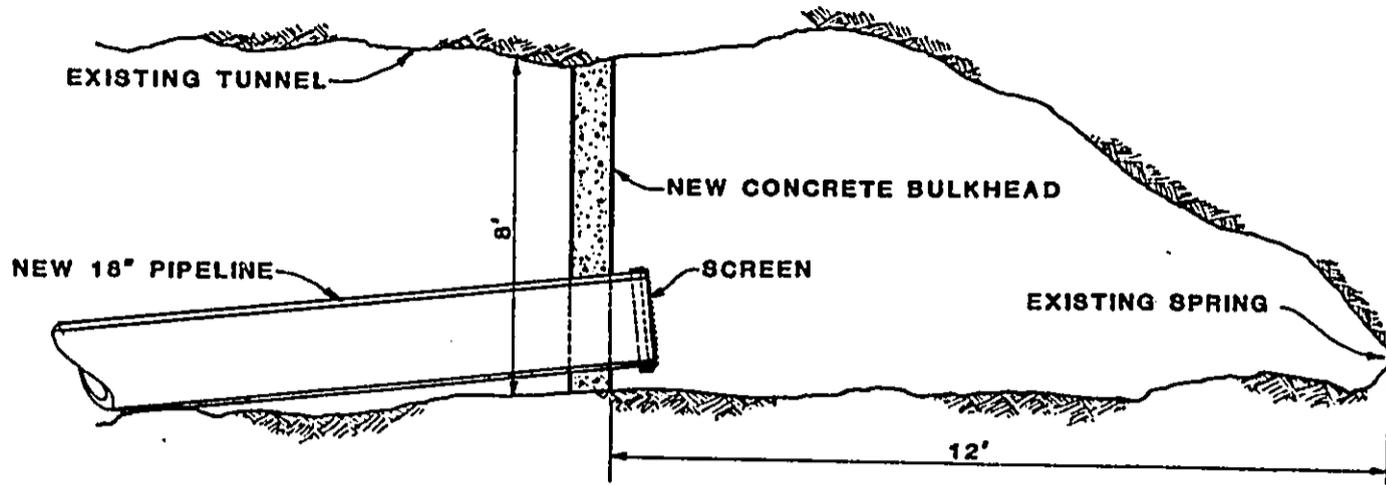
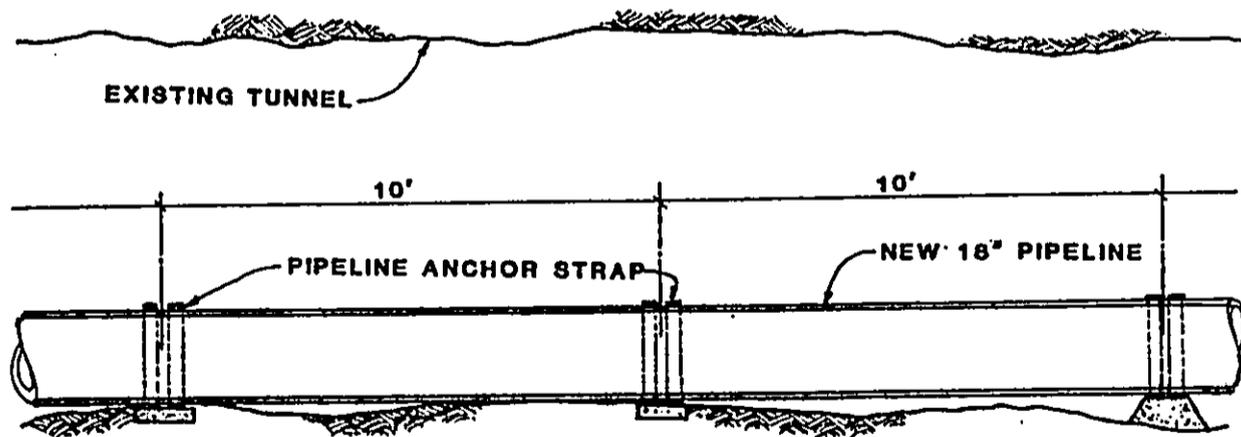


FIGURE FIVE



CONCRETE BULKHEAD SECTION



MID-DISTANCE TUNNEL SECTION

TUNNEL SECTIONS



VIEW OF SPRING
AT THE TUNNEL
END. ABOUT
6 MILLION GALLONS
OF SPRING WATER
COMES FROM THIS
SOURCE.

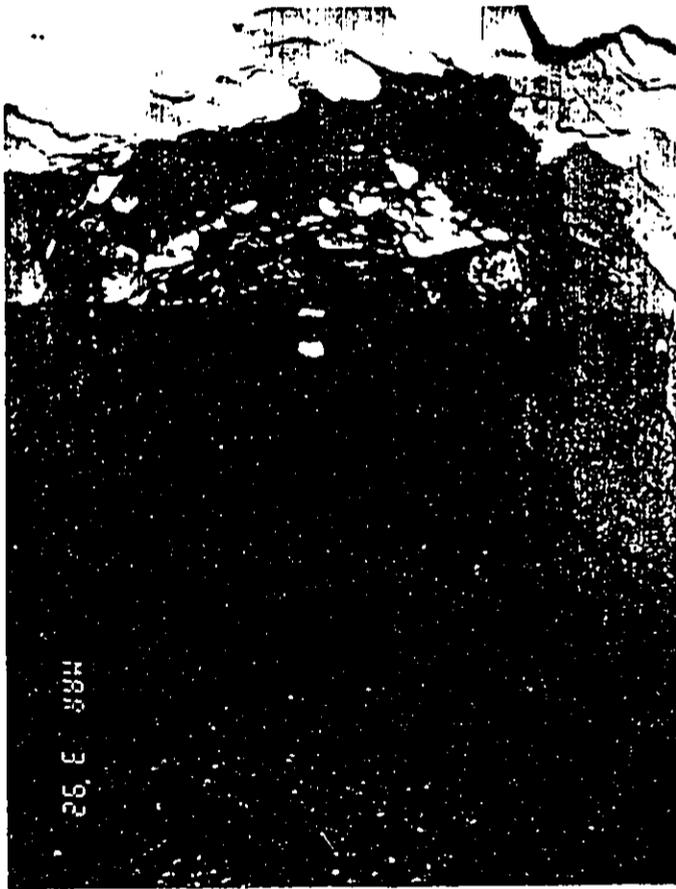


VIEW OF THE LOCATION
WHERE THE CONCRETE
BULKHEAD WILL BE
CONSTRUCTED. THIS
COLLECTION ENCLOSURE
STRUCTURE IS LOCATED
ABOUT 12- FEET FROM
THE SPRING.

TUNNEL PHOTOS



VIEW OF POTHOLE
NEAR THE SPRING
THAT CONTRIBUTES
TO BACTERIOLOGICAL
CONTAMINATION
OF THE SPRING
WATER.



VIEW OF THE TUNNEL
WHERE THE 18"
TRANSMISSION WILL
BE PLACED. THE
PIPELINE AND BULKHEAD
WILL AVOID WATER
LOSS DUE TO
FRACTURES IN THE
TUNNEL SYSTEM.

TUNNEL PHOTOS

The adjoining 18-inch transmission line is about 450 linear feet and will be anchored in the existing tunnel. The transmission line will be connected to the existing 18-inch supply line located at the entrance of the tunnel.

Gravel Service Road & Materials Storage Site

The purpose of the gravel service road is to provide access to the portholes to perform routine maintenance and emergency repair of the Olaa Flume Spring System (see Figure 5, Olaa Flume Tunnel Improvement). The gravel service road will be constructed first to facilitate the pipeline installation and spring containment construction. The alignment of the service road coincides with some of the existing foot trails to the portholes of the tunnel.

The purpose of the materials storage site is to facilitate the equipment and materials for this project. The storage site is temporary and will be used only during the construction period. The rehabilitation of the materials storage site will begin after all the materials are installed and will include revegetation using the type of native plants found in that vicinity.

III. SOCIAL AND ECONOMIC CHARACTERISTICS

Population

The Hawaii County population as of April 1, 1990 was 120,317 people. Of that population, Hilo represents 37% of the Island's total. From the period of April 1, 1970 to April 1, 1990, Hilo's population percentage change has decreased from 24.7% during 1970 to 1980 to 5.6% from 1980 to 1986 (see Table 1, Resident Populations of Hawaii County).

Water Consumption

Water consumption for Hilo is not proportionately related to population increases during the period of 1970 to 1986. Hilo's population percentage change during 1970 to 1980 was 24.7%. The water consumption percentage change for the same period was 36.8%. Hilo's population percentage change during 1980 to 1990 was 5.6%. Water consumption percentage change during the same period was 17.8%. Water consumption increases were greater than population increases (see Table 2, Water Consumption).

Resident Population of County:

County Districts	April 1 1970	April 1 1980	April 1 1990	Percent Change 1970 - 1980	Percent Change 1980 - 1990	1990 Percentage of Island Total
Hawaii County	63,468	92,053	120,317	45.0	30.7	100
Puna	5,154	11,751	20,781	128.0	76.8	17.3
South Hilo	33,915	42,278	44,639	24.7	5.6	37.1
North Hilo	1,881	1,679	1,541	-10.7	-8.2	1.3
Hamakua	4,648	5,128	5,545	10.3	8.1	4.6
North Kohala	3,326	3,249	4,291	-2.3	32.1	3.5
South Kohala	2,310	4,607	9,140	99.4	98.4	7.6
North Kona	4,832	13,748	22,284	184.5	62.1	18.5
South Kona	4,004	5,914	7,658	47.7	29.5	6.4
Ka'u	3,398	3,699	4,438	8.9	20.0	3.7

Table 1
Resident Populations of Hawaii County

PRINT DATE 08-Jun-92

SERVICES/USAGE
SOUTH HILO WATER SYSTEM (from ANNUAL REPORTS)

YEAR	HILO CITY			PAUKAA-HONOLII-PIIHONUA			PAPAIKOU-KALAOA		
	NO. SERV.	CONSUMPTION (1000 GALS)	USAGE (MGD)	NO. SERV.	CONSUMPTION (1000 GALS)	USAGE (MGD)	NO. SERV.	CONSUMPTION (1000 GALS)	USAGE (MGD)
1969-70	6,993	1,230,984	3.373	169	17,868	0.049	488	63,300	0.173
1970-71	7,267	1,266,269	3.469	172	17,303	0.047	490	60,228	0.165
1971-72	7,660	1,373,322	3.752	172	18,808	0.051	491	62,241	0.170
1972-73	8,039	1,471,654	4.032	177	18,404	0.050	490	62,107	0.170
1973-74	8,411	1,513,459	4.146	181	18,063	0.049	496	61,196	0.168
1974-75	8,580	1,560,418	4.275	183	17,642	0.048	510	61,969	0.170
1975-76	8,183	1,609,764	4.398	184	17,549	0.048	512	67,073	0.183
1976-77	9,082	1,681,222	4.606	182	17,329	0.047	514	65,454	0.179
1977-78	9,405	1,706,631	4.676	184	18,092	0.050	515	67,182	0.184
1978-79	9,698	1,684,559	4.615	186	17,219	0.047	522	65,813	0.180
1979-80	10,006	1,761,151	4.812	189	18,183	0.050	524	66,146	0.181
1980-81	10,230	1,776,030	4.866	187	18,431	0.050	531	66,942	0.183
1981-82	10,359	1,749,369	4.793	191	18,034	0.049	526	69,978	0.192
1982-83	10,518	1,781,266	4.880	189	18,591	0.051	528	68,220	0.187
1983-84	10,666	1,816,526	4.963	191	19,631	0.054	532	66,693	0.182
1984-85	10,858	1,868,467	5.119	190	18,710	0.051	532	65,914	0.181
1985-86	11,040	1,920,045	5.260	192	19,030	0.052	539	71,483	0.196
1986-87	11,239	1,985,381	5.439	195	18,084	0.050	541	70,028	0.192
1987-88	11,406	1,988,684	5.434	199	18,607	0.051	540	71,789	0.196
1988-89	11,603	2,004,080	5.491	201	18,595	0.051	551	74,706	0.205
1989-90	11,926	2,135,659	5.851	204	19,670	0.054	557	79,245	0.217
1990-91	12,105	2,149,116	5.888	206	19,413	0.053	560	80,151	0.220

WATER CONSUMPTION

Regulation Compliance

The Surface Water Treatment Rule applies to surface water drinking sources and those groundwater sources under the influence (GWI). Olaa Flume Spring is considered GWI because the porthole allows surface water to mix with the spring water in the tunnel. The vegetation from the porthole also contaminates the spring water.

The regulation requires GWI sources to filter and disinfect before distribution. This treatment requirement is expensive and beyond the DWS's resources. Alternative action included well development to replace this source. The cost of well development including booster stations is estimated at \$3.1M (see Table 3, Surface Water Treatment Rule Impact Cost Estimate).

The Olaa Flume Tunnel Improvement will cost about \$300,000 which represents a considerable savings in comparison to a well development. This project will also be constructed and operational before the compliance deadline of July 1, 1993.

Archaeology

Review of archaeological site location maps on file with the State Historical Preservation Office, Department of Land and Natural Resources did not show any sites in the project area. This area is far from the coastal area and at high elevation and ancient Hawaiian utilization was minimal.

Pre-1900 land use as described by Holly McEldowney, "Archaeological and Historical Literature Search and Research Design, Lava Flow Control Study, Hilo, Hawaii" indicated that "the probability of finding structural or artifactual evidence of these activities (gathering of forest resources) appears low due to the temporary nature of the huts and the dense character of the ground cover, which would quickly close unused paths and cleared areas."

Also, previous clearing of the project area to construct the tunnel area during 1900 may have destroyed any archaeological site. This scenario is unlikely due to very little likelihood of any sites being in the vicinity but this discussion of previous land clearing was necessary.

Latent Benefit

The salvage of Olaa Flume Spring provides for a latent benefit whose value would be realized immeasurably in a catastrophic disaster. One scenario of this could be the following. One day a hurricane will pass over the Big Island and cause widespread destruction, including loss of electrical power. All wells will be inoperable and Olaa Flume spring will be able to supply water to critical facilities such as Hilo Hospital. This project provides for the protection of the drinking water source during hurricanes.

SERVICE	CLASS	MAX. DAY CONSUMPTION	PRIORITY	SIZE	OPTIMUM	PROBABLE						
SWTR.WK1												
IMPACT COST ESTIMATE - SURFACE WATER TREATMENT RULE												
PRINT DATE 10-Jun-92												
SYSTEM	CONNECT.	POPULATION	PROBABILITY	SOURCE	(mgd)	IMPROVEMENTS	SCHEDULE	ELEVATION	(gpm)	COST (M)	COST (M)	PRIORITY
HILO	12,311	37,918	GWI (H)	Olaa Flume	1.0800	1) 3 Booster Stations @ #1,	J		300	1.30		
			GWI (H)	Lyman Spring	3.6000	Kahoana & Lyman Res.	J		(each)			
			GWI (H)	Waiakea-Uka Spring	0.5750	2) Production Well @ #1	J #1	1000'	2,100	1.50		
						3) Backup Pump @ #2	J		1,000	0.30		
						4) Deep Well @ Camp 7	J	900'	1,000	1.70	4.80	(#1)
PAUKAA/ PAPAIKOU	560	1,725	GWI (H)	Papaikou Spring	0.4242	1) Deep Well @ Papaikou Res.	#5	445'	500	1.00		
			GWI (L)	Kaieie Spring		2) Booster Sta. w/ 0.02 MG Res.	#2		100	0.70		
						3) Modification of Spring	#4					
						4) Deep Well @ Kaieie Res.	#1	555'	100	1.00		
						5) Booster Sta. @ Kaieie Res.	#3		100	0.10	0.80	(#2)
PEPEEKED	445	1,371	GWI (H)	Naukaloa Spring	0.2608	1) Deep Well @ Kulaiano #1	#2	707'	300	1.20		
						2) Booster Station @ Kulaiano #2	#1		150	0.15	0.15	(#7)
HONOLU	207	638	GWI (H)	Akaka Falls Spring	0.0752	1) Deep Well @ Honouu Res.	#1	525'	100	1.00		
						2) 2nd Deep Well @ or near Honouu Reservoir	#2	550'	100	1.00	1.00	(#4)
HAKALAU	81	249	GWI (L)	Hakalau Iki Spring	0.0428	1) Package Filter Plant	#2	1225'	50	0.10		
						2) Modification of Spring	#1			0.05	0.05	(#9)
HINOLE	48	148	GWI (L)	Chaves Spring	0.0342	1) Package Filter Plant	#2	511'	50	0.10		
						2) Modification of Spring	#1			0.05	0.05	(#6)
KUKUIHAELE	158	487	GWI (L)	Kukuihaele Spring	0.0559	1) Deep Well @ Kukuihaele Tank	#2	956'	100	1.50		
						2) Deep Well @ Kapulena Tank	#2	1000'	100	1.50		
						3) Modification of Spring	#1			0.05	0.05	(#11)
MAKAPALA	80	246	GWI (L)	Murphy Tunnel	0.0414	1) Package Filter Plant	#2		50	0.10		
			GWI (L)	Malua Tunnel		2) Modification of Tunnels	#1			0.20	0.20	(#5)
HALAULA	202	622	GWI (L)	Bond Tunnel	0.0916	1) Deep Well @ Halaula Tank	#2	621'	700	1.50		
						2) Modification of Tunnel	#1			0.10	0.10	(#8)
HAWI	1,032	3,179	GWI (L)	Watt Tunnel	0.5752	1) Deep Well @ Hawi Reservoir	#1	810'	700	1.70		
			GWI (H)	Hapahapai Tunnel		2) Modification of Watt & Lindsey Tunnels	#1			0.10	1.80	(#10)
			GWI (L)	Lindsey Tunnels								
PAHALA	460	1,417	GWI (H)	Alili Tunnel	0.4120	1) Deep Well @ Pahala Res.	#2	1112'	500	2.50	2.50	(#12)
WAIOHINU/ MAALEHU	682	2,101	GWI (H)	Haao Tunnel	0.5208	1) 3 Booster Stations @ Maalehu, Waiohinu Halts. & Waiohinu Mastd. Tanks	#1		400	0.70		
			GWI (H)	Mt. House Tunnel		2) Deep Well @ Maalehu #2	#1	748'	400	0.50		
						3) .05 MG Reservoir/Booster	#1		400	0.50	3.80	(#3)
									400	0.70		
TOTALS									24.30	15.30		

SWTR IMPACT COST ESTIMATE

SAY . . \$24.50 M \$15.50 M

TABLE THREE

IV. ENVIRONMENTAL CHARACTERISTICS

Climate

The Island of Hawaii has a semi-tropical climate and the range of land elevations lends to a climate of wide variations. Rainfall reaches a maximum intensity from 2,000 to 3,000 feet elevations and decreases at the higher elevations.

Olaa Flume Spring is located in an area where the mean annual rainfall is between 200 inches to 250 inches (see Figure 9, Rainfall Map).

Temperatures range from 58° to 90° along the coast to almost freezing in the mountains.

Soils

U.S. Soil Conservation Service has mapped soil surveys for the Island of Hawaii. Figure 10, Soil Survey Map No. 82, outlines soil areas and soil types for the vicinity of Olaa Flume Spring. Soil designation for Olaa Flume Spring is rKGD, Keei extremely rocky muck. In a representative soil of rKGD, the surface layer is very dark brown muck about 10 inches thick and underlain by Pahoehoe lava bedrock.

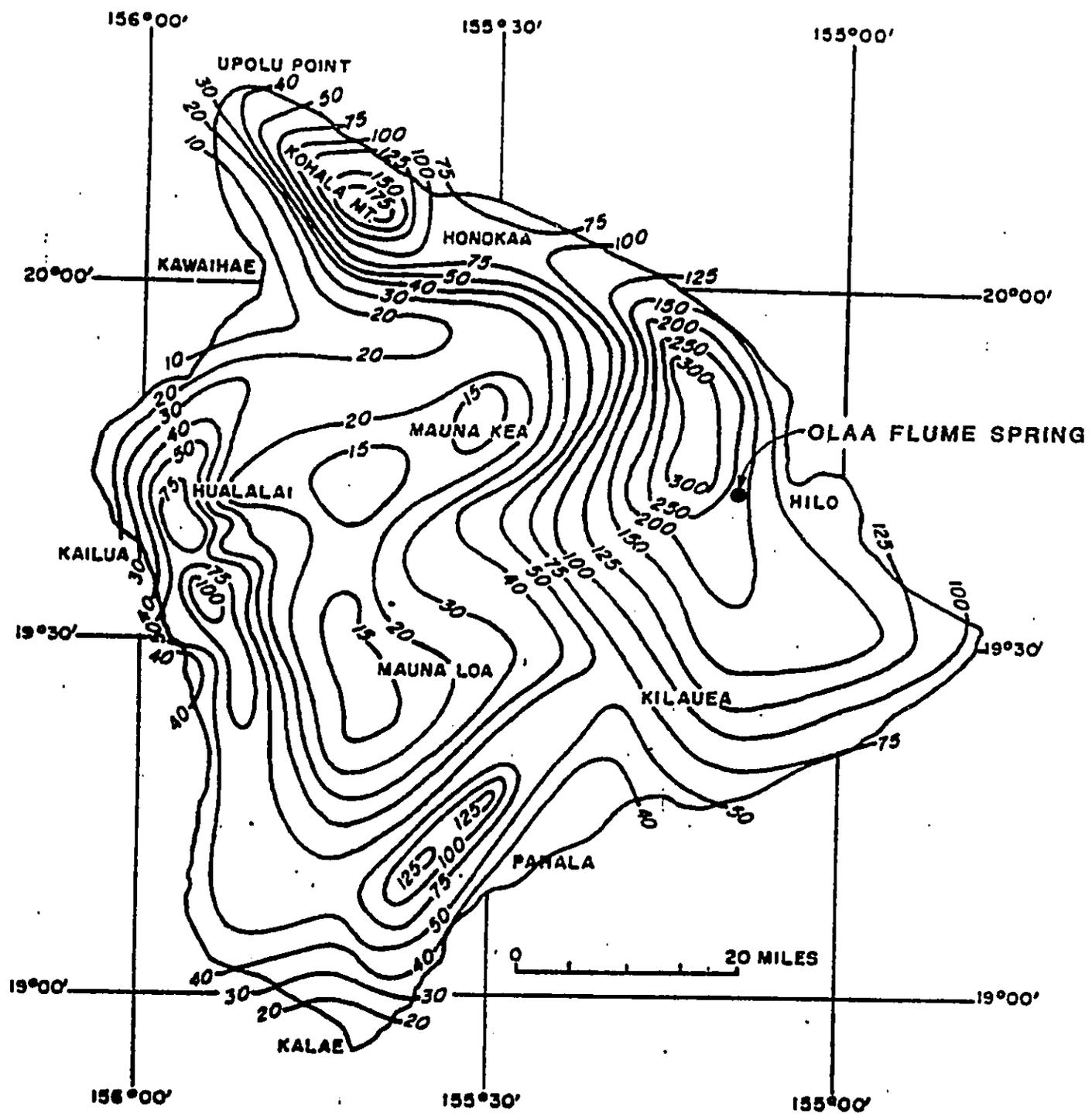
The Pahoehoe lava bedrock is very slowly permeable except where cracks occur and the surface layer is rapidly permeable. Runoff is medium and the erosion hazard is slight.

Adjacent to Olaa Flume Spring is the Lava Flow of 1855. This is Pahoehoe lava flow which is typically bare except for mosses and lichens. Where cracks and crevices occur, ohia trees, aalii, and other trees exist due to heavy rainfall. This type of lava contributes to the groundwater supply.

Water Source Quantity and Quality

From earlier studies by Daniel Lum and William J. Hull, Olaa Flume Spring produces an average flow of 6 to 7 million gallons per day (mgd), with an estimated low-flow of 500,000 gallons per day.

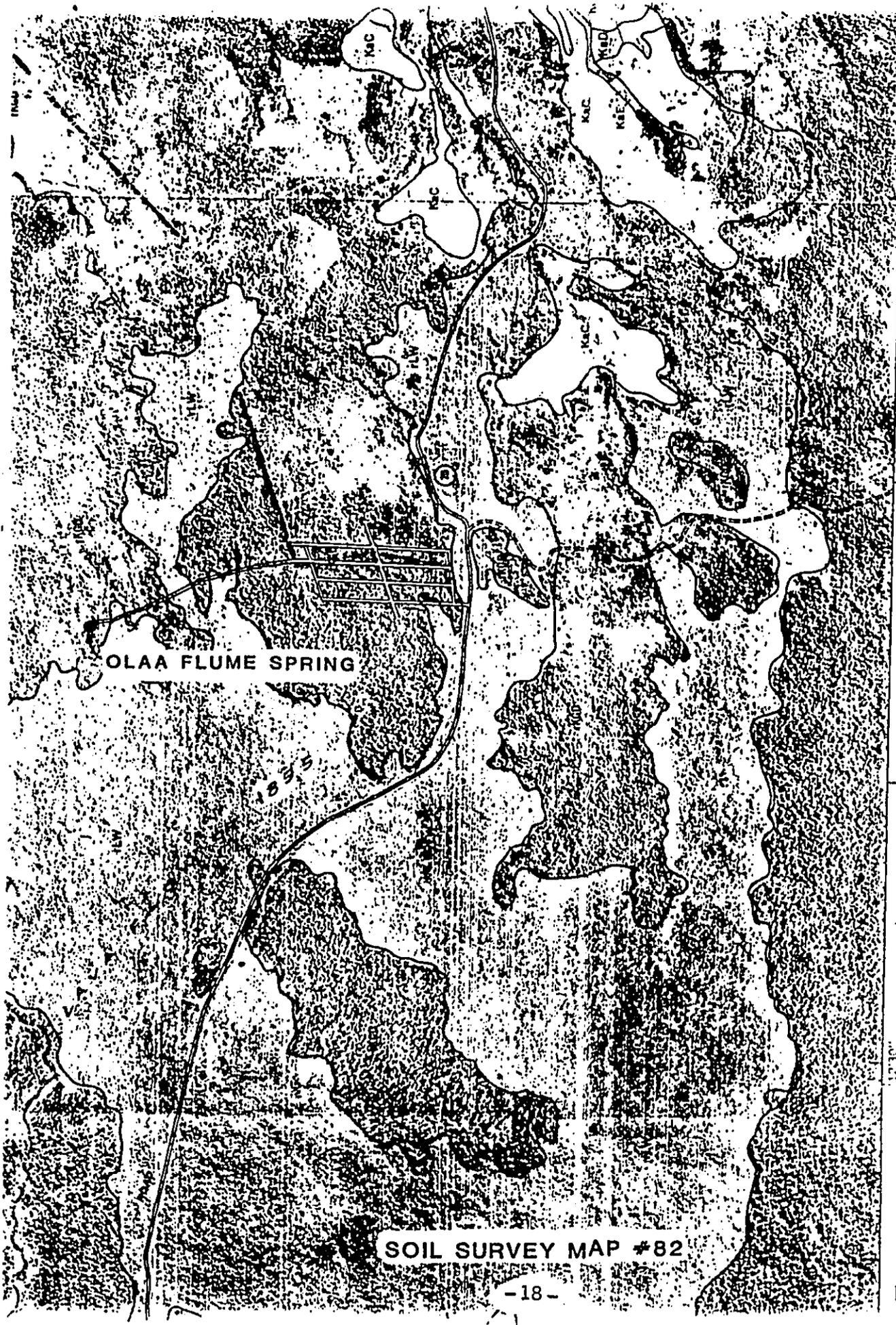
The Olaa Flume Spring is a subterranean perched groundwater spring which receives water that percolates through the Lava Flow of 1855. It is believed that perched water storage is adequate for sustained low flows but small enough to provide rapid response to climatic conditions. With heavy rains, the spring supply changed from 1 mgd to 7 mgd in 4 days.



Mean Annual Rainfall in Inches

RAINFALL MAP

Source: USGS Report R47



SOURCE: SOIL SURVEY OF ISLAND OF HAWAII: USDA, SOIL CONSERVATION SERVICE

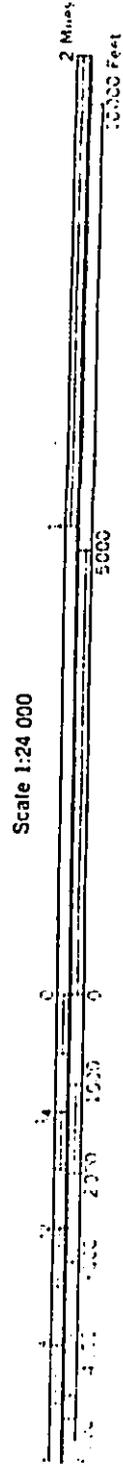


FIGURE TEN

A water quality analysis was conducted on March 4, 1992 of Olaa Flume Spring water in the tunnel and results were as follows:

Turbidity = 0.18 NTU
pH = 7.30
Temperature = 18.1°C
Fecal Coliform Negative at the spring location
Fecal Coliform Positive at the porthole location

Regulator monitoring from 1983 to present indicates that no chemicals exist in the source or corresponding watershed areas. The Hilo Watershed area remains pristine and that accounts for the higher quality drinking water produced from this source.

We are experiencing bacteriological contamination from the porthole and chlorine disinfection adequately inactivates the bacteria. This project will minimize the contamination potential.

Vegetation

A reconnaissance of the service road and materials storage areas was conducted to document plant life and to investigate potential environment problems.

There exists cleared footpaths that coincide with the proposed service road alignment (see Figure 11, Vegetation and Footpath Map). Approximately 2,640 square feet of vegetation will be cleared for the service road construction.

V. SUMMARY OF IMPACTS AND ALTERNATIVES CONSIDERED

Short-Term Impacts

During the construction of the project, minor adverse impacts such as noise and muddy conditions are anticipated.

Long-Term Impacts

Air Quality

No significant impact to air quality is expected.

Landforms and Flora

A strip of vegetation 10 feet wide by 450 feet long will be cleared and graded. Manufactured gravel will be laid to stabilize the road surface. Existing cleared foot trails are within the proposed service road corridor.

Water Quality

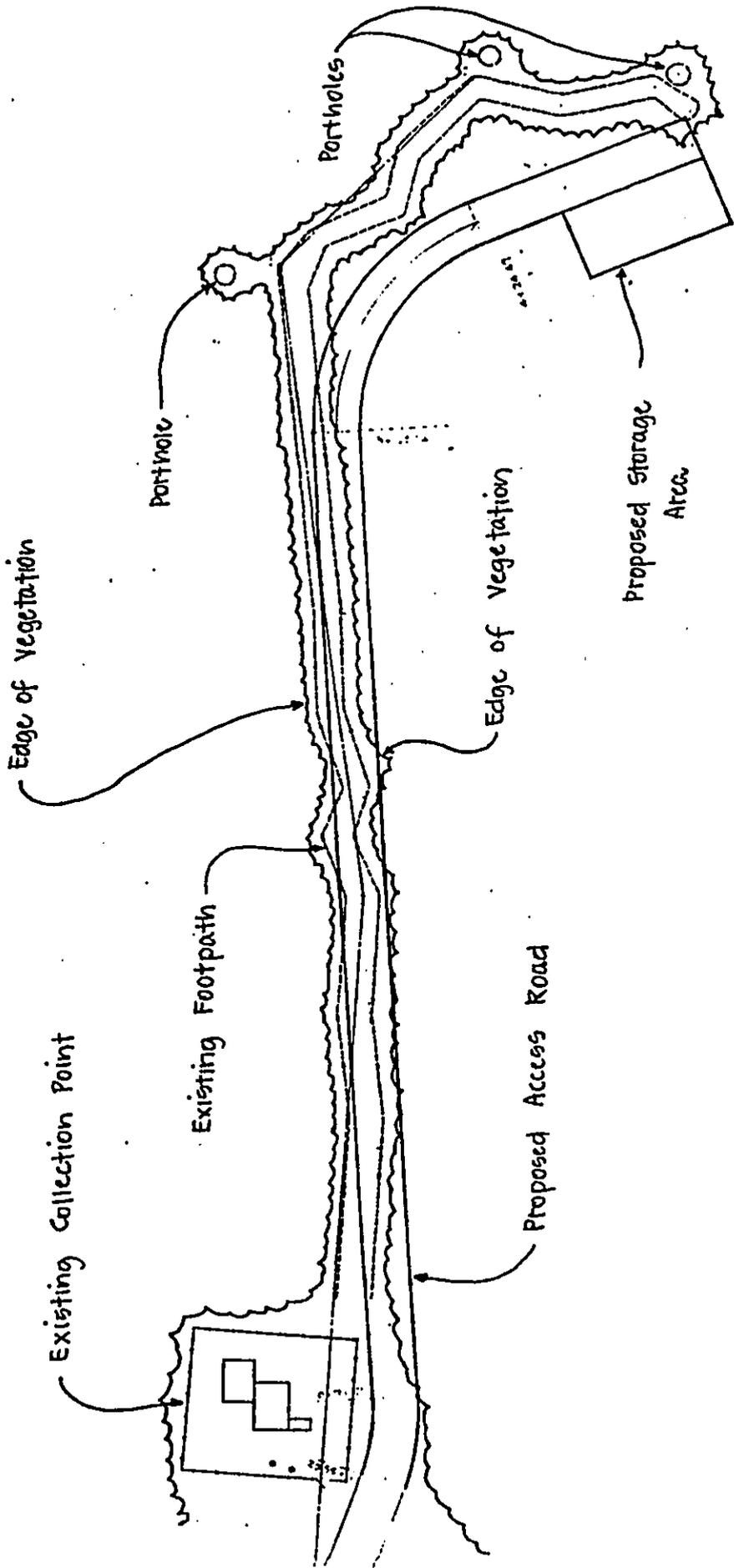


Figure 11 Vegetation and Footpath Map

Water Quality

This project will improve the water quality of this drinking water source.

Noise

No significant noise impact is anticipated.

Traffic

No significant traffic impact is anticipated.

Archaeological

No significant archaeological impact is anticipated.

Fauna

No significant impact on fauna is anticipated.

Visual

No significant visual impact is anticipated.

Alternatives Considered

The "no action" alternative was considered but deemed to be unacceptable because the benefits of this project far outweigh the adverse impacts of the project.

Mitigation Measures

The temporary materials storage site will be revegetated after the project is complete. Native plants similar to the ones found in that vicinity will be used.

The temporary muddy conditions from land clearing will be kept to a minimal by planning service road construction during dry weather conditions.

Determination

The Olaa Flume Tunnel Improvement is not expected to cause significant impacts to the environment. Therefore, it has determined that a negative declaration will be filed.

Findings and Reasons Supporting Determination

1. The proposed project will not involve the destruction to any natural or cultural resources.
2. The proposed project will not curtail the range of beneficial uses of the environment.
3. The proposed project will not conflict with the State's long-term environmental policies.
4. The proposed project will not substantially affect the economic or social welfare of the community or State.
5. The proposed project will not involve substantial secondary impacts, such as population changes or effects on public facilities.
6. The proposed project will not involve substantial degradation of environmental quality.
7. The proposed project will not substantially affect any rare, threatened or endangered species of flora or fauna or habitat. No endangered species of flora or fauna are known to exist in the project site.
8. The proposed project will not detrimentally affect air or water quality or ambient noise levels.
9. The proposed project will not be located in any environmentally sensitive area, such as flood plain, tsunami zone, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.

For the reasons above, the proposed project will not have any significant effect in the context of Chapter 343, Hawaii Revised Statutes.

VI. LIST OF AGENCIES CONSULTED AND REFERENCES USED

1. Department of Land and Natural Resources, State of Hawaii
2. Department of Planning, County of Hawaii
3. Department of Health, State of Hawaii
4. Soil Conservation Service, U.S. Department of Agriculture
5. The General Plan, Hawaii County, November 1989
6. Soil Survey of Island of Hawaii, State of Hawaii, December 1973

7. Hawaii County Water Use and Development Plan, December 1989
8. Hawaii Revised Statutes, Title II, Chapter 20, Rules Relating to Potable Water
9. Final Environmental Impact Statement, Wailuku River Hydroelectric Project, August 1989
10. Botanical Survey, Wailuku River Hydroelectric Project, February 1992
11. Faunal Survey, Wailuku River Hydroelectric Co. Project Site, April 4, 1992
12. Archaeological Survey of Proposed Wailuku River Hydroelectric Facilities, letter dated May 9, 1991, from Chiniago, Inc., Archaeological Consulting, to Rhett C. Hurless, Wailuku River Hydroelectric Power Company, Inc.
13. State of Hawaii Data Book, 1981
14. County of Hawaii Data Book, 1980
15. Appraisal Report - O'laa Flume Spring Source, November 1975
16. Reconnaissance of the O'laa Flume Source, December 21, 1973
17. Archaeological and Historical Literature Search and Research Design, Lava Flow Control Study, Hilo, Hawaii, by Holly McEldowney, 1979