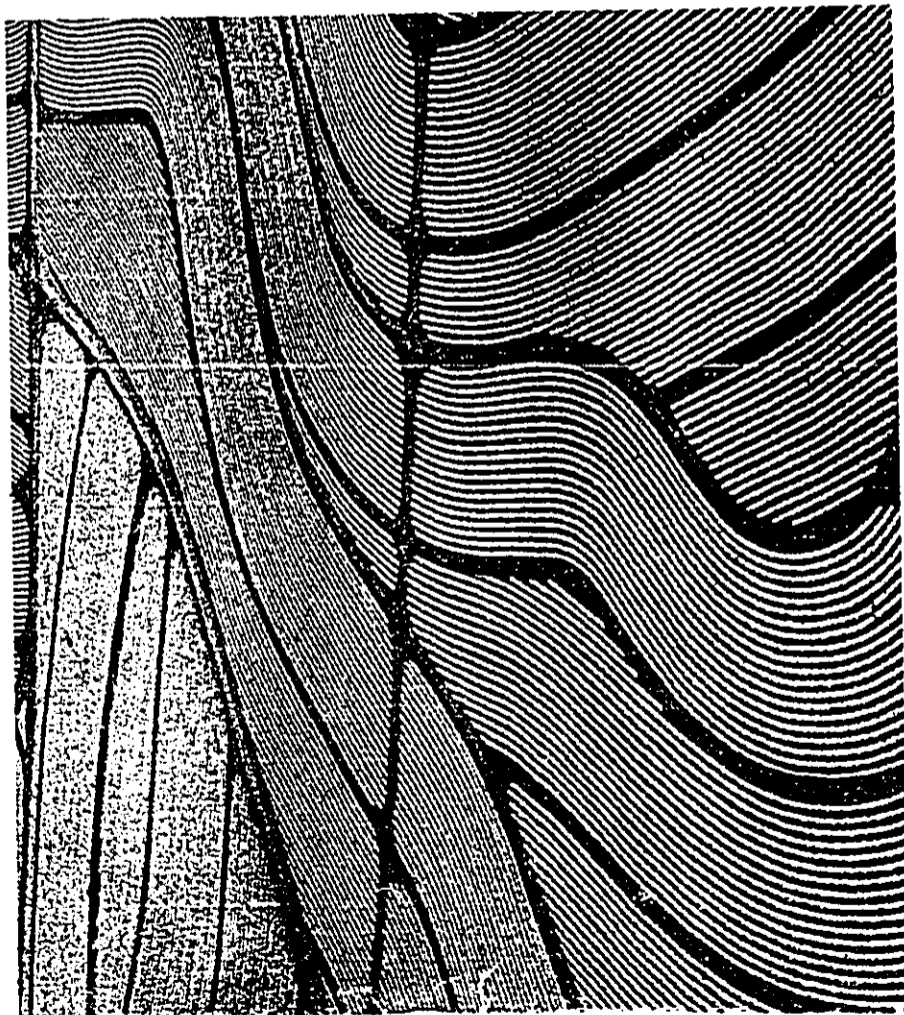


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**Final Environmental
Impact Statement
HONOLUA WATERSHED**

Maui County, Hawaii

MARCH 1976



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HONOLUA WATERSHED PROJECT
MAUI COUNTY, HAWAII

FINAL ENVIRONMENTAL IMPACT STATEMENT

Francis C. H. Lum
State Conservationist
Soil Conservation Service
Honolulu, Hawaii

Sponsoring Local Organizations

West Maui Soil and Water Conservation District
P. O. Box 1170
Wailuku, Hawaii 96793

County of Maui
Wailuku, Hawaii 96793

March 1976

PREPARED BY
UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
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Honolulu, Hawaii 96813

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USDA ENVIRONMENTAL IMPACT STATEMENT
HONOLUA WATERSHED PROJECT
MAUI COUNTY, HAWAII

Prepared in Accordance with
Sec. 102(2)(C) of P.L. 91-190

SUMMARY

- I. Final
- II. Soil Conservation Service
- III. Administrative
- IV. Description of Action: A project for watershed protection and flood prevention in Maui County, Hawaii, to be implemented under the authority of the Watershed Protection and Flood Prevention Act (P.L. 566, 83d Congress, 68 Stat. 666), as amended. Project measures consist of eight desilting basins, about 0.8 miles of floodwater diversions, about 0.7 miles of floodwater channels, land treatment measures on about 24,000 acres, four bridges, relocation of three water mains, and controlled use of flood plain areas.
- V. Favorable Environmental Effects: The project will reduce annual floodwater, erosion, and sediment damages; improve the quality of coastal waters; reduce damage to marine habitat; improve social and economic conditions; reduce risk of loss of life, improve the aesthetic quality of the landscape, reduce vectors, conserve productivity of agricultural lands, and create areas of open space through zoning. The efficiency of agriculture will be improved by the reduction of replanting and refertilizing costs. Harvesting schedules and milling operations can continue with minimal disruption resulting from flood damage to young sugarcane.

Adverse Environmental Effects: The project will eliminate agricultural production and marginal wildlife habitat on the areas occupied by channels, diversions, and desilting basins; remove trees and shrubs along channel work areas; produce some water, air, and noise pollution during construction, and temporarily inundate areas of basins during floods, as well as create temporary adverse visual effects. Restrictive measures applied to the flood plains below desilting basins will reduce the available acreage along the watershed coastline for intensive development, reduce property values in these areas, and increase the value of adjacent nonflood-prone land.

- VI. Alternatives Considered: (A) Accelerated Land Treatment only, (B) Accelerated Land Treatment, Flood Plain Zoning, Flood Proofing, and Flood Insurance, (C) Accelerated Land Treatment and Vegetative-lined Channels, (D) Accelerated Land Treatment and Concrete-lined Channels, and (E) No Project.
- VII. Comments were received from the following agencies and private organizations:

Federal

Advisory Council on Historic Preservation
Department of the Air Force
Department of the Army - Corps of Engineers
- Army Support Command, Hawaii
Environmental Protection Agency
Department of Commerce - Fish and Wildlife Service
Department of Health, Education, and Welfare
Department of the Interior
Department of Transportation - Coast Guard
- Federal Highway Administration

State

Department of Agriculture
Department of Health
Department of Land and Natural Resources
Department of Transportation
Department of Planning and Economic Development (State
Clearinghouse)
Office of Environmental Quality Control
University of Hawaii - Environmental Center
- Water Resources Research Center

County of Maui

Planning Department

Private

Pioneer Mill Company, Ltd.

- VIII. Draft statement transmitted to CEQ on October 3, 1974.

PROJECT IDENTIFICATION AND ENVIRONMENTAL SETTING

USDA Soil Conservation Service
Final Environmental Impact Statement^{1/}

For

HONOLUA WATERSHED, HAWAII

AUTHORITY

Installation of this project constitutes an administrative action. Federal assistance will be provided under authority of Public Law 83-566, 83d Congress, 68 Stat. 666, as amended.

LOCAL SPONSORING ORGANIZATIONS

1. West Maui Soil and Water Conservation District
2. County of Maui

PROJECT PURPOSES

Goals of the project are to reduce erosion, prevent floodwater and sediment damage in the flood plain, and reduce sediment pollution of coastal waters.

Project sponsors have noted a deterioration in the quality of the natural resource base, and are requesting watershed protection through conservation land treatment and structural measures.

The sponsors' specific goals are:

1. Land treatment--Establish 100 percent of the needed conservation measures on 23,980 acres during a 5-year installation period.
2. Flood prevention--Provide a 100-year level of flood protection to the areas presently flooded by the Napili 2-3, Honokowai, and Mahinahina Streams (see Appendix B).
3. Sediment reduction--Reduce sediment deposition by at least 50 percent in coastal waters along the 4-mile shoreline from Honokowai Stream to Napili Bay.

^{1/} All information and data, except as otherwise noted by reference to source, were collected during the watershed planning investigation by the Soil Conservation Service and Forest Service, U.S. Department of Agriculture.

PLANNED PROJECT

Land Treatment Measures: Land treatment measures to conserve soil and water will be applied during the 5-year installation period to 5,925 acres of cropland, 1,000 acres of pastureland, 16,655 acres of forest land, and 400 acres of other land. The Soil Conservation Service and the U.S. Forest Service will provide technical assistance to land owners and operators, who will install the needed measures on a voluntary basis. All land in the watershed is privately or state owned. U.S. Forest Service technical assistance will be provided through the State Division of Forestry for both public and private lands.

Cropland treatment measures include:

- Contour farming on sloping cultivated lands to reduce water runoff (300 acres).
- In-field diversions to collect runoff water from areas of concentration and carry it at safe velocities to protected outlets (90,000 feet).
- Grassed waterways to provide safe outlets for in-field diversions (25 acres).
- Irrigation water management to increase irrigation efficiency (2,400 acres).
- Establishment of permanent or temporary vegetative cover whenever cropland is removed from production (200 acres).
- Conservation cropping systems (5,925 acres).
- Crop residue management (5,925 acres).

Pastureland treatment measures include:

- Pasture management to maintain or improve proper use of pastures (1,000 acres).
- Pasture planting to improve or replace poor and low-producing forage (755 acres).
- Livestock water development to provide for efficient and uniform grazing patterns to reduce erosion and runoff (5,000 feet).

Forest land treatment measures include:

- Livestock management to properly use grazing areas within the forest (3,500 acres).
- Revegetation with grass or woody plants to provide cover on eroding areas (200 acres).

- Reforestation to provide cover on barren slopes in the lower watershed (200 acres).
- Forest management to control pests, disease, and fire (16,655 acres).

Treatment measures for other land include:

- Grade stabilization structures to stabilize the grade or to control head cutting in natural or artificial channels (7 each).
- Critical area planting to control erosion on barren areas with trees, shrubs, grass, or legumes (20 acres).
- Diversions to collect runoff water from areas of concentration and carry it at safe velocities to protected outlets (1,000 feet).
- Debris basins to trap sediment with a dam across a waterway or other water course (4 each).
- Mulching to conserve moisture and control erosion with plant residues of other suitable material (20 acres).

Nonstructural Measures: Nonstructural measures will be needed in the flood plain below desilting basins Nos. 2, 3, 4, 5, and 6 (see Appendix B). Structural and land treatment measures planned for this project will not prevent flood damage in these flood plains. These areas are zoned and partially developed for residential and resort use. The county of Maui will control development by zoning or restrictive building permit provisions only for those areas wherein said zoning controls or building permit provisions are applicable.

Structural Measures: Measures include eight desilting basins, 0.7 miles of floodwater channels, and 0.8 miles of floodwater diversions.

Dams for the desilting basins will be 24- to 43-foot-high earth fills with concrete drop inlet spillways designed to carry the 100-year peak runoff, plus required freeboard. Desilting basins will be designed to trap particles greater than 0.05 mm. Drain pipes with graded filter will be incorporated in the spillways to provide complete drawdown of the basins in about 24 hours. The dams on Mahinahina and Pohakukaanapali gulches will serve as highway fills for the state's Honoapiilani Highway realignment. The county will construct an unlined channel that will relocate Honokowai Stream to the north, so that one bridge will be required rather than two. This channel will be lined as part of the structural measures under this project. Adequate borrow material is located in construction areas, and the county will obtain necessary land rights prior to construction. Brush and trees within the limits of desilting basins (31.5 acres) will be removed and disposed of in sanitary landfills designated by the county of Maui.

Project plans include three rectangular, concrete-lined channels: Napili 2-3, Mahinahina, and Honokowai. Napili 2-3 Channel will extend about 1,545 feet from desilting basin No. 1 to the ocean; Mahinahina Channel will extend about 822 feet from desilting basin No. 7 to the ocean. Both will follow the existing drainageways. Honokowai Channel will extend about 1,533 feet from desilting basin No. 8 to the present stream crossing at Honoapiilani Highway. An existing lined channel--fenced and adequate to carry the 100-year storm runoff--extends from this location to the ocean. Channels below the remaining five desilting basins will not be modified. All project channels will be fenced for safety. Trees, shrubs and grass will be planted along the lined channels after installation wherever the existing vegetation has been removed to facilitate construction.

Three bridges will be constructed with the 8-inch watermain relocated at each highway crossing of the Napili 2-3, Mahinahina, and Honokowai Channels. A bridge will also be constructed at the cane haul road and Honokowai Channel crossing.

The Honokowai and Mahinahina floodwater diversions will be designed to protect about 69 acres of agricultural and urban land. They will be concrete-lined, trapezoidal diversions, outletting into desilting basins Nos. 7 and 8. Three culverts will be installed and irrigation pipe will be relocated along the Honokowai diversion.

The channels and floodwater diversions will be excavated through silty surface soils ("ML" and "MH" under the Unified Soil Classification System) and into saprolite in the deeper sections. Scattered large boulders and rock outcrops may be encountered during channel construction near the coastline.

All structural measures will be designed for a 100-year life. In addition, all will be designed to carry the 100-year (1 percent chance) storm runoff.

A total of 44.4 acres will be committed to structural measures, including 36.4 acres in gulches and 8 acres now in sugarcane production. Installation will commit 6.8 acres for damsites, 4.6 acres for channels, and 1.5 acres for diversions. The remaining 31.5 acres committed will be required for sediment basins, which will remain dry except during storms.

Steep sides of the sediment basins will be shaped and revegetated. There will be no relocations resulting from acquisition of land rights.

The Bishop Museum, National Park Service, State Historic Preservation Officer, and the Department of Land and Natural Resources (DLNR) will be notified if artifacts or other items of archaeological or historical significance are uncovered before or during construction and plans for salvage will be arranged as determined necessary. Since this is a federally assisted local project, there will be no change in the existing responsibilities of any federal agency under Executive Order 11593 with respect to archeological and historic resources.

Special design and construction features will limit soil erosion and air, water, and noise pollution during construction. Procedures to be incorporated in construction contracts include the following: excavation and disposal of excavated material will be performed to minimize the amount of sediment transported downstream by runoff; contractors will construct preventive measures such as diversions and temporary debris basins to prevent debris and silt from entering the ocean; operations likely to contribute sediment will be done during nonstorm seasons; earth dams and other areas disturbed during construction will be fertilized, vegetated, mulched, and watered; construction machinery will be equipped with residential type mufflers to limit noise; water wagons will be used to control dust; and earth moving equipment will be shut down when wind velocity exceeds 25 miles per hour.

The sponsors will assure that the project complies with the county grading ordinance and the state water quality regulations. Excavated material, construction debris, and sediment deposits in debris basins will be disposed of at a county sanitary land fill.

Operation and Maintenance: The county of Maui will operate and maintain all structural measures to assure efficient operation for the life of the project. Operation and maintenance agreements will be executed prior to signing project agreements.

Operation and maintenance for channels and diversions will include removing and properly disposing of debris and sediment deposited after each major storm. Additional maintenance associated with lined channels includes repairing cracks and similar damage, and keeping maintenance roads in usable condition. Maintenance associated with desilting basins includes reseeding or resodding any area damaged by erosion or use; cutting or spraying (with state-approved herbicide) undesirable vegetation; fertilizing to maintain vigorous stands; mowing grass at regular intervals to maintain optimum cover; and removing debris and sediment at least annually or whenever sediment storage is reduced by 10 percent.

The county of Maui, the West Maui Soil and Water Conservation District, and the Soil Conservation Service will jointly inspect all structures annually, and after severe storms, for 3 years following project installation. Thereafter, the county will inspect structures and submit reports to the SCS noting maintenance needs and scheduling appropriate corrective actions.

Annual operation and maintenance cost is estimated at \$41,200 and will be included in the county's annual budget as appropriated from the general fund.

Project Costs: Total project installation cost is estimated at \$6,582,900, including \$451,500 for land treatment measures and \$6,131,400 for structural measures. The following table shows costs distributed to PL-566 and other funds:

<u>Item</u>	<u>PL-566</u>	<u>Other</u>	<u>Total</u>
Construction	\$3,932,500	--	\$3,932,500
Total Project	\$4,894,100	\$1,688,800	\$6,582,900

The benefit-to-cost ratio is 1.5:1.0.

ENVIRONMENTAL SETTING

Physical Resources: The 24,800-acre Honolua Watershed is located on the western end of the island of Maui, Hawaii, approximately 25 miles by road from Wailuku-Kahului, the principal business center of the island. The southern boundary of the watershed lies 5 miles north of Lahaina and 1 mile north of the Kaanapali resort area.

The island of Maui is classified as a "subregion" of the Hawaii Water Resources Region established by the Water Resources Council to include the entire state.

The upper point of the watershed is Puu Kukui, the highest peak of the West Maui mountains (elev. 5,788 feet). ^{2/} Twelve major gulches fan outward to form the 10-mile long section of the watershed coastline (see Project Map).

The soils in the watershed have been grouped into five associations:^{3/}

Pulehu-Ewa-Jaucus association: Deep, nearly level to moderately sloping, well-drained and excessively drained soils that have a moderate fine-textured to coarse-textured subsoil on underlying material; on alluvial fans and in basins.

The above association is found on shore and near-shore locations and mouths of gulches and is generally not in use for agriculture.

Waiakoa-Keahua-Molokai association: This association is made up of moderately deep and deep, nearly level to moderately steep, well-drained soils that have a moderate fine-textured subsoil; on low uplands.

Honolua-Olelo association: This association is made up of deep, gently sloping to moderately steep, well-drained soils that have a fine-textured subsoil, on intermediate uplands.

The above two associations make up the great bulk of the agricultural lands in the watershed.

^{2/} Hawaii Department of Planning and Economic Development, "Elevations of major mountains in Hawaii," Statistical Report 52, Nov. 1967, as revised.

^{3/} U.S. Department of Agriculture, "Soil survey of islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii," Soil Conservation Service, U.S. Govt. Print. Off., 1972.

Rock land-Rough Mountainous land association: This association covers very shallow, steep and very steep, rock land and rough mountain land.

Hydrandepts-Tropoquods association: This association covers gently sloping to steep, well-drained to poorly drained soils that have a moderately fine-textured or fine-textured subsoil; on intermediate and high uplands.

The last two associations cover the forest reserve and upper watershed portions of this project.

The West Maui mountains were formed by volcanic action. The active volcanoes were of the "central type," and probably became extinct in either the Pliocene or earliest Pleistocene era.^{4/} Dikes now radiate from the ancient caldera, and the mountains have eroded to form steep canyons. Extruded basalts constitute the mass of the mountain foundation.

^{4/} Stearns, H. T., "Geology of the State of Hawaii," Pacific Books, Palo Alto, Calif., 1966.

The mean temperature at Lahaina is 77.5°F. with an average minimum of 61.4°F. and average maximum of 87.6°F. The growing season is 12 months long with only a slight reduction in the growth during the winter months.

The Honolua Watershed is exposed to three types of weather disturbances that produce torrential rains. These are the cold-front storms, the cyclonic "kona" storms, and the rarer tropical storms or hurricanes. The major storms usually occur during the months of October through May.

The average annual precipitation^{5/} at Puu Kukui Peak is about 400 inches, decreasing to about 20 inches along the Honokowai coastline and 30 inches along the Honolua Bay coastline.

High rainfall in the upper forested areas provides water to irrigate agricultural land in the watershed and 3,500 acres nearby. It is also used for domestic purposes.

Streamflows are diverted at higher elevations and transported in ditches, tunnels, and pipe systems. A combined total of 33.5 million gallons per day (MGD) is diverted from Honokohau, Honolua and Honokowai.^{6/} Walls and tunnels driven into diked (perched) water also provide a large supply and often are combined with diverted streamflows in the distribution system. Some basal water is tapped at lower elevations.

Although most of the water in private systems is used for irrigating sugarcane lands, it also supplements the public systems. Public and private systems use surface and high level ground water.

Ferruginous bauxite (iron-aluminum) deposits occur in the northern half of the watershed, from 200 to 1,000 feet elevation and extend 2 miles inland.^{7/} The deposits average 6 feet in thickness, and are covered with up to 20 feet of windblown nonbauxitic material. Total deposits, which extend north of the project area, are estimated to be from 9 million to 20 million dry tons. Average grade was estimated from drill samples at 38 percent aluminum oxide, 22 percent iron oxide, 7 percent silicon oxide, and 4 percent titanium oxide. The area is privately owned. There are no known plans to mine the material.

^{5/} Hawaii Water Authority. "Rainfall of the Hawaiian Islands," Honolulu, Hawaii, 1959.

^{6/} U.S. Geological Survey, "Preliminary Report on the Resources of the Lahaina District, Maui, " Circular C51, February 1969.

^{7/} Memorandum from R. N. Appling, Jr., U.S. Department of the Interior, Bureau of the Mines, Spokane. Washington. September 27, 1971.

Present land use in the watershed is distributed as follows:

<u>Use</u>	<u>Acreage</u>	<u>Percent of Total</u>
Cultivated crops:		
Pineapple	4,120	16.6
Sugarcane	2,400	9.7
Other	25	0.1
Forests:		
Reserve	8,900	35.9
Other	7,755	31.3
Pasture	1,000	4.0
Urban:		
Residence, apartment, and hotel	500	2.0
Other	<u>100</u>	<u>0.4</u>
	24,800	100.0

The watershed is incised by deep valleys radiating outward from the top of the drainage area to the ocean. Valleys typically range from 600 to 1,200 feet deep and 1,500 feet wide in their upper reaches, and to about 80 feet deep and 500 feet wide in their lower reaches. Grades begin at about 16 percent and flatten to 6 percent as they approach the ocean. Defined channels exist in the major valleys, varying from 5 to 10 feet deep and 10 to 20 feet wide. Outside of these channels, the valleys are vegetated with koa haole, guava, lantana, java plum, pukeawe, staghorn fern, and various shrubs.

Of the major 12 defined valleys, five have perennial flows but only Honokohau with 30 MGD flows perennially to the ocean. Honokowai with 8 MGD mean annual flows is diverted for sugarcane irrigation, and only flows to the ocean during intense rains. Honokahua, Honolua, and Kahana are perennial above 800 feet but are normally dry below that elevation due to percolation into the streambed. All other streams are dry except during periods of high rainfall.

All streams are in their natural conditions except the lower reaches of Napili 2-3, Mahinahina, and Honokowai. About 600 feet of Napili 2-3 have been shaped and vegetated, 400 feet of Mahinahina have been enlarged and rock-lined, and 1,000 feet of Honokowai have been enlarged and concrete-lined.

All streams in the watershed have been designated as Class 2 waters. Class 2 waters are described as follows:

The uses to be protected in this class of waters are bathing, swimming, recreation, growth and propagation of fish and other aquatic life and agricultural and industrial water supply. It is the objective for this class of waters that their use for recreational purposes, propagation of fish and other aquatic life and agricultural and industrial water supply not be limited in any way. Such waters shall be kept clean of trash, solid materials or oils and shall not act as receiving waters for any effluent which has not received the best practicable treatment compatible with the standards established for this class.^{8/}

Present and Projected Population: From 1960 to 1970, the population of the Lahaina District increased by approximately 14 percent.^{9/} Population in Honolua Watershed has remained comparatively stable during the past decade and is presently estimated at 1,000. Its multiracial composition, represented primarily by Caucasian, Polynesian, and Oriental races, is typical of the state's population. The watershed population should reach approximately 5,000 by 1990.^{10/}

Economic Resources: Most of the land (22,350 acres) in the watershed is privately owned. There is no federally owned or managed land. The state of Hawaii owns approximately 950 acres of forest land in the watershed; 750 acres are within the forest reserve, and 200 acres outside of the forest reserve. The state also owns 1,500 acres of agricultural land in the Napili 4-5 and Honokowai areas. This land is presently leased to private operators.

Landownership in the watershed is distributed as follows:

	<u>Percent</u>	<u>Acres</u>
Private (outside forest reserve)	57.2	14,200
Forest Reserve (private)	32.9	8,150
Forest Reserve (public)	3.0	750
Other Public Lands	6.9	1,700
Total	100.0	24,800

^{8/} Department of Health, State of Hawaii, Chapter 37-A, Water Quality Standards, Public Health Regulations, January 1968.

^{9/} U.S. Department of Commerce, "1970 Number of Inhabitants, Hawaii," Bureau of the Census, PC (1)A13, April 1971.

^{10/} General Plan for the Lahaina District, County of Maui. Financed in part under the provisions of Section 701 of the Housing Act of 1934, as amended, December 1968.

Agriculture is an important industry in the watershed. The watershed produces about 10 percent of the state's pineapple output and 1 percent of the state's raw sugar output. The following table depicts average annual gross value of watershed agricultural enterprises:

<u>Enterprises</u>	<u>Number of Enterprises</u>	<u>Average Annual Gross Value</u>
Pineapple	1	\$3,696,000
Sugarcane	1	2,730,000
Other crops	5	8,400
Beef	16	84,000
	<hr/>	<hr/>
Total	23	\$6,518,400

Cropland within the watershed was valued at \$1.40 per square foot or approximately \$60,000 per acre in 1975, according to the Maui Board of Realtors. The market value for residential zoned land was approximately \$110,000 per acre. Beach front properties commanded a premium price ranging from \$5 to \$12 per square foot. Few differences were noted in value of land located in the flood plain, except that beach front property is considered more valuable than inland property.

Farms and ranches have access to markets via the Honoapiilani Highway, the only artery linking the Lahaina District with the commercial airport at Kahului. The area is also served by a network of private roads, providing good access to the watershed. The Kahului Harbor, the only deepwater port for the island, provides interisland barge and container service for sugar, pineapple, cattle, agricultural exports, and capital and consumer goods imports.

Lahaina District presently is experiencing economic growth primarily based on development of its tourist industry. Maui County developed and adopted a 701 General Plan^{11/} in 1968 designed to promote orderly growth and preserve the national landmarks and environment in the district.

In 1970, industry in the Honokohau District, which includes the Honolua Watershed, employed 734 workers^{12/} of whom 37 percent, or 270, were associated with producing sugar and pineapple. The mean annual wage paid in 1969

^{11/} Ibid.

^{12/} Department of Labor and Industrial Relations, State of Hawaii, "Selected manpower indicators, Maui County, 1970," August, 1972.

was \$5,500.^{13/} By 1990, the work force is expected to increase to 15,800, the majority of whom will be employed by the tourist industry. In 1966, 5.4 percent of the Lahaina District's work force was unemployed. The December 1973 rate was approximately 8 percent.^{14/}

The Tri-Isle RC&D Project, which includes the three islands in Maui County, is a resource conservation and development project authorized under Public Law 87-701. It includes project actions to improve the natural resource base and provides for economic improvement and social enhancement. The U.S. Department of Agriculture is providing financial and technical assistance.

Plant and Animal Resources: There are about 550 acres of tree plantations, mostly outside the forest reserve. These introduced species for forestry production and watershed protection are mainly sugi, Cryptomeria japonica; Norfolk-Island-pine, Araucaria heterophylla; Monterey cypress, Cupressus macrocarpa; and Eucalyptus and Juniper spp.

Predominant native forest types in the watershed area are ohia, Metrosideros collina; and koa, Acacia koa. Introduced exotic tree stands contain Eucalyptus spp.; monkey pod, Pithecellobium saman; silk oak, Grevillea robusta; Norfolk-Island-pine, Araucaria heterophylla; sugi, Cryptomeria japonica; brushbox, Tristania conferta; ironwood, Casuarina spp.; paperbark, Melaleuca leucadendron; Monterey cypress, Cupressus macrocarpa; kukui, Aleurites moluccana; false staghorn fern, Dicranopteris linearis; lantana, Lantana camara; koa haole, Leucaena glauca; and honohono, Commelina diffusa.

The lower reaches of the gulches and noncultivated land along the coastline are occupied by low elevation trees and shrubs such as kiawe, Prosopis pallida; Christmas berry, Schinus terebinthifolius; java plum, Eugenia cumini; guava, Psidium guajava; and koa haole, Leucaena glauca.

^{13/} U.S. Department of Commerce, "1970 Census of Population and Housing," Bureau of the Census, Census Tracts PHC (1)-88, 1972.

^{14/} Determined by allowing for changes in the unemployment rate for Maui between 1970 and December 1973 and considering varying definitions between the Bureau of the Census and Department of Labor and Industrial Relations. The data further assumes the ratio of unemployment in the watershed area to unemployment for the county, as a whole, is the same in December 1973 as it was in 1970, as per telephone conversation between Gordon Frasier, Division of Research, Department of Labor and Industrial Relations, State of Hawaii, and J. David Hoodenpyle, SCS, Honolulu, Hawaii, February 1974.

Common pasture grasses include dallisgrass, Paspalum dilatatum; hilograss, Paspalum conjugatum; and yellow foxtail, Setaria spp. Other introduced forage plants such as guineagrass, Panicum maximum; bermudagrass, Cynodon dactylon; kikuyugrass, Pennisetum clandestinum; and pangolagrass, Digitaria decumbens, have been planted to improve pastures.

Sea life along the watershed coastline is similar to that of most tropical islands where colorful fish and other marine life live in and around the reef. Fish found along the shores and bays of this watershed include maomao, Abudefduf abdominalis; damsel fish, Abudefduf imparipennis; maikoiko, Acanthurus leucopareius; surgeon fish, Acanthurus nigrofuscus; manini, Acanthurus triostegus; spotted eagle ray, Aetobatus narinari; a'awa, Bodianus bilunulatus; common name unknown, Cathigaster amboinensis; common name unknown, Cathigaster jactator; lauwiliwili, Chaetodon miliaris; lauhau, Chaetodon quadrimaculatus; kikakapu, Chaetodon ornatissimus; common name unknown, Chromis leucurus; common name unknown, Chromis ovalis; kole, Ctenochaetus strigosus; common name unknown, Entromacrodus marmoratus; akilolo, Gomphosus varius; humuhumu-uli, Melichtys niger; weke, Mulloidichthys samoensis; Kalaholo, Naso brevirostris; unicorn fish, Naso unicornis; common name unknown, Ostracion meleagris camurum; pilikoa, Parachirrites arcatus; moano kea, Parupeneus chryserydos; moano, Parupeneus multifasciatus; munu, Parupeneus bifasciatus; kumu, Parupeneus porphyreus; common name unknown, Pervagor melanocephalus; o'ili uwiwi, Pervagor spilosoma; damsel fish, Pomacentrus jenkinsi; humuhumu-nukunuku-a pua'a, Rhinecanthus aculeatus; common name unknown, Rhinecanthus rectangulus; parrot fish, Scarus spp.; omaka, Stethojulis balteata; hinalea, Thalassoma duperreyi; awela, Thalassoma purpureum; kihikihi, Zanclus canescens; and laipala, Zebrasoma flavescens. Many of the foregoing are important food fish.^{15/} Certain types of seaweed are also harvested.

Fresh water species in streams of the watershed are limited to black opae, Atya bisulcata; wi, Neritina granosa; goby, Chonophorus sp., Sicydium simpsoni, Lentipes seminudus; toads, Bufo marinus; and frogs, Diplasiocoela spp.^{16/}

The ephemeral and intermittent streamflows in channels in the watershed do not support fish populations.

There are many varieties of small introduced birds such as doves, sparrows, cardinals, and mynahs. These birds can be found in both the populated areas and the forest reserve lands. Native Hawaiian birds, such as I'iwi, Maui Amakihi, and Nukupuu, are found within the forest reserve

^{15/} Source: Environmental Consultants, Inc., "Fish Census: Honolulu Bay, West Maui, Hawaii, January and April, 1974; and "Handbook of Hawaiian Fishes" by William A. Gosline and Vernon E. Brock, University of Hawaii Press.

^{16/} Division of Fish and Game, State of Hawaii, Limnological Survey for Introduction of Exotic Species of Fish," June 30, 1963.

above the area which will be affected by the structural measures. The Nukupuu is a threatened Hawaiian species.^{17/} Pheasants are occasionally seen in the cultivated fields.

Small animals such as mongooses and rodents are common in the lower populated areas and cultivated fields. Wild pigs inhabit the upper restricted forest areas. No other game exists in the watershed. Hunting is almost nonexistent since most of the land is not open to the public.

There are no known threatened plant or animal species in the portion of the watershed area where structural measures are proposed.

Recreational Resources: The primary recreational resources in the watershed are the beaches and coastal waters. This area contains some of the longest uninterrupted stretches of wide, sandy beaches on the island. They are extensively used by residents and tourists for swimming, surfing, sunbathing, and fishing.

Archaeological and Historical Resources: An archaeological walk-through survey of areas where structural measures are proposed was made by a team headed by Michael Kaschko of the Bernice P. Bishop Museum in September 1974. Six sites were located. Sites 1 and 2 are located in Napili 4-5. Both are probable prehistoric house platforms. Also found were various stone walls, alignments, and terraces. A group of about 30 rock piles were also found. Site 3, located in Honokeana Gulch, was a walled structure which "appears to be of historic origin with a probable agricultural function." Site 4, located in Mahinahina Gulch was a cultural deposit of charcoal and shell midden material. Site 5, also located in Mahinahina Gulch, contained more extensive cultural deposits consisting of fire-cracked rocks, charcoal fragments, coral, marine snails, cowrie, "pipipi," sea-urchin spines, and small mussel shells. A small firepit and an "imu" were also present. Site 6, located in Honokowai Gulch, consisted of a "complex of several low stone alignments and platforms." It was previously identified by the State Historic Sites Inventory in 1973 as Site Number 50-50-03-1208.

A re-examination survey was conducted in July 1975 by a team headed by Aki Sinoto of the B. P. Bishop Museum. The team found that all the sites appear to "possess research potential and that all fall under the National Register Criteria in that they may be likely to yield information important in prehistory or history." They recommended that salvage operations be conducted on any sites that will be affected by construction. The team's evaluation and recommendation were sent to the State Historic Preservation Officer (SHPO) for an opinion on the eligibility of the sites in the National Register of Historic Places.

^{17/} U.S. Department of the Interior, "Threatened Wildlife of the United States," Bureau of Sport Fisheries and Wildlife, Resource Publication 114, March 1973.

SHPO requested more information before a decision could be made on the eligibility of these sites. The additional information was obtained from the Bishop Museum and sent to SHPO along with an opinion that the structures will have no effect on sites 1, 2, 3, and 6, but may have an effect on sites 4 and 5 if these sites are not destroyed by erosion before the desilting basin is built. An opinion by SHPO has not been made as yet on the effect and eligibility of the sites to the National Register of Historic Places.

There are no sites within the watershed area listed in the National Register of Historic Places.

Soil, Water, and Plant Management Status: Cropland in the watershed consists of 4,120 acres used for pineapple production and 2,400 acres in sugarcane. There are also about 25 acres used for small orchard, vegetable, and flower growing enterprises.

These uses of the land are long established and are expected to continue except for 50 acres of pineapple and sugarcane lands which have been rezoned for urban use under the Maui County Master Plan for West Maui.

The West Maui Soil and Water Conservation District has encouraged its cooperators to apply needed conservation measures and recognized those who have done so. Maui Pineapple Company was selected the District's outstanding cooperator in the 1968 Goodyear Conservation Awards Program for installing land treatment measures in newly planted fields.

The owners of 98 percent of the land in the watershed have signed cooperative agreements with the West Maui Soil and Water Conservation District. There are three SWCD cooperators, including one with a conservation plan. Presently, about one-third of the planned conservation practices have been applied with the balance scheduled for installation over the 5-year project period. There are 620 acres of cropland and 200 acres of other urban land that are presently adequately treated.

A Memorandum of Understanding exists between the West Maui Soil and Water Conservation District and the Hawaii Department of Land and Natural Resources concerning forestry land treatment. Through its Division of Forestry, in cooperation with the U.S. Forest Service, technical assistance is provided to private landowners on management of their forest lands.

Projects of Other Agencies: The county of Maui has completed emergency bank protection along approximately 450 feet of the Mahinahina Stream immediately below Honoapiilani Highway. The rock-masonry work will check further streambank erosion in this area pending installation of Mahinahina Stream channel lining.

Private developers have installed approximately 1,000 feet of concrete lining on the Honokowai Channel between the Honoapiilani Highway and the ocean. The channel is adequate to carry the 100-year storm runoff.

Private interests have modified, by straightening and vegetatively lining, about 600 feet of the Napili 2-3 Channel between the highway and the ocean.

WATER AND RELATED LAND RESOURCE PROBLEMS

The principal water and related land resource problem in the watershed is intense local rainstorms that cause overland flooding and sheet erosion of the agricultural areas, sediment deposition on the flood plain and beaches, and sediment pollution of coastal waters.

Land and Water Management: With the introduction of mechanized harvesting in the sugar industry around 1945 and the subsequent increase of acreage used for pineapple and sugarcane production, cultivated land and flood plains became more vulnerable to erosion and flood runoff.

Large fields of sugarcane are denuded in short periods by highly mechanized harvesting operations. Pineapple fields are bare during replant periods because of the need for tillage. Even with immediate replanting, these croplands are susceptible to damage for extended periods before new growth provides significant protection.

The hydrologic condition of cropland varies during the growing cycle--40 to 50 months for pineapple and 20 to 30 months for sugarcane. Fields are most vulnerable to erosion when they are bare or newly planted, a period of up to 7 months. As the plants mature they provide significant protection to the fields against erosion. Field roads remain unprotected, however, and are the greatest source of sediment after plants mature.

Use of moderately steep lands directly above the coastal plains for sugarcane and pineapple has increased runoff and erosion. Minimal use of crop residue, characteristic of sugarcane field operations, also contributes to erosion, thus increasing sediment production and damage to watershed coastal areas. Above-ground concrete irrigation ditches are broken and harvesting schedules are altered by overland flooding of sugarcane fields. Damaged irrigation ditches can be successfully repaired if sugarcane is less than 8 months old. The dense cane growth prohibits repair of ditches damaged after that time. This results in greatly reduced yields--as much as 60 percent below normal--from lack of sufficient irrigation water.

Cane processing mills base production schedules on timely harvesting operations. When young sugarcane is damaged the areas are replanted. Replanted areas are immature and yield less than the nondamaged areas at harvest requiring mills to make costly adjustments. Other fields must then be harvested before they have reached their potential yield to maintain a consistent supply of cane to the mill.

Protection of watershed values has been the major objective of forest land management in the area for many years. The forest land is in good hydrologic condition with the exception of small areas in gulches below the forest reserves where livestock have damaged the vegetative cover. In such areas, soils are partially barren and compacted, contributing to greater and faster storm runoff and erosion.

Grass seeding and proper livestock management will help protect the soil and reduce runoff in some of the gulches. In others, such as the lower reaches of Papua and Pahakupule Gulch and Honolua Stream, barren eroded spots are still contributing sediment although the areas have not been grazed for many years. The State Division of Forestry estimated 400 acres are in need of reforestation and revegetation.

Some land use adjustments are expected to occur over the next 10 years due to urbanization below the new Honoapiilani Highway. Few land use adjustments are expected to occur in other areas of the watershed. Land, labor and capital are efficiently used for production in the watershed.

Land owners and operators are financially able, with the help of federal cost-sharing programs, to apply needed conservation measures. Allocation of funds for conservation practices, as well as technical assistance, will primarily determine the rate they will be planned and applied.

Floodwater, Sediment, and Erosion Damage: Areas seriously affected by the 100-year flood total approximately 80 acres. Included in this area are two businesses, 126 residences, 20 resort-apartment-hotel developments, and streets and highways. In addition, about 4 miles of beaches and coastal waters are affected by sediment pollution.

Between 1955 and 1968, 12 major floods have caused nearly \$1 million in direct damages to watershed residents. Major flooding presently is concentrated in the Napili, Mahinahina, and Honokowai subwatersheds (see Appendixes B and D). Extensive damages to agricultural, residential, commercial, and resort properties have resulted from the high-velocity, sediment-laden flood flows through the area. Minor flood damage is experienced in low-lying areas of the Kaopala, Kahana, and Honokahua subwatersheds.

The storm of December 1964, a type that occurs at a 20-year frequency, caused a total of \$233,300 in damages--\$106,000 in agricultural damages and \$127,300 in community damages along the coast. It caused extensive sediment and erosion damage to all subwatershed areas, and floodwater and sediment damages to residences and resort-commercial developments located principally at Napili, Honokowai, Mahinahina, and Kaopala. Many lives were threatened by this storm, the area was isolated for several hours, and sediment polluted the beach and coastal waters. Swimming beaches were not usable for more than a month. Hotel reservations were cancelled and businesses dependent on the tourist trade suffered financial losses, according to business owners and operators in the area.

Soil erosion in the watershed occurs primarily on the cultivated land. The average annual sediment yield varies between 0.1 and 3.2 tons per acre. There are no critical sediment source areas in the watershed.

The average annual sediment yield to the watershed coastline is approximately 24,350 tons.

Erosion causes crop losses when young plants, fertilizers, and soil are washed away by heavy rains. The cost of repairing and replanting fields and cleaning up flood damages has been high.

Flood damages in recent years are summarized in the following table:

FLOOD DAMAGES CAUSED BY PAST STORMS

<u>Date of Storm</u>	<u>Agriculture</u>	<u>Other</u>	<u>Total</u>	<u>Subwatershed</u>
	---- Dollars----			
Dec. 19-21, 1955	10,000	-	10,000	Honokowai
Jan. 12-16, 1956	800	-	800	Honokowai
Jan. 12-18, 1959	1,000	-	1,000	Honokowai
Oct. 31- Nov. 3, 1961	385,000	65,000	450,000	All
July 22-23, 1964	-	300	300	Honokowai
Dec. 19-20, 1964	106,000	127,300	233,300	All
Feb. 4-5, 1965	5,500	21,500	27,000	Napili, Honokowai
Mar. 22, 1965	-	2,500	2,500	Napili
Apr. 13, 1965	500	10,500	11,000	Napili
May 2, 1965	5,100	1,000	6,100	Napili
Mar. 17, 1967	36,000	149,200	185,200	Napili
Apr. 16, 1968	-	18,400	18,400	Honokowai
Total	549,900	395,700	945,600	

These damages together with projected future damages were used to evaluate the economic benefit of the project. The annual damages are shown in Appendix A.

Recreation Problems: Sediment is polluting the beaches and coastal waters, resulting in repeated degradation of the watershed's primary recreation resource.

The intensity of ocean water pollution caused by rainstorms depends on storm magnitude, ocean currents, and the reef formation bordering each subwatershed shoreline area. In some areas, offshore currents cause sediment to dissipate within a few days. However, reef barriers and offshore currents between Napili and Honokowai inhibit sediment from being carried out to sea. Suspended sediment colors water 1/4 to 1/2 mile offshore for 2 to 4 weeks following a normal rainstorm. Beaches in these areas are degraded by silt mixing with beach and offshore sands and coastal waters. The coastal environment of Honolulu is deteriorating because of this problem. According to fishermen and residents, sediment pollution over the course of about a decade has reduced the productivity of the ocean area bordering Honolulu. Marine biologists studying the effects of sediment on marine life in Kaneohe Bay, island of Oahu, have found that sediment pollution is a deterrent to normal coral growth and considerably reduces fish populations.^{18/}

All of the beaches are open to the general public. Access, although limited in some areas, is adequate for public use.

Irrigation Problems: Areas presently irrigated are in taro and sugarcane. Wells and perennial streams, such as Honokohau, Honolulu, and Honokowai, are the sources of irrigation water in the watershed. Approximately 30 MGD are available for irrigation. The quantity of water is adequate for present needs. However, should more land be brought under irrigation, additional sources will be needed and/or irrigation efficiency will need to be increased.

There are no agricultural subsurface or wetland drainage problems in this watershed.

Economic and Social Problems: Many families in the watershed are dependent on the tourist trade for employment. They have based their hopes for a better future on the growth and development of the tourist industry. Further resort development in the watershed is dependent to a great extent upon the maintenance and retention of the ideal tropical environment now enjoyed. It is this ideal tropical situation that has thus far attracted investment in resort and related development.

Flooding and sediment pollution are also threats to the peace-of-mind and the economic livelihood of the watershed community.

^{18/} Smith, Steven, et al., "Atlas of Kaneohe Bay: A Reef Ecosystem Under Stress," University of Hawaii Sea Grant Program, UNIHI Seagrant-TR-72-01, February 1973.

Since the development of Kaanapali resort center on the fringe of Honolua Watershed, the visitor industry has shown signs of growth that may soon make it the primary employer in the watershed. The rate of increase in the number of visitors to Maui is phenomenal. The increase was 50.1 percent for 1963 over 1962 but had increased to a 400 percent overall increase by June of 1975. Whereas 92,000 visitors arrived on Maui in 1963, there were 456,482 or 364,482 more in 1975 than 1963, a span of 12 years. Of the state total of 1,378,743 visitors in 1974, 30 percent or 416,431 visited Maui. In 1975, as of June 30, of the state total of 1,384,216 visitors, 33 percent or 456,482 visited Maui. Visitors to Maui increased 4 percent in 1975 over 1974.

To accommodate the increasing visitor flow and in anticipation of greater flows, tourist facilities in the watershed have increased from 44 hotel rooms in August 1962 to about 1,500 by 1975. With significant expansion of tourism at Kaanapali and the Honolua Watershed, Maui County has reversed a decade of consistent decrease in both labor force and employment.

Tourism in Honolua Watershed has undoubtedly come a long way since 1960. It no longer derives its momentum from a specific event that cannot be repeated, such as the advent and subsequent impact of statehood or the dedication of Lahaina as a national historical landmark. Its momentum may now be attributed to intrinsic strength within the industry. This strength is expected to increase rather than decrease. Jet travel and ideal climatic factors inherent to Honolua have contributed to this rapid growth. Joint promotion by government and business is another principal catalyst. These factors should continue to sustain and advance the development of Honolua's tourist industry.^{19/}

^{19/} Hawaii Visitors Bureau Data.

RELATIONSHIP TO LAND USE PLANS, POLICIES, AND CONTROLS

The planned project will not conflict with any water or land development project. The project is compatible with the 701 General Plan for Lahaina which includes the Honolua Watershed and with the Federal Water Pollution Control Act Amendments of 1972. It is supported as Project Measure B6 of the Tri-Isle RC&D Project.

ENVIRONMENTAL IMPACT

The major impacts of the project will be the reduction of damages from flooding of 80 acres in the Napili 2-3, Honokowai, and Mahinahina areas, and sediment deposition along 4 miles of coastal waters from the outlet of Honokowai Stream to Napili Bay. Lesser impacts will be the effects on the quality of land and related resources and the social and economic well-being of people in the project area. Minor impacts also will be felt on the esthetic character of the area. The irrevocable commitment of small parcels of land to sediment basins, diversions, and channels will affect the future options for use of this land. Those directly affected include 435 rural residents and farmers, 126 homes, two businesses, 20 apartment-hotel developments in the Honolua Watershed, and thousands of users of beaches and coastal waters each year.

Conservation Land Treatment: Conservation practices will be applied to cropland, forest land, pastureland, and urban land. These practices will help farm operators obtain optimum land use and production efficiency. Cultivated fields, the watershed's principal sediment sources, will receive intensive treatment to reduce erosion. Degradation of the water and land resource base from agricultural activities will be reduced by the installation of land treatment measures.

Impacts of the individual land treatment measures:

- Conservation cropping systems will reduce erosion and runoff (300 acres).
- Contour farming will reduce erosion and control water runoff (300 acres).
- Crop residue use will reduce erosion and control water runoff (5,925 acres).
- In-field diversions will divert water from areas where it is in excess to sites where it can be used or disposed of safely (90,000 feet).
- Cropland conversion will reduce erosion and control runoff (200 acres).
- Grassed waterways will prevent excessive soil loss and formation of gullies (25 acres).
- Irrigation water management will effectively utilize the available irrigation water supply in managing and controlling the moisture environment of crops; minimize soil erosion and loss of plant nutrients; control undesirable water loss; and protect the water quality (2,400 acres).

- Pasture management will prolong the life of desirable forage species; maintain or improve the quality and quantity of forage; and protect the soil and reduce soil loss (1,000 acres).
- Pasture planting to improve or replace poor- and low-producing stands (250 acres).
- Pipelines for livestock to be installed for efficient and uniform grazing patterns to reduce erosion and runoff (1 mile).
- Livestock management on grazed forest land will protect, maintain, or improve the quantity and quality of the plant and animal resources; maintain enough cover to protect the soil; maintain moisture resources; and increase natural beauty (3,500 acres).
- Revegetation with grass or woody plants will reduce erosion and sedimentation and improve the natural beauty (200 acres).
- Reforestation will provide cover on barren slopes, reduce erosion and sedimentation, and improve the natural beauty (200 acres).
- Forest management will improve watershed cover, reduce erosion, and enhance scenic and recreation values (16,655 acres).
- Grade stabilization structures will reduce erosion and sedimentation (7 each).
- Critical area planting will reduce erosion and sedimentation and improve natural beauty (20 acres).
- Diversions will reduce erosion, sedimentation and formation of gullies (1,000 feet).
- Debris basins will trap silt and reduce sedimentation (4 each).
- Mulching will conserve moisture, control erosion, and reduce sedimentation (20 acres).

All needed conservation practices are scheduled for completion during the project installation period. With the practices applied, it is estimated that the average annual sediment yield from the watershed will amount to approximately 2.2 tons per acre from cropland and about 0.2 tons per acre from undisturbed areas. The total sediment yield from the watershed after land treatment is estimated at 17,300 tons per year. This is a 29 percent reduction from present conditions. This reduction will affect the quality of the runoff water. Less pollution from nutrients such as nitrogen, phosphorus, and potassium will occur since less sediment will be deposited in the ocean.

The land treatment measures will change the physical appearance of the landscape by covering barren areas with grass and other vegetation.

Structural Measures: During flood flows, the desilting basins will temporarily inundate about 31.5 acres of gulch land. Eight acres of sugarcane with a gross value of \$8,500 per crop will be removed from production. Construction of structural measures will require a short, minor adjustment in production schedules of the plantation.

Vectors will be reduced by the elimination of health hazards from contaminated water and inundated cesspools. Marginal wildlife habitat will be eliminated by construction of desilting basins and channels. Where necessary, trees and shrubs will be removed for construction of desilting basins and channels.

The eight desilting basins will have little effect on flood flows. They will trap 40 percent of all sediment transported from the watershed and, together with conservation land treatment measures, will reduce siltation and sediment pollution affecting the watershed's 4-mile ocean-front by 57 percent.

Coastal water pollution periods following major storms will be reduced from 2-4 weeks to 3-4 days as a result of decreased sediment transported to the coast. This will improve habitat for marine life and offshore reef populations.

The proposed floodwater diversions and stream channel works are designed to contain the runoff from storms up to and including the 100-year frequency of occurrence. These measures will provide protection from floodwater to residents within the Napili 2-3, Mahinahina, and Honokowai flood plain. Agricultural lands and resort-commercial developments will also be protected.

A 1964-type (20-year frequency) storm flow would be contained in the channels and would cause no damage. The ocean water would have a red condition for no longer than 4 days. The threat to lives will be lessened in the 80-acre area protected by channel works and floodwater diversion.

Short-term, minimal inconveniences resulting from construction that cannot be completely avoided include equipment noise, construction area dust, and sediment carried by flowing water from construction areas.

The project will not impose any detrimental effects on present sources of water or existing distribution systems.

County expenditures for maintenance and repair of floodwater and sediment damage along a 4-mile portion of Honoapiilani Highway will be reduced. The savings in maintenance funds can be diverted to such projects as improving public parks and recreational facilities, which will enhance the quality of the environment. Interruption of travel and service and the general inconvenience and nuisance of flooding will be eliminated.

The tax base will be expanded as a result of development on urbanized areas in the protected portion of the flood plains.

Nonstructural Measures: Restrictive measures applied to the flood plains below desilting basins Nos. 2, 3, 4, 5, and 6 will reduce the acreage along the West Maui coast available for intensive development. This would reduce property values in those areas and increase the value of adjacent, nonflood-prone land.

Economic and Social: The project will remove a degree of uncertainty for local employers by maintaining and increasing the level of tourism and providing job security for the watershed residents employed in the tourist trade.

Protected individuals and businesses will have financial resources, formerly used for flood damage repairs, to upgrade living standards, businesses, and working conditions. The project will provide a sense of security and peace of mind for those in the 80-acre flood plain. These factors will contribute to an increase in the value of the property in the protected flood plain.

The distribution of rural population within the watershed will remain relatively constant. There are approximately 435 people living in the benefited area. The proposed project will promote urban development in conformance with the General Plan of the area. This will create additional employment, especially in wholesale-retail trades and in services. This will also create added demands for water supply, sewage disposal, transportation, and parks and recreational facilities. Plans for these facilities are also included in the General Plan.

The efficiency of agriculture will be improved by the reduction of replanting and fertilizing costs. Harvesting schedules and milling operations can continue with a minimum of disruption resulting from flood damage to young sugarcane.

The state has issued water quality standards for all coastal waters. Agricultural industries that do not conform to the standards will be compelled to stop operations. However, the installation of land treatment and structural measures will result in reduced sediment carried to the ocean assisting the agricultural sector in meeting the requirements of the law.

No one will be displaced by the project.

Favorable Environmental Effects:

1. Conserve productivity of 6,547 acres of cropland and 1,000 acres of pastureland for present and future use.
2. Reduce floodwater, erosion, and sediment damages in the 80-acre flood plain.
3. Reduce sediment in water entering the ocean by 57 percent, improving coastal water quality.
4. Reduce sedimentation damage to and improve the marine habitat along the coast.
5. Improve social and economic conditions in the watershed.
6. Relieve flooding of the present highway in the Honokowai, Mahinahina, and Napili areas.
7. Reduce health hazards.
8. Reduce risk of loss of life from flooding in the Napili 2-3, Mahinahina, and Honokowai areas.
9. Improve the esthetic quality of 260 acres of barren and sparsely vegetated forest land.
10. Reduce coastal water pollution from 2-4 weeks to 2-4.5 days.
11. Create areas of open space along the West Maui coast by implementing zoning and building codes to the flood plains below desilting basins Nos. 2, 3, 4, 5, and 6.
12. Improve esthetic quality of the landscape.

Adverse Environmental Effects

1. Eliminate agricultural production and marginal wildlife habitat on the areas occupied by dams, channels, diversions, and desilting basins.
2. Remove vegetation, such as kiawe and koa haole, along 0.7 miles of channel in Napili 2-3, Mahinahina, and Honokowai areas.

3. Increase sediment yield during project construction and temporarily lower coastal water quality during and immediately following construction.
4. Cause some air and noise pollution during construction.
5. Inundate about 31.5 acres of wildlife habitat in the gulches during large runoff events.
6. Reduce the acreage along the West Maui coast available for intensive development due to zoning and building codes applied to the flood plains below desilting basins Nos. 2, 3, 4, 5, and 6.

ALTERNATIVES

The following alternatives, some of which could not be carried out under the authority of PL-566, were considered as solutions to the problems identified at the onset of planning:

1. Accelerated Land Treatment Only: Accelerated conservation land treatment measures would be applied to cropland, pastureland, urban land, and forest land. Typical land treatment measures that would be applied to the various land uses are:

Cropland - Contour farming, in-field diversions, grassed waterways, establishment of permanent or temporary vegetative cover whenever cropland is removed from production, conservation cropping systems, and residue management.

Pastureland - Pasture management to maintain or improve pasture use, pasture planting, and livestock water development.

Urban land - Grade stabilization structures, critical area planting, diversions, and debris basins.

Forest land - Livestock management, revegetation with grass or woody plants, reforestation of barren areas, and forest management to control pests, disease, and fire.

The conservation land treatment measures would reduce floodwater damage and sediment yield by 10 percent and 29 percent, respectively. The cost of this alternative would amount to \$451,500.

2. Accelerated Land Treatment, Flood Plain Zoning, Flood Proofing, and Flood Insurance: The land treatment measures would be installed, and their impact and effect would be the same as the "Accelerated Land Treatment Only" alternative.

Flood plain zoning, or the restriction of further development in the flood-prone areas, would keep future damages at the present level; flood-proofing and relocations would reduce this level. Some of the existing buildings, such as resort hotels, could be flood-proofed to protect life and reduce property losses. Other buildings and damageable property could be relocated to elevations above the floodline. Beaches and coastal waters would remain red for some time after high intensity rains as they do now. This alternative would require the development of a new community, most likely removing cropland from production in the area of the new community. Flood plain lands could be developed for uses which would be less affected by flooding such as parks, wildlife areas, or other recreation lands. This would increase the recreation area and wildlife cover, but decrease the agricultural base and associated jobs. Any change from the present land use toward a less intensive use would favor public ownership.

The National Flood Insurance Program is presently available to partially offset property losses suffered by flood plain residents. Premiums for this type of insurance are paid by residents who desire protection.

The cost of flood-proofing is estimated at \$2.1 million. The cost of development of a new community could range from \$30 to \$50 million.

3. Accelerated Land Treatment and Vegetative-lined Channels: The land treatment measures in this alternative are those described in the "Accelerated Land Treatment Only" alternative.

Under this alternative, the present water courses would be widened and straightened; however, the channel bed and banks would be eroded by high velocity flow caused by the steep gradient of the stream. Therefore, drop structures and rock riprap would be necessary to reduce the velocity and control erosion, but even wider and larger channel sections would be needed.

Diversions between Mahinahina and Honokowai Streams would be needed to control overland flows. Total installed cost of the diversions and the new channel with riprap and drop structures is estimated to be \$4.2 million. The annual maintenance cost for the channel and diversions is estimated at \$125,000. All trees and shrubs along the existing drainage-ways would be removed. About 17.6 acres would be needed for the measures. This alternative would provide a 100-year level of protection.

4. Accelerated Land Treatment and Concrete-lined Channels: The land treatment measures for this alternative are the same as described in the "Accelerated Land Treatment Only" alternative. Providing concrete channels and diversions without desilting basins was also considered. This approach, like vegetative linings, would reduce property damage and save lives of people but the beach pollution problem would continue to cause financial loss to the watershed residents. Some trees and shrubs along the channel work areas would be removed. Total installed cost of this approach is estimated to be \$2 million. This alternative would provide a 100-year level of protection and require about 6.1 acres for the measures.

5. No Project: With the implementation of the Lahaina 701 plan, developments--such as residential, apartment, commercial, and resorts--will take place in the watershed area. The area is located below the proposed new highway and adjacent to and between the Mahinahina and Honokowai Streams.

Property damage in the flood plain will increase because of new development and increased runoff from adjacent lands. House tops and paved streets contribute almost total rainfall to runoff. These conditions increase the volume of runoff from developed areas and have an effect of indeterminate magnitude on the flood problem.

The ongoing land treatment program will continue at its present level. Water coming from the cropland and crossing developing areas will also carry more sediments from the areas disturbed by construction, resulting in a continual degradation of the resource base. These sediments will aggravate the pollution problem of the coastal waters. This will have a resultant adverse effect on the value of recreation and marine life. The Napili 2-3 area will have these same problems but they will be of a smaller magnitude. This is due mainly to smaller areas to be urbanized and the construction of a golf course on agricultural land.

Net monetary benefits that would be forgone by not implementing the project are estimated to be \$188,000 annually.

SHORT-TERM VS. LONG-TERM USE OF RESOURCES

Land use projections in the watershed follow the general trend of today. The Napili area is planned for hotels and apartment-hotels, while the nearby areas of Kahana and Honokowai are planned for single and multifamily dwellings. The Honolua Watershed Project will complement the 701 General Plan for the area.

Short-term uses will be affected to the extent of the 8 acres of land to be taken out of agricultural production by the structural measures. Long-term effects will be the preservation and enhancement of the land and water resources in the watershed area.

The reduction of flooding and pollution brought about by installation of the project measures will permit efficient use of the land with a continued economic return to the owners. The project will provide a long-term solution to the flooding problems in the Napili 2-3, Mahinahina, and Honokowai flood plains. The reduction of sediment pollution will enhance coral reef development, improve the capability of the shore area to support larger fish populations, and enhance the beaches by reducing the amount of silt mixed in with the sand.

Annual and recurrent land treatment measures should continue to be effective in conserving land and water resources after the 100-year life of the project. Replacement of some structural measures may be necessary at that time.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The area needed for desilting basins, diversions, and channels will be committed to these uses for at least the life of the project (100 years). This involves 8 acres of sugarcane and 36.4 acres of gulch land, a total of 44.4 acres.

Also, materials and labor to build structures are irretrievable items.

CONSULTATION AND REVIEW WITH APPROPRIATE AGENCIES AND OTHERS

General: The West Maui Soil and Water Conservation District (SWCD) held the first public meeting with residents in the Honolua Watershed area to see what could be done about flood problems. Public Law 566 was explained. The SWCD later held another meeting at which a petition was submitted requesting that a flood and sediment control project be initiated with assistance from the Soil Conservation Service. The sponsors then prepared the application for assistance.

This application was approved by the Secretary of the U.S. Department of Agriculture and the Governor of Hawaii.

A preliminary investigation was initiated to determine feasibility of the project. Residents of the watershed were interviewed to determine problem areas. Data was collected on past floods, damages, and intensity of coastal water pollution caused from sediment. The investigation indicated that a project was feasible.

A public meeting was held to explain to the sponsors and other interested individuals the findings and recommendations. All those present were in favor of the project and agreed to apply for federal planning assistance.

A tentative work plan was prepared. During preparation, two meetings were held with the sponsors to discuss progress and the possibility of covering the Napili 2-3 Channel. The covered channel (or buried conduit) would be more esthetically pleasing and the ground above could be used. The sponsors favored the open channel. Meetings were also held with the State Highways Division, the Federal Highway Administration, and the County Public Works Department to coordinate the planning of the new Honoapiilani Highway with the watershed project.

The tentative work plan was presented at a public meeting. After incorporating public comments, the plan and preliminary draft environmental impact statement were reviewed by the sponsors, public agencies, and interested people. A public "informal field review" was held to discuss the plan and preliminary draft EIS.

A draft EIS was prepared and in October 1974 sent to various agencies and private organizations for interagency review.

The State Historic Preservation Officer (SHPO) was asked to render an opinion on the archeological resources surveyed by personnel of the Bernice P. Bishop Museum. Presently, SCS is awaiting an official determination from SHPO on eligibility for inclusion in the National Register of Historic Places. Further steps will be taken, as required, to fully comply with the National Historic Preservation Act of 1966 and Executive Order 11593, May 13, 1971.

DISCUSSION AND DISPOSITION OF EACH PROBLEM, OBJECTION, AND ISSUE

Comments on the draft EIS were requested from the following agencies:

Federal

Advisory Council on Historic Preservation
Department of the Air Force
Department of the Army (Corps of Engineers)
Department of Commerce
Environmental Protection Agency
Department of Health, Education, and Welfare
Department of the Interior
Department of the Navy
Department of Transportation - Coast Guard
Power Commission
Office of Equal Opportunity

State

Department of Planning and Economic Development, State Clearinghouse
Office of Environmental Quality Control, Office of the Governor

Information copies were sent to the following agencies, groups, or individuals:

Council on Environmental Quality
Natural Resources Defense Council
Friends of the Earth
Environmental Defense Fund
National Wildlife Federation
National Audubon Society
Environmental Impact Assessment Project
Library, Colorado State University
Jack McCormick & Associates, Inc., Devon, Pennsylvania 19333
Institute for Ecological Studies, University of North Dakota
Center for Urban Affairs, Northwestern University

Comments were received from the following agencies and organizations:

Federal

Advisory Council on Historic Preservation
Department of the Air Force
Department of the Army (Corps of Engineers)
Department of the Army (Army Support Command, Hawaii)
Department of Commerce
Environmental Protection Agency
Department of Health, Education, and Welfare
Department of the Interior
Department of Transportation - Coast Guard
- Federal Highway Administration

State

Department of Agriculture
Office of Environmental Quality Control
Department of Health
Department of Land and Natural Resources
Department of Transportation
Department of Planning and Economic Development (State
Clearinghouse)
University of Hawaii - Environmental Center
- Water Resources Research Center

Private

Pioneer Mill Company, Ltd.

Comments made during the formal interagency review on the draft Environmental Impact Statement and their disposition are summarized as follows:

FEDERAL AGENCIES

Advisory Council on Historic Preservation

1. Comment: "Pursuant to its responsibilities under Section 102(2)(C) of the National Environmental Policy Act of 1969, the Advisory Council on Historic Preservation has determined that while you have discussed the historical, architectural and archeological aspects related to the undertaking, the Advisory Council needs additional information to adequately evaluate the effects on these cultural resources. When the survey of the project area by the Bishop Museum to identify sites of historical and archeological significance (page 20) is complete, please furnish additional information indicating:

Compliance with Executive Order 11593 of May 13, 1971

1. In the case of land under the control or jurisdiction of the Federal Government, a statement should be made as to whether or not the proposed undertaking will result in the transfer, sale, demolition or substantial alteration of potential National Register of Historic Places properties. If such is the case, the nature of the effect should be clearly indicated.
2. In the case of lands not under the control or jurisdiction of the Federal Government, a statement should be made as to whether or not the proposed undertaking will contribute to the preservation and enhancement of non-federally owned districts, sites, buildings, structures, and objects of historical, archeological, architectural or cultural significance.

"To insure a comprehensive review of historical, cultural, archeological and architectural resources, the Advisory Council suggests that the environmental statement contain evidence of contact with the appropriate State Historic Preservation Officer and that a copy of his comments concerning the effects of the undertaking upon these resources be included in the environmental statement. The State Historic Preservation Officer for Hawaii is Mr. Sunao Kido, Chairman, Department of Land and Natural Resources, State of Hawaii, P. O. Box 621, Honolulu, Hawaii 96809."

Response: The Archeological and Historical Resources section of the EIS has been revised to indicate that a survey has been made. This section also describes briefly the historical resources found during the survey and the evaluation made by Bernice P. Bishop Museum's personnel and the State Historic Preservation Officer on the resources' potential for listing in the National Register of Historic Places.

The Consultation and Review with Appropriate Agencies and Others section describes the continuing consultation to comply with the National Historic Preservation Act of 1966 and Executive Order 11593, May 13, 1971.

Department of the Air Force

1. Comment: "We have no comment to render relative to the draft environmental impact statement for Honolua Watershed, Honolua, Maui."

Response: Noted.

Department of the Army, Corps of Engineers

1. Comment: "a. According to pages 4 and 34 of the draft ES, nonstructural measures in the form of zoning and restrictive building permit provisions will be necessary for the flood plain below desilting basin Nos. 2, 3, 4, 5, and 6 and will reduce the acreage along the coast available for intensive development. The statement notes that these areas are zoned for residential and resort use although they are presently undeveloped.

"b. In the discussion of the No Project alternative on pages 40-41, future development with increased property damages in the flood plain is projected to occur without implementation of the proposed project between Mahinahina and Honokowai Streams. The new development would be in accordance with Lahaina 701 plan.

"c. It is not clear whether the nonstructural restrictive measures described on pages 4 and 34 are to be a specific local requirement of the total project or are part of existing local ordinances and constraints for development within flood plains. If the latter is true, the apparent lack of applicability to the Mahinahina-Honokowai area should be clarified."

Response: As stated in Non-structural Measures section of the dEIS, zoning or restrictive building permit controls is a specific requirement of the project to prevent future damages in flood prone areas downstream of desilting basins Nos. 2, 3, 4, 5 and 6. The County of Maui, under Ordinance No. 716, is empowered to implement such controls in Flood Plain Districts. However, no area in the watershed project has yet been designated as Flood Plain Districts. Detailed study to delineate the flood prone area accurately will be needed to implement such controls.

Zoning or restrictive building permit controls are not recommended for the Mahinahina-Honokowai flood plain because this area is nearing full development. Flood damage reduction is needed for the existing homes and other improvements. Discussion among local people, County of Maui and SCS indicated that channel work is needed to protect this area.

Department of the Army, U.S. Army Support Command, Hawaii

1. Comment: "Structural Measures, page 5, para 1. What will be the cost of obtaining necessary land rights prior to construction for the county?"

Response: Cost of the project is discussed on page 9 of the dEIS. Detailed breakdown of costs of the project measures has been included in the final EIS as Appendix K.

2. Comment: "Plant and Animal Resources, page 19, para 3. Can the statement, 'there are no known threatened plant or animal species in the portion of the watershed area where project measures are proposed' be substantiated?"

Response: According to information from the State Department of Land and Natural Resources, the statement is correct.

Department of Commerce

1. Comment: "The land treatment measures are the most vital part of this watershed project as far as curtailment of erosion is concerned. This is particularly true of the cropland treatment measures. It is not clear in the draft environmental impact statement whether these measures are part of the project itself, and therefore mandatory, or whether they are merely to be implemented on a voluntary basis. The land treatment measures outlined in the statement appear to be sound and practical, and should be made mandatory for both public and private lands within the Honolulu watershed."

Response: The land treatment measures under the Planned Project section of the EIS are part of the project and will be applied voluntarily by the landowners. The willingness and ability of the landowners to install the needed land treatment measures are some of the important criteria under PL-83-566 for a watershed project to receive planning authorization and subsequent funding.

As an indication of their ability, about one-third of the planned conservation practices have been applied. Maui Land and Pineapple Company and Pioneer Mill Company, landowners of most of the cropland in the watershed, have written commitments with the West Maui Soil and Water Conservation District to develop conservation plans and to install the needed land treatment measures. The landowners are also required by pollution control laws of the State of Hawaii to apply erosion control measures on their lands.

2. Comment: "An alternative that apparently has not been explored would be to allow flows in all streams within the watershed that historically were perennial. In the early 1900's, stream flows from perennial streams such as Honokohau, Honolua, and Honokowai were diverted by ditches and tunnels for the cultivation of sugar cane. If some of this water were rediverted to the original streams, the long-term results would be recolonization of these streams by endemic diadromous fauna, including the various species of gobies (oopu), prawns (opae), and fresh water limpets (hiwai) that once were abundant in the streams of Hawaii. Most of these species spend their larval stages in the sea and return to the streams as juveniles. Therefore, it is essential to provide perennial streams habitat to assure recolonization of these streams."

Response: The basic purpose of the project is to reduce flood damage and sediment pollution and not to find means of maintaining flows in streams that were historically perennial by reducing diverted water for sugarcane irrigation. Reducing diverted water from these streams would involve existing rights for irrigation water. This is outside the scope of the project.

3. Comment: "The perennial streams should be left natural or have vegetative-lined channels, and not the planned concrete-lined channels. The natural or vegetative-lined channels will continue to support aquatic life in the channel pools even during dry periods. Planting of trees and other vegetation (green-ways) along the stream beds for shading purposes and erosion control is also important; lack of shading greatly increases water temperature during the day in lined channels. It is possible that perennial flows in these streams would prevent the stream beds from becoming the desiccated arroyos that many are now, and would encourage development of the kind of lushly vegetated stream basins seen in the valleys containing perennial streams throughout Hawaii. The stream channel beds and banks would then be subjected to far less erosion during high velocity flows."

Response: None of the streams where structural measures will be installed flows perennially to the ocean. Only Honokohau Stream, located in the northern section of the watershed flows continuously to sea. No structural measures are planned in this stream. These facts have been incorporated in the EIS.

4. Comment: "The description of marine life along the watershed coastline (page 18) is incomplete, and we noted several errors in the common names of fish families (see specific comments below). The scientific family names should be used for these groups, and the methods of obtaining data should be given (i.e., underwater surveys, fishermen interviews, etc.). It would be desirable for the statement to provide a more complete description of the benthic biota in this area, particularly with regard to the present condition of the corals. The corals are so central to the integrity of the reef community that when they are destroyed, migration or death of much of the other reef biota ensues. Because the environmental tolerances of the reef community as a whole do not exceed those of its corals, 1/ an assessment of the corals would provide a good indication of the present condition of the total reef community along the watershed coast.2/"

Response: The section on sea life has been revised to include the scientific names of fish along the watershed coastline and coral data has also been included (see response to comment 6). Regarding coral, we quote from "Report to Maui Land and Pineapple Company on Preliminary Benthic Biological Survey Along the Northwest Coast of Maui" by Environmental Consultants, Inc., November, 1971.

"Corals are both an aesthetically desirable and an ecologically important part of the offshore biota. Unlike many of the other reef organisms, both the abundance and the diversity of corals is likely to decrease from almost any environmental perturbation. Increased area of sediment cover decreases the area available for coral growth. Increased deposition rate can directly kill the corals. However, since Honokeana Bay, with its apparently high deposition rate, presently supports a moderately diverse coral assemblage, it is unlikely that deposition rate, as such, is presently detrimental to corals over most of the area examined."

5. Comment: "Structural Measures, p. 7, paragraph 3. We believe that within the description of special design and construction features a statement should be included which indicates construction during periods of high rainfall or storms (December through April) will be limited to those operations least likely to contribute to the transport of sediment by runoff."

Response: The final EIS has been revised to include the following sentence under special design and construction features: "Operations likely to contribute sediment to the ocean will be done during non-storm seasons."

6. Comment: "Plant and Animal Resources, p. 18, paragraph 3. A statement is made that 'Fish caught for local use include crevalle, pompano, bonefish, mullet, bass, goatfish, grouper, and snapper.' We believe this list is inadequate for the following reasons: (1) crevalle are fish belonging to the family Carangidae, but this common name is not applied to species found in Hawaii; (2) if the common name "pompano" is also used for species in the family Carangidae, these are not found in Hawaii; however, if "pompano" refers to butterfish of the family Stromateidae, this should be so specified; (3) "bass" is not a common name applied to any group of Hawaiian salt water fish; and (4) the only native groupers caught in Hawaiian waters are taken offshore in waters usually over 100 fathoms deep (one species of introduced grouper, Cephalopholis argus, is found in Hawaiian nearshore waters, but is nowhere common).

"In the third sentence in this paragraph families of reef fish are natural. Reference to the 'coral' fish family should be expanded. The name 'sturgeon' in the fourth sentence should be 'surgeon, and, contrary to the statement, members of the family Acanthuridae are indeed important food fish in Hawaii."

Response: The write-up on fish resources under the Plant and Animal Resources section has been revised to read:

Sea life along the watershed coastline is similar to that of most tropical islands where colorful fish and other marine life live in and around the reef. Fish found along the shores and bays of this watershed include maomao, (Abudefduf abdominalis); damsel fish (Abudefduf imparipennis); maikoiko (Acanthurus leucopareus); surgeon fish (Acanthurus nigrofuscus); manini, (Acanthurus triostegus); spotted eagle ray (Aetobatus narinari); a'awa (Bodianus bilunulatus); common name unknown (Cathigaster amboinensis); common name unknown (Cathigaster jactator); lauwiliwili (Chaetodon miliaris); lauhau (Chaetodon quadrimaculatus); kikakapu, (Chaetodon ornatissimus); common name unknown (Chromis leucurus); common name unknown (Chromis ovalis); kole (Ctenochaetus strigosis); common name unknown (Entromacrodus marmoratus); akilolo (Gomphosus varius); humuhumu-uli (Melichthys niger); weke (Mulloidichthys samoensis); Kalaholo (Naso brevirostris); unicorn fish (Naso unicornis); common name unknown (Ostracion meleagris camurum); pilikoa (Parachirrites arcatus); moano kea (Parupeneus chryserydos); moano (Parupeneus multifasciatus); munu (Parupeneus bifasciatus); kumu (Parupeneus porphyreus); common name unknown (Pervegor melanocephalus); o'ili uwiwi (Pervagor spilosoma); damsel fish (Pomacentrus jenkinsi); humuhumu-nukunuku-a pua'a (Rhinecanthus aculeatus); common name unknown (Rhinecanthus rectangulus); parrot fish (Scarus spp.); omaka (Stethojulis balteata); hinalea (Thalassoma duperreyi); awela (Thalassoma purpureum);

kihikihi (Zanclus canescens); and laipala (Zebrasoma flavescens). Many of the foregoing are important food fish.^{15/}

7. Comment: "Plant and Animal Resource, p. 18, paragraph 4. This paragraph states that 'The ephemeral and intermittent streamflows in channels in the watershed do not support significant fish population.' Populations of fish and invertebrates supported by these channels should be stated."

Response: Since there are no fish in the stream channels because they are dry except in periods of rainfall, this comment has been met by the elimination of the word "significant" in the above sentence.

8. Comment: "Structural Measures, p. 33, paragraph 5. We believe the statement that the desilting basins 'will trap 40 percent of all sediment transported from the watershed and, together with conservation land treatment measures, will reduce siltation and sediment pollution affecting the watershed's 4-mile ocean front by 57 percent' should be substantiated. If much of the suspended fines were not actually trapped by the desilting basins, the problem of this suspended material causing brown water to occur up to 1/2 mile offshore for 2 to 4 weeks following a normal rain storm would still remain."

"Structural Measures, p. 33, paragraph 6. We believe the statement that 'water pollution periods following storms will be reduced from 2 to 4 weeks to 3 to 4 days as a result of decreased sediment transported to the coast' should be substantiated. Evidence indicating that the claimed reduction will indeed occur should be discussed in the final environmental impact statement."

Response: The computation for the estimated reduction of sediment into the ocean and its effect on the water's discoloration is on file at the Soil Conservation Service office, 440 Alexander Young Building, Honolulu, Hawaii 96813. This subject is discussed in the response to EPA's comment 3 (see page 45).

^{15/} Environmental Consultants, Inc., Fish Census: Honolua Bay, West Maui, Hawaii, January & April, 1974 and Handbook of Hawaiian Fishes by William A. Gosline and Vernon E. Brock, University of Hawaii Press, Honolulu, Hawaii, 1960.

Environmental Protection Agency

1. Comment: "The environmental statement should be expanded to include maps which reveal the following information:

- a) 100 year flood plain boundaries;
- b) the extent and distribution of urban development in the Honokowai, Mahinahina, and Napili 2-3 watersheds;
- c) the extent and distribution of urban development to be protected by the Honokowai - Mahinahina Floodwater Diversion; and
- d) tsunami zones."

Response: A map has been included in the final EIS to show the 100-year flood-prone and potential tsunami inundation areas. These designations have been superimposed on projected land uses contained in A General Plan for the Lahaina District, County of Maui. The map (Appendix D) also shows location of the structures.

2. Comment: "On page 35 it is stated: 'With the project installed, increases in population over and above normal growth are expected.' The environmental impact statement should discuss the anticipated population changes and the consequent environmental impacts that may occur. Specifically, are wastewater collection and treatment services adequate? Did the calculation of peak flood flows in the channels include a component of urban storm runoff?"

Response: The third paragraph under "Economic and Social" of the draft Environmental Impact Statement (dEIS) has been revised to read:

The distribution of rural population within the watershed will remain relatively constant. There are approximately 435 people living in the benefitted area. The proposed project will promote urban development in conformance with the General Plan 19/ of the area. This will create additional employment, especially in wholesale-retail trades and in services. This will also create added demands for water supply, sewage disposal, transportation, and parks and recreational facilities. Plans for these facilities are also included in the General Plan.

Future land use as projected in the General Plan was taken into account in computing peak flood flows for the structures.

3. Comment: "EPA notes that the project is anticipated to reduce sediment in waters entering the ocean by 57%."

- a) Since land treatment measures will account for a major portion of the anticipated reduction, and such land treatment measures are to be implemented by the private land owners on a voluntary basis, the environmental statement should set forth an estimated time when the sediment reductions may be fully realized.
- b) The desilting basins are expected to trap 40% of the incoming sediment. In view of the design to trap particles greater than 0.05 mm, an analysis of particle size distribution of incoming sediments would be appropriate. In addition, the detention time of flood waters in the desilting basin should also be set forth.
- c) To the extent that the Soil Conservation Service has experience with desilting basins in operation at other locations in the Hawaiian Islands, such experience should be cited to support the anticipated efficiencies of these proposed structures.
- d) Additional explanation of the anticipated duration of the effects of flood flows on the Ocean is needed. How is the determination made that the time will be reduced from 2-4 weeks to 3-4 days?"

Response:

- a) Page 32 of the dEIS, first sentence of last paragraph, has been revised to read: "All needed conservation practices are scheduled for completion during the five-year installation period."
- b) The size distribution of the predominant soil in the watershed was determined during the investigation. Generally, about 50 percent by weight of the soil aggregates was greater than 0.05 mm. Detention time of floodwaters in the sediment basins would vary depending on the magnitude of the storm and size of the basin. The 40 percent computed trap efficiency of the structures is a long-term average over a range of storms of various sizes.
- c) Although basins have been observed to trap a good percentage of sediment from their drainage areas in the projected areas, no detailed study has been made to determine the efficiency of sediment basins in the Hawaiian Islands. The proposed structures, when built, will lend themselves for such a study.

The efficiencies of the sediment basins were based on a trap efficiency envelope curve developed by Gunnar Brune in his paper, "Trap Efficiency of Reservoirs," Transactions, American Geophysical Union, Vol. 34, No. 3, 1953.

- d) The duration of discoloration of the ocean water along the beaches was determined by observation by the Soil Conservation Service of events that occurred during the project evaluation period and also by interviewing people living in the area for events that occurred before the study. It was found that large storms resulted with longer turbid water conditions than those due to small storms. A duration of discoloration versus storm frequency curve was developed for each of the two evaluation units--Napili area and Kahana-Honokowai area. The average annual duration of discoloration computed was 10.5 days for the Napili area and 22 days for the Kahana-Honokowai area.

Sediment production in the drainages with structures and land treatment will be reduced by 80 percent. The average for the entire watershed is expected to be 57 percent. With this reduction, we assumed a proportionate reduction on sediment discoloration days along the 4-mile ocean front. Therefore, with land treatment and sediment basins installed, the duration of discoloration would range from 2 to 4.5 average annual days. These values have been used in the final EIS.

4. Comment: "To the extent that flood waters entering the Ocean will have a large percentage of fine materials (due to desilting basins), the environmental statement should assess the impact of these waters on water quality standards and on the coral reef ecosystems. The extent of flocculation and deposition of fines in the presence of salt water should be assessed."

Response: After completion of the project, a large percentage of sediment causing discoloration will be of fine materials estimated to be similar to sediment produced by small storms observed during the investigation. Discolorations caused by these small storms were observed to last from 2 to 4 days. Effect of reduced sediment will be improved habitat for marine life and offshore reef populations. Impact of the project on water quality standards is discussed on page 25.

Analysis of sediment deposits along the beaches of the project area indicates that the particle distribution does not differ from samples of incoming sediments. We theorized that discoloration along the coast will be similar to that now caused by small storms.

5. Comment: "The invert elevations of the channels should be specified. Will tidal waters scour the channels? Are any potential problems with ground water/sea water interchange foreseen?"

Response: The invert elevations based on mean level datum at the outlet of the channels are: 2.6 feet at Napili 2-3, 1.0 feet at Mahinahina, and -4.0 feet at Honokowai. The channels will be concrete lined. No tidal water scour nor groundwater and sea water interchange is anticipated.

6. Comment: "Mitigating measures intended to minimize soil erosion and air, water, and noise pollution should be discussed in detail. The discussion on special design and construction features (Page 7), and maintenance procedures (Page 8) should be expanded with special emphasis on:

- a) prevention of stream turbidity during construction,
- b) disposal of dredging spoil and construction debris,
- c) disposal of silt and sediment collected in debris basins and desilting basins."

Response: The Planned Project, Structural Measures section on special design and construction features includes measures to prevent debris and silt from entering the ocean. The second paragraph, page 7, of the dEIS has been revised to include the following:

The sponsors will assure that the project complies with the county grading ordinance and the state water quality health regulations. Excavated material, construction debris, and sediment deposits in debris basins will be disposed of at a county sanitary landfill.

Additional comments by telephone:

7. Comment: "There seems to be a discrepancy with land use planning (Ordinance 716 - Flood Plain and Tsunami Inundation Ordinance). How can there be justification for protection in these areas?"

Response: Although Ordinance No. 716 was established in January 1972, the ordinance has not been implemented. Flood prone areas have not been established. The County of Maui has requested the Corps of Engineers to identify flood prone areas.

8. Comment: "Turbidity vs. suspended load data should be included."

Response: According to Dr. Paul Ekern of the University of Hawaii Water Resources Research Center, it is difficult to relate turbidity to suspended load because the quartz particles are coated with iron oxide which tends to absorb instead of reflect the light.

He has a curve relating turbidity and suspended load that seems to work well on streams he has tested. We have not, to this date, received the curve.

Department of Health, Education, and Welfare

1. Comment: "The Draft Environmental Impact Statement for the Honolulu Watershed Project, Maui County, Hawaii has been reviewed in accordance with the interim procedures of the Department of Health, Education and Welfare as required by Section 102(2)(c) of the National Environmental Policy Act (PL 91-190).

The material provided appears to describe adequately the impacts of the proposed action as well as the alternatives that were presented. The major concerns of this department are related to possible impacts upon the health of the population, services to that population and changes in the characteristics of the population which would require a different level or extent of services.

The opportunity to review this statement is appreciated. Our review does not identify problems related to these specific concerns."

Response: Noted.

Department of the Interior

1. Comment: "The effectiveness of voluntary land treatment should be evaluated, with mention given to specific commitments made by landowners. If specific commitments are not made by the cooperating landowners, then it appears that the goals of the project would not be accomplished. Furthermore, we suggest that an evaluation be made on land treatment measures listed on pages 2 through 4 as compared to alternative measures that may be considered."

Response: The land treatment measures under the "Planned Project" section of the EIS are part of the project and will be applied voluntarily by the landowners. The willingness and ability of the landowners to install the needed land treatment measures are some of the important criteria under PL-83-566 for a watershed project to receive planning authorization and subsequent funding. The land treatment measures listed on pages 2 through 4 are considered to be the best and most economically feasible for cropland. The only alternative to cropland treatment listed would be conversion to grassland, which is not economically feasible for the landowners. We know of no better alternatives for treatment of pasture, forest and other lands than those listed.

2. Comment: "Two aspects of the watershed plan involve potentially adverse impacts on the cultural resources of the area. One concern is with six of the land treatment measures outlined on pages 2-4. The following activities appear to involve surface disruption which could produce adverse effects on archeological resources: in-field diversions (90,000 feet) and other diversions (1,000 feet) to collect runoff water, grassed waterways (25 acres), grade stabilization structures, debris basins, and other land treatment measures."

Response: These land treatment measures will be located in cultivated lands. Any archeological resources in these cultivated areas that were once present have been destroyed.

3. Comment: "A second aspect of the plan which represents a potential danger to archeological resources is the initiation of proposed structural improvements as detailed on pages 4-7. The construction of eight dams and desilting basins, 0.7 miles of lined channels and 0.8 miles of floodwater diversions as well as the disposal of excavated material and the construction of preventive measures such as diversions and temporary debris will entail sufficient earthmoving activity to jeopardize cultural resources which may exist in the area."

Response: An archeological "walk-through" survey has been made of the areas where structural measures are proposed. The Archeological and Historical Resources section of the EIS has been revised to include a brief description of the resources found during the survey. This section also includes recommendations contained in the survey report to preserve or salvage the identified resources.

4. Comment: "An additional statement should be made to indicate whether the trees planned for disposal, top of page 5, are species identified as low elevation trees described on page 18, or whether other species would be involved."

"The extent of the proposed landscaping plans for areas along the altered stream should be fully described and, in addition, it should be made clear whether the project will improve public access within the Honolua Watershed area, including the beach areas, page 5."

Response: The trees to be removed within the limits of the debris basins are low elevation trees. This identification has been made in the EIS. There will be no landscaping along the concrete-lined channels and the last sentence statement on landscaping has been deleted.

Public access to the watershed and to the beaches will not be affected by the project. The structural measures do not have recreational features that would require public access. Access to beaches is the responsibility of the county of Maui and the state.

5. Comment: "The proposed method of disposition of spoils from initial channel excavation and subsequent maintenance does not appear to have been mentioned, although it is assumed that spoils from initial excavation would be used for earth fill in construction of the dams. A more adequate description of the nature of materials to be excavated would be helpful, particularly the character of the material now described only as 'soft rock' (page 6, paragraph 3)."

Response: Disposition of spoil during construction and of sediment has been included in the Structural Measures section of the EIS. The description of the material to be excavated in the channels and diversions is considered adequate.

The term "soft rock" has been changed to saprolite.

6. Comment: "The proposed dimensions of the five concrete-lined channels have not been found anywhere in the environmental statement. It might be advisable to refer to the detailed data in Table 3A in the watershed work plan. The two proposed floodwater diversion channels are depicted on the Project Map (App. B of EIS) in such a way that they appear to be a single continuous channel. It would be helpful either to delineate the channels more accurately, to indicate direction of flow, or to refer to the detailed map and profiles in figure 8 of the watershed work plan."

Response: Structural data of the desilting basins and channels has been included (see Appendix E). Appendix B (Project Map) has been corrected and improved.

7. Comment: "The benefit-to-cost ratio, which is given as 1.7:1.0 on page 9, fails to take into account the administrative costs, which reduce the ratio to 1.5:1.0 (App. A). The implementation of land treatment measures on about 24,000 acres, which appears to be an integral part of the proposed action, has not been mentioned in the Description of Action in the Summary."

Response: The benefit-to-cost ratio under "Project Costs" has been corrected to 1.5:1.0. The summary has been revised to include the land treatment measures.

8. Comment: "Paragraph 4, on page 11, should be expanded to indicate the names of all streams diverted and the total volume of water removed."

Response: Names of the streams and volumes of flow diverted have been included in the EIS.

9. Comment: "Stream communities should be surveyed at elevations where they exist as perennial streams. Many endemic stream species are diadromous and could migrate to and from the ocean during periods of continuous stream flow. Furthermore, scientific names should accompany the common family and species name of those previously listed."

Response: The following sentence has been included in the Plant and Animal Resources section of the EIS: Freshwater species in streams of the watershed are limited to black opae, Atya bisulcata; wi, Neritina granosa; goby, Chonophorus sp., Sicydium simpsoni, Lentipes seminudus; toads, Bufo marinus; and frogs, Diplasiocoela spp.

10. Comment: "We are pleased that an archeological survey of the project is being made. Without a copy of the survey report, however, we are unable to adequately assess the impacts which these two aspects of the plan may have on archeological resources. We will need to review the final statement and the survey report before we will be able to offer more appropriate comments on specific aspects of the project. The survey should cover the entire project area including all borrow and disposal sites, and a copy of the survey report should be made available to the National Park Service, Arizona Archeological Center, P. O. Box 49008, Tucson, Arizona 85717, in accordance with section 3(a) of Public Law 93-291. The survey should provide the following kinds of information:

1. The presence of archeological resources in areas to be affected by the proposed actions, including description and maps, showing their relationship to the project.
2. A description of survey methods and the intensity of the survey.
3. The significance of the identified resources and their potential for contributing information about the archeological problems of the project area, including identification of those which are listed on or which merit listing on the National Register of Historic Places.
4. A site-by-site cost estimate to totally excavate and study, using current archeological methodology and technology, each of the significant archeological resources to be affected by the project.
5. A recommended program of studies to realistically mitigate adverse effects which will result from the project, including research designs and estimates of time and funding needed.
6. Recommendations for any other mitigation measures which may lessen the adverse effects of the project."

Response: A copy of the report has been sent to the National Park Service in compliance with section 3(a) of Public Law 93-291. As stated in this report, some archeological resources are present within the project area. The report also contains recommendations to preserve, salvage or record these resources.

The report and subsequent memorandums and reports are available for inspection at 440 Alexander Young Building, Honolulu, Hawaii, during regular working hours.

All of the kinds of information mentioned in the comment are contained in the report and the followup memorandums and reports.

11. Comment: "Even without the results of the survey, there should have been a better indication of what mitigating measures would be taken should a significant site be discovered either through survey prior to construction or during construction. Proposed mitigation measures should be discussed in the final statement. Should a significant archeological site of National Register quality be identified prior to construction, preservation of such resource should be considered as well as archeological salvage.

"Any significant archeological resources which are identified during the course of the survey should be described and evaluated for their National Register potential. If they meet the criteria for nomination outlined in title 36 CFR 800.10, they should be nominated to the National Register. This evaluation should be documented in the final statement."

Response: The survey identified archeological resources that may have National Register potential. The resources identified in the survey and the recommendations to preserve, salvage, or record these resources have been included in the EIS.

12. Comment: "The planned conservation practices currently employed and the schedule for installation of future control measures should be described in the section.

"Soil, Water, and Plant Management Status (page 21). In addition, a statement should be included to indicate whether or not vegetative planting has been used around fields and adjacent to roads as erosion control measures. It appears that one of the existing and possibly future problems of erosion is the lack of adequate control measures in these specific areas. The reduction of erosion in croplands to 2.2 tons per acre as indicated on page 32, under Conservation Land Treatment, does not appear adequate."

Response: The section, Soil, Water, and Plant Management Status has been revised to include the types of applied land treatment measures. The types and schedule of installation of future land treatment measures are discussed in the Planned Project section. Most of the unpaved cane-haul roads are just wide enough to accommodate farm vehicles and there are no borders to plant grass. On roads where there are borders, grass planting would require extensive management to prevent grass from spreading into the sugarcane.

The 2.2 tons per-acre-per-year sediment transported from the watershed is in our opinion, within the erosion tolerance for agricultural lands. The SCS national standard for maximum erosion on agricultural land is 5.0 tons per acre per year.

13. Comment: "Some of the figures given for reduction in sediment discharge and in coastal water pollution may be uncertain because basic data for fluvial sediment loads of Hawaiian streams are as yet limited. The 'red condition' of the ocean water after rains is believed to be caused mainly by fine particles of clay suspended in the water, a condition which might not be reduced appreciably by the system of sedimentation basins."

Response: Although the "red condition" of the ocean water would not be entirely corrected by the sedimentation basins, it would be greatly reduced by the very action of the slowing of water in the basins. The water would still be "murky" from the very fine sediments not settled out, but discoloration would be greatly lessened.

14. Comment: "Both the work plan and the statement include information concerning the ferruginous-bauxite deposits located in the northern portion of the northwest end of the Island of Maui. Although the statement does not include an evaluation of project effects on these bauxite deposits, they are located on the hills above the proposed structural measures, and should not be affected by the proposed project."

Response: Noted.

15. Comment: "It is indicated on page 28, last paragraph, that recreational access, although limited in some areas, is adequate for public use. This statement should be expanded to indicate the extent of adequacy."

Response: Public access to the watershed and to the beaches will not be affected by the project. The structural measures do not have recreational features that would require public access. Access to beaches is the responsibility of the county of Maui and the state of Hawaii.

16. Comment: "Conservation Land Treatment (page 32, last paragraph). In this section it is indicated that the land treatment measures will result in a 29 percent reduction of sediment yields from the watershed, with the average sediment transport amounting to 2.2 tons per acre from cropland and about 0.2 tons per acre from undisturbed areas. Total sediment from the watershed would therefore yield 17,300 tons per year. This yield of 2.2 tons per acre from cropland compared to 0.2 tons from undisturbed areas definitely appears excessive. It indicates that the Conservation Land Treatment proposals are not adequate and that additional measures should be applied to croplands. This section should therefore be expanded to indicate the inadequacies of control measures."

Response: The 2.2 tons-per-acre sediment transported from the watershed is in our opinion, within the erosion tolerance for agricultural land.

Measures cited are standard practices in the watershed area and all have, to one extent or another, been utilized in the watershed. These practices are totally adequate when used, but need to be applied in greater number and with more rapidity. An effort to hasten the cooperators in their application will be made by the Soil Conservation Service and the West Maui SWCD by more frequent followup and more stress in the need for speed of application of the recommended practices.

17. Comment: "We suggest that the section on favorable effects, page 36a, No. 12, be expanded to reveal how open space will be created by implementation of zoning and building codes."

Response: Open space will be created by the implementation of zoning and building codes which will be applied at the commencement of construction. The code will necessitate the clearing of R/W of buildings and structures and disallow later building within the R/W and the flood plain.

18. Comment: "Data used to conclude that the project area provides marginal wildlife habitat should be identified, (page 37, No. 1). Also, the adverse impact of channelization on stream organisms, particularly the diadromous species which can migrate to and from the ocean when interrupted streams are flowing, should be mentioned."

Response: Since streams are not perennial, aquatic life is minimal, consisting of black opae, Atya bisulcata; wi, Neritina granosa; and goby, Chonophorus sp., Sicydium simpsoni and Lentipes seminudus. Of necessity, channelization and desilting basins may adversely affect diadromous species which can migrate to and from the ocean when ephemeral streams are flowing. Warm-blooded species are also minimal, consisting of mongoose and feral cats. Birdlife consists of pheasants and the low elevation birds normal to Hawaii. The project will have little effect on any of these species.

19. Comment: "As an alternative not considered, we suggest a combination of riprap and concrete-lined channels designed with rock-lined, low-flow channels to minimize the effect of accelerated drainage during low-flow periods as a result of channelization. Thus, these channels will allow diadromous species access to the ocean. Furthermore, an additional alternative that should be included is development of 50-100-foot green belt zones along both sides of the Honolua Watershed streams where feasible."

Response: The alternative of rock-lined, low-flow channels was investigated, but found to be more costly to complete than concrete-lined channels. The green-belt zones, though desirable, would have to be on lands purchased by the county of Maui. With present land costs in Hawaii at a phenomenally high rate, the acquisition of lands for this purpose is not economically feasible.

Department of Transportation - U.S. Coast Guard

1. Comment: "We have no comments to offer nor do we have any objection to the project."

Response: Noted.

Department of Transportation - Federal Highway Administration

1. Comment: "Page 21, last paragraph. The proposed realignment of Federal-Aid Primary Route 30, Honoapiilani Highway between Honokawai and Honokohau should be mentioned."

Response: The projects referred to on page 21 are limited to water resource development projects. The proposed realignment of Honoapiilani Highway is indirectly mentioned on page 30, second paragraph by citing the 701 General Plan. This Plan discusses the proposed realignment of the highway as well as plans for other facilities for the area.

2. Comment: "Appendix D, project map, Honolua watershed. The proposed second unit of the new Honoapiilani Highway realignment between Alaeloa and Honokohau is not shown."

Response: Appendixes B and D have been revised to include current information, such as the proposed realignment of Honoapiilani and others.

STATE AGENCIES

Department of Agriculture

1. Comment: "The Department of Agriculture has reviewed the Honolua Watershed project impact statement. The statement adequately describes potential environmental impacts and considers cost benefit implications. The Department recommends approval of the draft statement.

"This Honolua Watershed has been the model for soil and water conservation projects. It extends the previous accomplishments to provide a greater level of protection for a developing urban area. The practices and benefits can be assessed readily on the basis of past experience.

"Thank you for the opportunity to review this well developed statement."

Response: Noted.

Office of Environmental Quality Control

1. Comment: "Dams. Since the dEIS briefly discusses the proposed dams, this Office strongly recommends an expanded discussion including justification of the dams, capacity of each and their predicted flows, diagrams of the proposed structures, locations (maps would be helpful) of each dam, and descriptions of the surrounding area.

"In addition, this Office would like to point out a few problems that are created by dams and should be given consideration.

1. Flooding is diverted to other areas possibly near the proposed Honoapiilani Highway or the mauka area.
2. During flood periods, excess can flow over a dam to inundate the downstream area which in this instance may be the highway, residential, or resort areas.
3. If the dam inundates, then siltation and erosion will still occur.
4. If the dam gives way, what emergency precautions will exist?"

Response: Structure features and other pertinent data of the desilting basins are contained in Table 3 of the Honolua Watershed Work Plan. This table has been made Appendix E to the final EIS. Location of these structures are shown in Appendix B.

1. Temporary flooding will occur in 31.5 acres within the debris basins, as pointed out in the last sentence, page 6 of the dEIS. No other area will be flooded by the structures or because of the structures.
 - 2 & 3. The spillway of each embankment creating the sediment basin is designed to pass larger flow rates than the 100-year flow. Flow rates much larger than the 100-year flow will go through the spillway safely. Downstream flooding caused by these flows is not an effect of the sediment basins, rather, is caused by mere excessive volume of the floodwater.
 4. In addition to the large capacity of the spillways, proper construction of the earthfill embankment will make sudden failure unlikely. Also, proper maintenance, as discussed on page 7 of the dEIS, will reduce the hazard of a sudden failure. Due to the remote possibility of sudden failure and the small size of the basins, no emergency procedure was developed. Normal emergency procedures carried out by the county Civil Defense, in case of flooding downstream of these basins, are estimated to be sufficient.
2. Comment: "Relocation of Honokowai Stream. The relocation of Honokowai Stream needs further discussion. We also recommend that the following points be considered and included in the discussion.
1. A channelized course may turn a living stream into a stagnant ditch.
 2. Chances for sedimentation, siltation, and erosion increase because the channel is not a natural course.
 3. Acceleration of drainage in the watershed can occur. Because Honokowai Stream is a perennial stream, diversion may cause it to flow faster. Thus, with less water percolation, dry or drought conditions may result and affect the existent wildlife.
 4. What erosion control will be used along the channel?"

Response: Proper design and construction will prevent erosion in the relocated stream. Features such as drop structures and bank protection will be included if non-erosive velocity cannot be maintained in the relocated stream. Honokowai Stream at the structural site is ephemeral. The steepness of gradient will prevent this ephemeral stream from becoming a "stagnant ditch." Sedimentation and siltation will be prevented below the desilting basins. Drought conditions already exist as the stream is dry except for periods of prolonged or high-intensity rain.

3. Comment: "Concrete-lined Channels. From the dEIS, major flooding has occurred where man-made structures exist. Thus, this Office recommends detailed descriptions and diagrams of the proposed channels. Will these channels be adequate to prevent flooding?"

Response: Drawings which show the shape, size, and profiles of the channels are included in the final EIS (Appendixes G, H, I, and J). The proposed channels will contain and prevent flooding from the estimated 100-year flow rates.

4. Comment: "Confusion. According to page 5, the remaining channels below the desilting basins will not be modified. However, the map in Appendix B shows streams with no outlets. Clarification on this matter is necessary."

Response: Appendix B, showing the project map, has been modified to include continuous drainageways, to the ocean downstream of structures Nos. 2, 3, 4, 5, and 6.

5. Comment: "Bridges. The description of the proposed bridges should be expanded in the final document."

Response: The bridges to be relocated are described in the Planned Project - Structural Measures section of the EIS. Details of these bridges will be determined during the design phase of this project.

6. Comment: "Protected Land. Although page 6 mentions 44.4 acres will be committed to structural measures, a few questions are raised. Does the 44.4 acres used include the area that will be flooded by the dams? What are the total acres protected from this flood control project?"

Response: The description and breakdown of the 44.4 acres committed to structural measures are described adequately in the Planned Project - Structural Measures section of the EIS. The acres protected by the project was estimated at about 80 acres, as described in the Environmental Impact - Economic and Social section of the EIS. With the exception of 8 acres, the 44.4 acres are on non-developed and non-usable land such as gulches.

7. Comment: "Water Table. Because the public and private system depend on the surface and high level ground water, would the project cause the water table to decrease? Would increasing population shown by zoning of residential and resort use deplete more of the water table since there will be less return to the ground supply?"

Response: The land treatment measures proposed in the project will increase water percolation as one of their effects. Increased water penetration in the agricultural and forest areas is estimated to be more beneficial to groundwater than decreased water percolation due to urban development.

8. Comment: "Need for Extension. The dEIS states on page 22, 'Private developers have installed approximately 1,000 feet of concrete lining on the Honokowai Channel between the Honoapiilani Highway and the ocean. The channel is adequate to carry 100-year storm runoff.' Will the proposed 1,500 foot extension from the desilting basin No. 8 to Honoapiilani Highway be necessary?"

Response: The proposed 1,500-foot concrete channel upstream of the existing channel is needed to contain the 100-year flow rate from the sediment basin, thus preventing flood damage in the Honokowai flood plain. The sediment basin was located at the proposed site to take advantage of a natural site for high sediment trap efficiency and at minimum structural cost.

9. Comment: "Need for Maps. In order to adequately analyze this document, this Office recommends that maps be given. For example, on page 25, where is the 80 acres effected by the 100-year flood? Where has the major flooding occurred? The maps should also depict watershed and sub-watershed areas, agricultural areas, forest boundaries, etc."

Response: A map (Appendix D) showing the flood-prone areas, land uses within and outside of these flood-prone areas, and location of structural measures has been included in the EIS. The streams and their drainage area boundaries in their lower reaches, the area benefitted by the structural measures, and the forest reserve boundary are shown in Appendix B of the EIS.

10. Comment: "Irreversibility of the Environment. Discussion should be to include the loss of water retention, dredging of the channels, and destruction of natural resources."

Response: Reduced water percolation into the groundwater from the channels is estimated to be very minor due to their small sizes and location near sea level. Commitments of areas for the channels, basins, and diversions are discussed in the Irreversible and Irrecoverable Commitment of Resources section of the EIS. It is believed there will be no "destruction of natural resources" in the true sense of the word since the streams are ephemeral for the most part and new channels do not depart very far from natural locations.

11. Comment: "Juxtaposition of the Watershed and the Flood Control. The juxtaposition of the watershed and the flood control is not congruent. With the reduction of the sediment and erosion there will be an increase in water retention. However, the flood control project will also increase the capacity for drainage such that any intensity of rainfall will become runoff water. Thus, we question whether this whole project will protect the watershed or will it only divert the runoff water."

Response: The proposed project measures include complementary actions--land treatment on the upper areas and flood prevention in the urban areas. Land treatment measures, among other things, will increase water penetration into groundwater and reduce erosion on croplands and forest lands. The channels are needed to contain excess floodwater to prevent floodwater damage in existing urban areas.

12. Comment: "Future. With the increasing population predicted in the dEIS, what effects will this project contribute to in terms of urban sprawl, secondary effects as the public facilities, pollution, and etc.?"

Response: The proposed project will promote urban development in conformance with the General Plan for the Lahaina District, County of Maui, as discussed in the Environmental Impact - Economic and Social section of the EIS. Public facilities needed for this growing community are described in the General Plan. These will be provided by the county of Maui.

13. Comment: "Page 36. What are the \$34,270 secondary benefits?"

Response: The analysis of secondary benefits was based on primary benefits stemming from the project, together with increased costs of producing the additional goods induced by the project. The benefits arise from the increased value of production of goods and services realized by local businesses and residents. Secondary benefits from a national viewpoint are not considered pertinent to the economic evaluation.

14. Comment: "Page 37. The dEIS states that conservation measures will reduce floodwater damages by 10%. Will conservation measures reduce the floodwater?"

Response: Land treatment will reduce floodwater. Reduction due to land treatment measures will be significant during small storms. During major storms such as the estimated 100-year storm, reduction due to land treatment is estimated to be minor.

15. Comment: "Alternatives. The following has not been considered as possible alternatives to the project.

1. For agricultural areas, the Water Bank Act of 1970 should be mentioned.
2. Development of a park for the flood areas will reduce the loss of lives."

Response:

1. The Water Bank Act of 1970 is not applicable in the project area.
2. Flood plain management is considered and discussed in the Alternatives section of the final EIS.

Department of Health

1. Comment: "The Department of Health, Maui District Office, has reviewed the subject Environmental Impact Statement and has found it to be well prepared and complete.

The Department of Health supports the efforts of the Soil Conservation Service to control erosion and its effects on coastal water quality degradation."

Response: Noted.

Department of Land and Natural Resources

1. Comment: "The Department of Land and Natural Resources has no suggestions or recommendations for changes to the proposed Honolua Watershed Project, Maui County, Hawaii. We believe that the EIS adequately covers the proposed project."

Response: Noted.

Department of Planning and Economic Development

1. Comment: "We have reviewed the subject draft and find that it is generally adequate in assessing the probable impacts of the proposed project. We have no comment to offer at this time but appreciate the opportunity to review the draft statement."

Response: Noted.

Department of Transportation

1. Comment: "We have reviewed the subject environmental statement and have no comments to offer as it relates to and affects our transportation program."

Response: Noted.

University of Hawaii - Environmental Center

1. Comment: "Land Treatment Measures (Pp. 2-4). It would seem that many if not most of the Soil Conservation measures cited on these two pages are standard practices and at least some of them are already in use: ie., contour farming, irrigation water management, pasture management, livestock management, revegetation and reforestation, and forest management. It is not clear to what extent there are inadequacies in the soil conservation practices hitherto prescribed and to what extent there are inadequacies in the extent to which past practices have followed the prescriptions. It is also not clear what practices or intensities of practice not hitherto prescribed are proposed, nor how failures to practice what is prescribed will be rectified. For example, are currently 'bare' areas bare because no attempts have been made to vegetate them, because past efforts to establish vegetation on them have been inadequate, or whether the maintenance of vegetation on them has been inadequate."

Response: Measures cited on the two pages are standard practices in the watershed area and all have, to one extent or another, been utilized in the watershed. The main inadequacy is in the lack of application of more of these same practices to problem areas in the watershed rather than inadequacies in the practices themselves. An effort to hasten the cooperators in their application of these practices will be made by the SCS and the West Maui SWCD by more frequent followup and more stress on the need for greater speed of application of the recommended practices.

The "bare" areas for the most part are in the more inaccessible parts of the mountain side forests and for this reason few attempts have been made to vegetate them. Indeed, some of them are caused by what could be called "geologic erosion" inasmuch as they were caused by mud slides on steep mountain slopes. Others were caused by overgrazing by feral animals many years ago.

2. Comment: "Nonstructural Measures (Pp. 4). The statement is made that although the area below five of the desilting basins to be constructed is currently zoned for residential and resort use, it will not be protected from floods by the proposed structural measures, and thus that development will be restricted by building permit or zoning restrictions imposed by the County.

The EIS should state what restrictions the County has imposed on the use of the floodplains, what additional restrictions are proposed, whether carrying out the project is contingent upon the County imposing these additional restrictions, and what assurances there are that the restrictions will be continued in the future."

Response: The county of Maui has a flood plain ordinance which is a framework for imposing restrictions in the use of flood plains. Restrictions as to kind of buildings, floodproofing, etc., have not been passed by the County Council for this particular area; but such restrictions are expected to be enacted once the necessary maps and flood plain data have been completed for this flood plain area.

3. Comment: "If the restrictions on land use cannot be imposed without recompense to landowners, the recompense should be included in the overall costs of the project unless the County would impose restrictions whether or not the project will be carried out. Presumably restrictions and their cost would be less if the project is carried out than would be appropriate to assure the same level of protection if it were not carried out."

Response: Restrictions on development, and compensation therefor, are local land use decisions which the county can establish for the best use of the land.

4. Comment: "Structural Measures (Pp. 5, last sentence). Mention is made that trees and shrubs similar to those now growing along the Honokowai Channel will be planted after construction. It is not clear why planting will be restricted to this channel."

Response: This section has been changed to read: "Trees, shrubs, and grass will be planted along the lined channels after installation wherever the existing vegetation has been removed to facilitate construction."

5. Comment: "Pp. 6: Paragraph 3). It would appear that the channels and floodwater diversions will be excavated through soil types highly susceptible to erosion: 'silty surface materials and into soft rock.' The EIS should state what measures will be taken to minimize the probable erosion during the construction, such as scheduling construction during non-storm seasons. Serious permanent damage to coral in the nearshore waters could result from the additional burden of sediment transported from the construction areas during storms."

Response: Erosion damage during construction will be minimized by the use of "settling basins" constructed within the R/W. Normal channel runoff will be channeled into these ponds and the water released after most silt has settled into the newly constructed works below. Because construction will begin from the outlet, these settling basins will be filled and new ones constructed upstream ahead of construction. The EIS has been revised to state that silt producing operations will be done during non-storm seasons.

6. Comments: "(Pp. 7). The EIS indicates that 31.5 acres cleared for the sediment basins 'will be left idle and expected to revert back to present vegetation.' It is not clear why the land will have to be cleared, except perhaps as the borrow pits for dam materials will be parts of the basins. It is also not clear why the basins should not be deliberately revegetated instead of merely allowed to revert to a vegetated condition. Without vegetation, the basins would be subject to wind erosion and sources of dust."

Response: The section on Structural Measures of the EIS has been revised to include the following sentence: "Steep sides of the sediment basins will be shaped and vegetated." The first sentence on page 7 of the dEIS has been omitted. Clearing the sediment basin of trees will be necessary for ease of maintenance. Also, some of these trees and brush when inundated, even temporarily, will die. Dead trees in the basin will be a source of debris that can clog and render the outlet structures of these basins inefficient.

Grass will be allowed to grow in the basins. The basins are not deliberately vegetated because periodic cleanout of the basins would damage any permanent vegetation. Also, sediment deposited in the basin after storms would cover and kill any permanent vegetation. However, should the basins become sources of dust due to wind erosion, appropriate measures will be taken by County of Maui to control this problem.

7. Comment: "Project Costs (Pp. 9). The text discussion of costs and benefits should cite appendix A and the Watershed Work Plan for details."

Response: Concur. Appendix A has been cited and further breakdown of the costs has been included as Appendix K.

8. Comment: "Economic Resources (Pp. 15). The 1965 valuation of cropland, \$22,000, is out of date. Some adjustment to 1974 values is surely possible."

Response: Concur. Valuation has been changed to read \$1.40 per square foot or approximately \$60,000 per acre in 1974 according to the Maui Board of Realtors.

9. Comment: "Conservation Land Treatment (Pp. 31-33). See comments on land treatment measures (pp. 2-4).

"The EIS should cite the methods used in estimating soil loss, soil loss reduction, and its anticipated reduction. Presumably the Universal Soil Loss Equation was used."

Response: Sediment yields were determined from field examinations and studies made by the U.S. Geological Survey on the island of Oahu. Soil loss reduction and anticipated reduction were estimated using the method described in the Engineering and Watershed Planning Unit Technical Guide 15, South Technical Service Center, SCS.

10. Comment: "Structural Measures (Pp. 33-34). The EIS should cite the methods used in estimating the sediment-trapping efficiency of the silting basins and the effects of the trapping. A 40% effectiveness seems high considering the fine nature of the soil particles. The reduction of coastal water pollution by the soil particles from 2 to 4 weeks to 3 or 4 days seems questionable considering that the coastal water turbidity results from the finest soil particles that will be least effectively removed by the desilting basins. It should be recognized that the proposed channelization will result in the loss of effectiveness of the flood plain as sediment traps."

Response: The method used to estimate the trap efficiency of the sediment basins and the estimated effect of sediment reduction on the coastal water has been discussed in response to comment No. 3 by the U.S. Environmental Protection Agency (see page 45).

11. Comment: "Non-structural Methods (Pp. 34-35). See comment on non-structural measures (p. 4).

"The EIS should also cite the Watershed Work Plan concerning details of the proposed structure. It is noted in that Plan that the structures are designed to cope with 100-year storm discharges. Because such discharges have certain likelihoods of occurring even during shorter periods of time, consideration should certainly be given in the EIS to the consequences of a storm discharge exceeding the design discharge.

"Plans for the operation of the desilting basins are not clear. Will they be drawn down after a storm, and if so at what rate?"

Response: The outlet structures of the desilting basins are designed to pass much higher discharges than the 100-year flow. Higher design flows are necessary to lessen the likelihood of overtopping of these structures.

The floodwater channels are designed to contain the 100-year flow. Including freeboard, the channels can contain about the 200-year peak flow. Discharges, as well as structural data, for the proposed structures have been included in the EIS (see Appendixes E & F).

We concur that the 100-year storm discharges have certain likelihoods of occurring at any time. This concern is also discussed in response to a comment made by the Office of Environmental Quality Control (see response to comment 1 on page 57).

The Planned Project section has been revised to include the following sentence: "Drain pipes with graded filter will be incorporated in the spillways to provide complete draw-down of the basins in about 24 hours." Rate of drawdown will vary for the various structures and at different water levels in the basins. Structure No. 8 will have the longest drawdown time estimated at about 26 hours.

12. Comment: "Economic and Social (Pp. 35, paragraph 4). This paragraph cites general increase in population 'over and above normal growth,' resulting from the project. Required public facilities, water, sewer, electricity, schools, roads, and of course housing which will be required must be considered and the appropriate agencies apprised of the additional impact on their resources."

Response: The proposed project will be undertaken in conformance with the general plan of the area. The third paragraph under the Economic and Social section has been revised to read:

The distribution of rural population within the watershed will remain relatively constant. There are approximately 435 people living in the benefitted area. The proposed project will promote urban development in conformance with the general plan of the area. This will create additional employment, especially in wholesale-retail trades and in services. This will also create added demands for water supply, sewage disposal, transportation, and parks and recreational facilities. Plans for these facilities are included in the general plan.

University of Hawaii - Water Resources Research Center

1. Comment: "In page 4, the earth dams for desilting range from 24 to 43 feet in height. In order to prevent overflow, concrete drop inlet spillways were designed to carry the 100-year peak runoff. The 100-year peak runoff for each stream and the dimensions of the spillway are important data to be included in the EIS. Methods for maintaining the desilting basin in operational condition should be stated."

Response: Tables containing the 100-year peak flow runoff for each structure and the dimensions of the spillway has been included (Appendixes E and F).

Operation and maintenance requirements for the desilting basins are contained in the Operation and Maintenance section of the final EIS.

2. Comment: "In page 5, the profiles and dimensions of the three rectangular, concrete-lined floor channels should be provided, and the total of their capacities should match with that of 100-year flood."

Response: Profiles and dimensions of the three rectangular concrete channels have been included in the final EIS as Appendixes G, H, and I.

3. Comment: "In page 6, the profile and dimensions of the floodwater diversions should be given."

Response: Profiles and dimensions of the floodwater diversions have been included in the final EIS as Appendix J.

4. Comment: "In page 8 or 9, an item of project benefits should be added for comparison with the project costs."

Response: The purpose of this section is to show how the installation cost is distributed to PL-566 and other funds. The benefit-cost comparison is shown in Appendix A.

5. Comment: "In page 25, the storm of December, 1964 was cited as a 20-year frequency storm. It caused extensive sediment damages to residences and resort-commercial development located at Napili, Honokowai, Mahinahina and Kaopala areas. An estimation of the sediment deposition in each area would provide a check on the capacity of the corresponding desilting basin."

Response: An estimation of the sediment deposition on land which did not include that entering the ocean (impossible to estimate) would be an invalid means of checking the capacity of the corresponding desilting basin.

6. Comment: "In page 27, the damages caused by past floods provided an estimate of the average annual benefit at \$67,500, (\$945,000/14 years). However, page 47 reported an average annual benefit at \$337,490. A statement to support the estimation on page 47 is needed."

Response: The damages listed on page 27 are limited to those on existing businesses, residential areas and farm operations at the time of the flood. The damages (benefit) reported on page 47 include damages on projected beneficiaries during the useful life of the project. The following sentence will be added after the table of damages: "These damages together with projected future damages were used to evaluate the economic benefit of the project. The annual damages are shown in Appendix A."

7. Comment: "In page 38, it is stated that withdrawing portions of the cultivated land and replanting the area with permanent vegetation would reduce erosion and sedimentation by a great amount. This is a very good plan to be included as part of the recommended project. The plantations should be convinced that the retiring of some of the acreage in the strategic zones would give them better return in a long run and they may avoid law suits against them under the Environmental Protection Law."

Response: The sedimentation reduction estimated at 80 percent would be attained if all of the cultivated lands are planted with permanent vegetation. If only a portion of the cropland is put into permanent cover, the percent reduction would be less.

Acreage reduction of productive lands would present economic problems to the project area in terms of less employment and production. This economic problem would not be limited to the project area but also to other sectors of the economy connected with the pineapple and sugar industry. As long as the landowners are willing to reduce sediment production by applying conservation practices, keeping this acreage in crop production would be the cheaper and better alternative.

PRIVATE ORGANIZATIONS

Pioneer Mill Company, Limited

1. Comment: "The West Maui Soil and Water Conservation District plan for the control of storm water runoff from the Honolua watershed of West Maui involves land owned by Pioneer Mill Company, Limited, State land of Honokowai held by Pioneer Mill Company, Limited under General Lease No. 3588 and land leased by Pioneer Mill Company, Limited from Maui Land and Pineapple Company, Inc.

"Part of the proposal envisions two floodwater diversion channels across cane land at Honokowai leading to Mahinahina and Honokowai gulches, as described in the "Watershed Work Plan, Honolua Watershed," Maui County, Hawaii, 1972, Page 35, and elsewhere in the report. These channels are recommended for location 400-600 feet mauka of the proposed extension of the Honoapiilani Highway and would cut across very productive cane land. They would act as barriers to irrigation and would preclude efficient operation of the fields mauka and makai of the diversions.

"In 1973, we expressed our concern to the Soil Conservation Service who subsequently proposed an alternate whereby the diversion channels would be located along the mauka boundary of the new highway right-of-way. However, we recently learned that the Soil Conservation Service had not abandoned the plan for using the original mauka diversion channels. Pioneer Mill Company believes that the diversions should be located adjacent to the highway, not only to alleviate what would be a serious impedance to our operations, but also to avoid having to live with a visible scar slicing across privately and publicly owned lands. The channel, in a position adjacent to the road, would not only serve the same purpose but would also blend in with the proposed highway.

"Pioneer Mill Company, Limited has supported this project from the beginning and will be making substantial concessions once the project is started. It is hoped that this objection and proposed viable alternative will be given full consideration."

Response: As discussed in our several meetings and correspondence, the SCS will evaluate alternative alignments for the Mahinahina and Honokowai floodwater diversions during design to limit disturbance of the company's irrigation system and agricultural operation. More detailed data, including the final highway design, to be obtained for the design phase will enable SCS to make the evaluation.

Appendix A - Comparison of Benefits and Costs for Structural Measures

Appendix B - Project Map

Appendix C - Letters of Comments Received on the Draft Environmental Impact Statement

Appendix D - Flood Prone Areas and Future Land Uses

Appendix E - Structural Data - Desilting Basins

Appendix F - Structural Data - Channels

Appendix G - Napili 2-3 Channel

Appendix H - Mahinahina Channel

Appendix I - Honokowai Channel

Appendix J - Floodwater Diversions

Appendix K - Estimated Project Installation Costs

APPROVED BY: Francis C. H. Lum Date 3/19/76
Francis C. H. Lum
State Conservationist
Soil Conservation Service

APPROVED BY: Elmer F. Cravalho Date 3-31-76
Elmer F. Cravalho, Mayor
County of Maui

APPROVED BY: George R. Ariyoshi Date 4-23-76
George R. Ariyoshi, Governor
State of Hawaii

APPENDIX A

COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES

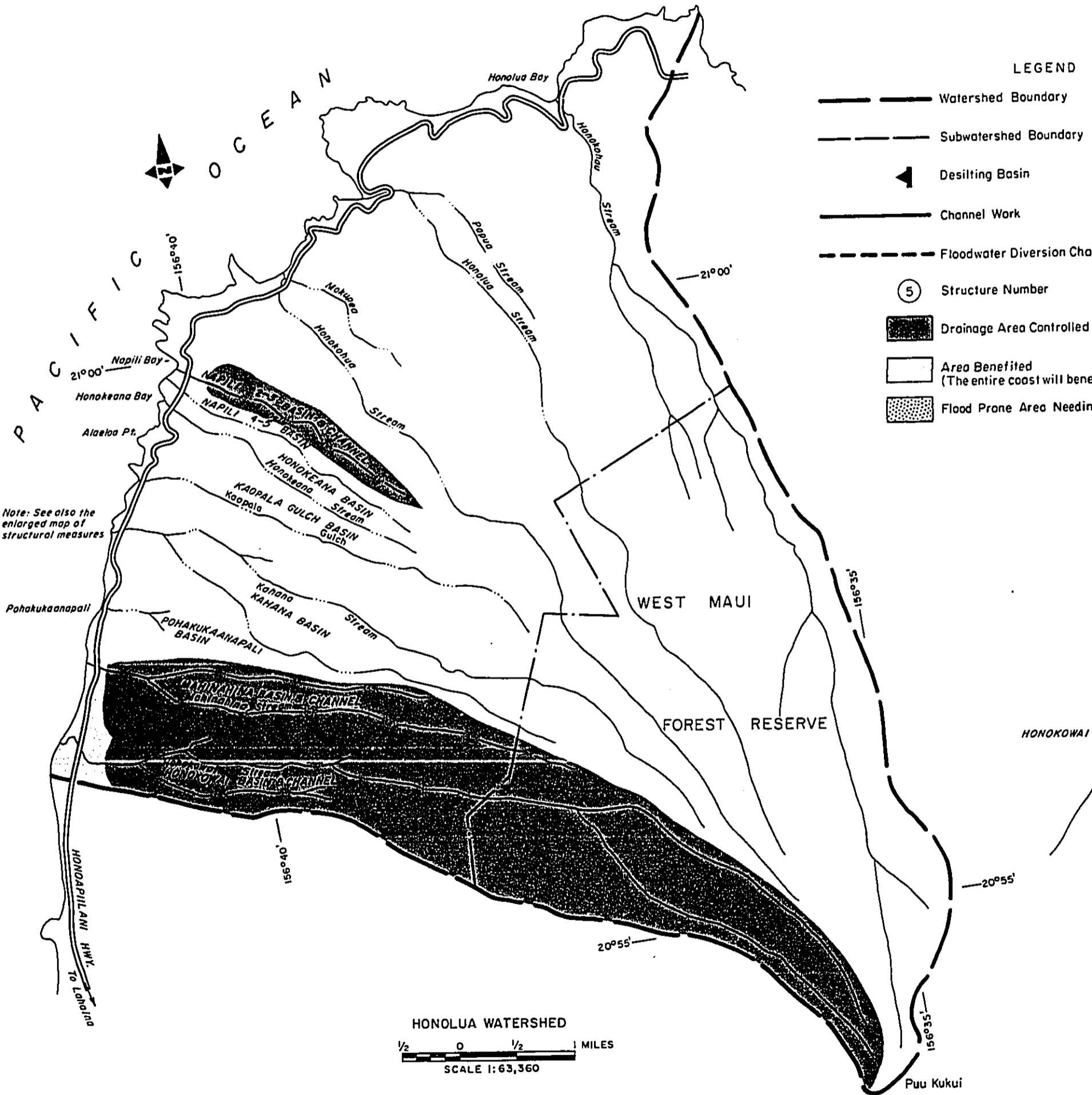
Honolua Watershed, Hawaii
(Dollars)^{1/}

Evaluation Unit	Average Annual Benefits		Total	Average Annual Cost	Benefit Cost Ratio
	Damage Reduction ^{2/}	Secondary			
All Structural Measures	551,900	53,800	605,700	386,100	1.6:1.0
Project Administration	-	-	-	31,600	-
GRAND TOTAL	551,900	53,800	605,700	417,700	1.5:1.0

^{1/} Price base: Current normalized prices for crop and pasture; all others 1975.
^{2/} In addition, it is estimated that land treatment measures will provide floodwater, sediment and erosion damage reduction benefits of \$41,400 annually.

March 1976

APPENDIX B - Project Map

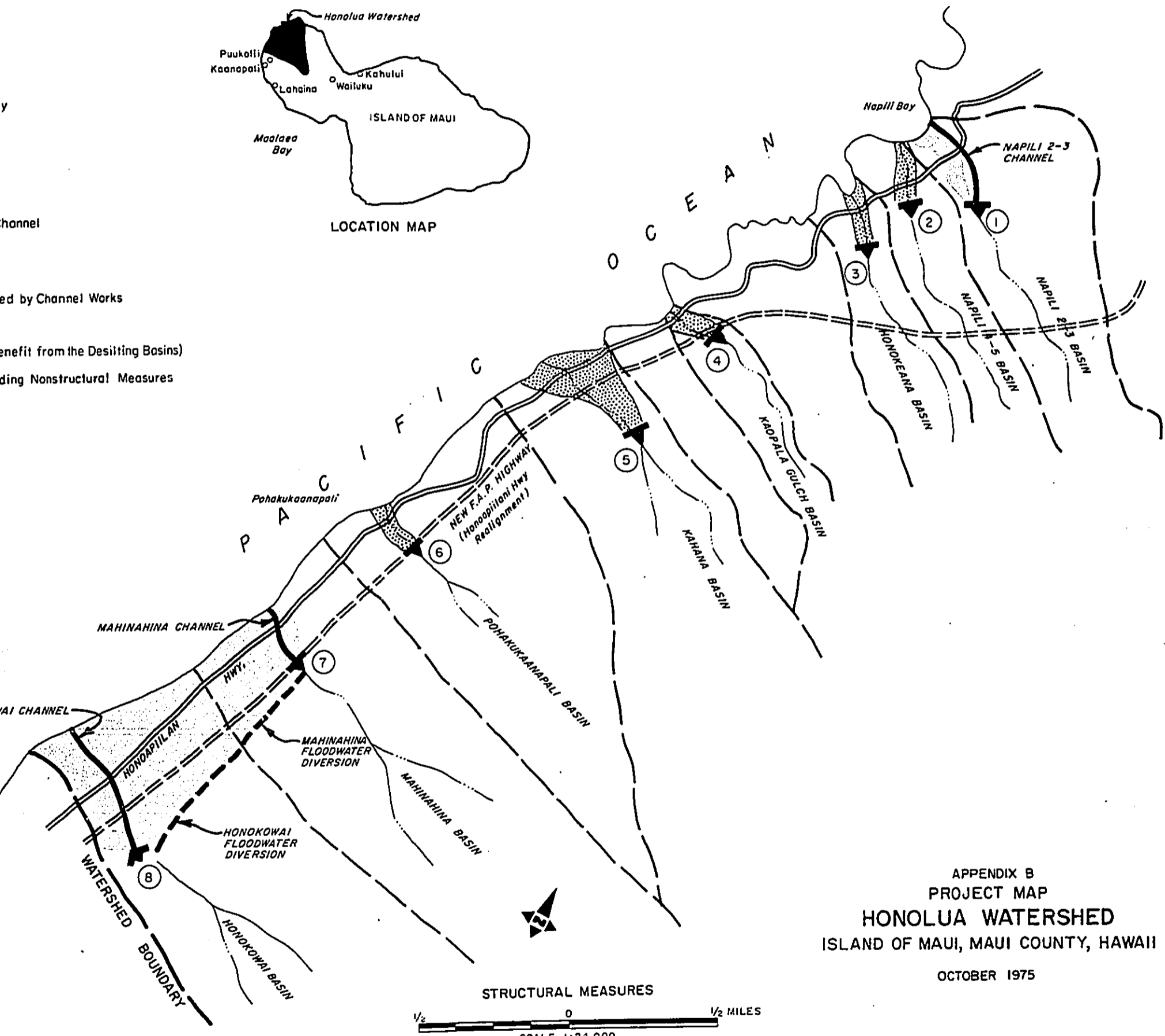
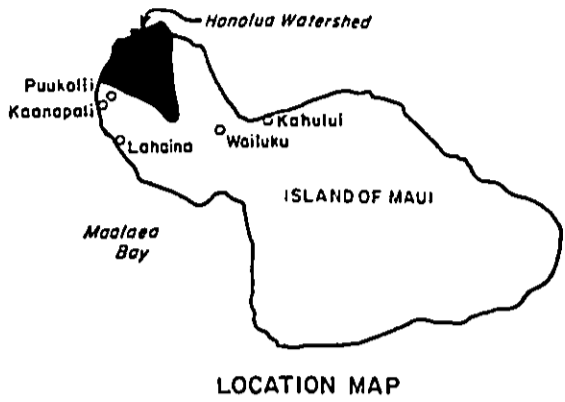


Note: See also the enlarged map of structural measures

HONAPILIANI HWY. To Lanaiua

- LEGEND**
- Watershed Boundary
 - - - Subwatershed Boundary
 - ◀ Desilting Basin
 - Channel Work
 - - - Floodwater Diversion Channel
 - ⑤ Structure Number
 - Drainage Area Controlled
 - Area Benefited (The entire coast will benefit)
 - ▨ Flood Prone Area Needing

HONOLUA WATERSHED
 1/2 0 1/2 1 MILES
 SCALE 1:63,360



APPENDIX B
 PROJECT MAP
HONOLUA WATERSHED
 ISLAND OF MAUI, MAUI COUNTY, HAWAII
 OCTOBER 1975

APPENDIX C

Letters of Comments Received on the Draft Environmental Impact Statement

C-1-1

**Advisory Council
On Historic Preservation**
1522 K Street N.W. Suite 430
Washington D.C. 20005

Mr. Francis C. H. Lum
State Conservationist
Soil Conservation Service
U.S. Department of Agriculture
440 Alexander Young Building
Honolulu, Hawaii 96813

DEC 9 1974

Dear Mr. Lum:

This is in response to your request of October 3, 1974 (received October 17, 1974) for comments on the environmental statement for Honolua Watershed Project, Maui County, Hawaii. Pursuant to its responsibilities under Section 102(2)(C) of the National Environmental Policy Act of 1969, the Advisory Council on Historic Preservation has determined that while you have discussed the historical, architectural and archeological aspects related to the undertaking, the Advisory Council needs additional information to adequately evaluate the effects on these cultural resources. When the survey of the project area by the Bishop Museum to identify sites of historical and archeological significance (page 20) is complete, please furnish additional information indicating:

Compliance with Executive Order 11593 of May 13, 1971

1. In the case of land under the control or jurisdiction of the Federal Government, a statement should be made as to whether or not the proposed undertaking will result in the transfer, sale, demolition or substantial alteration of potential National Register of Historic Places properties. If such is the case, the nature of the effect should be clearly indicated.
2. In the case of lands not under the control or jurisdiction of the Federal Government, a statement should be made as to whether or not the proposed undertaking will contribute to the preservation and enhancement of non-federally owned districts, sites, buildings, structures, and objects of historical, archeological, architectural or cultural significance.

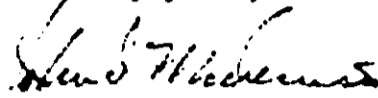
To insure a comprehensive review of historical, cultural, archeological and architectural resources, the Advisory Council suggests that the environmental statement contain evidence of contact with the appropriate State Historic Preservation Officer and that a copy of his comments concerning the effects of the undertaking upon these resources be included in the environmental statement. The State Historic Preservation Officer for Hawaii is Mr. Sunao Kido, Chairman, Department of Land and Natural Resources, State of Hawaii, P. O. Box 621, Honolulu, Hawaii 96809.

The Council is an independent unit of the Executive Branch of the Federal Government created by the Act of October 15, 1966 to advise the President and Congress in the field of Historic Preservation.

C-1-2

Should you have any questions or require any additional assistance, please contact Michael H. Bureman of the Council staff at P. O. Box 25085, Denver, Colorado 80225, telephone number (303) 234-4946.

Sincerely yours,



John D. McDermott
Director, Office of Review
and Compliance

C-2-1

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 15th AIR BASE WING (PACAF)
APO SAN FRANCISCO 96553



18 NOV 1974

REPLY TO DEEE (Mr Kimura, 4492158)
ATTN OF:

SUBJECT: Draft Environmental Impact Statement

TO: Office of Environmental Quality Control
Office of the Governor
550 Halekauwila Street
Tani Office Building, Third Floor
Honolulu, Hawaii 96813

We have no comment to render relative to the draft environmental impact statements for the following projects:

1. Base Yard Facilities, Hanapepe, Kauai
2. Flood Control, Kapaakea, Molokai
3. 76-Unit Townhouse, Waialae Nui, Oahu
- ✓4. Honolua Watershed, Honolua, Maui

A handwritten signature in cursive script, appearing to read "Allan M. Yamada".

ALLAN M. YAMADA
Asst Dep Comdr for Civil Engrg

C-3-1



PODED-P

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
BLDG. 230, FT. SHAFTER
APO SAN FRANCISCO 96358

19 November 1974

Mr. Francis C. H. Lum
State Conservationist
Soil Conservation Service
440 Alexander Young Building
Honolulu, Hawaii 96813

Dear Mr. Lum:

We have reviewed the draft environmental statement (ES) and work plan for the Honolua Watershed Project and have the following comments.

a. According to pages 4 and 34 of the draft ES, nonstructural measures in the form of zoning and restrictive building permit provisions will be necessary for the flood plain below desilting basin Nos. 2, 3, 4, 5, and 6 and will reduce the acreage along the coast available for intensive development. The statement notes that these areas are zoned for residential and resort use although they are presently undeveloped.

b. In the discussion of the No Project alternative on pages 40-41, future development with increased property damages in the flood plain is projected to occur without implementation of the proposed project between Mahinahina and Honokowai Streams. The new development would be in accordance with the Lahaina 701 plan.

c. It is not clear whether the nonstructural restrictive measures described on pages 4 and 34 are to be a specific local requirement of the total project or are part of existing local ordinances and constraints for development within flood plains. If the latter is true, the apparent lack of applicability to the Mahinahina-Honokowai area should be clarified.

Sincerely yours,

A handwritten signature in cursive script that reads "Elroy Chinn".

ELROY CHINN
Acting Chief, Engineering Division

Copy furnished:
Office of Environmental Quality Control



HCSG-E

C-4-1

DEPARTMENT OF THE ARMY
HEADQUARTERS UNITED STATES ARMY SUPPORT COMMAND, HAWAII
APO SAN FRANCISCO 96558

21 NOV 1974

Richard E. Marland, PhD
Interim Director
Office of Environmental Quality Control
State of Hawaii
Room 301, 550 Halekauwila Street
Honolulu, Hawaii 96813

Dear Dr. Marland:

The draft EIS on Honolua Watershed Project, Maui County, Hawaii, was reviewed by this office, and the following comments are offered:

1. Structural Measures, page 5, para 1. What will be the cost of obtaining necessary land rights prior to construction for the county?
2. Plant and Animal Resources, page 19, para 3. Can the statement, "there are no known threatened plant or animal species in the portion of the watershed area where project measures are proposed" be substantiated?

It is hoped that the comments offered will help in adequately evaluating the EIS.

We thank you for the opportunity to comment on the EIS and offer our help if we can be of further assistance.

Sincerely,

LEE C. HERWIG, JR.
Colonel, MSC
Environmental Consultant to Commander,
U.S. Army Support Command, Hawaii



C-5-1

UNITED STATES DEPARTMENT OF COMMERCE
The Assistant Secretary for Science and Technology
Washington, D.C. 20230

December 9, 1974

Mr. Francis C.H. Lum
State Conservationist
Soil Conservation Service (U.S.D.A.)
440 Alexander Young Building
Honolulu, Hawaii 96813

Dear Mr. Lum:

The draft environmental impact statement for "Honolua Watershed Project, Maui County, Hawaii," which accompanied your letter of October 3, 1974, has been received by the Department of Commerce for review and comment.

The statement has been reviewed and the following comments are offered for your consideration.

General Comments

The land treatment measures are the most vital part of this watershed project as far as curtailment of erosion is concerned. This is particularly true of the cropland treatment measures. It is not clear in the draft environmental impact statement whether these measures are part of the project itself, and therefore mandatory, or whether they are merely to be implemented on a voluntary basis. The land treatment measures outlined in the statement appear to be sound and practical, and should be made mandatory for both public and private lands within the Honolua watershed.

An alternative that apparently has not been explored would be to allow flows in all streams within the watershed that historically were perennial. In the early 1900's, stream flows from perennial streams such as Honokohau, Honolua, and Honokowai were diverted by ditches and tunnels for the cultivation of sugar cane. If some of this water were rediverted



to the original streams, the long-term results would be recolonization of these streams by endemic diadromous fauna, including the various species of gobies (oopu), prawns (opae), and fresh water limpets (hiwai) that once were abundant in the streams of Hawaii. Most of these species spend their larval stages in the sea and return to the streams as juveniles. Therefore, it is essential to provide perennial stream habitat to assure recolonization of these streams.

The perennial streams should be left natural or have vegetative-lined channels, and not the planned concrete-lined channels. The natural or vegetative-lined channels will continue to support aquatic life in the channel pools even during dry periods. Planting of trees and other vegetation (green-ways) along the stream beds for shading purposes and erosion control is also important; lack of shading greatly increases water temperature during the day in lined channels. It is possible that perennial flows in these streams would prevent the stream beds from becoming the desiccated arroyos that many are now, and would encourage development of the kind of lushly vegetated stream basins seen in the valleys containing perennial streams throughout Hawaii. The stream channel beds and banks would then be subjected to far less erosion during high velocity flows.

The description of marine life along the watershed coastline (page 18) is incomplete, and we noted several errors in the common names of fish families (see specific comments below). The scientific family names should be used for these groups, and the methods of obtaining data should be given (i.e., underwater surveys, fishermen interviews, etc.). It would be desirable for the statement to provide a more complete description of the benthic biota in this area, particularly with regard to the present condition of the corals. The corals are so central to the integrity of the reef community that when they are destroyed, migration or death of much of the other reef biota ensues. Because the environmental tolerances of the reef community as a whole do not exceed those of its corals,^{1/} an assessment of the corals would

^{1/} Levin, J. 1970. A literature review of the effects of sand removal on a coral reef community. University of Hawaii Sea Grant Publication. 78 p.

provide a good indication of the present condition of the total reef community along the watershed coast.^{2/}

Specific Comments

PLANNED PROJECT

Structural Measures, p. 7, paragraph 3. We believe that within the description of special design and construction features a statement should be included which indicates construction during periods of high rainfall or storms (December through April) will be limited to those operations least likely to contribute to the transport of sediment by runoff.

ENVIRONMENTAL SETTING

Plant and Animal Resources, p. 18, paragraph 3. A statement is made that "Fish caught for local use include crevalle, pompano, bonefish, mullet, bass, goatfish, grouper, and snapper." We believe this list is inadequate for the following reasons: (1) crevalle are fish belonging to the family Carangidae, but this common name is not applied to species found in Hawaii; (2) if the common name "pompano" is also used for species in the family Carangidae, these are not found in Hawaii; however, if "pompano" refers to butterflyfish of the family Stromateidae, this should be so specified; (3) "bass" is not a common name applied to any group of Hawaiian salt water fish; and (4) the only native groupers caught in Hawaiian waters are taken offshore in waters usually over 100 fathoms deep (one species of introduced grouper, Cephalopholis argus, is found in Hawaiian nearshore waters, but is nowhere common).

In the third sentence in this paragraph families of reef fish are natural. Reference to the "coral" fish family should be expanded. The name "sturgeon" in the fourth sentence should be "surgeon," and, contrary to the statement, members of the family Acanthuridae are indeed important food fish in Hawaii.

^{2/} Smith, S.V., K.E. Chave, and D.T.O. Kam. 1973. Atlas of Kaneohe Bay: a reef ecosystem under stress. University of Hawaii Sea Grant Publication. 128 p.

As mentioned under General Comments above, the confusion caused by the improper use of common names can be eliminated by using proper scientific names. (See Gosline, W.A., and V.E. Brock, 1960, "Handbook of Hawaiian Fishes." Honolulu, University Press of Hawaii, and American Fisheries Society Special Publication No. 6, 1970, "A List of Common and Scientific Names of Fishes from the United States and Canada (Third Edition)).

Plant and Animal Resources, p. 18, paragraph 4. This paragraph states that "The ephemeral and intermittent streamflows in channels in the watershed do not support significant fish populations." Populations of fish and invertebrates supported by these channels should be stated.

ENVIRONMENTAL IMPACT

Structural Measures, p. 33, paragraph 5. We believe the statement that the desilting basins "will trap 40 percent of all sediment transported from the watershed and, together with conservation land treatment measures, will reduce siltation and sediment pollution affecting the watershed's 4-mile ocean front by 57 percent" should be substantiated. If much of the suspended fines were not actually trapped by the desilting basins, the problem of this suspended material causing brown water to occur up to $\frac{1}{2}$ mile offshore for 2 to 4 weeks following a normal rain storm would still remain.

Structural Measures, p. 33, paragraph 6. We believe the statement that "water pollution periods following storms will be reduced from 2 to 4 weeks to 3 to 4 days as a result of decreased sediment transported to the coast" should be substantiated. Evidence indicating that the claimed reduction will indeed occur should be discussed in the final environmental impact statement.

Thank you for giving us an opportunity to provide these comments, which we hope will be of assistance to you. We would appreciate receiving a copy of the final statement.

Sincerely,

Sidney R. Galler

Sidney R. Galler
Deputy Assistant Secretary
for Environmental Affairs

C-6-1



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
100 CALIFORNIA STREET
SAN FRANCISCO, CALIFORNIA 94111

Francis C. H. Lum
State Conservationist
Soil Conservation Service
440 Alexander Young Building
Honolulu HI 96813

DEC 12 1974

Dear Mr. Lum:

The Environmental Protection Agency has received and reviewed the draft environmental statement for the following proposed action, Honolua Watershed Project, Maui County, Hawaii.

EPA's comments on the draft environmental statement have been classified as Category ER-2, specifically environmental reservations pending resolution of the comments noted in the attachment to this letter. Definitions of the categories are provided on the enclosure. The classification and the date of EPA's comments will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal actions under Section 309 of the Clean Air Act. Our procedure is to categorize our comments on both the environmental consequences of the proposed action and the adequacy of the environmental statement.

EPA appreciates the opportunity to comment on this draft environmental statement and requests one copy of the final environmental statement when available.

Sincerely,

A handwritten signature in cursive script that reads "Paul De Falco, Jr.".

Acting
Paul De Falco, Jr.
Regional Administrator

Enclosure

cc: Council on Environmental Quality, Wash., DC 20460

Comments on the Draft Environmental Statement
for
Honolua Watershed Project

1. The environmental statement should be expanded to include maps which reveal the following information:
 - a) 100 year flood plain boundaries;
 - b) the extent and distribution of urban development in the Honokowai, Mahinahina, and Napili 2-3 watersheds;
 - c) the extent and distribution of urban development to be protected by the Honokowai - Mahinahina Floodwater Diversion; and
 - d) tsunami zones.
2. On page 35 it is stated: "With the project installed, increases in population over and above normal growth are expected." The environmental impact statement should discuss the anticipated population changes and the consequent environmental impacts that may occur. Specifically, are wastewater collection and treatment services adequate? Did the calculation of peak flood flows in the channels include a component of urban storm runoff?
3. EPA notes that the project is anticipated to reduce sediment in waters entering the ocean by 57%.
 - a) Since land treatment measures will account for a major portion of the anticipated reduction, and such land treatment measures are to be implemented by the private land owners on a voluntary basis, the environmental statement should set forth an estimated time when the sediment reductions may be fully realized.
 - b) The desilting basins are expected to trap 40% of the incoming sediment. In view of the design to trap particles greater than 0.05 mm, an analysis of particle size distribution of incoming sediments would be appropriate. In addition, the detention time of flood waters in the desilting basin should also be set forth.
 - c) To the extent that the Soil Conservation Service has experience with desilting basins in operation

at other locations in the Hawaiian Islands, such experience should be cited to support the anticipated efficiencies of these proposed structures.

- d) Additional explanation of the anticipated duration of the effects of flood flows on the Ocean is needed. How is the determination made that the time will be reduced from 2-4 weeks to 3-4 days?
4. To the extent that flood waters entering the Ocean will have a large percentage of fine materials (due to desilting basins), the environmental statement should assess the impact of these waters on water quality standards and on the coral reef ecosystems. The extent of flocculation and deposition of fines in the presence of salt water should be assessed.
 5. The invert elevations of the channels should be specified. Will tidal waters scour the channels? Are any potential problems with ground water/sea water interchange foreseen?
 - 6) Mitigating measures intended to minimize soil erosion and air, water, and noise pollution should be discussed in detail. The discussion on special design and construction features (Page 7), and maintenance procedures (page 8) should be expanded with special emphasis on:
 - a) prevention of stream turbidity during construction,
 - b) disposal of dredging spoil and construction debris,
 - c) disposal of silt and sediment collected in debris basins and desilting basins.

Environmental Impact of the Action

LO--Lack of Objections

EPA has no objections to the proposed action as described in the draft impact statement; or suggests only minor changes in the proposed action.

ER--Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of suggested alternatives or modifications is required and has asked the originating Federal agency to reassess these aspects.

EU--Environmentally Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that the potential safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The Agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

Adequacy of the Impact Statement

Category 1--Adequate

The draft impact statement adequately sets forth the environmental impact of the proposed project or action as well as alternatives reasonably available to the project or action.

Category 2--Insufficient Information

EPA believes that the draft impact statement does not contain sufficient information to assess fully the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft statement.

Category 3--Inadequate

EPA believes that the draft impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonably available alternatives. The Agency has requested more information and analysis concerning the potential environmental hazards and has asked that substantial revision be made to the impact statement.

If a draft impact statement is assigned a Category 3, no rating will be made of the project or action, since a basis does not generally exist on which to make such a determination.

CHAP 3

C-7-1



DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

REGIONAL OFFICE

50 FULTON STREET

SAN FRANCISCO, CALIFORNIA 94102

OFFICE OF
THE REGIONAL DIRECTOR

Office of Environmental Affairs

December 4, 1974

Mr. Francis C. H. Lum
State Conservationist
Soil Conservation Service
Department of Agriculture
440 Alexander Young Building
Honolulu, Hawaii 96813

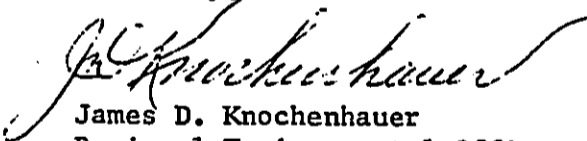
Dear Mr. Lum:

The Draft Environmental Impact Statement for the Honolua Watershed Project, Maui County, Hawaii has been reviewed in accordance with the interim procedures of the Department of Health, Education and Welfare as required by Section 102(2)(c) of the National Environmental Policy Act (PL 91-190).

The material provided appears to describe adequately the impacts of the proposed action as well as the alternatives that were presented. The major concerns of this department are related to possible impacts upon the health of the population, services to that population and changes in the characteristics of the population which would require a different level or extent of services.

The opportunity to review this statement is appreciated. Our review does not identify problems related to these specific concerns.

Sincerely,



James D. Knochenhauer
Regional Environmental Officer

cc: P. Hayes
W. Muir

C-8-1



United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

In Reply Refer to:
PEP ER-74/1335

FEB 1 1975

Dear Mr. Lum:

Thank you for your letter of October 25, 1974, requesting the Department of the Interior's comments on the draft environmental statement and work plan for Honolua Watershed Project, Maui County, Hawaii. We offer comments on both documents.

Work Plan

In the June 1974 addendum to the work plan, additional space could be used to advantage in making clear the relationship between the various parts of the addendum and the January 1972 work plan. A case in point is the 15 desilting basins listed on page 3-1 under Plant Elements. This is inconsistent with other parts of the work plan which indicate that 8 desilting basins will be installed (pages 2, 54, 63).

A sentence should be added to D-1, page 2-3, to reveal the extent of natural streambed that would be replaced by the concrete-lined channels and debris basins.

The paragraph under Sea (page 17) should include a discussion of the adequacy of public access to the Watershed's beach front, with particular attention given to the availability of parking facilities.

The land treatment measures that have been installed (Table 1A) should be described in detail under Cropland (page 18, 6th paragraph). It should specifically include the locations of the various treatment measures, the effectiveness of the measures, and the date installation was completed.

Fish and Wildlife Resource Data (page 21). It is suggested that this section include a species list for the freshwater, marine, and terrestrial fauna of the watershed. It should include, in addition, a description of the method in which the data were collected and identification of the compiler.



Save Energy and You Serve America!

Land Treatment Measures (page 30). This section should be expanded to disclose whether or not a specific land treatment plan has been developed by or for the landowners. If such a plan has been developed, it should be described, the locations of the various treatment measures identified, the effectiveness of these measures at each subwatershed estimated, and a schedule added to show when the various anticipated events are expected to occur.

Structural Measures (page 31, 2nd paragraph). We should like to see this paragraph expanded to include a discussion on whether a low flow, "V" notched channel, lined with protruding rocks, can be incorporated into the proposed concrete-lined stream sections. This would then accommodate the diadromous stream fauna which would migrate through the Honokowai Stream during wet periods.

Effects of Works of Improvements (page 41, 5th paragraph). This paragraph should be modified by eliminating the first sentence and adding appropriate language to indicate the endemic stream species, which would increase under conditions of continuous stream flow, and which will be required to cope with higher stream temperatures, increased stream velocities, and reduced habitat diversity caused by concrete-lined channels and the removal of riparian vegetation; that this project will also affect wildlife through the displacement of depressions along the stream bottom which function as temporary watering sites during wet periods; and that the proposed channel widening will remove feeding, nesting, and loafing habitat for birds.

Structural Measures (page 50, 3rd paragraph). The term "unwanted vegetation" should be properly defined to provide assurances that out of channel shade trees will not be adversely affected when vegetation is removed.

The proposed action will not affect any existing or proposed units of the National Park System or any existing, proposed, or known potential sites or properties listed or to be listed as National Landmarks.

Draft Environmental Impact Statement

Planned Project The effectiveness of voluntary land treatment should be evaluated, with mention given to specific commitments made by landowners. If specific commitments are not made by the cooperating landowners, then it appears that

the goals of the project would not be accomplished. Furthermore, we suggest that an evaluation be made on land treatment measures listed on pages 2 through 4 as compared to alternative measures that may be considered.

Two aspects of the watershed plan involve potentially adverse impacts on the cultural resources of the area. One concern is with six of the land treatment measures outlined on pages 2-4. The following activities appear to involve surface disruption which could produce adverse effects on archeological resources: in-field diversions (90,000 feet) and other diversions (1,000 feet) to collect runoff water, grassed waterways (25 acres), grade stabilization structures, debris basins and other land treatment measures.

A second aspect of the plan which represents a potential danger to archeological resources is the initiation of proposed structural improvements as detailed on pages 4-7. The construction of eight dams and desilting basins, 0.7 miles of lined channels and 0.8 miles of floodwater diversions as well as the disposal of excavated material and the construction of preventive measures such as diversions and temporary debris will entail sufficient earthmoving activity to jeopardize cultural resources which may exist in the area.

An additional statement should be made to indicate whether the trees planned for disposal, top of page 5, are species identified as low elevation trees described on page 18, or whether other species would be involved.

The extent of the proposed landscaping plans for areas along the altered stream should be fully described and, in addition, it should be made clear whether the project will improve public access within the Honolulu Watershed area, including the beach areas, page 5.

The proposed method of disposition of spoils from initial channel excavation and subsequent maintenance does not appear to have been mentioned, although it is assumed that spoils from initial excavation would be used for earth fill in construction of the dams. A more adequate description of the nature of materials to be excavated would be helpful, particularly the character of the material now described only as "soft rock" (page 6, paragraph 3).

The proposed dimensions of the five concrete-lined channels have not been found anywhere in the environmental statement. It might be advisable to refer to the detailed data in Table 3A in the watershed work plan. The two proposed floodwater diversion channels are depicted on the Project Map (App. B of EIS) in such a way that they appear to be a single continuous channel. It would be helpful either to delineate the channels more accurately, to indicate direction of flow, or to refer to the detailed map and profiles in figure 8 of the watershed work plan.

The benefit-to-cost ratio, which is given as 1.7:1.0 on page 9, fails to take into account the administrative costs, which reduce the ratio to 1.5:1.0 (App. A). The implementation of land treatment measures on about 24,000 acres, which appears to be an integral part of the proposed action, has not been mentioned in the Description of Action in the Summary.

Environmental Setting

Paragraph 4, on page 11, should be expanded to indicate the names of all streams diverted and the total volume of water removed.

Stream communities should be surveyed at elevations where they exist as perennial streams. Many endemic stream species are diadromous and could migrate to and from the ocean during periods of continuous stream flow. Furthermore, scientific names should accompany the common family and species name of those previously listed.

We are pleased that an archeological survey of the project is being made. Without a copy of the survey report, however, we are unable to adequately assess the impacts which these two aspects of the plan may have on archeological resources. We will need to review the final statement and the survey report before we will be able to offer more appropriate comments on specific aspects of the project. The survey should cover the entire project area including all borrow and disposal sites, and a copy of the survey report should be made available to the National Park Service, Arizona Archeological Center, P.O. Box 49008, Tucson, Arizona 85717, in accordance with section 3(a) of Public Law 93-291. The survey should provide the following kinds of information:

1. The presense of archeological resources in areas to be affected by the proposed actions, including description and maps, showing their relationship to the project.
2. A description of survey methods and the intensity of the survey.
3. The significance of the identified resources and their potential for contributing information about the archeological problems of the project area, including identification of those which are listed on or which merit listing on the National Register of Historic Places.
4. A site-bysite cost estimate to totally excavate and study, using current archeological methodology and technology, each of the significant archeological resources to be affected by the project.
5. A recommended program of studies to realistically mitigate adverse effects which will result from the project, including research designs and estimates of time and funding needed.
6. Recommendations for any other mitigation measures which may lessen the adverse effects of the project.

Even without the results of the survey, there should have been a better indication of what mitigating measures would be taken should a significant site be discovered either through survey prior to construction or during construction. Proposed mitigation measures should be discussed in the final statement. Should a significant archeological site of National Register quality be identified prior to construction, preservation of such resource should be considered as well as archeological salvage.

Any significant archeological resources which are identified during the course of the survey should be described and evaluated for their National Register potential. If they meet the criteria for nomination outlined in title 36 CFR 800.10, they should be nominated to the National Register. This evaluation should be documented in the final statement

The planned conservation practices currently employed and the schedule for installation of future control measures should be described in the section.

Soil, Water, and Plant Management Status (page 21). In addition, a statement should be included to indicate whether or not vegetative planting has been used around fields and adjacent to roads as erosion control measures. It appears that one of the existing and possibly future problems of erosion is the lack of adequate control measures in these specific areas. The reduction of erosion in croplands to 2.2 tons per acre as indicated on page 32, under Conservation Land Treatment, does not appear adequate.

Some of the figures given for reduction in sediment discharge and in coastal water pollution may be uncertain because basic data for fluvial sediment loads of Hawaiian streams are as yet limited. The "red condition" of the ocean water after rains is believed to be caused mainly by fine particles of clay suspended in the water, a condition which might not be reduced appreciably by the system of sedimentation basins.

Both the work plan and the statement include information concerning the ferruginous-bauxite deposits located in the northern portion of the northwest end of the Island of Maui. Although the statement does not include an evaluation of project effects on these bauxite deposits, they are located on the hills above the proposed structural measures, and should not be affected by the proposed project.

It is indicated on page 28, last paragraph, that recreational access, although limited in some areas, is adequate for public use. This statement should be expanded to indicate the extent of adequacy.

Environmental Impacts

Conservation Land Treatment (page 32, last paragraph). In this section it is indicated that the land treatment measures will result in a 29 percent reduction of sediment yields from the watershed, with the average sediment transport amounting to 2.2 tons per acre from cropland and about 0.2 tons per acre from undisturbed areas. Total sediment from the watershed would therefore yield 17,300 tons per year. This yield of 2.2 tons per acre from cropland compared to 0.2 tons from undisturbed areas definitely appears excessive. It indicates that the Conservation Land Treatment proposals are not adequate and that additional measures should be applied to croplands. This section should therefore be expanded to indicate the inadequacies of control measures.

We suggest that the section on favorable effects, page 36a, No. 12, be expanded to reveal how open space will be created by implementation of zoning and building codes.


Data used to conclude that the project area provides marginal wildlife habitat should be identified, (page 37, No. 1). Also, the adverse impact of channelization on stream organisms, particularly the diadromous species which can migrate to and from the ocean when interrupted streams are flowing, should be mentioned.

Alternatives

As an alternative not considered, we suggest a combination of riprap and concrete-lined channels designed with rock-lined, low-flow channels to minimize the effect of accelerated drainage during low-flow periods as a result of channelization. Thus, these channels will allow diadromous species access to the ocean. Furthermore, an additional alternative that should be included in development of 50-100-foot green belt zones along both sides of the Honolua Watershed streams where feasible.

We hope these comments will be of assistance to you in preparing your final documents.

Sincerely yours,


Secretary of the Interior

Deputy Assistant

Francis C. H. Lum
State Conservationist
Soil Conservation Service
440 Alexander Young Building
Honolulu, Hawaii 96813



C-9-1
DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
U.S. COAST GUARD (G-WS/73)
400 SEVENTH STREET SW.
WASHINGTON, D.C. 20590
PHONE: (202) 426-2262

• 8 DEC 1974

Mr. Francis C. H. Lum
State Conservationist
Soil Conservation Service
440 Alexander Young Building
Honolulu, Hawaii 96813

Dear Mr. Lum:

This is in response to your letter of 3 October 1974 addressed to Commandant, U. S. Coast Guard concerning a draft environmental impact statement for the Honolua Watershed Project.

The Department of Transportation has reviewed the material submitted. We have no comments to offer nor do we have any objection to the project.

The opportunity to review the draft statement is appreciated.

Sincerely,

W. E. Caldwell

W. E. CALDWELL
Captain, U.S. Coast Guard

C-10-1

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION—REGION NINE

AMERICAN SAMOA
ARIZONA
CALIFORNIA
GUAM
HAWAII
NEVADA

Suite 613, 677 Ala Moana Boulevard, Honolulu, Hawaii 96813

November 5, 1974

IN REPLY REFER TO
915EC



Dr. Richard E. Marland
Interim Director
Office of Environmental Quality Control
State Capitol, Room 436
Honolulu, Hawaii 96813

Dear Dr. Marland:

Subject: Honolua Watershed Project, Maui County, Hawaii
Draft Environmental Impact Statement

We have reviewed the subject Draft Environmental Impact Statement dated October, 1974, which was prepared by the U. S. Department of Agriculture Soil Conservation Service.

The following review comments are offered for consideration:

1. Page 21, last paragraph.

The proposed realignment of Federal-Aid Primary Route 30, Honoapiilani Highway between Honokawai and Honokohau should be mentioned.

2. Appendix D, project map, Honolua watershed.

The proposed second unit of the new Honoapiilani Highway realignment between Alaeloa and Honokohau is not shown.

3. Watershed work plan, page 29, second paragraph.

Construction of the Honoapiilani Highway has not begun. Project scheduling should be updated.

4. Page 35, first paragraph.

Correct ASSHO to "State Standard Specifications for Road & Bridge Construction". Further, culverts crossing the new Honoapiilani Highway will be designed for a useful life of 20 years.

-MORE-

We are aware that the State Highways Division is coordinating their design of the new Honoapiilani Highway with the U. S. Soil Conservation Service, Honolua Watershed Work Plan. We will continue to assist the Highways Division and the Soil Conservation Service in their mutual development of public facilities within the Honolua Watershed.

We thank you for the opportunity to comment on the Draft Environmental Impact Statement for the Honolua watershed project.

Sincerely yours,

Ralph T. Segawa
Division Engineer

By: 
H. K. Kistner
Assistant Division Engineer

JOHN A. BURNS
GOVERNOR

C-11-1



FREDERICK C. ERSKINE
CHAIRMAN, BOARD OF AGRICULTURE

WILLIAM E. FERNANDES
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF AGRICULTURE
1428 SO. KING STREET
HONOLULU, HAWAII 96814

October 21, 1974

MEMORANDUM

To: Dr. Richard E. Marland, Interim Director
Office of Environmental Quality Control

Subject: Draft EIS for Honolua Watershed Project, Maui County

The Department of Agriculture has reviewed the Honolua Watershed project impact statement. The statement adequately describes potential environmental impacts and considers cost benefit implications. The Department recommends approval of the draft statement.

This Honolua Watershed has been the model for soil and water conservation projects. It extends the previous accomplishments to provide a greater level of protection for a developing urban area. The practices and benefits can be assessed readily on the basis of past experience.

Thank you for the opportunity to review this well developed statement.

Frederick C. Erskine
Frederick C. Erskine
Chairman, Board of Agriculture

C-12-1

JOHN A. BURNS
GOVERNOR



RICHARD E. MARLAND, Ph.D.
INTERIM DIRECTOR
TELEPHONE NO.
548-6915

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
OFFICE OF THE GOVERNOR
550 HALEKAUWILA ST
ROOM 301
HONOLULU, HAWAII 96813

December 2, 1974

Francis C. H. Lum
State Conservationist
Soil Conservation Service
440 Alexander Young Building
Honolulu, Hawaii 96813

SUBJECT: Draft Environmental Impact Statement for Honolua
Watershed Project, Maui County, Hawaii

Dear Mr. Lum,

As of this date, this office has received ten comments on the above subject. An attached sheet lists the responding agencies.

In our evaluation of the draft EIS ^{*}(dEIS) and comments provided, this Office finds several areas in which the final EIS should expand discussion. The following comments are offered:

DAMS

Since the dEIS briefly discusses the proposed dams, this Office strongly recommends an expanded discussion including justification of the dams, capacity of each and their predicted flows, diagrams of the proposed structures, locations (maps would be helpful) of each dam, and descriptions of the surrounding area.

In addition, this Office would like to point out a few problems that are created by dams and should be given consideration.

1. Flooding is diverted to other areas possibly near the proposed Honoapiilani Highway or the mauka area.

*comments will be directed only to the draft EIS.

2. During flood periods, excess can flow over a dam to inundate the downstream area which in this instance may be the highway, residential, or resort areas.
3. If the dam inundates, then siltation and erosion will still occur.
4. If the dam gives way, what emergency precautions will exist?

RELOCATION OF HONOKOWAI STREAM

The relocation of Honokowai Stream needs further discussion. We also recommend that the following points be considered and included in the discussion.

1. A channelized course may turn a living stream into a stagnant ditch.
2. Chances for sedimentation, siltation, and erosion increase because the channel is not a natural course.
3. Acceleration of drainage in the watershed can occur. Because Honokowai Stream is a perennial stream, diversion may cause it to flow faster. Thus, with less water percolation, dry or drought conditions may result and affect the existent wildlife.
4. What erosion control will be used along the channel?

CONCRETE-LINED CHANNELS

From the dEIS, major flooding has occurred where man-made structures exist. Thus this Office recommends detailed descriptions and diagrams of the proposed channels. Will these channels be adequate to prevent flooding?

CONFUSION

According to page 5, the remaining channels below the desilting basins will not be modified. However, the map in Appendix B shows streams with no outlets. Clarification on this matter is necessary.

BRIDGES

The description of the proposed bridges should be expanded in the final document.

PROTECTED LAND

Although page 6 mentions 44.4 acres will be committed to structural measures, a few questions are raised. Does the 44.4 acres use include the area that will be flooded by the dams? What are the total acres protected from this flood control project?

WATER TABLE

Because the public and private system depend on the surface and high level ground water, would the project cause the water table to decrease? Would increasing population shown by zoning of residential and resort use deplete more of the water table since there will be less return to the ground supply?

NEED FOR EXTENSION

The dEIS states on page 22, "Private developers have installed approximately 1,000 feet of concrete lining on the Honokowai Channel between the Honoapiilani Highway and the ocean. The channel is adequate to carry 100-year storm runoff." Will the proposed 1,500 feet extension from the desilting basin No. 8 to Honoapiilani Highway be necessary?

NEED FOR MAPS

In order to adequately analyze this document, this Office recommends that maps be given. For example, on page 25, where is the 80 acres effected by the 100-year flood? Where has the major flooding occurred? The maps should also depict watershed and sub-watershed areas, agricultural areas, forest boundaries, etc.

IRREVERSIBILITY OF THE ENVIRONMENT

Discussion should be expanded to include the loss of water retention, dredging of the channels, and destruction of natural resources.

JUXTAPOSITION OF THE WATERSHED AND THE FLOOD CONTROL

The juxtaposition of the watershed and the flood control is not congruent. With the reduction of the sediment and erosion there will be an increase in water retention. However, the flood control project will also increase the capacity for drainage such that any intensity of rainfall will become run-off water. Thus, we question whether this whole project will protect the watershed or will it only divert the run-off water.

FUTURE

With the increasing population predicted in the dEIS, what effects will this project contribute to in terms of urban sprawl, secondary effects as the public facilities, pollution, and etc.?

PAGE 36

What are the \$34,270 secondary benefits?

PAGE 37

The dEIS states that conservation measures will reduce floodwater damages by 10%. Will conservation measures reduce the floodwater?

ALTERNATIVES

The following has not been considered as possible alternatives to the project.

1. For agricultural areas, the Water Bank Act of 1970 should be mentioned.
2. Development of a park for the flood areas will reduce the loss of lives.

For brevity and fairness, this Office did not attempt to summarize other commentors. Instead, we strongly recommend that thorough consideration be given to all reviewers.

We further recommend that (1) written responses be sent to all commentors including this Office, indicating how specific concerns were considered, evaluated, and disposed; (2) all comments and your responses should be incorporated as an appendix to the final EIS; (3) a copy of the final EIS should be sent to those individuals that provided substantive comments to the draft EIS.

We trust that these comments will be helpful to you in preparing the final EIS. Thank you for the opportunity to review the draft EIS. We look forward to the final EIS.

Sincerely,



Richard E. Marland
Interim Director

Attachment

LIST OF RESPONDING AGENCIES

FEDERAL

Department of Transportation Federal Highway Administration	November 5, 1974
Department of the Air Force	November 18, 1974
Department of the Army (District Engineers)	November 19, 1974
Department of the Army	November 21, 1974

STATE

Department of Agriculture	October 21, 1974
Department of Transportation	November 12, 1974
Department of Health	November 21, 1974

UNIVERSITY OF HAWAII

Water Resources Research Center	November 20, 1974
Environmental Center	November 20, 1974

PRIVATE

Pioneer Mill Company, Limited	November 14, 1974
-------------------------------	-------------------

C-13-1



JOHN A. BURNS
GOVERNOR OF HAWAII

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

November 21, 1974

WALTER B. QUISENBERRY, M.P.H., M.D.
DIRECTOR OF HEALTH

WILBUR S. LUMMIS JR., M.S., M.D.
DEPUTY DIRECTOR OF HEALTH

RALPH B. BERRY, M.P.H., M.D.
DEPUTY DIRECTOR OF HEALTH

HENRI P. MINETTE, M.P.H., DR.P.H.
DEPUTY DIRECTOR OF HEALTH

In reply, please refer to:
File: EPHS-PTA

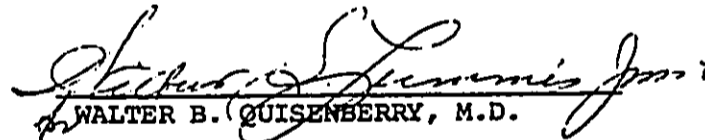
To: Dr. Richard E. Marland, Interim Director
Office of Environmental Quality Control

From: Director of Health

Subject: Draft Environmental Impact Statement for Honolua Watershed
Project, Maui

The Department of Health, Maui District Office, has reviewed the subject Environmental Impact Statement and has found it to be well prepared and complete.

The Department of Health supports the efforts of the Soil Conservation Service to control erosion and its effects on coastal water quality degradation.


WALTER B. QUISENBERRY, M.D.

C-14-1

JOHN A. BURNS
GOVERNOR OF HAWAII



DIVISIONS:
CONVEYANCES
FISH AND GAME
FORESTRY
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

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

November 21, 1974

MEMORANDUM

To: Office of Environmental Quality Control
From: Sunao Kido, Chairman
Subject: Comments on Draft Environmental Impact Statements

Proposed Flood Control Improvement, Unit I, South King Street to
Alii Wai Canal, Oahu.

This Department has reviewed the above mentioned draft EIS, and we have no objections to this project as presented.

Proposed Honolua Watershed Project, Maui County, Hawaii

The Dept. of Land and Natural has no suggestions or recommendations for changes to the above mentioned draft EIS covering this proposed Watershed Project on Maui.

We believe that the EIS adequately covers the proposed project.

BOARD OF LAND AND NATURAL RESOURCES

A handwritten signature in cursive script, appearing to read "Sunao Kido".

SUNAO KIDO
Chairman and Member

C-15-1

JOHN A. BURNS
GOVERNOR



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

E. ALVEY WRIGHT
DIRECTOR

LAWRENCE F. O. CHUN
DEPUTY DIRECTOR

MUNNY Y. M. LEE
DEPUTY DIRECTOR

DOUGLAS S. SAKAMOTO
DEPUTY DIRECTOR

IN REPLY REFER TO:

ATP 8.2820

November 12, 1974

Dr. Richard E. Marland
Interim Director
Office of Environmental
Quality Control
550 Halekauwila St., Room 301
Honolulu, Hawaii 96813

Dear Dr. Marland:

Subject: Draft Environmental Impact Statement
Honolua Watershed Project, Maui County

We have reviewed the subject environmental statement and have no comments to offer as it relates to and affects our transportation program.

Sincerely,

Douglas S. Sakamoto
/s/ E. ALVEY WRIGHT
Director

C-16-1



DEPARTMENT OF PLANNING
AND ECONOMIC DEVELOPMENT

JOHN A. BURNS
Governor

SHELLEY M. MARK
Director

EDWARD J. GREANEY, JR.
Deputy Director

250 South King St. / Honolulu, Hawaii 96813 / P. O. Box 2359 / Honolulu, Hawaii 96804

November 11, 1974

Ref. No. 2120

Mr. Francis C.H. Lum
State Conservationist
U.S. Department of Agriculture
Soil Conservation Service
440 Alexander Young Building
Honolulu, Hawaii 96813

Dear Mr. Lum:

Subject: Draft EIS for the Honolua Watershed Project, Maui County,
Hawaii

We have reviewed the subject draft and find that it is generally
adequate in assessing the probable impacts of the proposed project.

We have no comment to offer at this time but appreciate the opportunity
to review the draft statement.

Sincerely,


SHELLEY M. MARK

C-17-1



University of Hawaii at Manoa

Environmental Center
Maile Bldg. 10 • 2540 Maile Way
Honolulu, Hawaii 96822
Telephone (808) 948-7361

Office of the Director

November 20, 1974

MEMORANDUM

TO: Richard E. Marland, OEQC
FROM: Doak Cox *Doak Cox*
RE: Review of Draft Environmental Impact Statement
Honolua Watershed Project, Maui County, Hawaii

On first hasty scrutiny it was apparent that, in general, the draft Environmental Impact Statement on the Honolua Watershed Project on Maui had been well prepared by the Soil Conservation Service. A decision to undertake its review was arrived at late, when the very magnitude of the project made failure by the Environmental Center to provide any review commentary on the EIS seem inappropriate. Our comments are briefer than might be expected, in part because of the delay in the decision to review, staff limitations of time, and certain communication difficulties with our Environmental Center representative on Maui. Also in part, because, the EIS, as supplemented by the accompanying Watershed Work Plan is remarkably comprehensive in spite of its brevity. The comments have mainly to do with desirable expansion and explanation of what is presented.

Contributing to the review were Doak C. Cox (Environmental Center), Jacquelin Miller (Environmental Center), and E. D. Stroup (Oceanography).

The comments are presented in the order of the discussions in the EIS text to which they relate, as indicated by the page numbers cited.

Land Treatment Measures (Pp. 2-4)

It would seem that many if not most of the Soil Conservation measures cited on these two pages are standard practices and at least some of them are already in use: ie., contour farming, irrigation water management, pasture management, livestock management, revegetation and reforestation, and forest management. It is not clear to what extent there are inadequacies in the soil conservation practices hitherto prescribed and to what extent there are inadequacies in the extent to which past practices have followed the prescriptions. It is also not clear what practices or intensities of practice not hitherto prescribed

Richard E. Marland

-2-

November 20, 1974

are proposed, nor how failures to practice what is prescribed will be rectified. For example, are currently "bare" areas bare because no attempts have been made to vegetate them, because past efforts to establish vegetation on them have been inadequate, or whether the maintenance of vegetation on them has been inadequate.

Nonstructural Measures (Pp. 4)

The statement is made that although the area below five of the desilting basins to be constructed is currently zoned for residential and resort use, it will not be protected from floods by the proposed structural measures, and thus that development will be restricted by building permit or zoning restrictions imposed by the County.

The EIS should state what restrictions the County has imposed on the use of the floodplains, what additional restrictions are proposed, whether carrying out the project is contingent upon the County imposing these additional restrictions, and what assurances there are that the restrictions will be continued in the future.

If the restrictions on land use cannot be imposed without recompense to landowners, the recompense should be included in the overall costs of the project unless the County would impose restrictions whether or not the project will be carried out. Presumably restrictions and their cost would be less if the project is carried out than would be appropriate to assure the same level of protection if it were not carried out.

Structural Measures (Pp. 5, Last sentence)

Mention is made that trees and shrubs similar to those now growing along the Honohowai Channel will be planted after construction. It is not clear why planting will be restricted to this channel.

(Pp. 6: Paragraph 3)

It would appear that the channels and floodwater diversions will be excavated through soil types highly susceptible to erosion: "silty surface materials and into soft rock." The EIS should state what measures will be taken to minimize the probable erosion during the construction, such as scheduling construction during non-storm seasons. Serious permanent damage to coral in the nearshore waters could result from the additional burden of sediment transported from the construction areas during storms.

(Pp. 7)

The EIS indicates that 31.5 acres cleared for the sediment basins "will be left idle and expected to revert back to present vegetation." It is not clear why the land will have to be cleared, except perhaps as the borrow pits for dam materials will be parts of the basins. It is also not clear why the basins should not be deliberately revegetated instead of merely allowed to revert to a vegetated condition. Without vegetation, the basins would be subject to wind erosion and sources of dust.

Richard E. Marland

-3-

November 20, 1974

Project Costs (Pp. 9)

The text discussion of costs and benefits should cite appendix A and the Watershed Work Plan for details.

Economic Resources (Pp. 15)

The 1965 valuation of cropland, \$22,000, is out of date. Some adjustment to 1974 values is surely possible.

Conservation Land Treatment (Pp. 31-33)

See comments on land treatment measures (pp. 2-4).

The EIS should cite the methods used in estimating soil loss, soil loss reduction, and its anticipated reduction. Presumably the Universal Soil Loss Equation was used.

Structural Measures (Pp. 33-34)

The EIS should cite the methods used in estimating the sediment-trapping efficiency of the silting basins and the effects of the trapping. A 40% effectiveness seems high considering the fine nature of the soil particles. The reduction of coastal water pollution by the soil particles from 2 to 4 weeks to 3 or 4 days seems questionable considering that the coastal water turbidity results from the finest soil particles that will be least effectively removed by the desilting basins. It should be recognized that the proposed channelization will result in the loss of effectiveness of the flood plain as sediment traps.

Non-structural Methods (Pp. 34-35)

See comment on non-structural measures (p. 4)

The EIS should also cite the Watershed Work Plan concerning details of the proposed structure. It is noted in that Plan that the structures are designed to cope with 100-year storm discharges. Because such discharges have certain likelihoods of occurring even during shorter periods of time, consideration should certainly be given in the EIS to the consequences of a storm discharge exceeding the design discharge.

Plans for the operation of the desilting basins are not clear. Will they be drawn down after a storm, and if so at what rate?

Economic and Social (Pp. 35, para. 4)

This paragraph cites general increase in population "over and above normal growth," resulting from the project. Required public facilities, water, sewer, electricity, schools, roads, and of course housing which will be required must be considered and the appropriate agencies apprised of the additional impact on their resources.

cc: E. D. Stroup

UNIVERSITY OF HAWAII

Water Resources Research Center
Office of the Director

November 20, 1974

MEMORANDUM

TO: Richard E. Marland
Interim Director, OEQC

FROM: Reginald H. F. Young^{LMH}
Asst. Director, WRRRC

SUBJECT: Review of the draft EIS of Honolua Watershed Project, Maui, County, Hawaii

Review of the subject EIS has resulted in the following comments for your consideration:

1. In page 4, the earth dams for desilting range from 24 to 43 feet in height. In order to prevent overflow, concrete drop inlet spillways were designed to carry the 100-year peak runoff. The 100-year peak runoff for each stream and the dimensions of the spillway are important data to be included in the EIS. Methods for maintaining the desilting basin in operational condition should be stated.
2. In page 5, the profiles and dimensions of the three rectangular, concrete-lined floor channels should be provided, and the total of their capacities should match with that of 100-year flood.
3. In page 6, the profile and dimensions of the floodwater diversions should be given.
4. In page 8 or 9, an item of project benefits should be added for comparison with the project costs.
5. In page 25, the storm of December, 1964 was cited as a 20-year frequency storm. It caused extensive sediment damages to residences and resort-commercial development located at Napilli, Honokawai, Mahinahina and Kaopala areas. An estimation of the sediment deposition in each area would provide a check on the capacity of the corresponding desilting basin.
6. In page 27, the damages caused by past floods provided an estimate of the average annual benefit at \$67,500, (\$945,000/14 years). However, page 47 reported an average annual benefit at \$337,490. A statement to support the estimation on page 47 is needed.
7. In page 38, it is stated that withdrawing portions of the cultivated land and replanting the area with permanent vegetation would reduce erosion and sedimentation by a great amount. This is a very good plan to be included as part of the recommended project. The plantations should be convinced that the retiring of some of the acreage in the strategic zones would give them better return in a long run and they may avoid law suits against them under the Environmental Protection Law.

RHFY:jm

cc: Y. Fok
E. Murabayashi
H. Gee
Env. Center



C-19-1

PIONEER MILL COMPANY, LIMITED

Growers of sugar cane and producers of raw sugar

P. O. Box 727
Lahaina, Hawaii 96761

November 14, 1974

Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Sirs:

Subject: Comments on the Draft Environmental Impact
Statement for the Honolua Watershed Project

The West Maui Soil and Water Conservation District plan for the control of storm water runoff from the Honolua watershed of West Maui involves land owned by Pioneer Mill Company, Limited, State land of Honokowai held by Pioneer Mill Company, Limited under General Lease No. 3588 and land leased by Pioneer Mill Company, Limited from Maui Land and Pineapple Company, Inc.

Part of the proposal envisions two floodwater diversion channels across cane land at Honokowai leading to Mahinahina and Honokowai gulches, as described in the "Watershed Work Plan, Honolua Watershed", Maui County, Hawaii, 1972, Page 35, and elsewhere in the report. These channels are recommended for location 400-600 feet mauka of the proposed extension of the Honoapiilani Highway and would cut across very productive cane land. They would act as barriers to irrigation and would preclude efficient operation of the fields mauka and makai of the diversions.

In 1973, we expressed our concern to the Soil Conservation Service who subsequently proposed an alternate whereby the diversion channels would be located along the mauka boundary of the new highway right-of-way. However, we recently learned that the Soil Conservation Service had not abandoned the plan for using the original mauka diversion channels. Pioneer Mill Company believes that the diversions should be located adjacent to the highway, not only to alleviate what would be a serious impedance to our operations, but also to avoid having to live with a visible scar slicing across privately and publicly owned lands. The channel, in a position adjacent to the road, would not only serve the same purpose but would also blend in with the proposed highway.



Division of Amfac, Inc.

C-19-2

Office of Environmental
Quality Control

#2

November 14, 1974

Pioneer Mill Company, Limited has supported this project from the beginning and will be making substantial concessions once the project is started. It is hoped that this objection and proposed viable alternative will be given full consideration.

Sincerely,

PIONEER MILL COMPANY, LIMITED

A handwritten signature in cursive script, appearing to read "John W. Siemer", written in dark ink. The signature is fluid and extends across the width of the page.




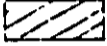

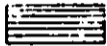
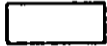





John W. Siemer
President

BLH:ms

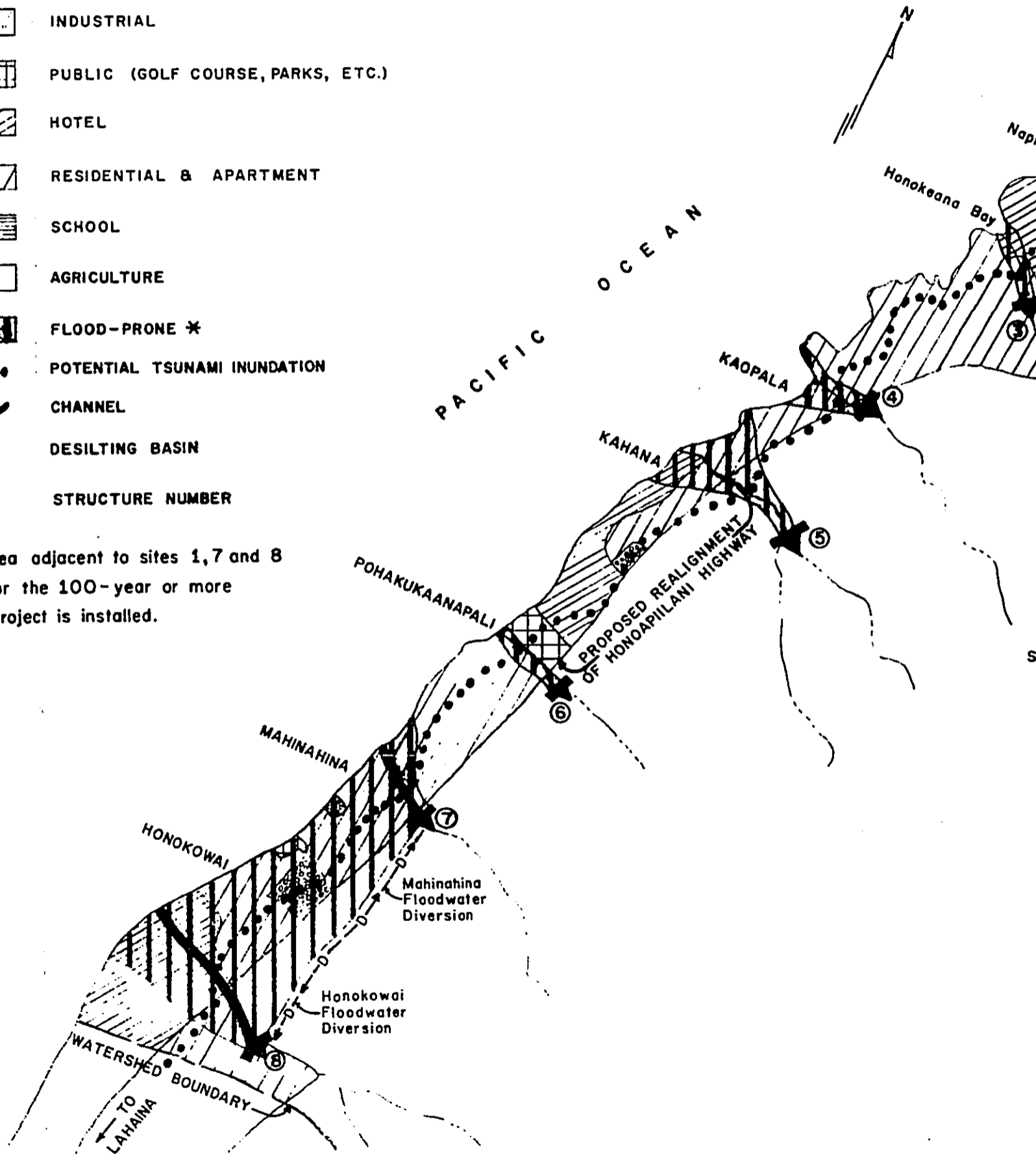
cc: Mr. James Shaw
Mr. Sunao Kido
Maui Land and Pineapple Company, Inc.

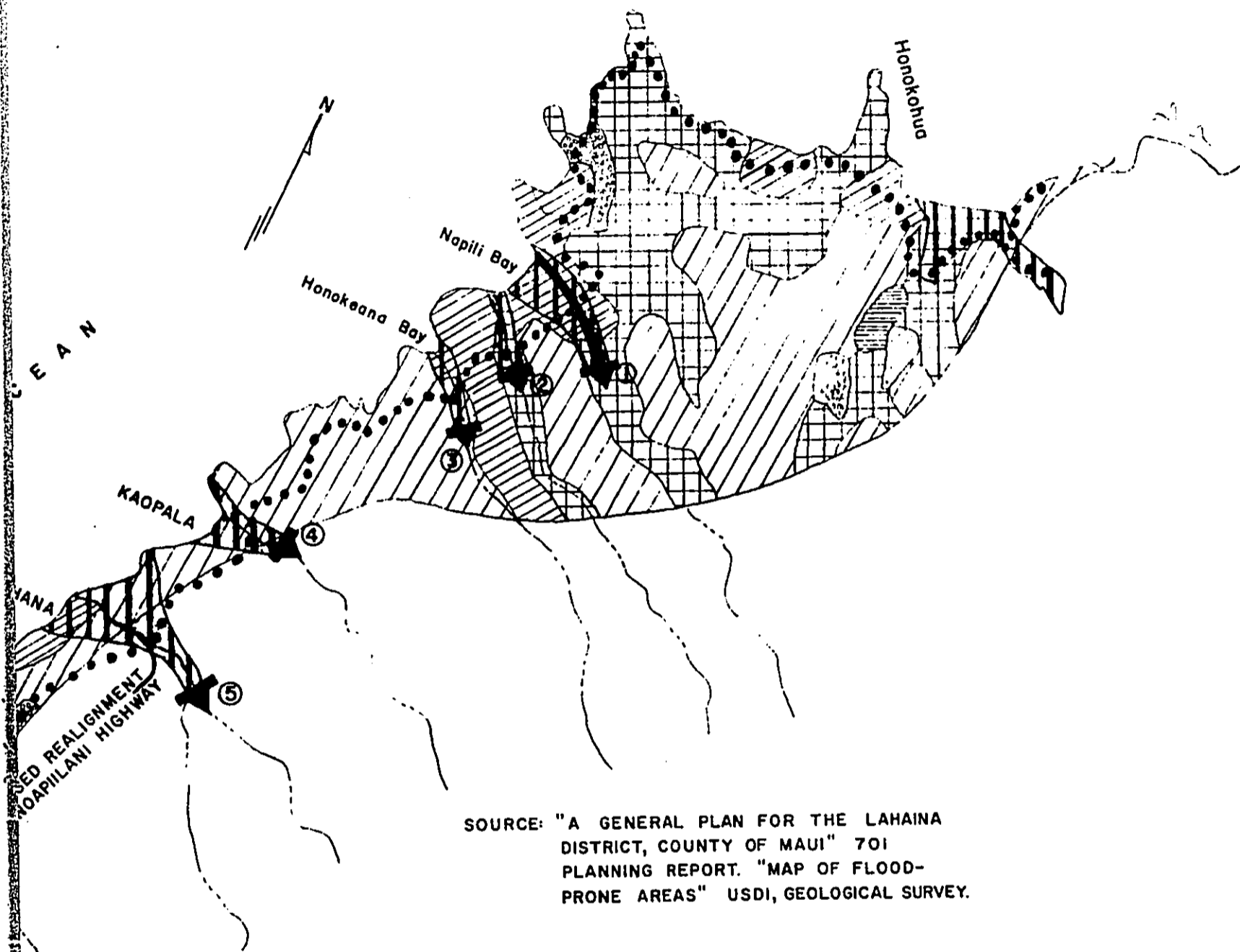
APPENDIX D - Flood Prone Areas and Future Land Uses

LEGEND

-  COMMERCIAL
-  INDUSTRIAL
-  PUBLIC (GOLF COURSE, PARKS, ETC.)
-  HOTEL
-  RESIDENTIAL & APARTMENT
-  SCHOOL
-  AGRICULTURE
-  FLOOD-PRONE *
-  POTENTIAL TSUNAMI INUNDATION
-  CHANNEL
-  DESILTING BASIN
-  STRUCTURE NUMBER

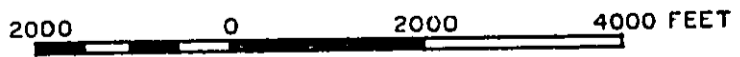
* Designated flood prone area adjacent to sites 1,7 and 8 will not be flood prone for the 100-year or more frequent events after the project is installed.





APPENDIX D
 FLOOD PRONE AREA AND FUTURE LAND USE
HONOLUA WATERSHED
 ISLAND OF MAUI, HAWAII

OCTOBER 1975



SCALE 1:24,000

U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE

APPENDIX E

STRUCTURAL DATA - DESILTING BASINS

Honolua Watershed, Hawaii

F-1

Item	Unit	Structure Number								Total
		1	2	3	4	5	6	7	8	
Class of Structure		C	C	C	C	B/C	C	C	B/C	
Drainage Area CN (1-Day) (AMC II)	Sq. Mi.	0.43 71	0.93 65	0.57 76	0.94 62	4.53 68	0.24 78	1.90 68	5.98 63	15.52
Elevation Top of Dam	Ft.	70	59	55	60.5	62	67	55	60	-
Elevation Crest Spillway	Ft.	63	52	49	53	50	62	42	50	-
Drop Distance	Ft.	10	11	10	12	18.3	16	20	16	-
Maximum Height of Dam	Ft.	30	30	24	25	43	25	25	25	-
Volume of Fill	Cu. Yds.	21,210	15,770	10,120	8,000	60,370	-	-	38,470	153,940
Storage Capacity To Spillway Crest	Ac. Ft.	15.6	25	11.5	22	82	3	36	83	278.1
Spillway Capacity Freeboard	cfs	1,940	3,250	2,190	3,170	18,760	1,490	7,340	20,150	-
100-year event	cfs	1,030	1,600	1,210	1,330	7,400	645	4,100	8,450	-
Capacity Equivalents Sediment Volume	In.	0.68	0.50	0.38	0.44	0.34	0.23	0.36	0.26	-
Retarding Volume	In.	0	0	0	0	0	0	0	0	-

March 1976

APPENDIX F

STRUCTURAL DATA - CHANNELS

Honolua Watershed, Hawaii

Channel	Station	Drainage Area sq. mile	Capacity cfs		Water Surface Elev.	Invert Slope ft/ft	Channel Dimensions			Velocity fps	Total Excavation cu yds	Type of Work ^{2/}	Before Project	
			Req'd	Design			Bottom	Depth ft	Side Slopes				Type of Channel ^{3/}	Flow Condition ^{4/}
Mapii 2-3 Channel	2+05	0.43	1,030	1,030	32.7	0.0070	10	6.3	0	38.2	-	III	N	E
	7+00	0.43	1,030	1,030	31.0	0.0460	10	5.4	0	22.9	-	III	N	E
	11+25	0.56	1,040	1,040	10.2	0.0070	10	3.8	0	32.2	-	III	N	E
	11+45	0.56	1,140	1,140	10.0	0.0070	10	3.8	0	32.2	-	III	M(1968)	E
	17+50	0.58	1,140	1,140	8.2	0.0070	10	6.7	0	20.4	6,976	III	N(1968)	E
Mahinahina Channel	2+70	1.90	4,100	4,100	18.3	0.0136	23	11.0	0	32.7	-	III	N	E
	2+85	1.90	4,100	4,100	18.0	0.0136	20	7.9	0	31.1	-	III	N	E
	7+10	1.90	4,100	4,100	12.6	0.0136	20	7.9	0	31.1	-	III	M(1971)	E
	10+92	1.94	4,100	4,100	7.4	0.0136	20	7.9	0	31.1	3,323	III	M(1971)	E
Honokowai ^{1/} Channel	1+00	5.98	8,450	8,450	38.4	0.0465	70	14.0	0	15.7	-	III	N	E
	2+70	5.98	8,450	8,450	32.8	0.0150	36	12.0	0	23.5	-	III	N	E
	8+45	6.0	8,450	8,450	21.6	0.0150	36	8.9	0	31.7	-	III	N	E
	16+33	6.0	8,450	8,450	9.1	0.0150	36	8.0	0	35.0	43,260	III	N	E
Mahinahina Floodwater Diversion	0+00	0	0	277	78.0	0.0150	4	2.9	1.5	0	-	IL	-	-
	7+50	0.15	277	277	66.7	0.0150	4	2.9	1.5	16.3	-	IL	-	-
	15+00	0.22	415	415	55.4	0.0150	4	3.5	1.5	18.1	-	IL	-	-
	16+40	0.22	415	415	26.7	0.1970	6	2.1	0	40.7	2,910	IL	-	-
Honokowai Floodwater Diversion	0+00	0	0	225	101.7	0.0150	4	2.6	1.5	0	-	IL	-	-
	8+00	0.12	225	225	89.7	0.0150	4	2.6	1.5	17.3	-	IL	-	-
	24+00	0.24	450	450	65.4	0.0150	4	3.7	1.5	19.3	-	IL	-	-
	26+50	0.24	450	450	29.9	0.1380	6	2.3	0	39.5	4,490	IL	-	-

Note: "n" value for all concrete-lined channels is 0.014.

^{1/} Channel improvement from Honoapiilani Highway to ocean has been accomplished by private developer.

^{2/} III - Enlargement or realignment of existing channel or stream, reinforced concrete lining.

IL - Establishment of new channel including necessary stabilization measures; reinforced concrete lining.

^{3/} N - An unmodified, well-defined, natural channel or stream.

M(1968) - Manmade ditch or previously modified channel, constructed in 1968.

^{4/} E - Ephemeral - flows only during periods of surface run-off, otherwise dry.

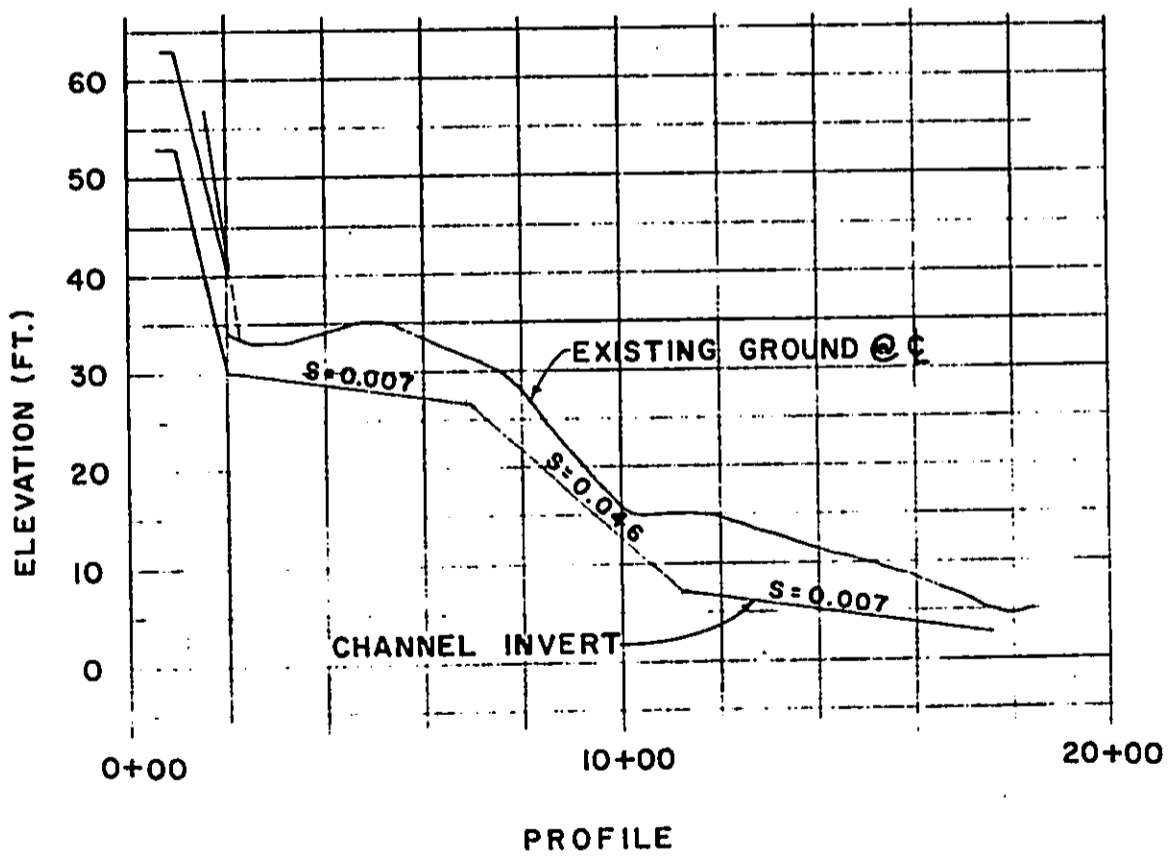
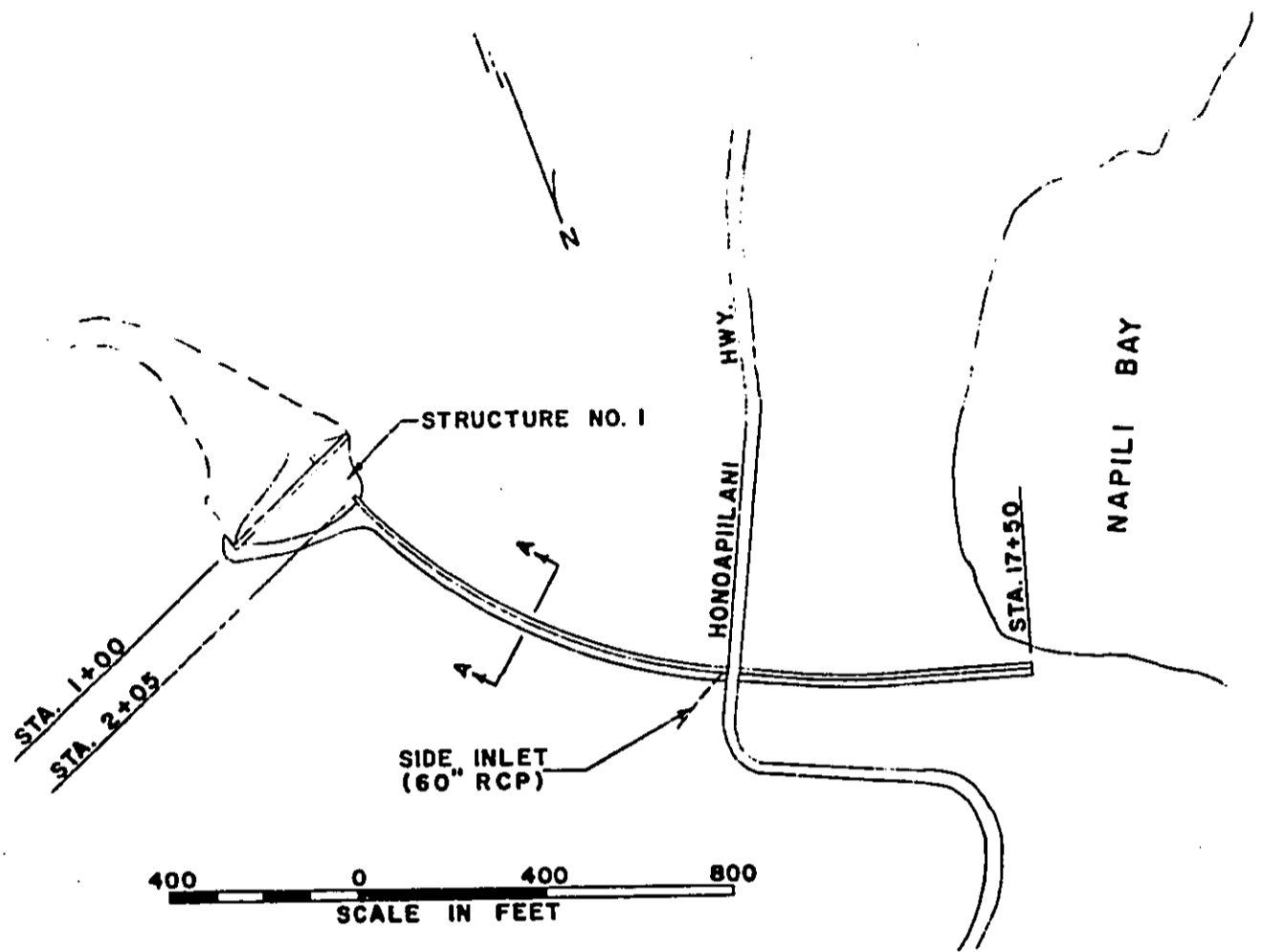
March 1976

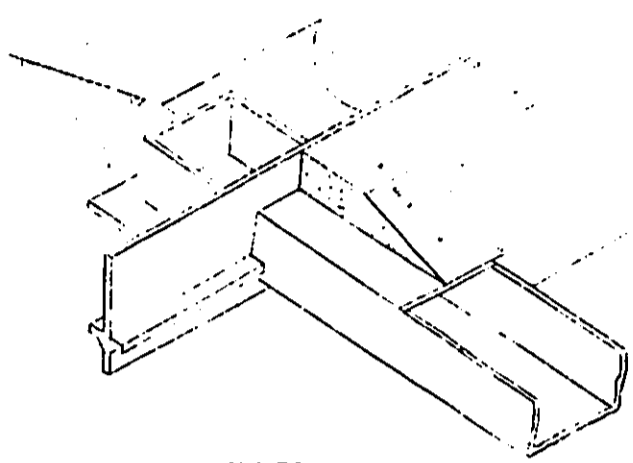
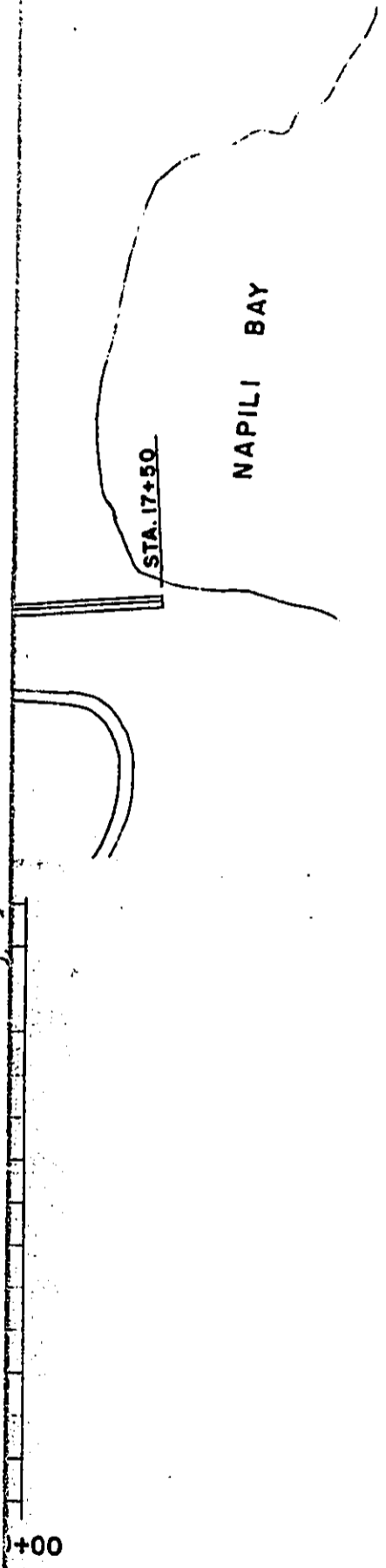
APPENDIX G - Napili 2-3 Channel

APPENDIX H - Mahinahina Channel

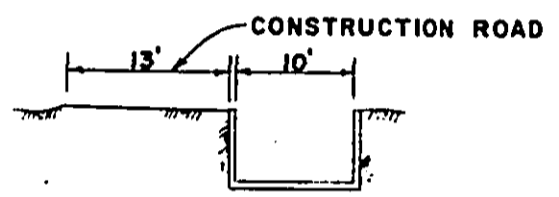
APPENDIX I - Honokowai Channel

APPENDIX J - Floodwater Diversions





INLET
ISOMETRIC VIEW

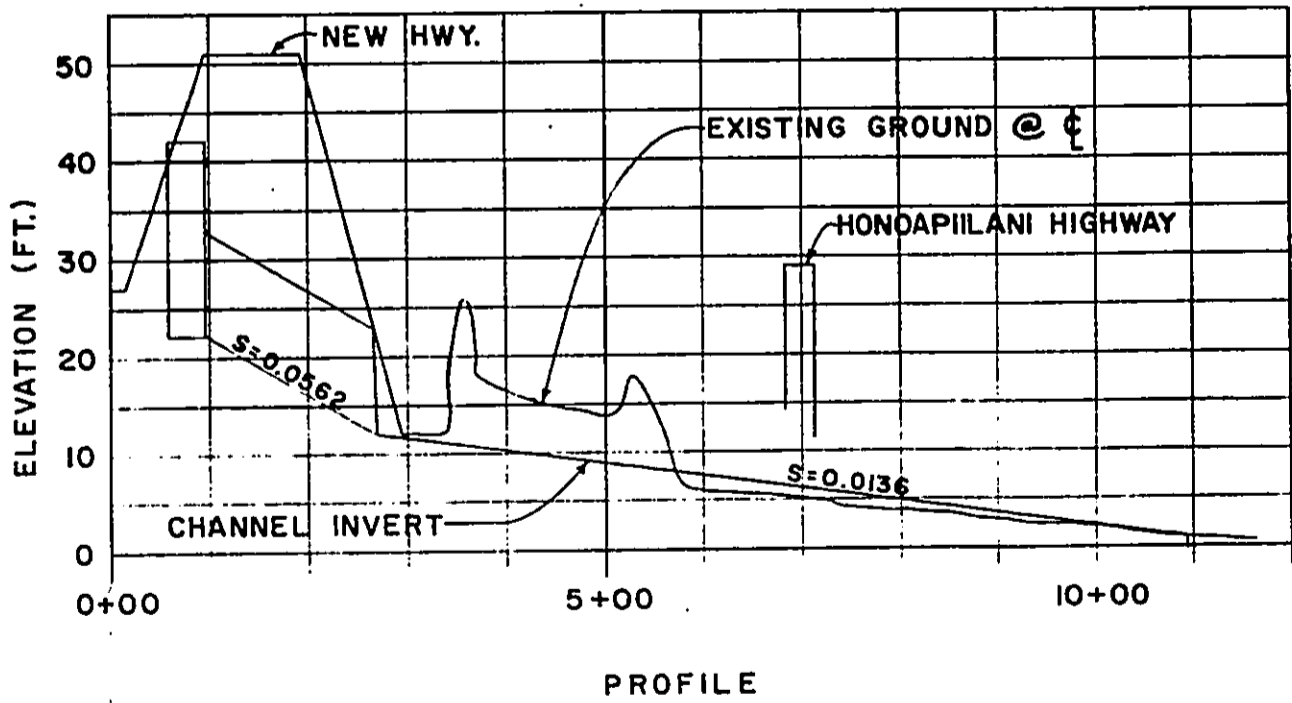
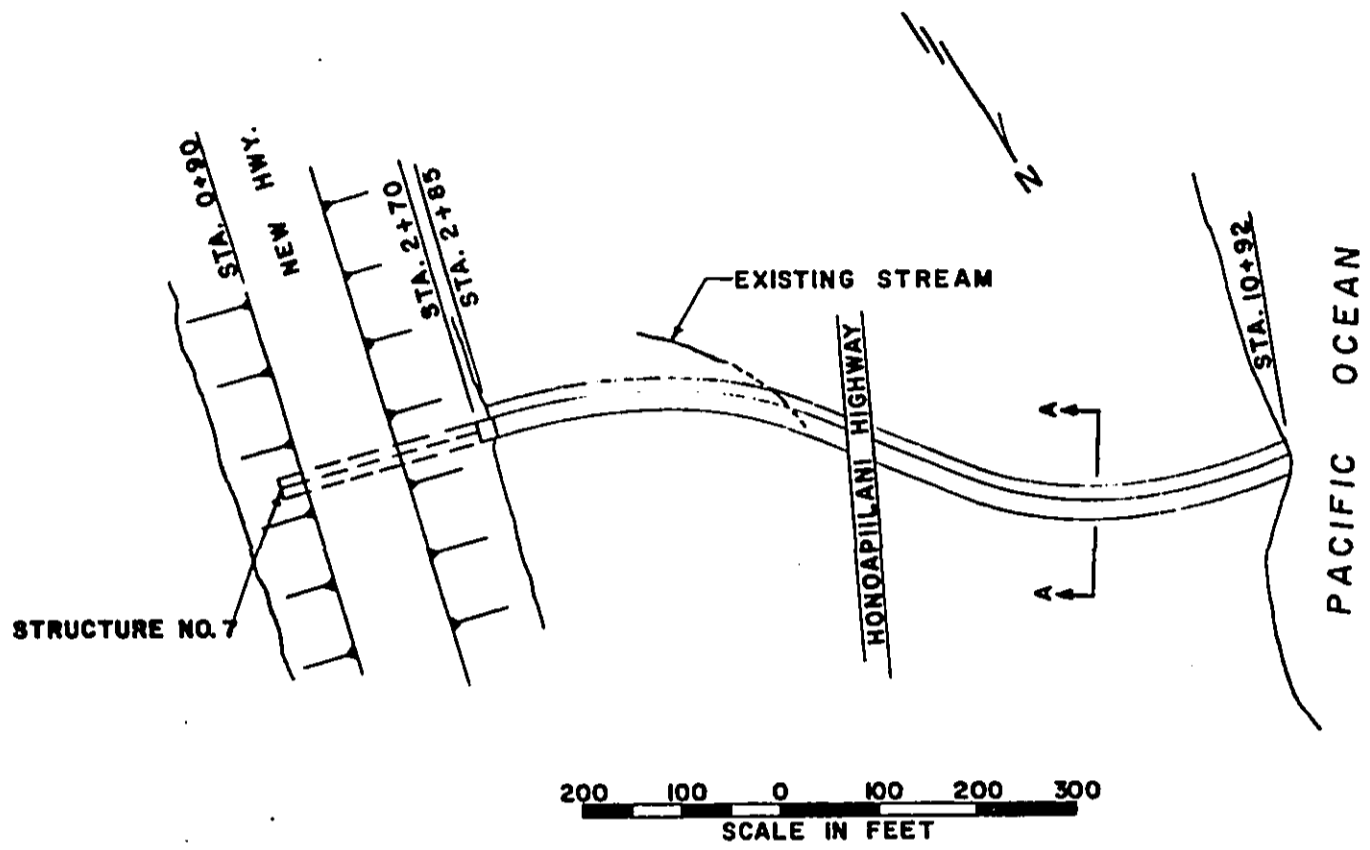


STA. 2+05 TO 17+50
TYPICAL CROSS SECTION A-A

APPENDIX G

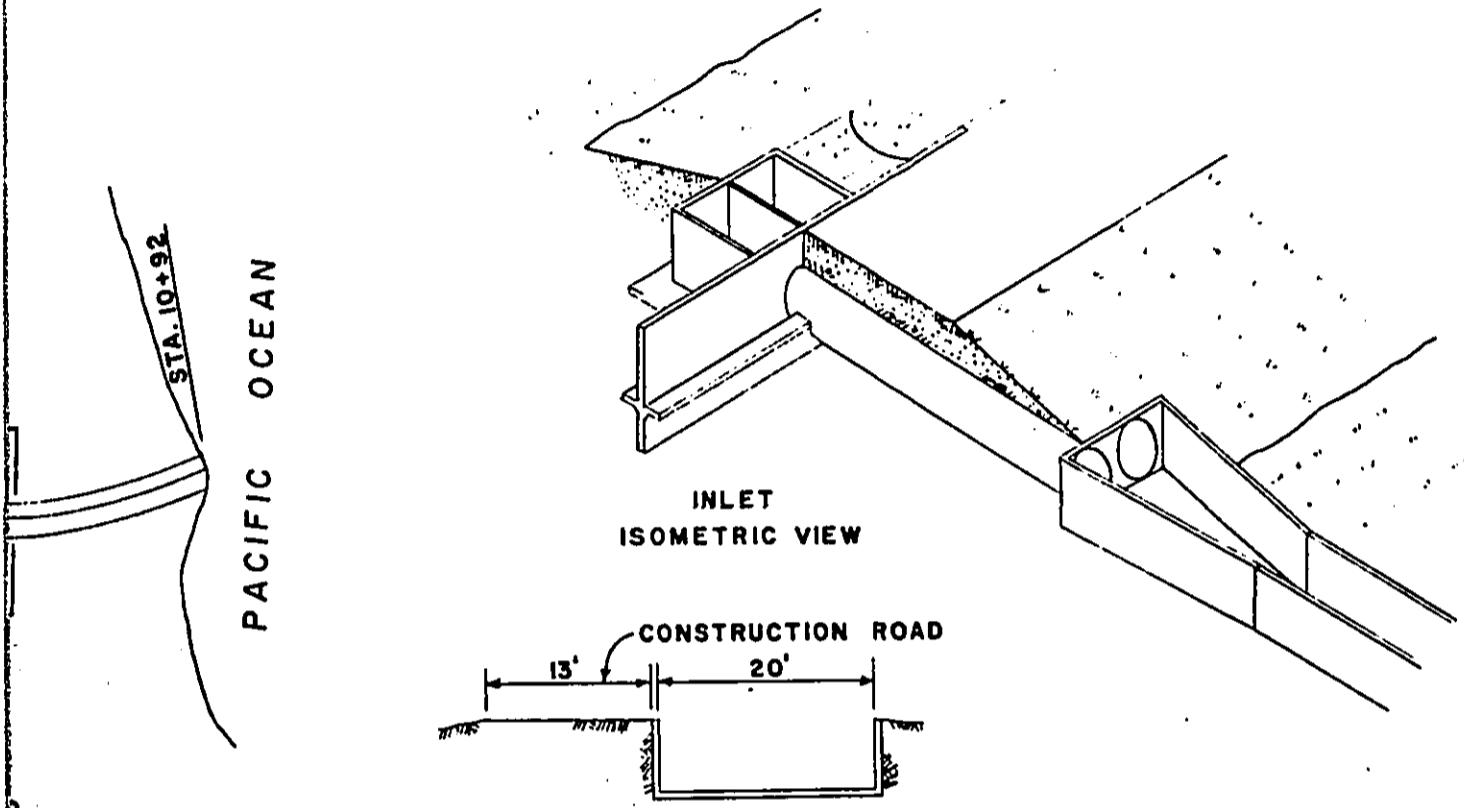
NAPILI 2-3 CHANNEL
HONOLUA WATERSHED
ISLAND OF MAUI, HAWAII
OCTOBER 1975

U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE
Prepared by S.L.W. Date 1-70 Traced by G.W.S.L.



13'

TYPICAL



PACIFIC OCEAN

STA. 10+92

INLET
ISOMETRIC VIEW

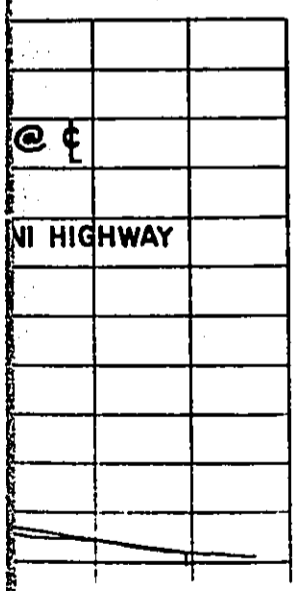
CONSTRUCTION ROAD

13'

20'

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TYPICAL CROSS SECTION A-A



@ f

NI HIGHWAY

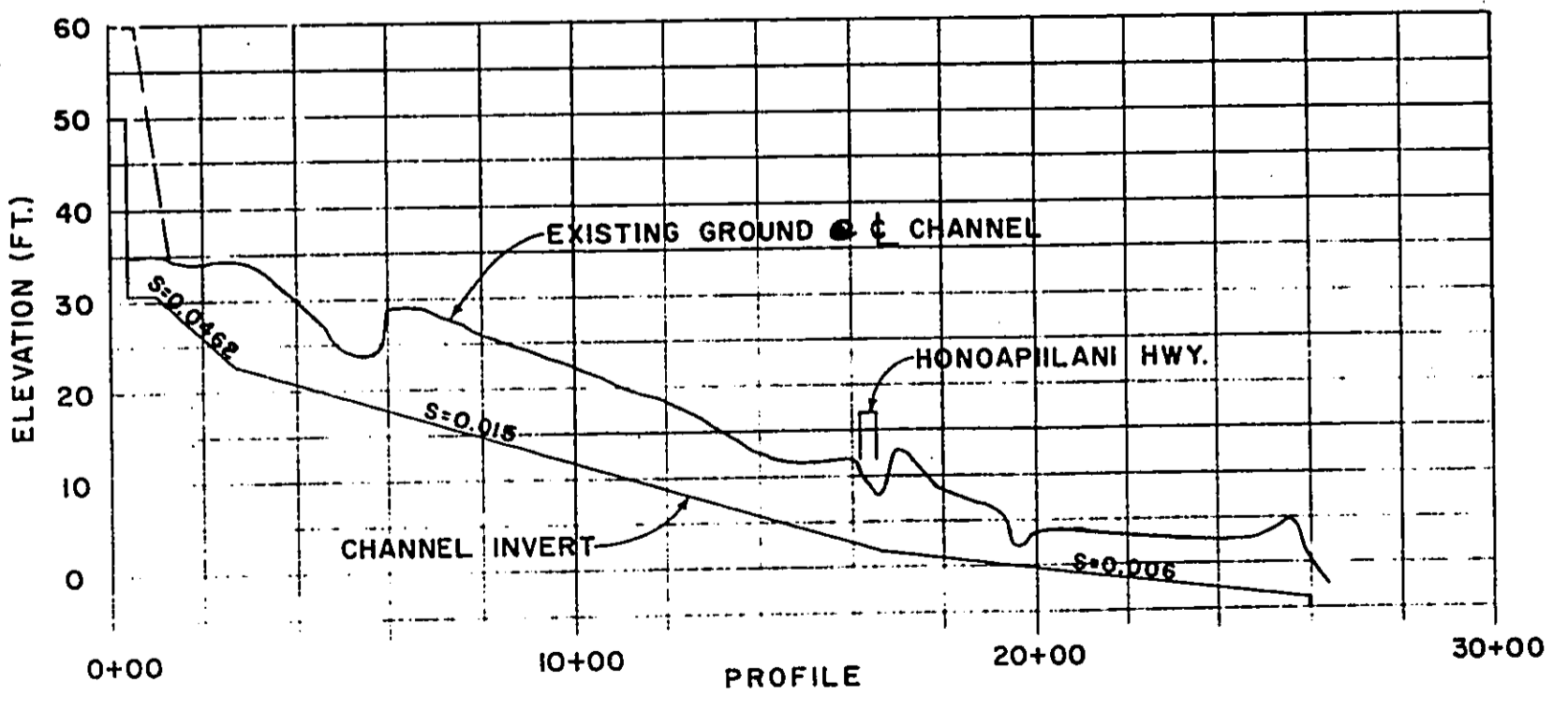
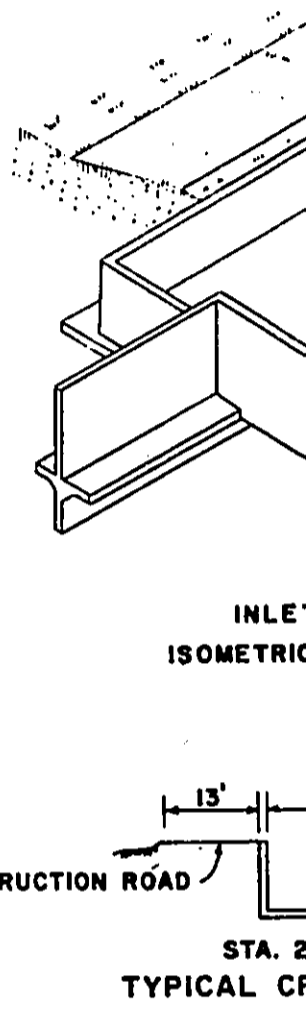
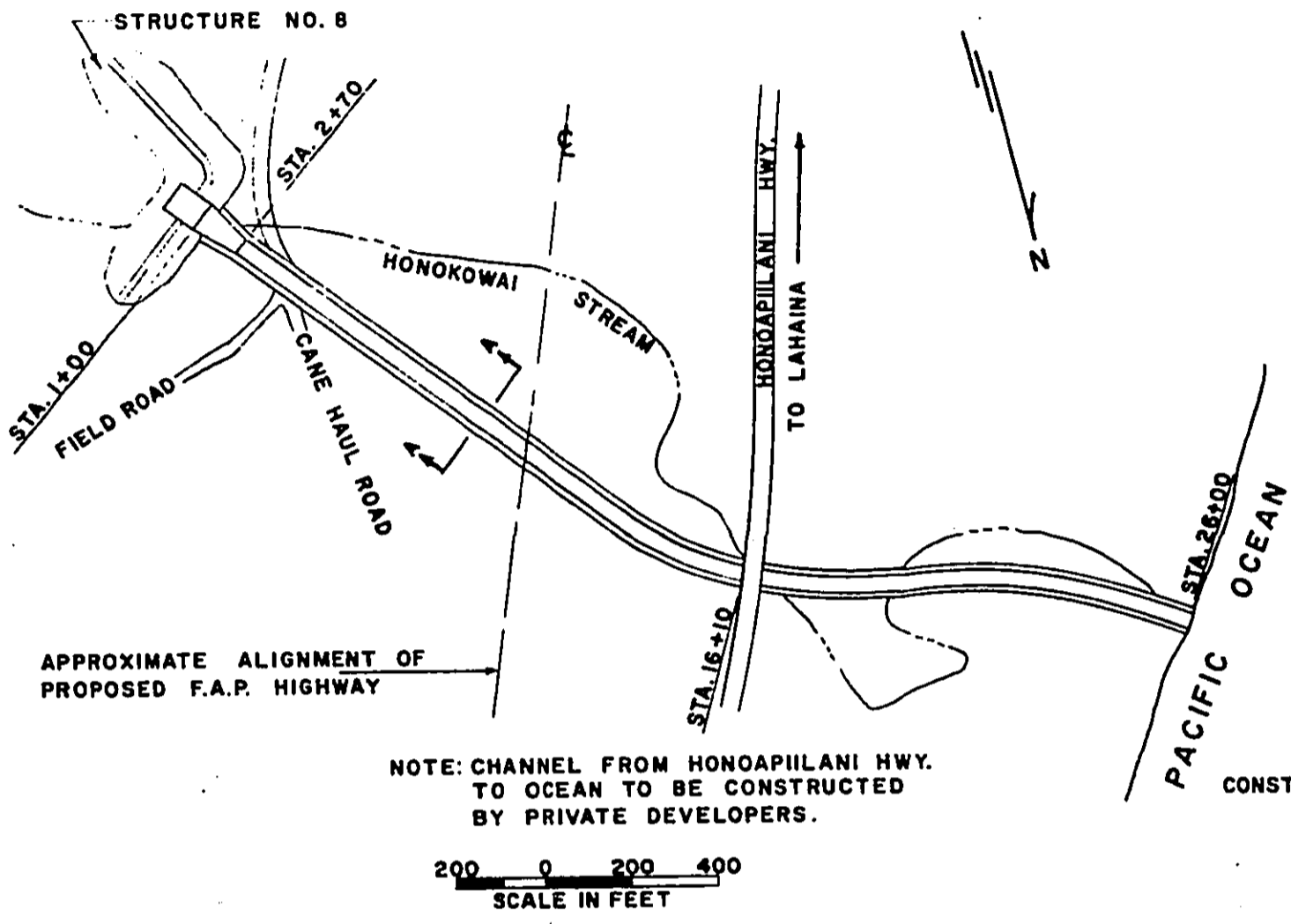
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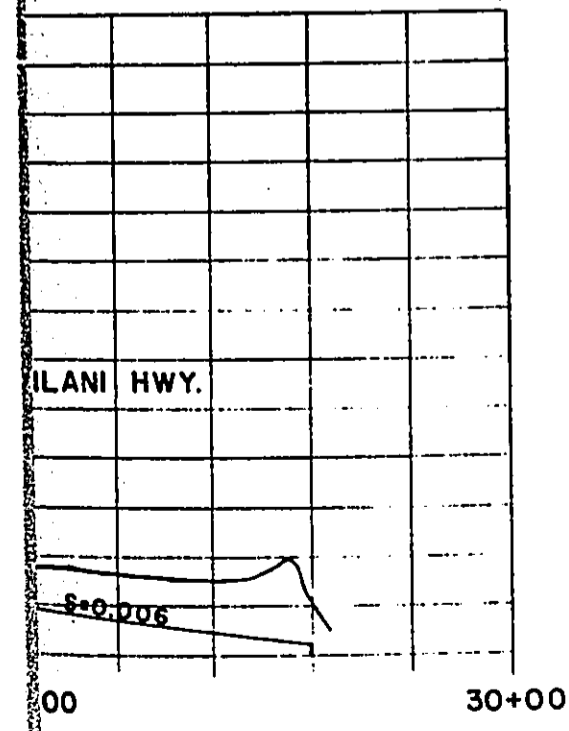
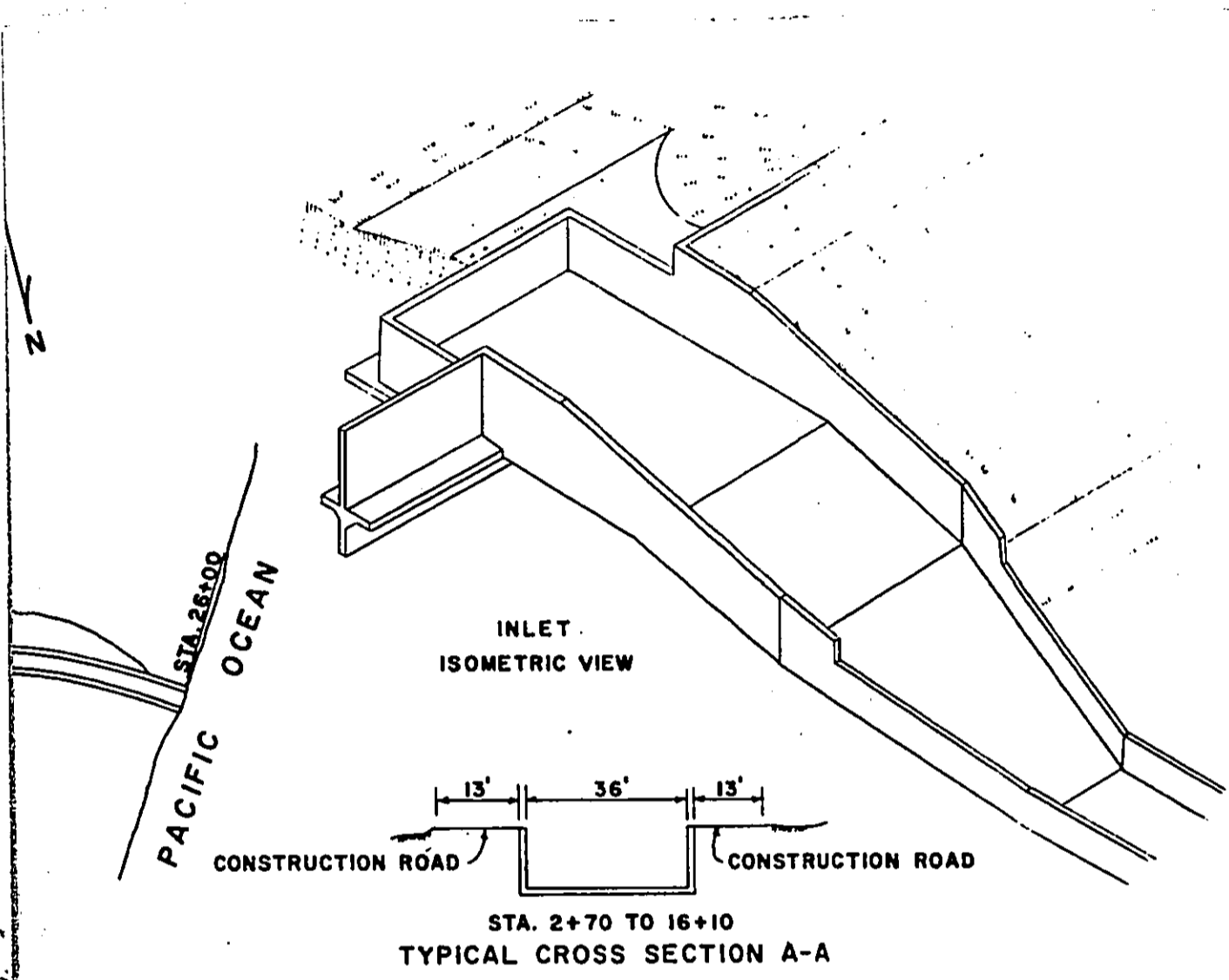
APPENDIX H

MAHINAHINA CHANNEL
HONOLUA WATERSHED
ISLAND OF MAUI, HAWAII

OCTOBER 1975

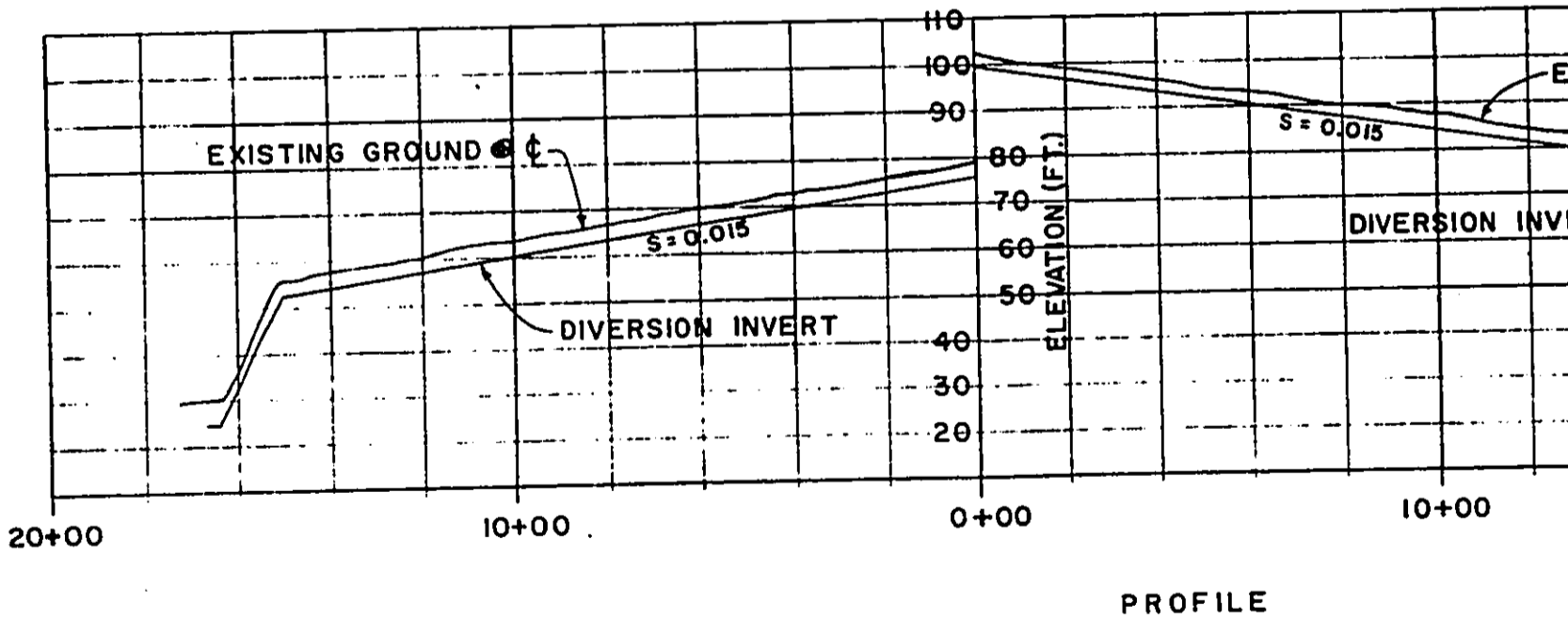
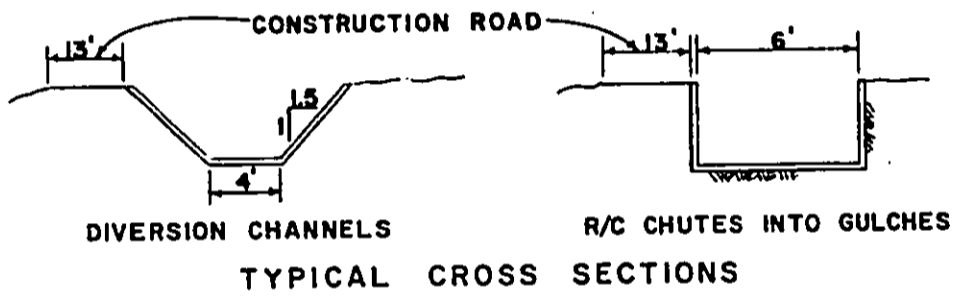
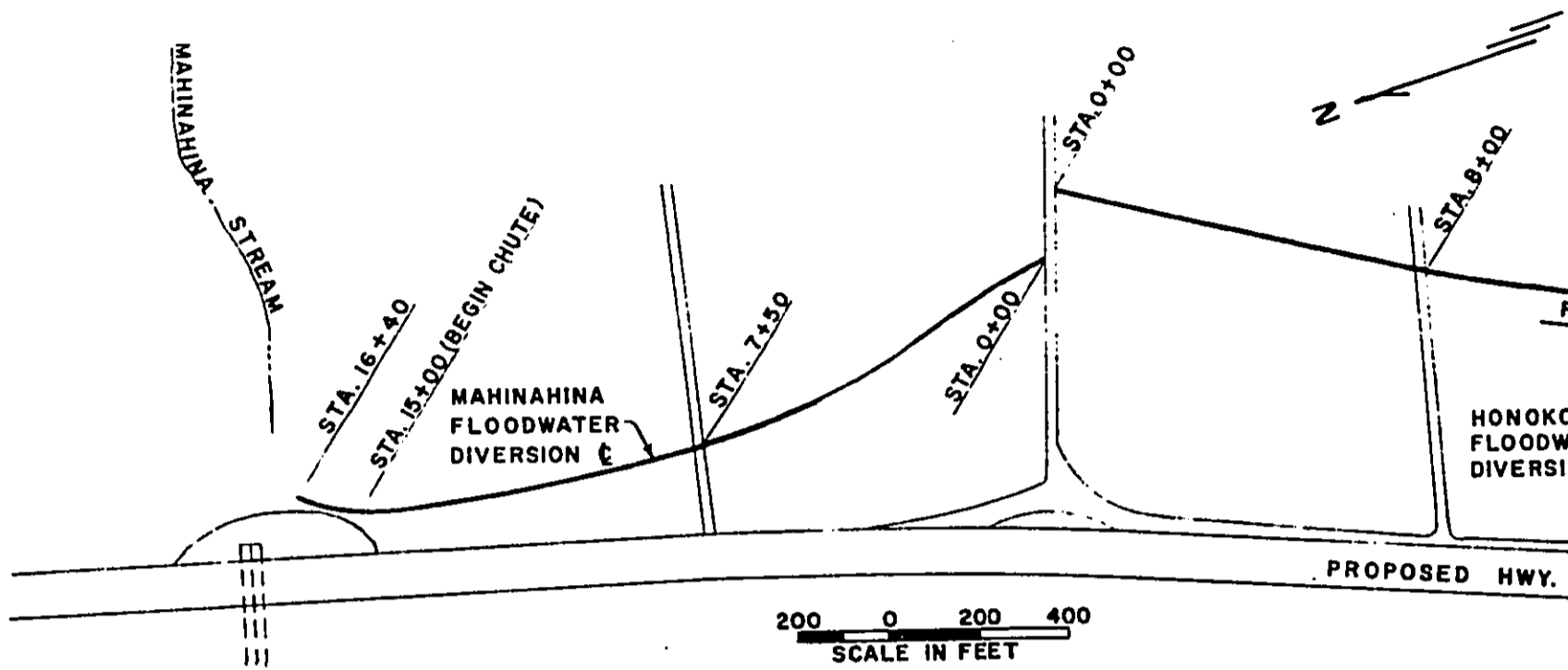
U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE
Prepared by S.L.W. Date 1-7 Traced by G.W.S.L.

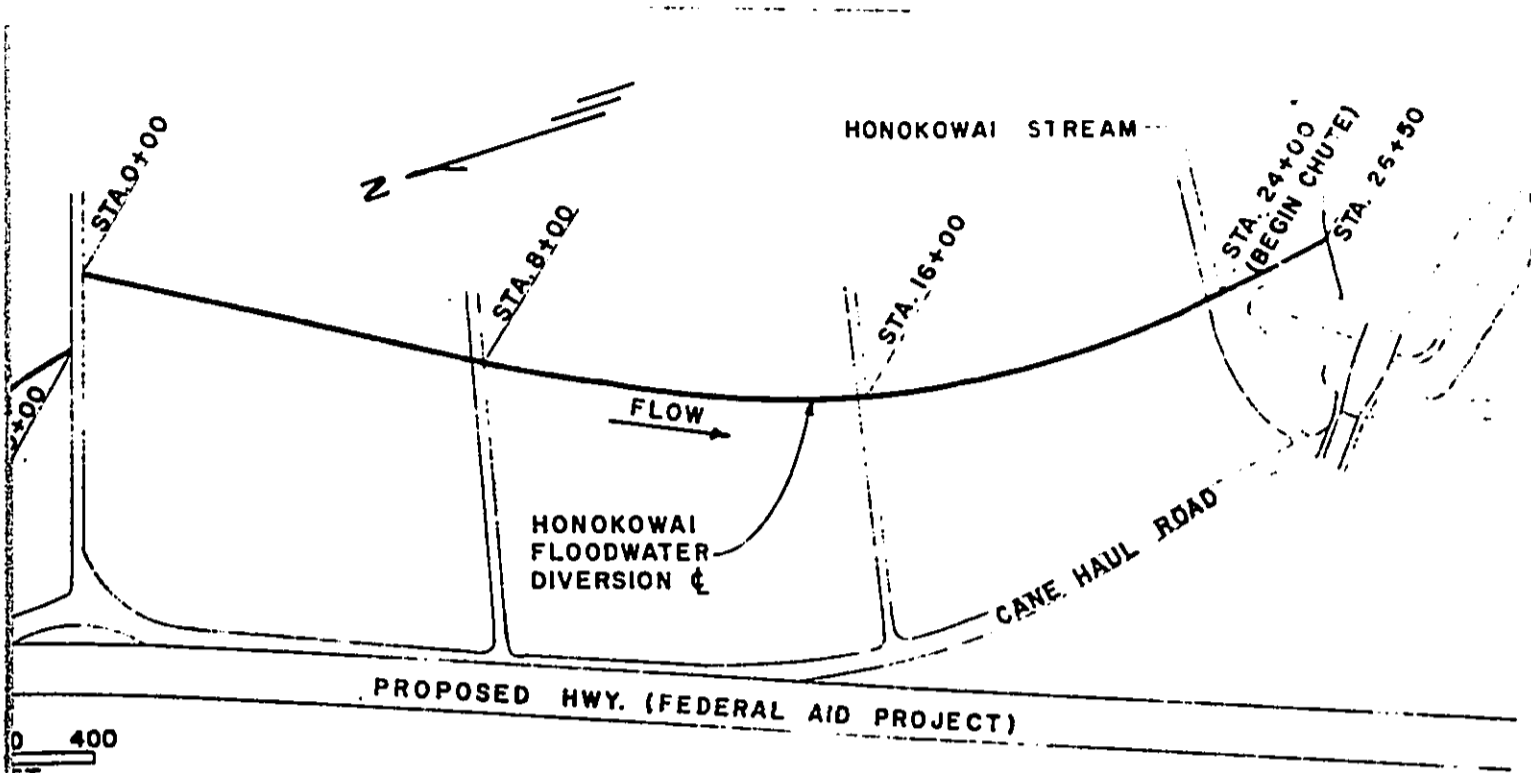




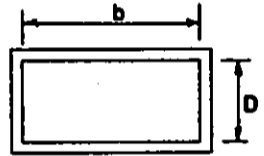
APPENDIX I
 HONOKOWAI
HONOLUA WATERSHED
 ISLAND OF MAUI, HAWAII
 OCTOBER 1975

U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE
 Prepared by S.L.W. Date 12-69 Traced by G.W.S.L.





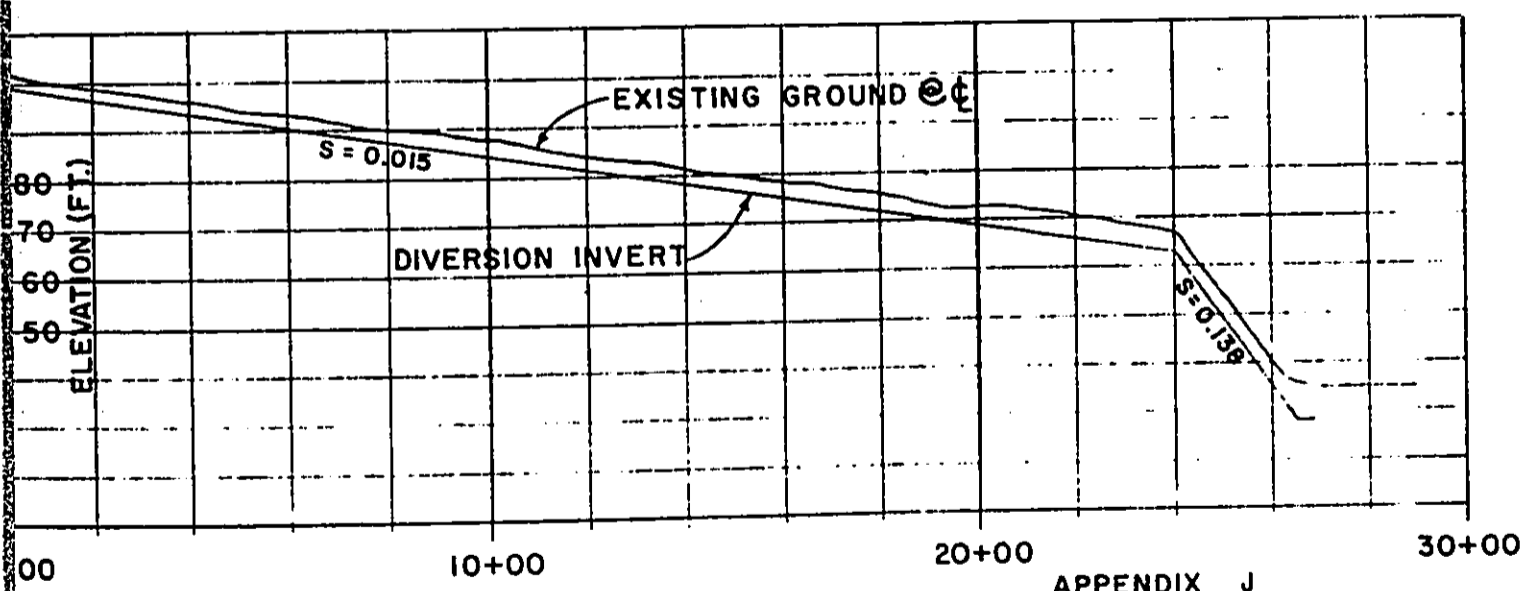
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STA.	b (FT.)	D (FT.)
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16+00	8.0	3.9
24+00	8.0	3.9

HONOKOWAI DIVERSION CULVERTS

GULCHES



PROFILE

APPENDIX J
FLOODWATER DIVERSIONS
HONOLUA WATERSHED
 ISLAND OF MAUI, HAWAII
 OCTOBER 1975

U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE
 Prepared by S.L.W. & S.P. Date 12-69 Traced by G.W.S.L.

APPENDIX K
ESTIMATED PROJECT INSTALLATION COSTS
Honolua Watershed, Hawaii

Installation Cost Item	Unit	Number	Estimated Cost (Dollars) 1/						Total
			P.L. 566 Funds			Other			
			Non-Fed. Land SCS3/	FS3/	Total	Non-Fed. Land SCS3/	FS3/	Total	
LAND TREATMENT									
Land Areas ^{2/}									
Cropland	Ac.	5,925	--	--	--	101,300	--	101,300	101,300
Grassland	Ac.	1,000	--	--	--	149,200	--	149,200	149,200
Forest Land	Ac.	16,655	--	--	--	--	56,300	56,300	56,300
Other Land	Ac.	400	--	--	--	7,500	--	7,500	7,500
Technical Assistance			89,900	6,500	96,400	36,100	4,700	40,800	137,200
TOTAL LAND TREATMENT	Ac.		89,900	6,500	96,400	294,100	61,000	355,100	451,500
STRUCTURAL MEASURES									
Construction									
Desilting Basins	No	8	2,156,000	--	2,156,000	--	--	--	2,156,000
Floodwater Diversions	Ft.	4,290	511,500	--	511,500	--	--	--	511,500
Channel Work ^{4/} (N)	Ft.	3,900	1,265,000	--	1,265,000	--	--	--	1,265,000
Subtotal Construction			3,932,500	--	3,932,500	--	--	--	3,932,500
Engineering Services			471,900	--	471,900	--	--	--	471,900
Project Administration									
Construction Inspection			121,900	--	121,900	37,600	--	37,600	159,500
Other			271,400	--	271,400	83,600	--	83,600	355,000
Subtotal Administration			393,300	--	393,300	121,200	--	121,200	514,500
Other Costs									
Land Rights			--	--	--	1,212,500	--	1,212,500	1,212,500
Subtotal Other			--	--	--	1,212,500	--	1,212,500	1,212,500
TOTAL STRUCTURAL MEASURES			4,797,700	--	4,797,700	1,333,700	--	1,533,700	6,131,400
TOTAL PROJECT			4,887,600	6,500	4,894,100	1,627,800	61,000	1,688,800	6,582,900

1/ Price base: 1975
2/ Includes only areas estimated to be adequately treated during the project installation period. Treatment will be accelerated throughout the watershed, and dollar amounts apply to total land area, not just to adequately treated areas.
3/ Federal agency responsible for assisting in installation of works of improvement.
4/ Type of channel before project: (N) - an unmodified, well defined natural channel or stream.

March 1976