GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

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

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES
EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

DIVISIONS:
AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

MAY 29 1985 REF. NO.: CPO-956-85

Environmental Quality Commission
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Gentlemen:

Pursuant to Section 1:72, Environmental Impact Statement Regulations, we have this day accepted the final environmental impact statement (EIS) for Kapaa Quarry, Phase 2 by Ameron HC&D.

This letter is to notify you of our determination in this matter and to transmit an authenticated copy of the final EIS.

Very truly yours,

SUSUMU ONO, Chairperson
Board of Land and Natural Resources

Enclosures (2)

REVISED
ENVIRONMENTAL
IMPACT STATEMENT

KAPAA QUARRY
• PHASE 2

Ameron
HC&D

State of Hawai'i - Office of Environmental Quality
Control Library
220 South King Street, Fourth Floor
Honolulu, Hawai'i 96813
Telephone 586-4185
Facsimile 586-4186
e-mail: nancyh@pixi.com

REVISED
ENVIRONMENTAL IMPACT STATEMENT

FOR THE PROPOSED

KAPAA QUARRY PHASE 2 PROJECT

* * * * *

Kapaa Valley, Koolaupoko
City and County of Honolulu, State of Hawaii

TMK: 4-2-15 : 1

* * * * *

Applicant: Thomas E. Bastis
Thomas E. Bastis, President
AMERON H C & D
811 Middle Street
Honolulu, HI.
96819

Accepting Authority is:
Chairman, Board of Land & Natural Resources

Accepted: Susumu Ono Date: 5/31/ 1985
Susumu Ono, Chairman
Board of Land & Natural Resources
State of Hawaii

May 1985

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SUMMARY

SECTION 1:
The Kapaa Site was selected after studies were conducted in 1949 as the HC&D quarry at Moiliili was no longer feasible due its location in a rapidly growing urban area. The relative isolation of the Kapaa Valley site in 1949 was a logical choice for the new quarry. Negotiations with the H. K. L. Castle Trust led to the first Kapaa Quarry which is now the City and County Kapaa Landfill Site. After the first site was depleted, HC&D negotiated for another and larger site further into Kapaa Valley. This area totalled 480.6 acres. The quarry boundaries were adjusted to accommodate the Interstate H-3 Highway and the present Kapaa Quarry Site now totals 416.507 acres including the 37-acre wire mesh fabricating plan.

The Phase I area, mined from 1964 to the present, is expected to be quarried out by 1988. The Phase II area, 152 acres more of less, is the subject for the non-conforming use of the quarry established prior to the 1964 Land Use Act. Quarrying of the Phase II Site will be carried out similar to the Phase I Site. An under-pass has been provided under the H-3 highway to service the Phase II Site. The existing quarry processing plant on the Phase I Site will continue to process the materials emanating from the Phase II Site.

Ameron HC&D, operator for the Kapaa Quarry Site, employs 300 Hawaii residents, of which 278 are on Oahu and dependent on the Kapaa Quarry materials for their livelihood. Ameron HC&D accounts for nearly 50% of the rock and aggregate materials used in the Oahu construction industry.

The Phase II Site is in the "Conservation District" and is subzoned "L" (Limited) and "G" (General) by the Department of Land and Natural Resources. No rare/endangered species of plant and fauna have been found in the area. Twenty four months of lead time is required before quarry work can start in the Phase II Site.

SECTION 2:
Kapaa Valley is part of the large Koolau Volcano and the rocks to be found here are dense, thick and slightly metamorphosed units. Kapaa Stream, as the water drainage course in the valley is often called, discharges into the lower end of nearby Kawainui Marsh. The theoretical discharge of Kapaa Stream into Kawainui Marsh is estimated to be about 10% with Maunawili and Kahanaiki streams contributing the major runoff into the marsh. Rainfall is about 60 inches per year. The greatest single 24 hour rainfall has not exceeded 15 inches in the valley. The Phase II Site is estimated to contribute 1 to 2% of the total Kawainui Marsh drainage. The sediment from the present quarry is directed to sedimentation

ponds lessening the impact on the marsh waters. Groundwater is not a developable resource in Kapaa based on results from earlier wells drilled in this area.

Based on an archaeological survey of the Phase II Site, the area does not have any significant archaeological feature of historic nature. One site discovered during the survey was excavated and the findings analyzed. The conclusion was that the site was void of interpretive potential on the basis of the common feature types represented and the location in an area that is difficult to reach.

A botanical survey disclosed the site vegetation to be predominately exotic. The remnants of endemic and indigenous flora are sparse and no rare/endangered species were located within the project site. Fauna, found on the project site, were exotic birds and animals. Native wildlife inhabits the Kawainui Marsh area on the opposite side of Ulumawao Ridge, the eastern or makai boundary of Kapaa Valley.

The Kapaa Quarry operation is not expected to change significantly when quarrying begins in the Phase II Site. The same number of personnel is expected to work the site; the same quantity of equipment will continue to be utilized; and the present processing plant will handle materials from the Phase II Site. No additional infrastructure needs are foreseen as the present services: roads, water, electric, telephone, police, fire, etc., are adequate.

SECTION 3:
Construction is important to the State's economic growth and the Kapaa Quarry material is essential to the construction industry on Oahu. State plans stress economic growth. Quarrying is permitted under a "Conditional Use" permit which is applicable to the non-conforming status of the Kapaa Quarry Site under the Department of Land and Natural Resources regulations for the administration of "Conservation Districts." Quarrying is a permitted conditional use in "Preservation Districts" as provided in the Comprehensive Zoning Code of the City and County.

SECTION 4:
Noise impacts are mitigated by the distance of the proposed quarry site from residential area. The topography of the site, a U-shaped ridge isolates quarry activity from the built up areas. Blasting is controlled and carefully supervised to preclude any damage to neighboring structures. Air quality is maintained by areal water sprinkling and installation of dust collectors in the processing plant. Traffic is not expected to increase as the output of the quarry will not vary significantly. Quarry runoff is captured in sedimentation basins to comply the the NPDES per-

mit issued by the Department of Health. The visual disturbance of quarried areas will be mitigated by a landscaping program as mandated by the Court, Board of Land and Natural Resources and the owners of the property.

SECTION 5:
Quarrying is an appropriative use of a natural resource and changes to the landscape will occur. Noise and dust will have impacts which are mitigated to a large extent by the distance of the quarry to residential areas and practices and corrective measures instituted by Ameron HC&D.

SECTION 6:
Studies and surveys conducted by Ameron HC&D in the past shows that the Kapaa Valley area is the most suitable location for a quarry. The excellent quality and large quantity of rock material in an isolated environment yet close to the areas of highest use for quarry products cannot be economically and environmentally duplicated.

SECTION 7:
The quarry is necessary to supply an essential construction material. It is to be understood that quarrying depletes an area of its resource. The site is a poor agricultural area; however, restoring top soil to the quarried and graded site can improve long term agricultural aspects.

SECTION 8:
The quarry will mine a non-renewable resource that is required for the construction industry. Alteration of the landscape will be permanent. The visual change will be mitigated to some extent by a re-planting and beautification program.

SECTION 9:
The State economic growth policies include the statement that government will strive to achieve a sustained level of construction activity responsive to, and consistent with, State growth objectives.

SECTION 10:
Approvals from various State and City and County agencies are required for the project. It is interesting to note that the State Department of Planning and Economic Development's Certificate of Appropriateness is required in conformance with the Kawainui Management Plan.

SECTION 1

PROJECT DESCRIPTION

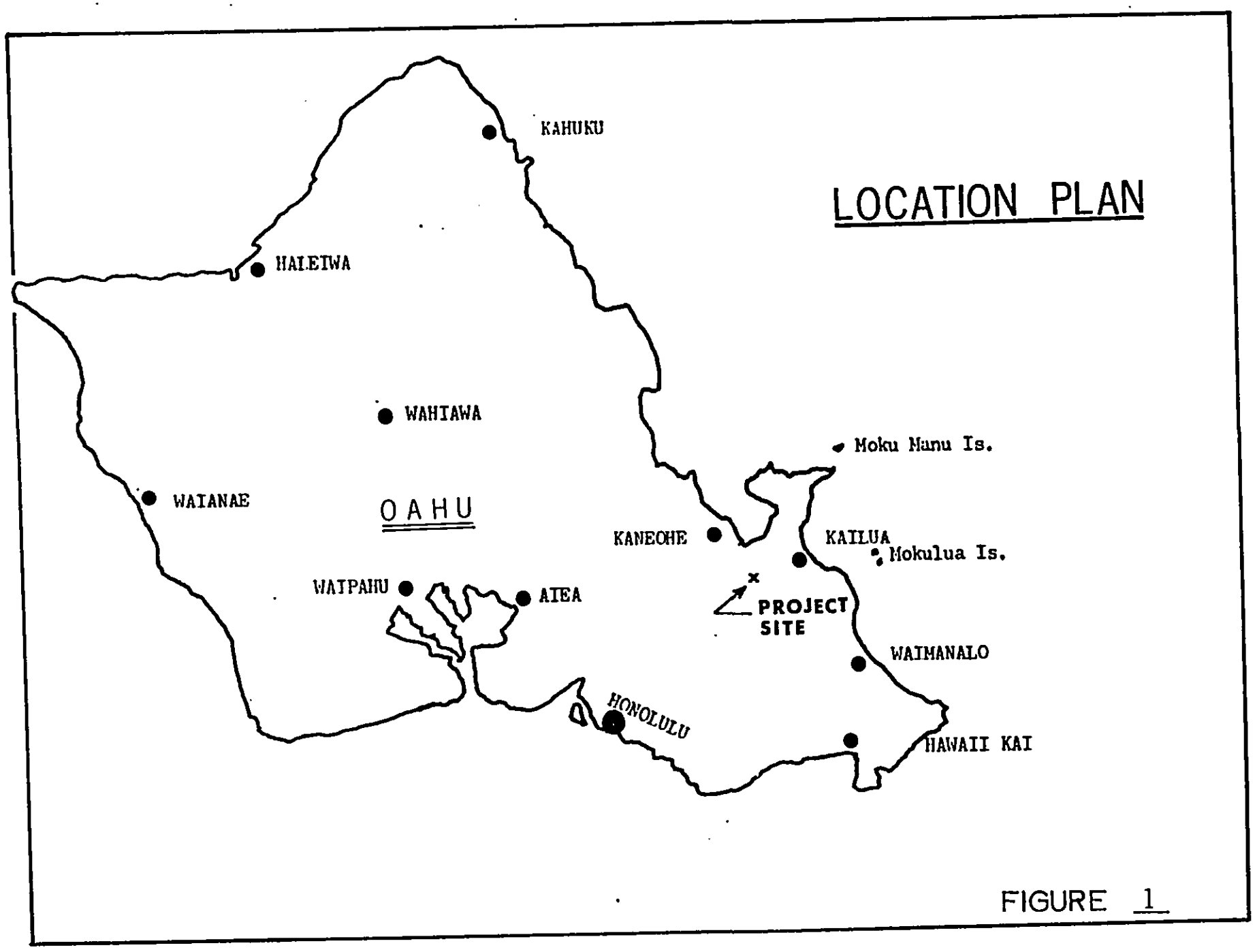
A. BACKGROUND

The Kapaa Valley site has been the principal quarry for Ameron HC&D since 1951. Figure 1 is a general location plan. Prior to World War II, HC&D operated a quarry at Moiliili. This site is now owned and used by University of Hawaii for its athletic program. The move to Kapaa Valley was by a negotiated lease from the H. K. L. Castle Estate. The original lease was dated December 30, 1949 and covered an area of 101.0 acres. See Figure 2. The deposit was subsequently quarried out and this depletion led to another negotiated lease with the H. K. L. Castle Trust. The new lease dated June 30, 1964 covered 480.6 acres encompassing nearly all of Kapaa Valley. See Figure 1. The expiration date of this lease is June 30, 2012.

The Kapaa site was selected as the future quarry site of Ameron HC&D as test borings disclosed that the quality and quantity of rock were about the best to be found on Oahu; and the quarry site was centrally located to the development areas of Honolulu primarily, and also close to the Kaneohe-Waimanalo region of secondary growth.

B. PRESENT QUARRY SITE

Ameron HC&D carried out an exploratory program prior to securing the 1964 lease from the Castle Trust. In 1962 to 1964, Ameron HC&D constructed access roads into the valley and drilled several



LOCATION PLAN

FIGURE 1

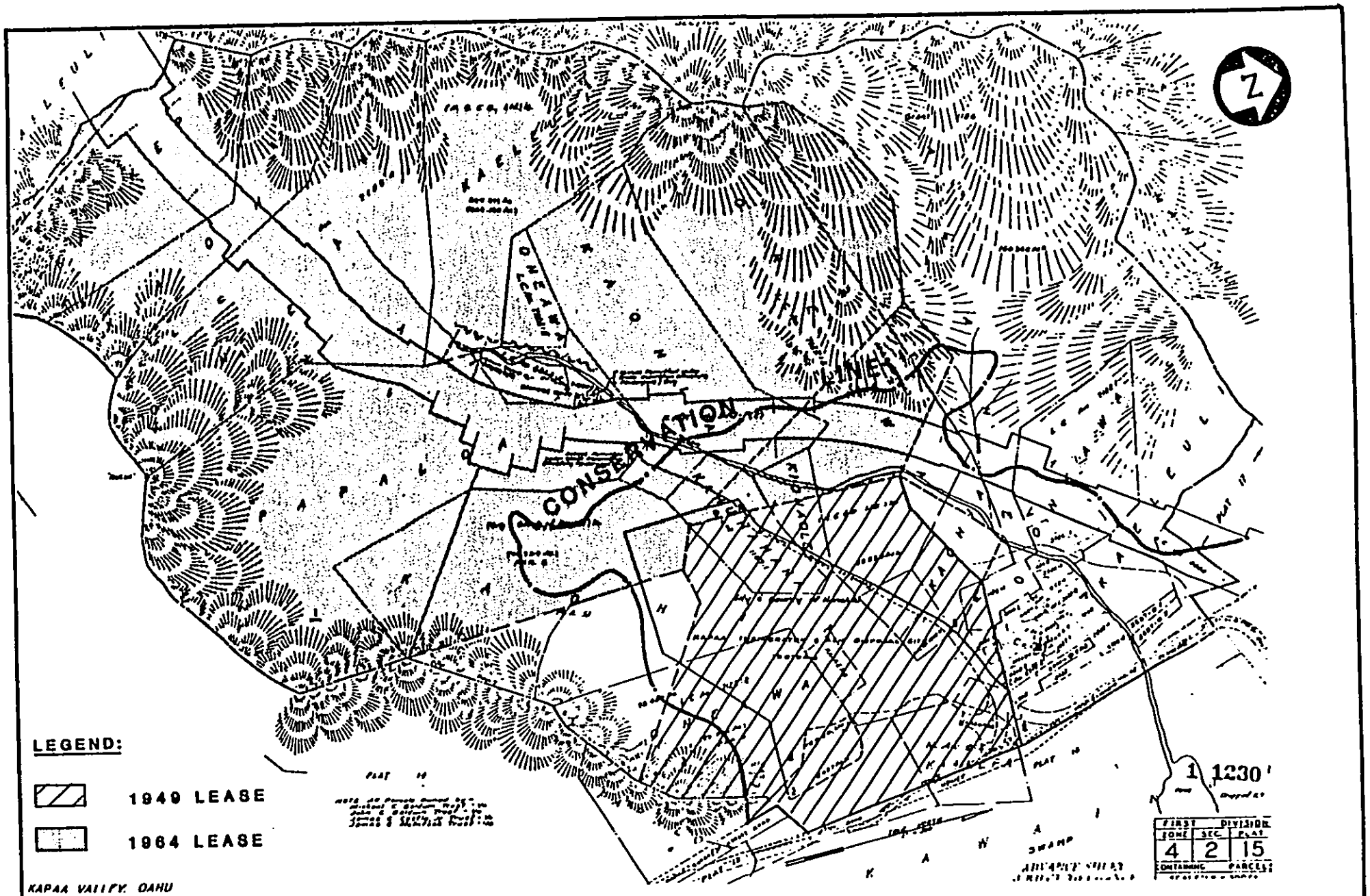


FIGURE 2
QUARRY LEASES
1949 AND 1964

areas in the valley to secure geologic/petrographic information, and started quarry mining operations in the valley in 1964. At the same time, a lease was negotiated with the Castle Trust for the entire valley area of 480.6 acres.

In 1966, Ameron HC&D applied for a Conservation District Use Application for the relocation of the quarry complex from the 1949 lease site to the 1964 lease site. Prior to the enactment of the 1964 Land Use Act, Kapaa Valley was in the agricultural district of the City and County of Honolulu and quarrying was a permitted use. Under the 1964 Land Use Act, Kapaa Valley, for the most part, was designated "Conservation" and became under the jurisdiction of the State Department of Land and Natural Resources. In this respect, Ameron HC&D applied for and was granted approval for the Phase I quarry complex under Application No.OA-66/3/2-32. The approval stipulated that quarry work for Phase I was to be confined to 160 acres, more of less. See Figure 3.

At the time approval for the Phase I quarry was given, the alignment for the H-3 highway was being established and quarry operation boundaries were set to avoid conflict with the future H-3 highway. In addition, under the then existing Regulation 4 of the Department of Land and Natural Resources, quarrying was a permitted use.

In March 1974, a stipulated judgement filed in the first Circuit Court ended condemnation proceedings for the H-3 highway acreage

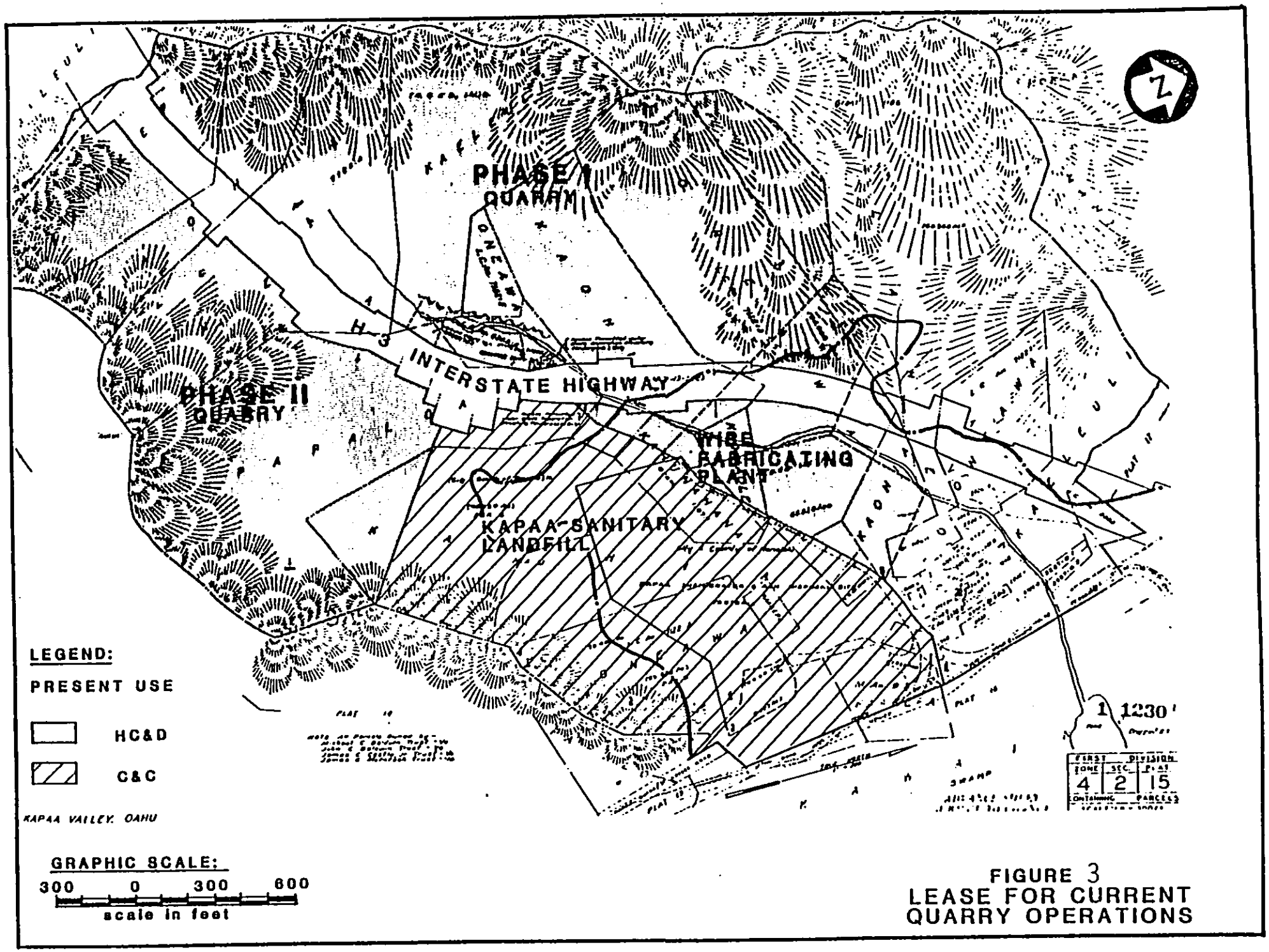


FIGURE 3
LEASE FOR CURRENT
QUARRY OPERATIONS

that traversed the June 30, 1964 leased parcel. The stipulated judgement is Civil #27870. The area for the H-3 highway was determined to be 50.734 acres according to the Final Order dated July 6, 1982.

At present, the HC&D leased lands from the H. K. L. Castle Trust totals 416.507 acres and is made up of three land sections due to the H-3 highway and City & County Kapaa Landfill projects. The first section is the present Phase I quarry site (227 acres); the second section is the wire mesh fabrication plant (37 acres); and the third section is the proposed Phase II quarry site (152 acres). Figure 3 shows this division; it should be noted that both Phase I and Phase II are on the same lot - TMK: 4:2:15 - 1.

C. PROPOSED PHASE II PROJECT

The extension of the quarrying operations into the Phase II area was outlined in the 1966 C.D.U.A. approved by the Board of Land and Natural Resources. It was shown as a future quarry site - in 1966, the boundaries for H-3 were undetermined; the Phase I site was estimated to be adequate up to the early '80's; also, quarrying was a permitted use under the then existing (1966) regulation governing uses in Conservation Districts; and no change in existing laws or regulations were expected - no attempt to secure approval for Phase II was initiated in 1966. See Figures 4 & 4A.

The proposed Phase II site contains 152 acres, more or less. It is part of the 480.6-acre site leased in 1964 which was subsequently amended and now totals 416.507 acres. The earlier work

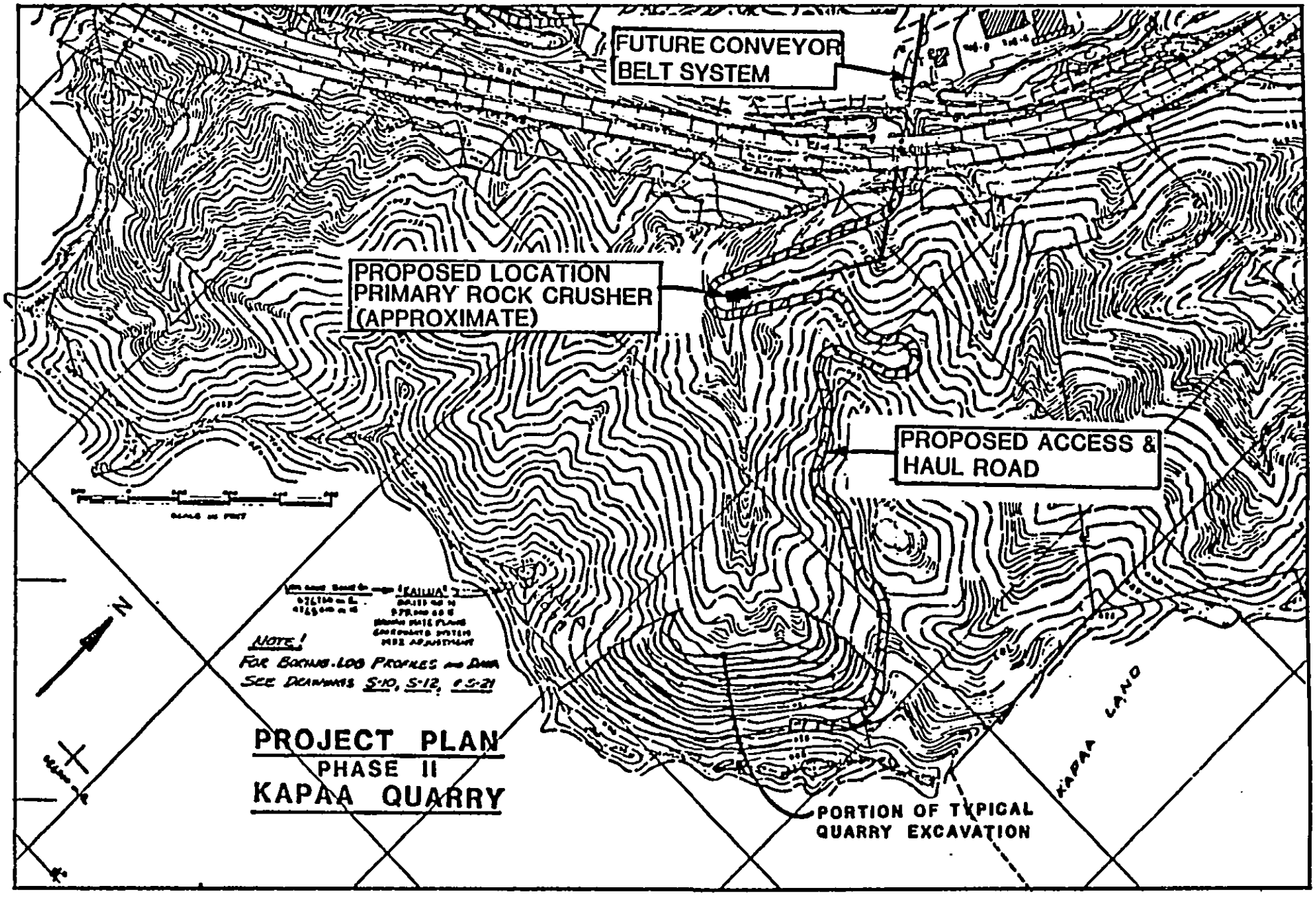

FUTURE CONVEYOR BELT SYSTEM
PROPOSED LOCATION PRIMARY ROCK CRUSHER (APPROXIMATE)
PROPOSED ACCESS & HAUL ROAD
N
NOTE!
FOR BORING LOG PROFILES AND DATA SEE DRAWINGS S-10, S-12, & S-21
PROJECT PLAN
PHASE II
KAPAA QUARRY
PORTION OF TYPICAL QUARRY EXCAVATION
KAPAA LAND

FIGURE 4

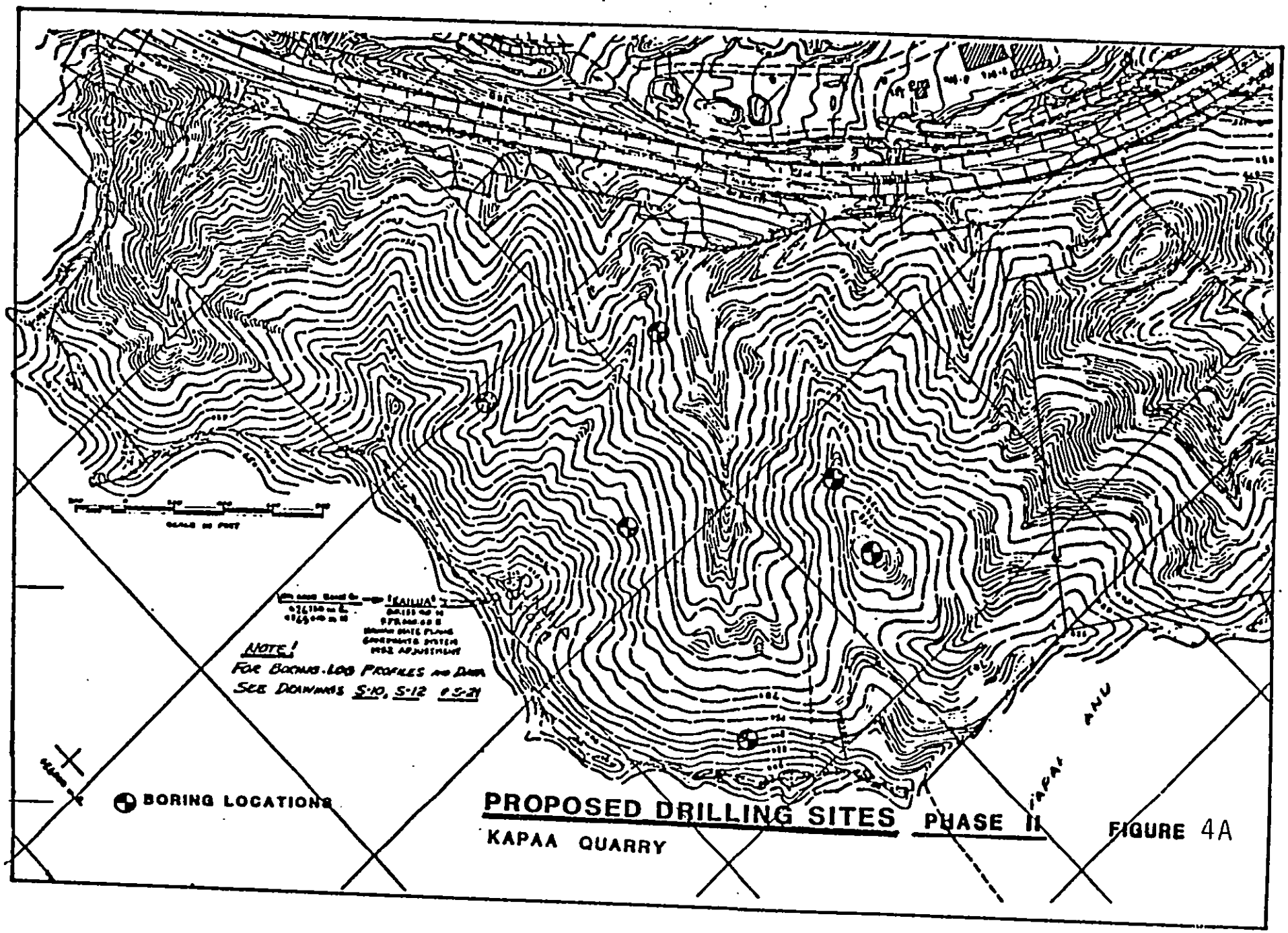

NOTE!
BORING LOCATIONS
PROPOSED DRILLING SITES PHASE II
KAPAA QUARRY
KAPAA
ANU

FIGURE 4A

started in 1962 disclosed that the estimated quantities of rock in the Phase I area to be 37,558,000 tons and in the Phase II area to be 56,620,000 tons. The Phase I quarry site is expected to be depleted before 1988 and, hence, it is essential that preliminary work on the Phase II site be initiated. This will include construction of access road and associated clearing, and new drilling to provide specific data relating to the sub-surface material. At the same time, construction, grading and drainage plans will be prepared for approval by the Board of Land and Natural Resources as a prerequisite to actual construction. The approval for the Phase II site requires a lead time of at least 24 *months before* actual field quarrying operations can commence.

Quarrying operations will be carried out similar to that for the Phase I quarry. Rock faces shall be benched at vertical intervals not exceeding fifty feet. The width of each bench shall be not less than 50% of the height of the rock face above, measured vertically to the elevation of the next higher bench, and not less than a minimum width of 25 feet. Each bench upon termination of quarrying thereon shall be covered with not less than two feet of topsoil and planted with suitable vegetation. Replanting will be carried out to replace vegetation that may die.

When quarrying operations are completed possibly by the year 2012, the quarry floor shall be covered with two feet of topsoil and revegetated with such plants as the owners of the parcel shall prescribe.

The existing facilities at the Phase I site - crushers, storage bins, drying plants, man-sand plant, batching plants, offices and repair shops - are expected to remain in use and service the Phase II quarry site.

The quarry material from the Phase II site is described in Appendix 1.

D. GENERAL DESCRIPTION OF THE ACTION'S TECHNICAL, ECONOMIC, SOCIAL, AND ENVIRONMENTAL CHARACTERISTICS:

Technical Characteristics:

The proposed project involves the quarrying and preparation of suitable rock for the concrete industry and base material for use in the construction industry.

Additional exploratory drilling will be carried out to assess the location and estimated quantity of quarry material more accurately. As part of the approval of the Conservation District Use Application, an exploratory drilling permit is requested. Based on this initial exploratory drilling survey, a definitive quarrying plan will be filed with the Board of Land and Natural Resources. Temporary access roads will be constructed and drilling site, each 50 feet by 50 feet, cleared. The exploratory drilling plan is shown in Figure 4A.

All quarrying of the Phase II quarry site will be confined within the leased boundaries shown on Figure 3. Quarrying will not

occur on the Ulumawao Ridge line, this is to retain the natural ridge line and not disturb any of the lands beyond the leased boundaries.

The overburden of topsoil will be removed to expose the quarry rock. The soil will be stored for future use or used to cover previously excavated areas. The topsoil shall be used for purposes primarily connected with the leased area according to the terms of the lease with the H. K. L. Castle Trust.

Rock will be removed from its natural state by controlled blasting or with power shovels. Initially, the rocks from the Phase II quarry (proposed project site) will be hauled to the existing quarry processing plant using a road through the underpass at Sta. 564+00 of the H-3 highway. A crusher plant will be erected within the Phase II area at an appropriate time to reduce the size of the quarried material to facilitate its transportation to the processing plant by a conveyor belt system. This will eliminate the need for the constant relay of dump trucks hauling uncrushed rocks to the existing processing facility. Dump trucks will operate within the Phase II area to transport rocks to the new Phase II crusher plant.

Blasting is carried out by drilling a series of holes 6-1/2 inches in diameter by approximately 55 feet deep. The blast holes are generally spaced on a 16 by 18-foot pattern using ANFO and watergel slurries as blasting agents. The controlled blasting reduces the possibility of shock vibrations causing structural

damage to any of the homes or buildings of nearby communities. A monitoring program is carried out to ensure that the vibrations are within acceptable limits to preclude possible structural damage to neighboring structures including the Pahukini Heiau.

The Phase II project site will be quarried similar to the existing Phase I quarry. The terms of the lease specifies (Provision 8, page 15, of 1964 lease):

"8. That the Lessee will work the quarries on the land hereby demised in accordance with the usual standards and approved practices of quarrying, and in accordance with the following:

a. All excavations within the 1964 Parcel shall be contoured to provide natural drainage of the excavated area into the existing central valley drainage channel.

b. All rock faces within the 1964 Parcel shall be benched at vertical intervals not exceeding fifty feet. The width of each bench shall be not less than 50 percent of the height of the rock face above, measured vertically to the elevation of the next higher bench, and not less than a minimum width of 25 feet.

c. Each bench within the 1964 Parcel shall, upon termination of quarrying thereon, be covered with not less than two feet of topsoil and planted with suitable vines and seedling trees, of varieties and in density approved by the Lessors. All plantings

which shall not survive for one year shall be replanted.

d. Upon termination of quarrying therein, and in all events at the end of the term or other sooner termination of this lease, the floor of each excavation shall be covered with not less than two feet of topsoil.

e. Anything to the contrary herein notwithstanding, the Lessee shall be obligated to provide topsoil for benches and excavated areas only if and to the extent that topsoil is available at a location within the leased lands from which topsoil may lawfully be removed and which shall be approved by the Lessors. Topsoil shall be taken in such manner as to leave in place sufficient topsoil to support growth of the vegetation common to the area."

A finished quarry plan for Phase II quarry will be prepared and be similar to that shown in Figure 5 for the Phase I area. Since the existing quarry processing plant will be used to handle the material excavated from the Phase II project site, a detailed description of this operation is attached as Appendix 2 for better understanding of the project.

Socio-economic Characteristics:

Kapaa Valley is located near the center of the Kailua-Kaneohe urbanized area of Windward Oahu. This is in the Koolaupoko District which includes the area between Kahaluu to Waimanalo. It

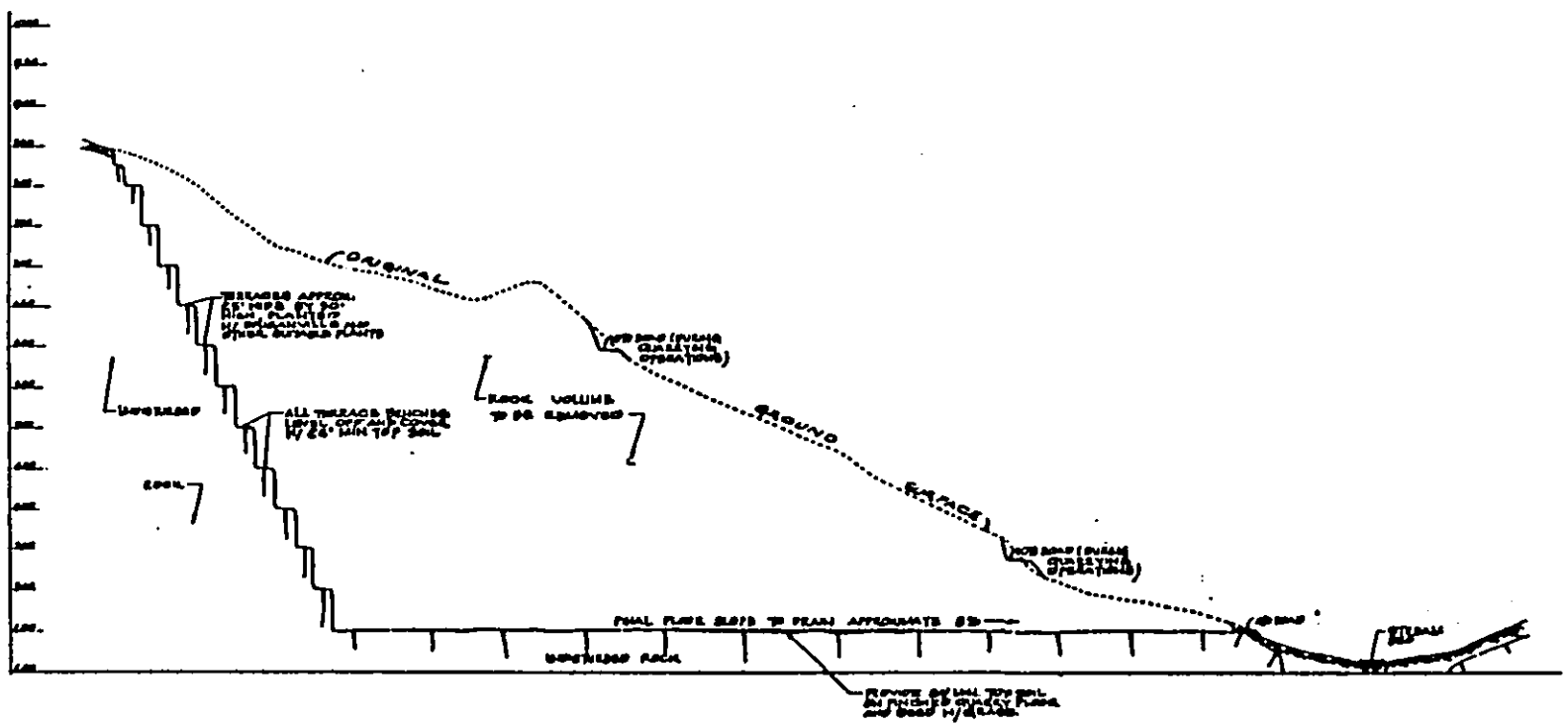


FIGURE 5

PHASE I QUARRY PLAN

Amfac/HC&D
KAPAA VALLEY
PROPOSED METHOD OF QUARRYING ROCK FROM KAPAA VALLEY

has been an area of steady growth. Table 1 shows the estimated resident population of this area:

TABLE 1

RESIDENT POPULATION, KAILUA-KANEOHE

	1980	1970	1960
Kailua-Kaneohe Urbanized Area	105,712(Total)		
Kailua	35,812	33,783	24,402
Kaneohe	29,919	26,998	15,291
Rest of Urbanized Area	39,981	N/A	N/A

The Kailua-Kaneohe urbanized area boundary was formally defined as of 1980.

The population and number of households of communities bordering or near Kapaa Valley are represented in Table 2, Population by Census Tract, Kailua-Kaneohe Region. The data can be interpolated to show that the average household contains 4.6 persons attesting to the predominant family type neighborhood that comprise this region.

The Kailua-Kaneohe area is described as being "urban-fringe" in the Honolulu General Plan, 1977. Most of the jobs are "across the Pali" in Honolulu, Waikiki, Pearl Harbor, etc. A general description of this region would be to classify this as being primarily "bedroom" communities. The largest employer in this region is the Kaneohe Marine Corps Air Station (KMCAS).

The construction industry on Oahu in 1982 was assessed at $1.147

billion in completed work. The new construction authorized for Oahu in 1982 and 1983 were as follows:

	1982	1983
Private Construction	$198,864,000	$207,901,000
Commercial and Industrial	255,041,000	139,867,000
Government Contract Awards	369,179,000	311,899,000
TOTAL:	$823,084,000	$659,667,000

The employment figure in the construction industry on Oahu varies according to the volume of construction available. It is estimated that 13,600 persons were in the construction industry on Oahu in 1984.

The Ameron HC&D firm employs about 300 Hawaii residents with an annual payroll and material purchase expenditures of over $27 million; 278 employees are located on Oahu. The Ameron HC&D operations are dependent upon the Kapaa Quarry operations. Its main industrial plant on Middle Street and pipe manufacturing plant at Campbell Industrial Park require the raw materials from the Kapaa Quarry. Nearly 50% of the rock and aggregate materials used in the construction industry on Oahu is supplied by Ameron HC&D. The firm also contributes over $1 million to the State in taxes.

TABLE 2

POPULATION BY CENSUS TRACT
KAILUA-KANEOHE

Census Tract	Area (Acres)	Resident Population 1980	Resident Population 1970	Population Percent Change	House-holds Per Acre 1980	holds 1980
103.02	2,572	3,232	3,338	- 3.2	1.3	817
106.01	288	3,019	3,227	- 6.4	10.5	835
106.02	449	4,994	5,105	- 2.2	10.0	1,374
107.01 (Kokokahi)	762	3,680	2,586	42.3	4.8	1,128
107.02	1,038	3,723	3,500	6.4	3.6	907
109.01 (Kalaheo)	840	3,161	3,374	- 6.3	3.8	924
109.03	226	4,158	4,500	- 7.6	18.4	1,263
110 (Maunawili)	6,926	4,218	3,957	6.6	0.6	1,115
111.03	821	3,872	2,145	80.5	4.7	1,017
TOTAL	13,922	34,057	31,732	7.3	2.4 (1980)	9,380 (1980)

(See Figure 6 for census tracts location.)

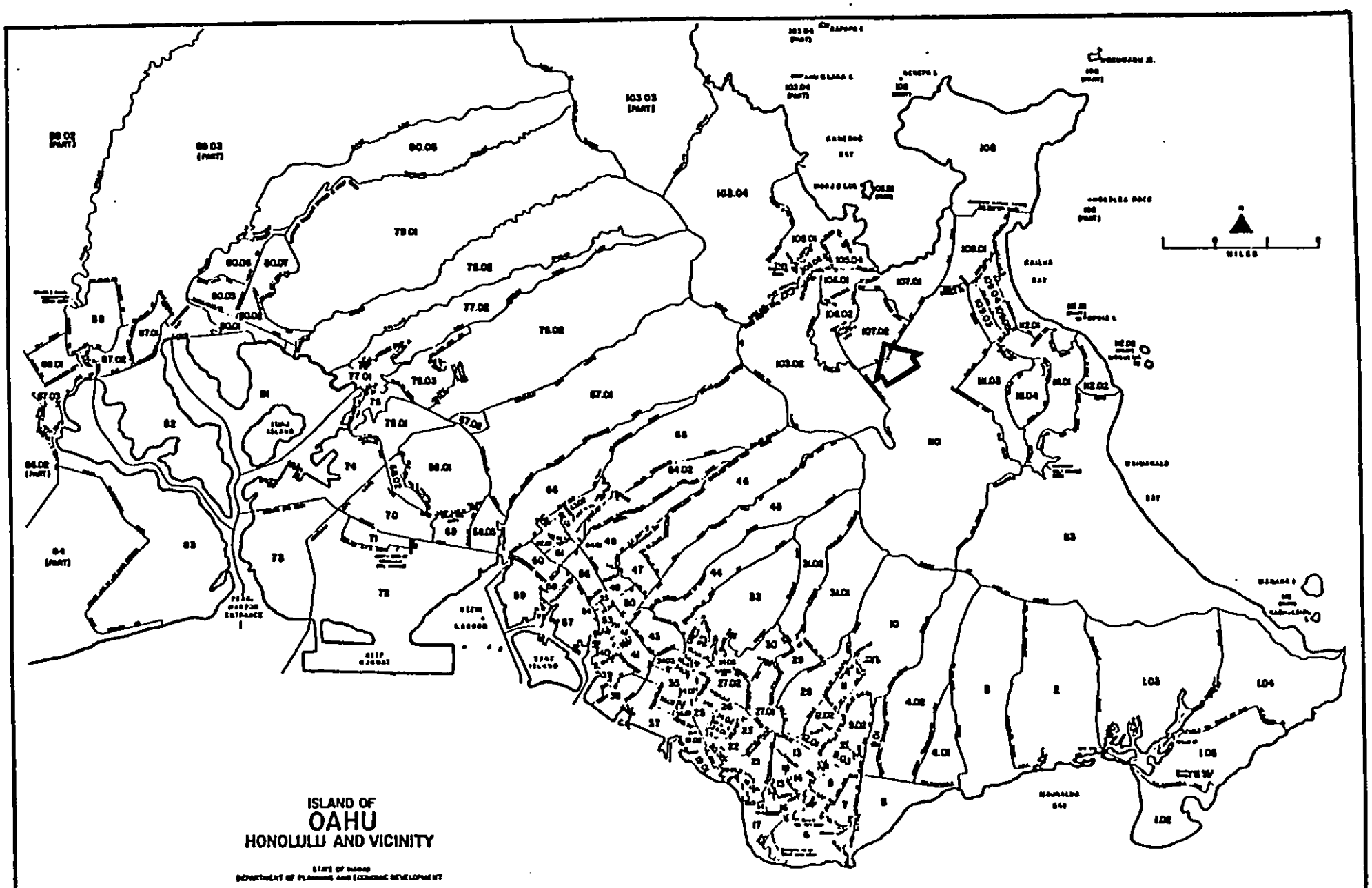


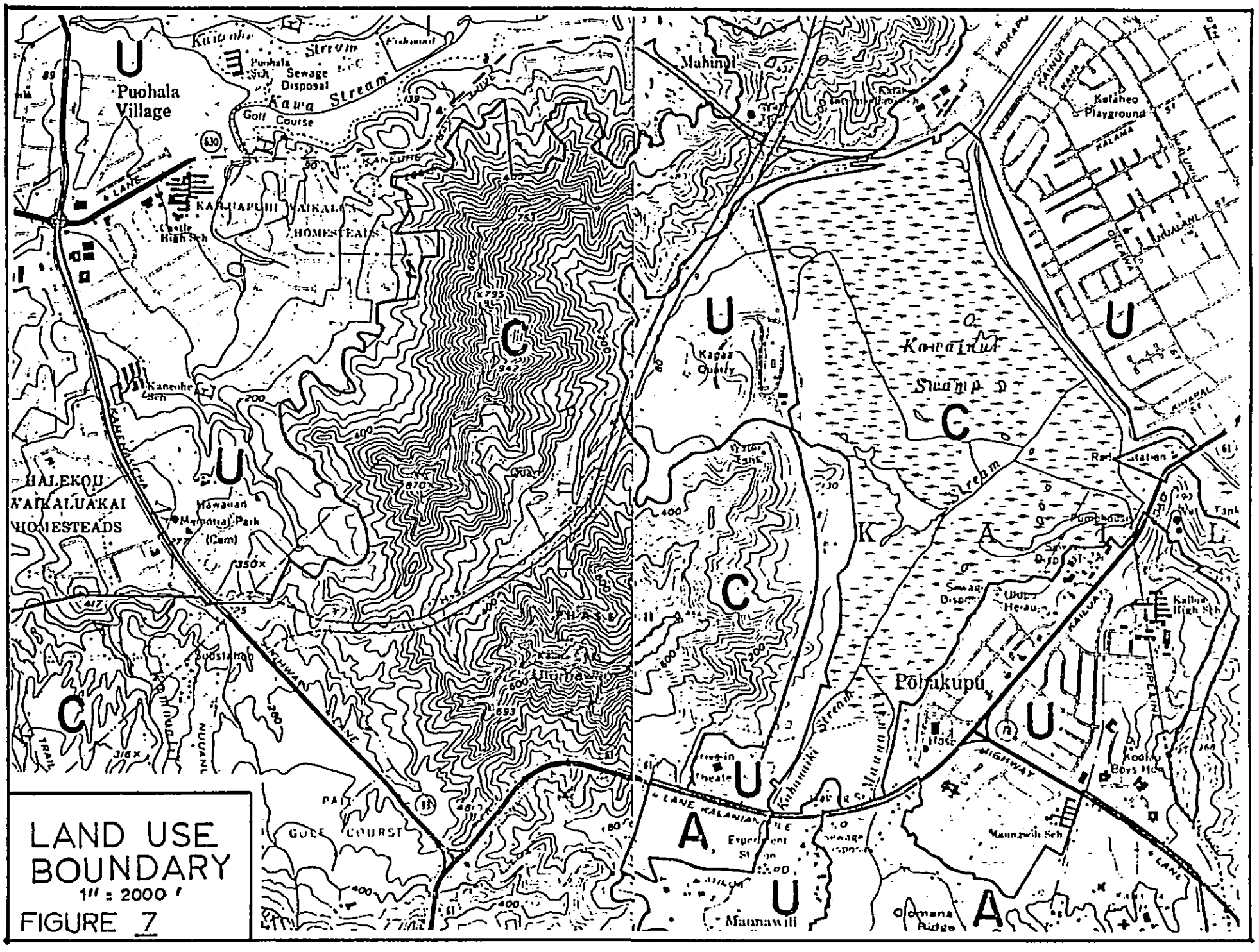
FIGURE 6
1980 CENSUS TRACTS
IN VICINITY OF PROJECT

Environmental Characteristics:

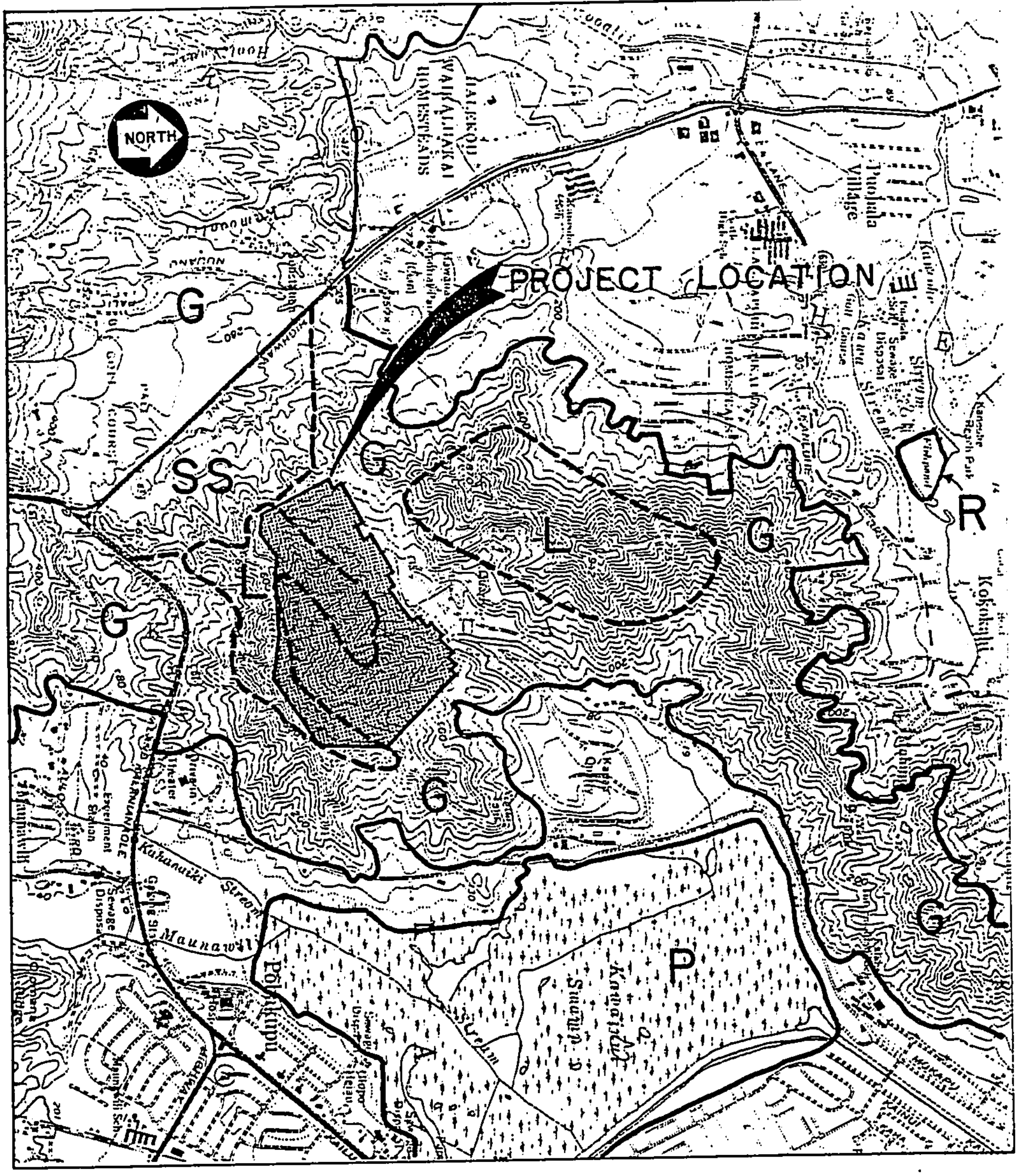
The proposed project site is located in Kapaa Valley, Koolaupoko, Oahu, and identified as being part of TMK: 4-2-15: 1. The entire parcel totals 394.271 acres. A completed portion of the H-3 highway divides this parcel: the upper or present quarry site (Phase I) contains 227+ acres; and the lower or proposed project site (Phase II) is approximately 152+ acres in size. The remaining 15+ acres adjoins another parce, TMK: 4-2-15: 8, leased by Ameron HC&D, which contains 22.236 acres, and is currently used as a wire mesh fabricating plant. The wire mesh is used for reinforcing concrete.

The present quarry site, Phase I, is almost wholly within the State Land Use Commission (LUC) "Conservation District." A small piece, about 2.4 acres, at the lower end of the valley lies within the LUC "Urban District." See Figure 7. The proposed project site, Phase II, is entirely within the "Conservation District." The wire fabricating plant is in the "Urban District" except for a small section (0.8 acre) at the very tip of this parcel. Administration of the "Conservation Districts" rests with the State Department of Land and Natural Resources.

The "Conservation District" of the present and proposed quarry sites is divided into two subzones. The top and upper section of Ulumawao Ridge and Oneawa Hills are within the "Limited" (L) subzone. The balance of the area is within the "General" (G) subzone. Refer to Figure 8.


U
Puohala Village
Kaneohe Stream
Puohala Sch
Sewage Disposal
Kaua Stream
Golf Course
KANEOHE
LANE
KAMEHAMEHA HOMESTEADS
Castle High Sch
C
U
Kaneohe Sch
KAMEHAMEHA
HALEKOU
KAIKALUAKAI HOMESTEADS
Hawaiian Memorial Park (Cem)
350x
Substation
KKUHWAY
NUUANU
TRAIL
316x
PALI
GOLF COURSE
Mahinui
Kapaa Quarry
Kaelaeo Playground
KALAMA
KAWAILOA
MOKAPU
KAINUI
Kawainui Swamp
A
K
Swag Disp
Ulupo Heiau
Kailua High Sch
RAILWAY
Pohakupu
Hosp
Drive-in Theate
KUHIMUKI
LANE KALANIANAOLE
Experiment Station
Maunawili Sch
Maunawili
Olomana Ridge
HIGHWAY
PIPELINE
Koolau Boys Home
LAND USE BOUNDARY
1" = 2000'
FIGURE 7

CONSERVATION DISTRICT SUBZONES



SCALE: 1" = 2000'

FIGURE 8

The project site is outside the Special Management Area of the City and County. According to the Flood Insurance Rate Map for Oahu, the project site is not within any designated flood plain.

The City and County zoning for the Phase I project site is P-1, "Preservation." The Koolaupoko Development Plan designation is also "Preservation." See Figure 9 and Figure 10.

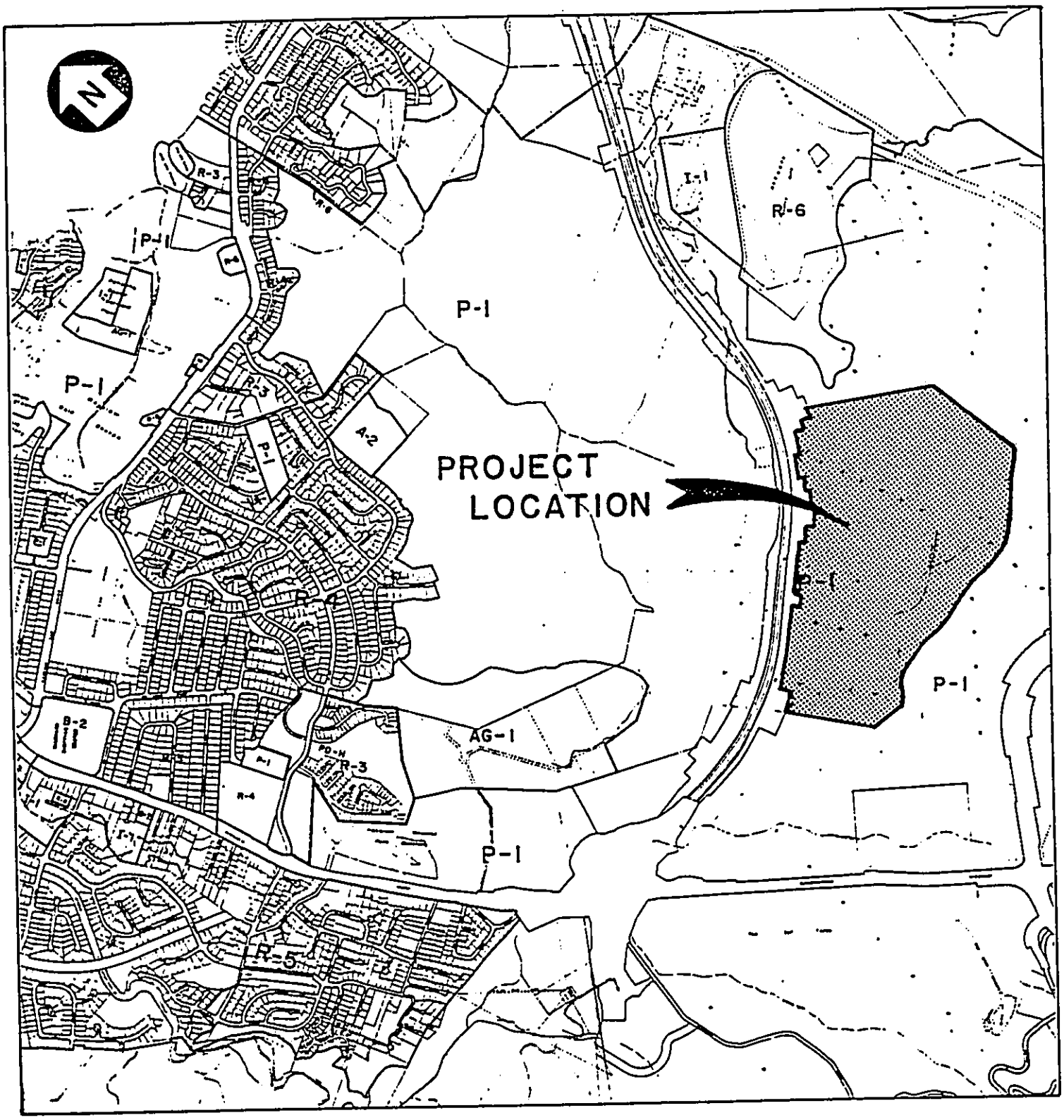
Kapaa Valley is shaped like a horseshoe. On the east is Ulumawao Ridge. The west side is made up on Oneawa Hills. The ridge on the south at the upper end of the valley is low and crossed by the H-3 highway. The lower open end of the valley on the north is presently used as the Kapaa landfill site of the City and County. This site was formally used for quarrying purposes from 1950 to well into the 1960's by Ameron HC&D.

On the makai or east side of Kapaa Valley lies Kawainui Marsh, a large swamp of high ecological value. And further to the east beyond Kawainui is the town of Kailua. To the south lies Maunawili Valley and its watershed. The communities of Maunawili and Pohakupu are south of the project area.

To the west of Kapaa Valley are: the Pali Golf Course, Hawaii Loa College, Hawaiian Memorial Park and the communities of Halekou, Kailuapuhi, Waikalua, Pikoiloa and Puohala Village. To the north lie Kaneohe, Kokokahi and Kalaheo.

Figure 11 is a geographic map of the general area.

CITY & COUNTY ZONING PLAN



SCALE: 1"= 1600'

FIGURE 9

CITY & COUNTY
COMMUNITY DEVELOPMENT PLAN

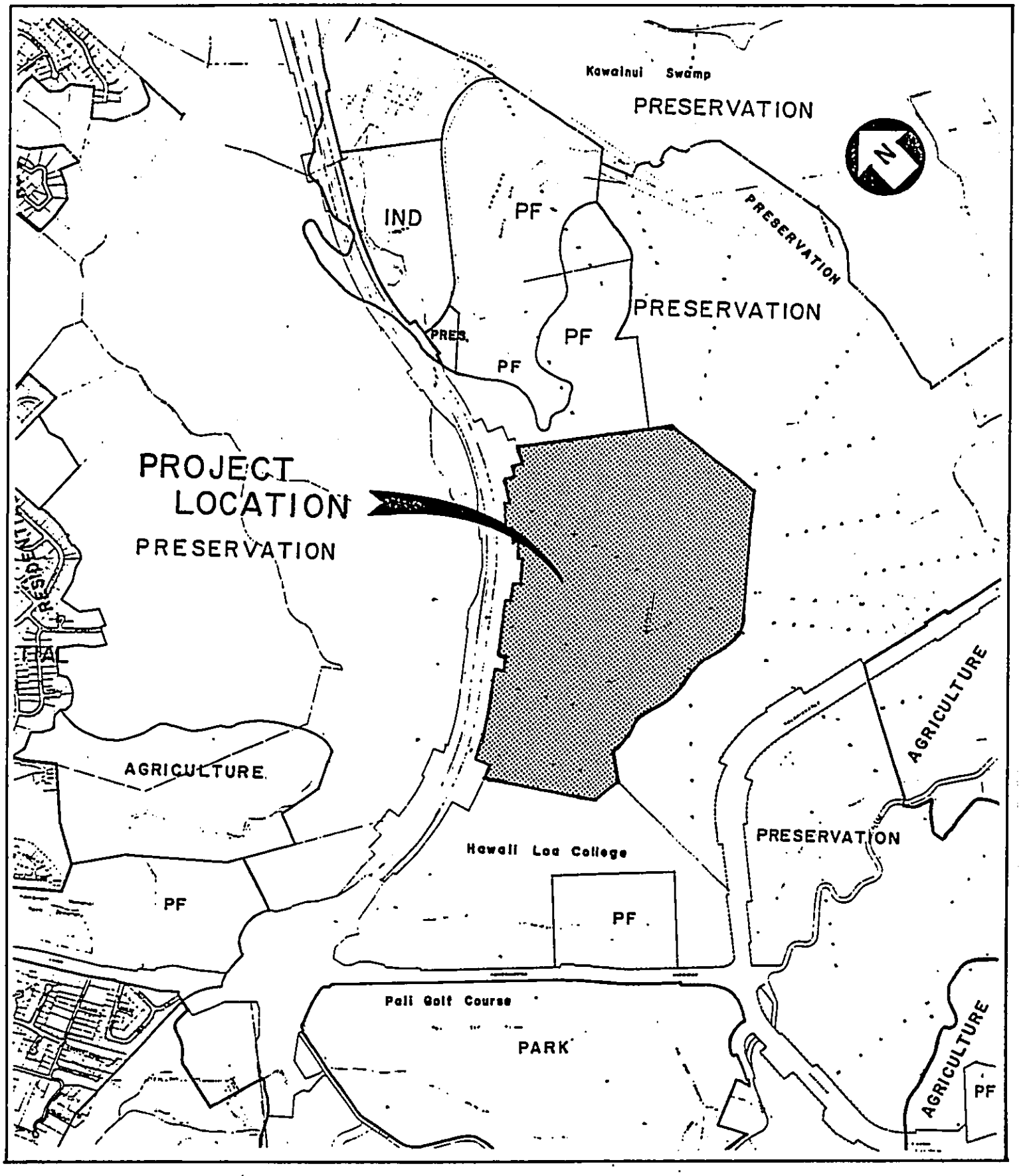
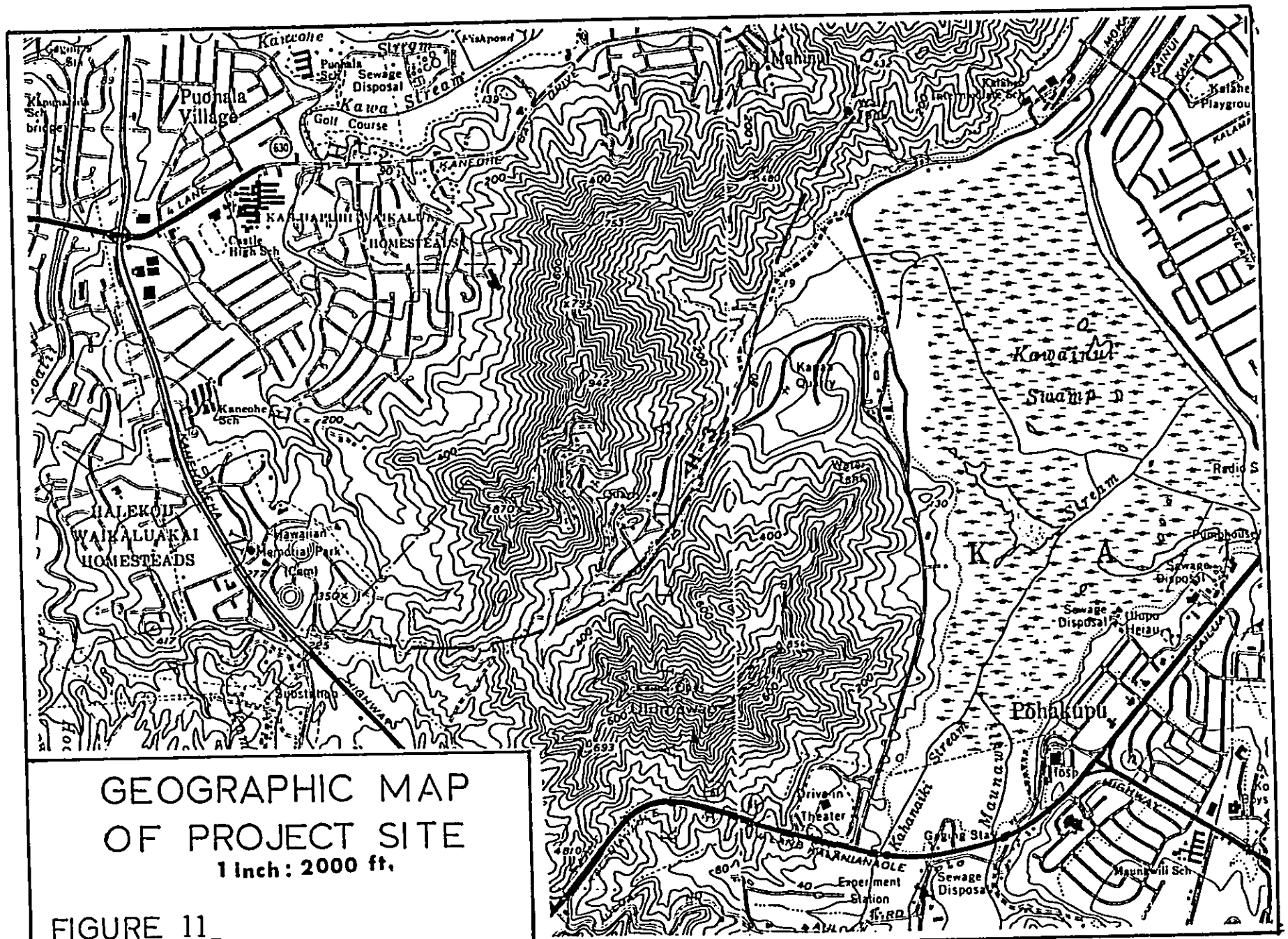


FIGURE 10



GEOGRAPHIC MAP OF PROJECT SITE

1 inch : 2000 ft.

FIGURE 11

Kapaa Valley is owned by the H. K. L. Castle Trust for the most part. As mentioned earlier, H-3 highway runs through the valley and was formally acquired by the State through condemnation proceedings. The lower end was acquired by the City and County for the Kapaa landfill site. Prior to 1949 when Ameron HC&D acquired the initial lease, the area was used for grazing and as a training area for the personnel of the not too distant Kaneohe Marine Corps Air Station.

The vegetation to be found in the project site is predominately exotic with occasional native species. Trees in the area are mostly yellow guava, java plum, Christmas berry and haole koa. Also found on the ridges and especially in the lower regions of the valley are monkeypod trees. These exotic plants are generally associated with disturbed areas. Other non-woody exotics found in the area are Philippine ground orchid, Spanish needle, lantana, sour bush, sour grass, molasses grass, buffel grass, and maile-pilau. Some native plants still exist in the area and these include 'ohi'a-lehua, 'ulei, pukiawe, 'akia, sea bean, pa-ma-kani-mahu, moa, and pala'a.

It was also noted that the areas disturbed by the H-3 highway have been invaded by other exotic weeds such as purple cudweed, lilac pua-lele, red pua-lele, Spanish needle, sensitive plant, burbush, comb hyptis, and pennywort.

Other plant species also are to be found in the area. No rare

and/or endangered plant specie was found during the botanical survey. A complete list of species observed during the botanical survey of the area is contained in Appendix 3.

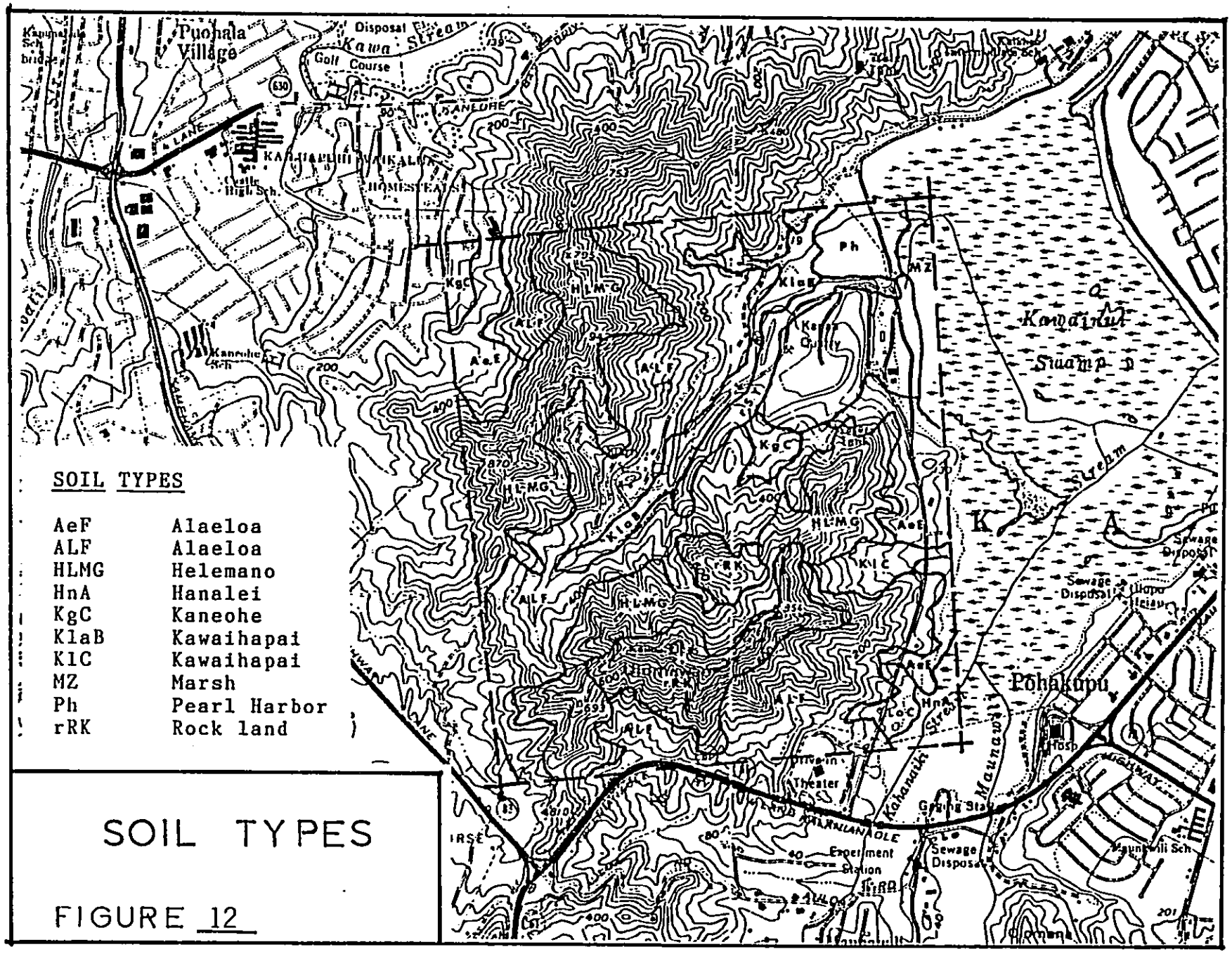
The soils to be found in the project site can be divided into three soil type classifications. These include:

Helemano: Silty clay, 30 to 90 percent slopes. Well drained soil on sides of V-shaped gulches. Derived from basic igneous rock. Typical surface layer is dark brown silty clay about 10 inches thick. Subsoil, about 50 inches thick, is dark reddish brown. Permeability is moderately rapid, runoff is medium to very rapid. Erosion hazard is severe to very severe. Soils used for pasture, woodland and wildlife habitat.

Alaeloa: Silty clay, 40 to 70 percent slopes. Well drained. Developed in material weathered from basic igneous rock. Typical surface layer is dark reddish-brown silty clay 10 inches thick. Subsoil,about 48 inches thick, is dark red and red silty clay. Runoff is rapid to very rapid. Erosion hazard is severe. Soil used for pasture and wildlife habitat.

Rock Land: Rock land is made up of areas where exposed rock covers 25 to 90 percent of the surface. Rock outcrops and very shallow soils are the main characteristics. Rock outcrops are mainly basalt and andesite. This land type is nearly level to very steep. Rock land is used for pasture, wildlife habitat and water supply.

Figure 12 depicts the soil types in the project vicinity.



SOIL TYPES

AeF	Alaeloa
ALF	Alaeloa
HLMG	Helemano
HnA	Hanalei
KgC	Kaneohe
KlaB	Kawaihapai
KlC	Kawaihapai
MZ	Marsh
Ph	Pearl Harbor
rRK	Rock land

SOIL TYPES

FIGURE 12

E. USE OF PUBLIC FUNDS OR LANDS:

No public funds or lands will be required for this project. The proposed project will be undertaken by Ameron HC&D. Their main office is located at 811 Middle Street, Honolulu, HI. Besides the Kapaa Quarry and the industrial facility at Middle Street, the firm operates the following:

Pipe Manufacturing Plant, Campbell Industrial Park

Wire Fabrication Plant, Kapaa Valley

Ready Mix Plant, Kaukonakua, Oahu

Camp 10 Quarry, Puunene, Maui

Cinder Quarry, Haleolono, Molokai

F. PROJECT TIME TABLE:

As noted earlier, the Phase I quarry site could be excavated to its design depth by 1988. It is planned that at least 24 months of lead time is required to prepare the Phase II site for commercial quarrying. Upon approval of the CDUA by the Board of Land and Natural Resources, which is expected to be sometime in mid-1985, preliminary work will be initiated. The quarry lease will expire in the year 2012.

SECTION 2

DESCRIPTION OF THE AFFECTED ENVIRONMENT

A. PHYSICAL CHARACTERISTICS:

GEOLOGY

The location of the Kapaa Quarry, both the present excavation and the proposed Phase II site, lies within the original caldera complex of the Koolau Volcano. The rocks of the caldera radically differ from the more extensive lava flows associated with the bulk of the volcanic dome. Normal lava layers are usually less than 10 feet in thickness and are highly permeable, whereas caldera rocks are dense, massive, slightly metamorphosed and very poorly permeable.

The central portion of the Koolau caldera incorporates both Kapaa and Kawainui Marsh within its approximately 5 by 3 mile area. On mapping the geology of the Kailua-Kaneohe region, Stearns was so struck by the uniqueness of the caldera lithology that he assigned it the name "Kailua volcanic series" to differentiate it from the Koolau formations. He later recognized that the rocks were part of the Koolau succession rather than from a separate eruptive center.

Stearns' work and subsequent geological and geophysical investigations showed the primary lithology in Kapaa to consist of thick basaltic lava flows intruded by many dikes and suffused with secondary mineralization. The dikes are numerous and usually less than 5 feet thick. They are dense and virtually impermeable and,

because of their vertical orientation, act as effective barriers to groundwater movement. The secondary minerals, which include quartz, opal, calcite and zeolites, were deposited from hydrothermal solutions in vesicles, joints and fractures, further reducing the permeability of the rock mass. Metamorphism in the form of chloritization of the basalt accompanied by the hydrothermal activity.

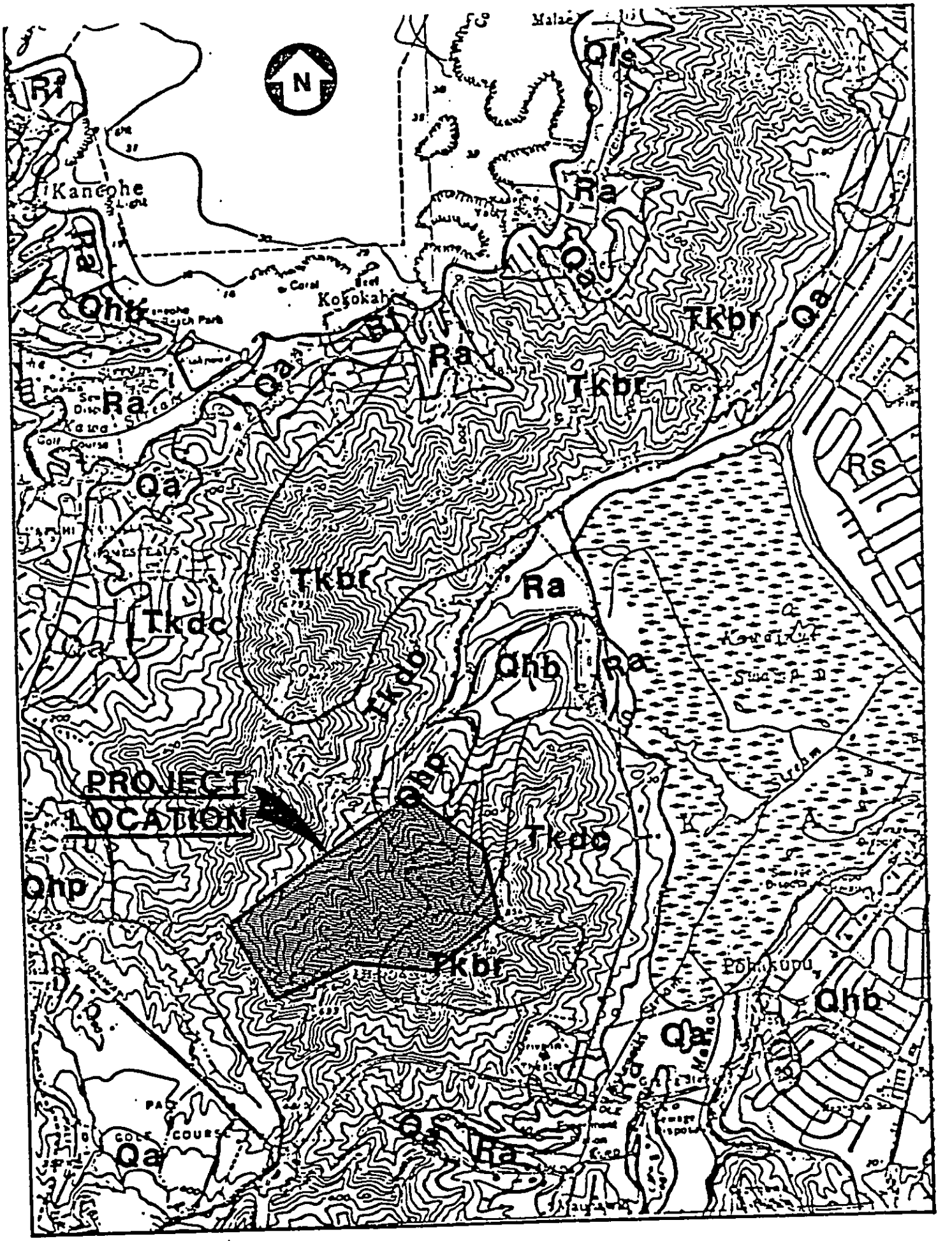
In addition to the original in-situ rocks of the caldera, tightly cemented breccia covers a portion of the Kapaa hills. The breccia originated as talus that accumulated from collapse of the caldera walls and subsequently became cemented. Like the original rocks, it has very low permeability. About half a square mile of Ulumawao consists of breccia.

Following cessation of activity within the caldera, processes of weathering and erosion began. A stream, frequently called Kapaa Stream but un-named on most maps, cut a valley in the caldera formations with its head at the drainage boundary of Kamooalii Stream and its mouth in Kawainui Marsh. The entire drainage basin of about 1 square mile lies in the ancient caldera. Moderately deep weathering took place and is retained on gentler slopes where erosion is least active. Several old wells drilled near the mouth of the stream indicated depth of weathering to about 50 feet. The breccia covering Ulumawao is highly resistant to removal by erosion and sustains the highest point on the drainage divide at 995 feet above sea level.

Volcanic activity resumed for a brief interval long after erosion had already formed the local topography. An approximately 100 feet thick layer of nepheline basalt effused from the Castle vent of the Honolulu volcanic series to cover about 0.2 square mile now occupied by the City and County sanitary landfill. This thick flow became the site of the first quarry in Kapaa and evidently was completely mined out before sanitary landfill operations were initiated.

With respect to the Kapaa quarrying sites, it is important to understand that their geology uniquely differs from the general mass of the remnant Koolau Volcano. Whereas the normal Koolau formations consist of thin layers of aa, clinker and pahoehoe in random succession, the Kapaa rocks are thick, dense and slightly metamorphosed units. This difference results in a profound contrast in water bearing properties between the formations. The Koolau rocks are permeable and constitute productive acquifers, while the Kapaa rocks are tight and resistant to groundwater storage and passage. Refer to Figure 13.

A discussion of the local geology would be incomplete without also touching on the Kawainui Marsh environment, which receives both surface and subsurface drainage from Kapaa. Kawainui is also part of the Koolau caldera and may overlie the very center of the original volcanic plug. Evidently greater collapse of the caldera took place at the site of the marsh than in the Kapaa drainage.



GEOLOGIC MAP
OF PROJECT AREA

Scale: 1"= 2000'

FIGURE 13

EXPLANATION OF GEOLOGIC NOTATIONS SHOWN ON FIGURE 13
(USGS Geologic Map of Oahu)

Qa	Consolidated deposits. Chiefly older alluvium, generally consisting of mottled brown to red-brown, deeply weathered, poorly assorted, and nearly impermeable friable conglomerates, in places cemented with limonite or hematite and usually forming conspicuous terraces along the principal streams.
Qhb	Honolulu volcanic series. Dense and vesicular jointed aa and pahoehoe flows of olivine, nephelite, and nephelite-melilite basalt, from about 10 to 300 feet thick, generally flooring valleys in the Koolau Range and poured out of numerous vents.
Qhp	Honolulu volcanic series. Fire fountain deposits of friable red to black bedded cinders, spatter, pumice, and bombs, coarse, thick, and forming cones near the vents but thin and finer-grained elsewhere; they are permeable but too local to carry water except in a few places as in Nuuanu Valley.
Qls	Consolidated calcareous marine sediments. Chiefly emerged coral reefs but in places, especially near Pearl Harbor, finely laminated lagoon limestone. Extremely permeable because of primary and secondary cavities and yields water copiously, but the water is apt to be brackish.
Ra	Unconsolidated noncalcareous deposits. Chiefly younger alluvium, a black to brown fluviatile deposit generally consisting of coarse permeable detritus only slightly weathered and in many places subangular.
Rf	Artificial fill composed of marine deposits. Brown to white permeable marine mud containing shells, coral, and other calcareous marine organisms dredged from the ocean floor and used to fill up salt marshes and other low lands.
Rs	Unconsolidated marine calcareous sediments. Chiefly cream-colored and light-tan, very permeable beach sand consisting of grains of worn coral, coralline algae, and shells with appreciable amounts of formaminifers and other calcareous marine organisms.
Tkbr	Firmly cemented, usually structureless impermeable gray throat breccia containing angular intrusive and extrusive basalt fragments as much as about 6 feet in diameter filling ancient craters.
Tkdc	Koolau volcanic series. A denuded rift zone consisting of gray to black, usually almost vertical, single and multiple basalt dikes a few inches to 15 feet thick, usually micro-crystalline, a few with olivine phenocrysts, chiefly cross-jointed, some platy and vesicular, intruded into Koolau and Kailua amygdaloidal lava beds and filling the fissures through which the Koolau basalt flows issued.

Because of its depressed topography, Kawainui eventually became a sediment trap for streams draining the caldera and contiguous terrain. Originally the site of the existing marsh was part of the sea coast, but during the rise of sea level to the Waimanalo Stand, 25 feet above the present level, and its subsequent withdrawal, a large barrier beach, on which much of the community of Kailua is now built, was constructed so that Kawainui became isolated. Drainage entered Kawainui rather than the open sea, and the sediment load of the streams accumulated to create the marsh. Into an area of about 1.6 square miles, runoff and sediment flowed from an area of about 11 square miles. Of this total drainage area, Kapaa accounts for less than 1 square mile.

The chief sources of drainage to Kawainui are Maunawili and Kahanaiki streams. Secondary sources are hill sides bordering the marsh and Kapaa Stream. Under natural conditions, about 100 feet of terrestrial sediments, predominantly fine grain material such as clay, accumulated in the marsh. Urbanization in the drainage of Maunawili and on the hill sides of Pohakupu probably increased the sediment load. Uncontrolled runoff from the sanitary landfill and the quarry operations could also occasionally contribute sediments. Discrimination among the components of the sediment load reaching the marsh -- natural, urban and industrial -- would be very difficult, but the natural component continues to be the dominant one.

CLIMATE

Average annual rainfall in the Kapaa drainage varies from about 50 inches at the margin of Kawainui Marsh to 68 inches at the divide above Kamooalii Stream. The weighted average for the basin is on the order of 60 inches per year. Trade wind orographic showers and winter cyclonic storms yield most of the rain, but the most intense showers originate with the storms and with local convective disturbances. Refer to Figure 14.

From historical records near Kapaa, probabilistic storm rainfalls and intensities have been computed by the U. S. Army Corps of Engineers and National Weather Service. Principal probable storm types and expectable 24 hour rainfall are shown in TABLE 3.

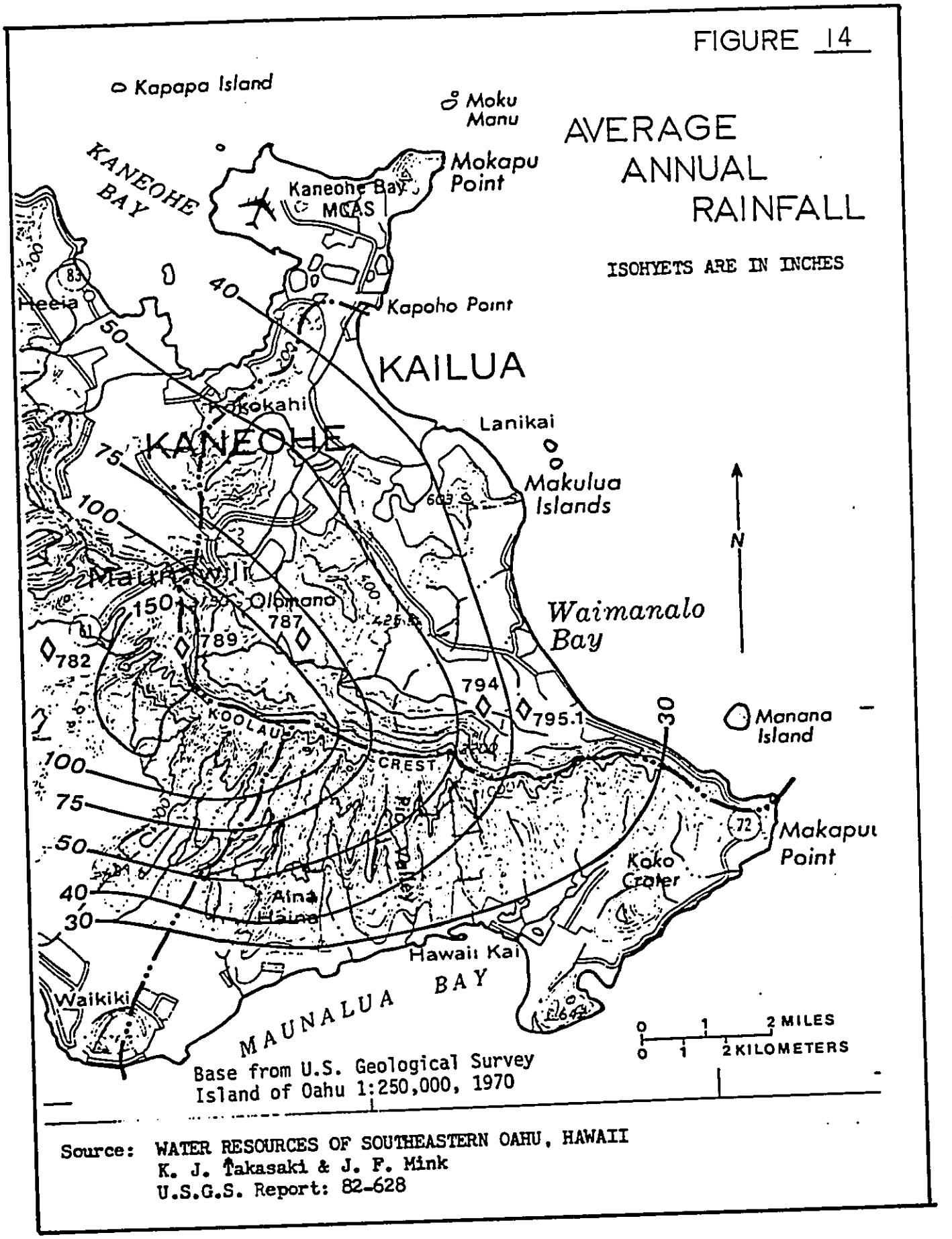
TABLE 3

STORM TYPES AND RAINFALL

Storm Type	24 Hour Rain (in.)	Explanation
100 year	15	National Weather Service. Probability of occurence once per 100 years.
Standard Project Storm	26	US Army Corps Engineers. Hypothetical storm with most severe flood rain.
Probable Maximum Storm	44	National Weather Service. Maximum rainfall that could conceivably occur. Probability very small.

Historically, the greatest single 24 hour rainfall near Kapaa has not exceeded 15 inches.

FIGURE 14



Source: WATER RESOURCES OF SOUTHEASTERN OAHU, HAWAII
K. J. Takasaki & J. F. Mink
U.S.G.S. Report: 82-628

The calculated potential rainfall intensities are severe. Wu, in his report, lists intensities for a 100 year return period as follows:

Time Interval	Inches	Time Interval	Inches
30 minutes	3.0	3 hours	6.5
1 hour	4.0	6 hours	9.0
2 hours	5.5	12 hours	12.0
		24 hours	15.0

These intensities suggest that sedimentation rates can be extremely high. Storms are responsible for virtually all of the sediment load that reaches Kawainui Marsh.

Rainfall amounts exceed evaporation and transpiration requirements, and therefore infiltration into the subsurface occurs. Although the rocks constitute inferior aquifers, groundwater does accumulate and move. However, most of the rainfall is disposed of by direct surface runoff and evapotranspiration.

The nearest temperature recording station is at the Kaneohe Ranch Office. The temperature at the project site will be about the same with the coolest month, January, averaging 63.8 degrees F. to 75.6 degrees F., and the warmest month, August averaging 69.8 degrees F. to 80.8 degrees F.

The tradewind pattern is generally from the east-northeast with an average speed of ten to fifteen miles per hour. Since the project area is in a U-shaped valley, the interior of the valley

is sheltered from winds other than the northeast trades.

HYDROLOGY

The Kapaa drainage upstream of the processing operation and the City and County sanitary landfill totals about 0.87 square miles of which the present quarry area accounts for 227 acres, the wire plant for 37 acres, the landfill for 76 acres, the proposed Phase II operation for 152 acres, and the H-3 highway corridor for 51 acres. An additional area of about 150 acres drains toward the mouth of Kapaa Stream or directly into Kawainui Marsh downstream of the plant.

Surface Runoff:

Kapaa is one of three streams that discharge directly into Kawainui Marsh. The others, Maunawili and Kahanaiki, are larger and drain a more diverse terrain. Flow records obtained and compiled by the U.S. Geological Survey exist for the larger streams, but Kapaa Stream evidently has not been measured.

Under natural conditions an average of 7.8 mgd (million gallons per day) flowed into Kawainui from Maunawili and another 1.0 mgd from Kahanaiki. Of the natural flow of Maunawili, 2 mgd is diverted to Waimanalo by an irrigation ditch, leaving the average input from both streams as 6.8 mgd. This water eventually passes through the Marsh to the canals which connect it with the sea, but most of the sediment remains behind to accumulate in the Kawainui depression. Hillside runoff outside the three streams adds an additional average in excess of 1 mgd.

Maunawili and Kahaniki are perennial streams because they collect high level water from the dike complex outside the caldera area, but Kapaa apparently flows only during rainy weather. Its channel and banks are moist for long periods because of small seepages of perched water. Without a flow record, the natural drainage of Kapaa to the Marsh can only be roughly estimated. Although both Maunawili and Kahanaiki drain more varied terrains encompassing a greater spread of rainfall (up to 150 inches per year at the headwaters of Maunawili), because of their proximity to and geological analogy with Kapaa, they will be used to establish average flows in the smaller basin.

The expected average natural runoff values in Kapaa in the sector extending from the processing area upstream to the headwaters, and separately for the area below the plant are as follows:

Sector		Approx. Area	Average Flow
Upstream of plant and sanitary landfill.		447 acres	0.7 mgd
Plant and sanitary landfill.		113 "	0.2 "
	Total:	560 acres	0.9 mgd
Below plant.		150 acres	0.3 mgd

Of the total average of 0.9 mgd from the working areas, the 152 acres of the proposed Phase II quarry contribute about 0.25 mgd, only 1 to 2 percent of the total drainage to Kawainui.

Runoff, however, takes place sporadically, not as a continuous average. Probabilistic flood peaks have not been computed for

either Maunawili or Kahanaiki, but they are given for Kamooalii Stream, which shares a common drainage divide with Kapaa. Because flood peaks are caused by area wide storms, the record of Kamooalii can be adapted to Kapaa.

Recurrence intervals for instantaneous flood peaks at the Kamooalii gage in units of mgd/acre are listed below:

Recurrence Interval	Instantaneous Peak
1 year	0.13 mgd/acre
2 years	0.65 "
5 "	1.29 "
10 "	1.94 "
25 "	2.84 "
50 "	3.75 "
100 "	4.72 "

The maximum peak recorded at Kamooalii has been 1.53 mgd/acre. The above unit values are appropriate for Kapaa. Although the theoretical runoff from Kapaa is substantial during storms, it amounts to less than 10 percent of total storm drainage into Kawainui.

Sedimentation:

The natural sediment load deposited in Kawainui Marsh has not been measured, but it probably is on the order of 10,000 tons per year, an estimate based on the U.S. Geological Survey record for Kamooalii, the only stream in the region to have been monitored. A sedimentation-duration curve calculated by the the U.S.G.S.

gives an annual average of 964 tons per square mile, or 1.51 tons per acre. This is similar to the calculated loads for southern Oahu streams having a mixed drainage predominantly of agriculture and forest reserve. For instance, Waikele Stream discharges about 700 tons sediment per square mile per year, Waiawa aabout 880 tons, and Waimalu about 630 tons. On the other hand, it is more than twice the sediment yield from Kipapa Stream (350 tons per square mile per year) at a measuring station that drains only forest reserve.

Assuming the Kamooaliii sedimentation rate is applicable to all drainage leading to Kawainui, the normal contribution of Kapaa Stream would be 846 tons/year, about 3.5 percent of the total load reaching the marsh. Uncontrolled sedimentation from quarrying and other industrial activities would undoubtedly exceed this rate, but runoff draining the mining area and the plant site is directed to sedimentation ponds where particulate matter settles before the effluent passes into the drainage channel or evaporates away. Process water from the industrial plant is also directed to sedimentation ponds. Figure 15 is a diagram tracing the disposition of overland runoff in the Kapaa drainage basin. The Phase II quarrying operations will be included in a similar runoff-sediment capture scheme.

GROUNDWATER

Groundwater resources in Kapaa are negligible and could not be feasibly exploited. Local aquifers consist of poorly permeable

- KAPAA VALLEY -
DRAINAGE DIAGRAM

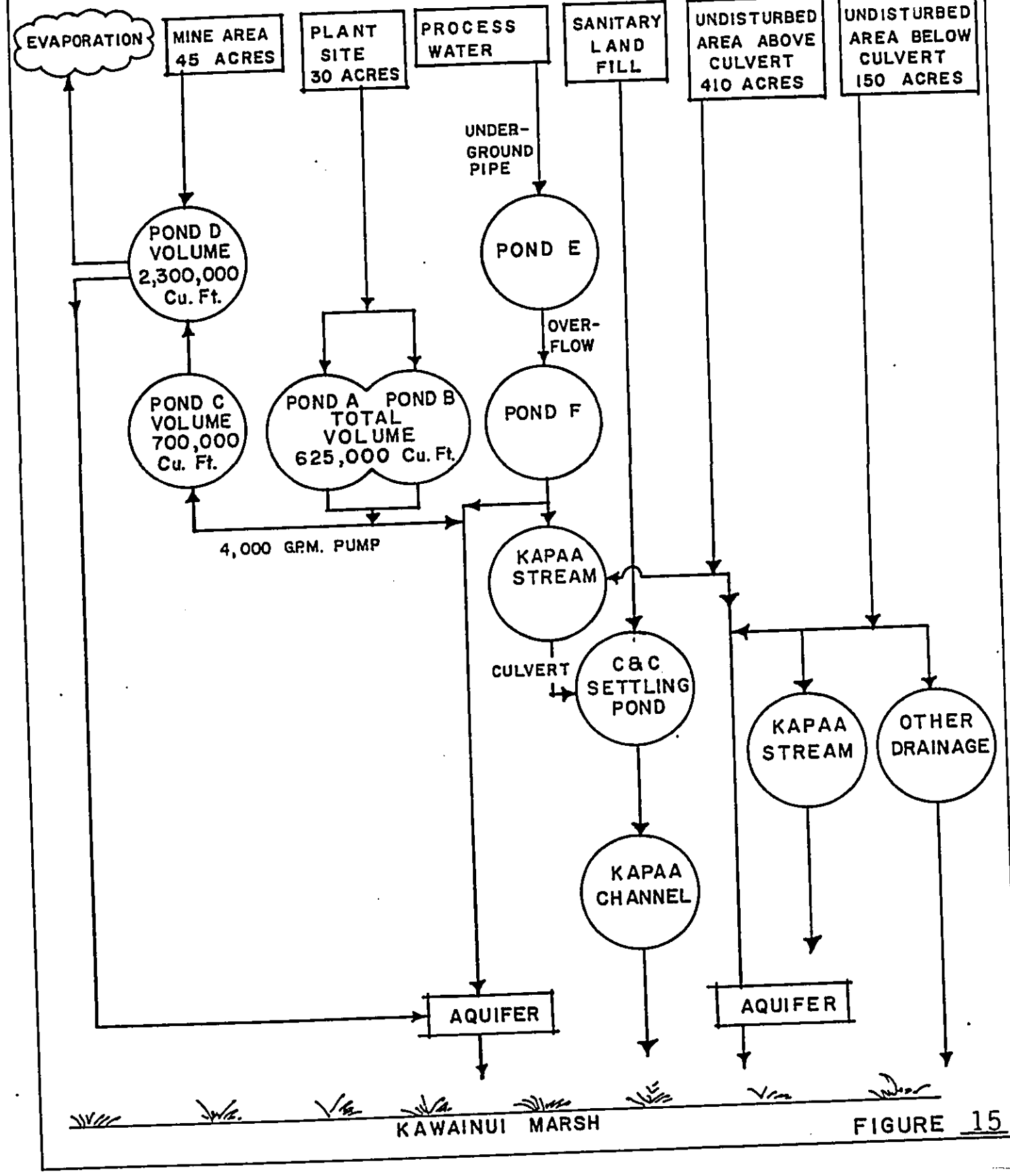


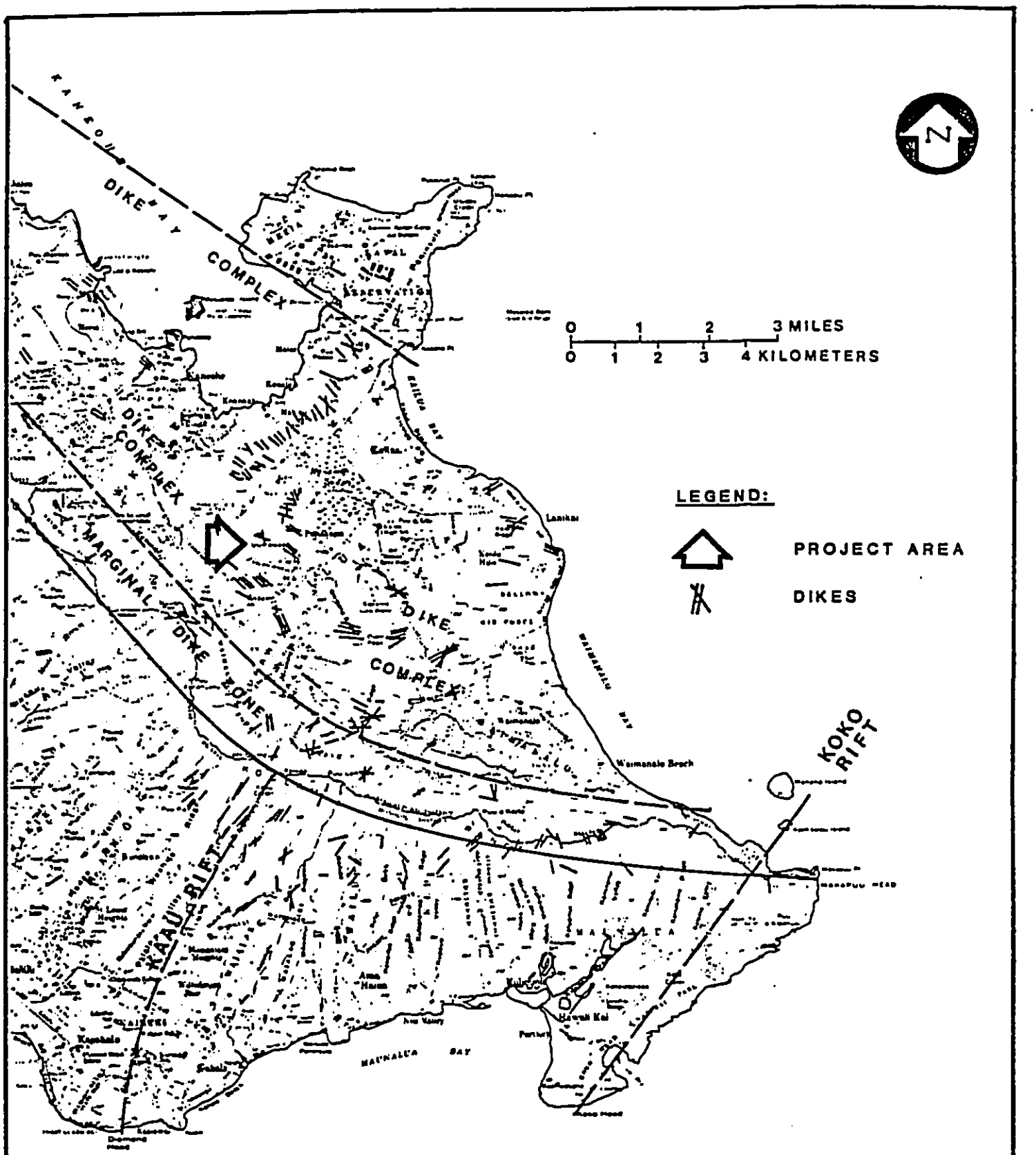
FIGURE 15

caldera basalts intruded by even less permeable dikes. A continuous water table does not exist, and subsurface flow is small and sporadic. Seepage moves to Kawainui as spillover in buried dike compartments. Total groundwater flux is considerably less than surface runoff. The geological environment is among the poorest in all of Hawaii for the accumulation and movement of groundwater. Figure 16 shows the dike system.

Three wells have been drilled in Kapaa, all of them in the relatively level area where the stream meets Kawainui. The first well (State No.2446-01) was drilled in 1892, probably for irrigation, but no record except for its location exists. Two more (State Nos. 2446-02 and 2446-03) were drilled in 1944, also for agriculture, but neither were successful. Pumping yield was less than 10 gpm in each. None of the wells remain. Essential information concerning them is as follows:

Well No.	Year Drilled	Ground Elev.(ft)	Depth (ft)	Initial Head (ft.)	Chloride (mg/l)	Yield (gpm)
2446-01	1892					
2446-02	1944	29	108	18.5	50	10
2446-03	1944	47	184	25.6	46	9

Groundwater is not a developable resource in Kapaa. Subsurface infiltration that does occur eventually works its way to Kawainui Marsh, just as it always has. Unless grossly polluted, the seepage into the marsh is innocuous.



Base from U.S. Geological Survey
Island of Oahu 1:62,500, 1954.

FIGURE 16
DIKES IN THE SOUTHERN PART OF OAHU

(Modified from Takasaki and Mink, 1981)

B. ARCHAEOLOGCIAL CHARACTERISTICS

In 1979, an archaelogical survey was conducted by the Department of Anthropology of the Bishop Museum. The findings of this survey is shown in the report attached as Appendix 4.

This reconnaissance survey was to determine the presence or absence of archaeological and/or historical sites and if measures were necessary to mitigate adverse impacts since extensive archaeological/historical features had been found within the close proximity to Kawainui Marsh in other surveys, Further, the existence of Pahukini Heiau on the lower end of Ulumawao Ridge (within the Kapaa Sanitary Landfill site) showed the importance of investigating the surrounding area for historical remains. *Pahukini Heiau is on* the State and National Register of Historical Places.

The archaeological survey disclosed only one site of possible prehistoric activity within the proposed Phase II site. This was made up of a complex of features: level area, stone terrace facing, and a cobble-paved area. This complex was designated as Site 50-Oa-G6-31. A second archaelogical survey to determine significance of the complex was authorized. See Appendix 4.

This second investigation was also carried out by the Bishop Museum staff. Test excavations were made and the subsurface findings analyzed. The significance of archaeological sites is based upon potential for further research or interpretive display. Site

50-0a-G6-31 is void of interpretive potential on the basis of the common feature types represented and their location in an area that is difficult to reach. The potential for further research is obviated by the lack of a subsurface cultural deposit. The recommendation of the archaeologists was: "Site 50-0a-G6-31, is now completely mapped, has yielded all the data that it is likely to yield with presently available archaeological techniques. Phase I mapping and test excavations have thus mitigated the adverse effects of proposed quarry construction on the research potential of the site. Accordingly, no further archaeological work at Site 50-0a-G6-31 is necessary. The site is not eligible for inclusion on the State or National Registers of Historic Places."

C. BIOLOGICAL CHARACTERISTICS

FLORA:

A botanical survey of the project site was conducted by the Department of Botany, Bernice P. Bishop Museum, during March 7-10, 1979. This report appears as Appendix 3. The following information is excerpted from the survey report and other sources.

Since there are no distinct major vegetation communities, the survey team divided the area into four broadly defined habitats. These are the cutover slopes, open grasslands, stunted ridgetop forest, and valley floors. Much of the original vegetation was removed from the valley floor and some ridges during the quarry development and its related activities, and during the construction of the H-3 highway. These activities have also accelerated the colonization of the area with exotic weed and shrub species.

Vegetation in the project area consists predominantly of exotic species co-mingled with occasional remnants of indigenous or endemic species. Dominant woody exotic species, present throughout the area, include guava, java plum, Christmas berry, koa haole, and monkeypod. These species are widespread throughout the Hawaiian Islands and are generally associated with ecologically disturbed habitats. The understory and open areas consist predominantly of exotic species which includes buffel grass, molasses grass, sour grass, brooms sedge, Spanish needle, Asiatic pennywort, maile pilau, vervain, morning glory, burbush, lantana and others.

Remnants of endemic and indigenous flora found sparsely in the area include 'ohi'a-lehua, 'ulei, pukiawe, 'akia, and wiliwili. These species are widespread throughout the Hawaiian Islands though not always associated with disturbed habitats. They frequently persist as isolated remnants once endemic flora has been altered.The botanical survey indicated that no rare or endangered plant species are located within the project site. Future development of the project site will have minimal detrimental effect on the native flora, as they are already largely absent from the area and all the exposed areas within the valley and ridgetops are being aggressively invaded by exotic weeds, grasses and shrubs.

Modifying the denuded valley to pastoral use by landfill with soil and planted to grass, and tree and shrub planting on the

slopes for erosion protection will regain some of the naturalness of the valley and provide another productive use of the land, to wit, grazing.

FAUNA

The most complete bird survey of the Kawainui Marsh and surrounding areas were made by Dr. Robert J. Shallengberger in 1977 for the U.S. Army Engineers and by Dr. Sheila Conant and her study team in 1981 for the Hawaii State Department of Planning and Economic Development. The findings of biological field reconnaissances conducted in the project area in September 1983 were in agreement with the findings of the above studies.

Endangered Native Birds:

Four native bird species classified as "Endangered" by the U.S. Fish and Wildlife Service occur in the wet lands of Kawainui Marsh. These are all present as breeding populations. These are the Hawaiian Duck or Koloa (Anas wyvilliana), Hawaiian Gallinule or 'Alae 'Ula (Gallinula chloropus sandvicensis), Hawaiian Coot or Alae Ke'oke'o (Fulica americana alai) and the Hawaiian Stilt or A'eo (Himantopus himantopus knudseni).

The Hawaiian Duck or Koloa (Anas wyvilliana):

The Koloa is an endemic water fowl which was once common on all the main islands of the Hawaiian chain but by the 1940's was found only on Kauai and Oahu.

George Munro reports (1944) finding in 1941, five nests of

this endemic duck on one of the twin islands of Mokulua off Lanikai. The nests were hidden in the grass so more were likely present but not found. Her states that Koloa were observed in Kawainui at this time and he believed the birds that nested at Mokulua Islands brought their young to the marsh at Kawainui. He summarized that the birds nested on these offshore islands because no mongoose or cats were present.

It is not known whether the Koloa survived on Oahu through the 1950's and 1960's, but if they did, in all probability, any remnant population that remained lived in Kawainui Marsh. Kawainui, the largest freshwater marsh in Hawaii, would have provided the Koloa with the most suitable and sizeable habitat on Oahu.

In 1969, a program was begun to reestablish (or increase a dangerously low population) of this endemic duck on Oahu. Beginning in 1969 and continuing through 1979, the State of Hawaii's Division of Fish and Game (now the Division of Forestry and Wildlife) released a total of 201 Koloa in Kawainui Marsh. These birds were raised at the Division's Endangered Species Project at Pohakuloa, Hawaii, from birds originally obtained on Kauai.

Since these successful releases, Koloa and their young have been observed in the marsh. But observation of these birds

is difficult because they often remain hidden in rushes and grasses.

The Hawaiian Gallinule or 'Alae 'Ula (Gallinula chloropus sandvicensis:

'Alae 'ula were once found on all major islands but now occur only on Oahu and Kauai, and in very small numbers on Molokai. 'Alae 'ula are birds that avoid open water and prefer areas of rushes and other vegetation on the borders of freshwater marshes, ponds, streams and taro patches. This concealing habitat, plus the birds' secretive nature, makes finding and censusing them very difficult.

Kawainui Marsh is an important habitat of the 'Alae 'ula, and observers have found their nests in the cattails and bulrushes there.

The Hawaiian Coot or 'Alae ke'oke'o (Fulica americana alai):

The 'Alae ke'oke'o survives on all the main Hawaiian Islands. they prefer more open water than the 'Alae 'ula and build a large bulky floating nest of aquatic vegetation. Thus, observing them, even in a large area like Kawainui Marsh, is more easily accomplished. As many as 75 coots have been counted by State biologists on this marsh and it is likely more were present but not observed.

The Hawaiian Stilt or Ae'o (Himantopus himantopus knudseni):

The Ae'o occurs on all the major islands and also on Niihau,

but are found chiefly on Oahu and Maui. The Ae'o may be seen in parts of Kawainui Marsh and recent reports of pairs nesting there have been made. However, this is not their preferred habitat on Oahu. They are most common in the brackish ponds of Pearl Harbor and Kaneohe.

Non-Endangered Birds, Native:

Black-Crowned Night Heron or 'Auku'u (Nycticorax nycticorax hoactii):

These birds are found on all the main islands. The 'Auku'u is a conspicuous resident of the Kawainui Marsh area. They feed on fish, frogs, and other aquatic life and roost in the trees bordering the marsh. These sizeable heron are regular inhabitants of the marsh, but to date observers have not found them nesting in the vicinity, although they nest in colonies in trees elsewhere on Oahu. The highest total count for the marsh area was 65 birds, recorded by State biologists in 1973.

Great Frigate Bird or 'Iwa (Fregata minor):

This spectacular seabird roosts in great numbers on the Island of Moku Manu off Kaneohe Bay. It is a regular flying visitor to the marsh area and many often soar overhead. On numerous occasions they have been seen skimming the open marsh to drink the fresh water.

Migratory Water Fowl:

During the winter and early spring months, many migrant water

fowl visit Kawainui Marsh during their stay in Hawaii. The great majority of these birds spend the rest of the year on the North American mainland where they nest and rear their young. The most abundant migrant water fowl at the marsh, as elsewhere in the islands, are pintail and shoveler ducks. A number of less common migratory ducks and geese have been identified and these are shown in Table 4, Fauna List.

Migratory Shorebirds:

The most common species of shorebirds that migrate to Hawaii to spend the winter months are the Golden Plover or Kolea, Ruddy Turnstone, and Wandering Tattler. As do the migrant water fowl, these birds fly to the North American mainland to nest and rear their chicks. They and their young then return to Hawaii in the fall. These three kinds of shorebirds prefer pastures and shorelines and have all been recorded in the Kawainui Marsh area.

Non-Endangered Birds, Introduced:

Many species of birds have been introduced into the Hawaiian Islands. A number of these non-native kinds of birds are present in the Kawainui Marsh borders and surrounding areas. All of the introduced bird species found in the project area are present elsewhere on Oahu.

The most conspicuous of the introduced birds is the cattle egret (Bubulcus ibis). Most kinds of egrets eat in or near water, but cattle egrets feed primarily in pastures and other

open areas. These attractive white birds were introduced into all the major islands beginning in 1959 by the State of Hawaii to aid in controlling the large numbers of flies on cattle. They have accomplished this goal and biologists have observed that each bird may consume large numbers of flies from the bodies of cattle and horses daily. They also eat quantities of grasshoppers, roaches and other noxious insects. Cattle egrets are regularly seen in the vicinity of the project area because of the nearby City and County Kapaa Sanitary Landfill. These birds follow the trucks as they dump trash and consume great quantities of the flies attracted by this activity.

Other introduced birds that may be found, at least occasionally, in the project area are listed in Table 4, Fauna List.

TABLE 4

FAUNA LIST

NATIVE HAWAIIAN BIRDS

Native Birds Classified as Endangered:

Common Name	Hawaiian Name	Scientific Name
Hawaiian Duck	Koloa	Anas wyvilliana
Hawaiian Gallinule	'Alae 'ula	Gallinula chloropus sandvicensis
Hawaiian Coot	'Alae ke'oke'o	Fulica americana alai
Hawaiian Stilt	Ae'o	Himantopus himantopus knudseni

Native Birds Not Classified as Endangered:

Black-Crowned Night Heron	'Auku'u	Nycticorax nycticorax hoactii
Great Frigate Bird	'Iwa	Fregata minor

Migratory Water Fowl:

Pintail Duck		Anas acuta
Shoveler Duck		Spatula clypeata
Lesser Scaup Duck		Aythya affinis
Mallard Duck (Probably domestic escapees)		Anas platyrhynchos
Canada Geese		Branta canadensis
Emperor Geese		Philacte canagica

Migratory Shore Birds:

American Golden Plover	Kolea	Pluvialis dominica fulva
Ruddy Turnstone	'Akekeke	Arenaria interpres
Wandering Tattler	'Ulili	Heteroscelus incanum

TABLE 4 (CONTINUED)

FAUNA LIST

INTRODUCED BIRDS

Common Name	Scientific Name
Spotted Dove	Streptopelia chinensis
Barred Dove	Geopelia striata
Feral Pigeon	Columba livia
House Sparrow	Passer domesticus
House Finch	Carpodacus mexicanus
Common Myna	Acridotheres tristis
Cattle Egret	Bubulcus ibis
Red Vented Bulbul	Pycnonotus cafer
Melodious Laughing Thrush (Chinese Thrush)	Garrulax canorus
Shama Thrush	Copsychus malabaricus
Japanese Bushwarbler	Cettla diphone
Japanese White-Eye	Zosterops japonicus
Spotted Munia (Ricebird)	Lonchura punctulata
Cardinal	Cardinalis cardinalis
Red-Crested Cardinal	Paroaria coronata
Red-Billed Leiothrix	Leiothrix lutea

MAMMALS

Mongoose	Herpestes auropunctatus
Rat	Rattus rattus
House Mouse	Mus musculus
Cat	Felis catus
Dog	Canis familiaris
Cattle	Bos taurus

D: SOCIO-ECONOMIC CHARACTERISTICS:

No person lives on the site. After working hours, the area is secured. Both Phase I and Phase II sites are quarry sites and does not contain any residence. As mentioned earlier under Section 1-D, the proposed project site is located away from the residential areas by the U-shaped ridge of the valley. The population of the surrounding and nearby communities that comprise the Kailua-Kaneohe urbanized area was 105,712 according to the 1980 census. The same number of employees will be retained to handle the Phase II quarry operations when the Phase I site rock has been depleted. The same quantity of equipment is expected to continue the Kapaa Quarry operations utilizing materials from the Phase II area.

The Ameron HC&D Kapaa Quarry fulfills about 50% of Oahu's concrete and base materials needs. The construction industry on Oahu is valued at over $800,000,000 annually. The basic materials furnished by the Kapaa Quarry is needed for high rise office and hotel buildings, roads, water reservoirs, highways, airports, residences - almost all aspects of major construction projects are dependent on quarry products, one way or another. The Phase II quarry site is required to continue production for Oahu's largest concrete supplier. The industry requirement will require a major realignment if the Phase II site becomes unavailable. The Ameron HC&D firm will be unable to continue business without the Phase II site resulting in a loss of jobs for all its employees. Should Ameron HC&D cease operations, the two remaining

rock quarry operators on Oahu (Lone Star and Pacific Concrete and Rock) would in all likelihood deplete their reserves within permitted areas before 20 years. Further, the competitive forces acting within the industry would be reduced.

E. INFRASTRUCTURE:

ROADS:

Access to Kapaa Quarry is from the Kapaa Quarry Road which can be entered from the Kailua direction off Kalanianaole Highway or from the Kaneohe direction off Mokapu boulevard. An underpass permits crossing the H-3 highway into the Kapaa quarry site.

The 1964 lease with the H. K. L. Castle Trust provides a non-exclusive easement for access to Kalanianaole Highway over the Kapaa Quarry Access Road. Another easement permits the quarry to connect to Mokapu Boulevard.

A final easement permits connection to Kamehameha Highway. This easement, running parallel to the H-3 highway, has not been established and no road has been constructed. These road easements are co-terminus with the quarry lease which expires in 2012.

The City and County also uses the Kapaa Quarry Access Road for entry to the Kapaa Landfill Site with permission from the Castle Trust. A portion of the Kapaa Quarry roadway crosses the City-owned Kapaa Landfill Site and is covered by an easement between the City and Ameron HC&D.

WATER SERVICE:

The Board of Water Supply's 36-inch transmission main along the Kapaa Quarry Access Road is tapped by 6-inch and 2-inch lines to serve the quarry. No change is contemplated with the opening up of the Phase II area.

TELEPHONE SERVICE:

The Kapaa Quarry office is served by Hawaiian Telephone Company. Two lines are available for communication purposes. No change is contemplated with this set-up when the Phase II operations begin.

ELECTRIC SERVICE:

Hawaiian Electric Company serves the Kapaa Quarry facility. Service is from the power lines which cross the quarry site. No change is anticipated as the service is adequate for the present and future needs of the quarry.

SANITARY WASTE DISPOSAL:

The City and County sewer system does not extend to the Kapaa Valley vicinity. Sanitary waste disposal is by a self-contained treatment unit in accordance with applicable Department of Health regulations.

SOLID WASTE DISPOSAL:

Solid waste is disposed of at the nearby City and County Kapaa Sanitary Landfill Site.

DRAINAGE:

The quarry site, Phase I, has been graded to minimize runoff from entering Kapaa Stream. This is to prevent dust or silt generated from quarry operations from directly entering the stream and discharging into Kawainui Marsh. Three silt basins serve as detention ponds to minimize pollution of Kawainui Marsh. The existing drainage plan is shown in Figure 18. The plan is in compliance with NPDES regulations administered by the Department of Health.

The project site is located in Zone D, an area of undetermined but possible flood hazards, according to the Flood Insurance Rate Map (FIRM) for Oahu prepared by the Federal Insurance Administration. The map is dated September 3, 1980.

FIRE PROTECTION:

The nearest fire station is the Aikahi Fire Station, 2.2 miles away, with supportive services from the Kailua Fire Station, (4.0 miles distant) and the Kaneohe Fire Station (4.5 miles distant). A new City and County fire station is proposed for construction adjacent to Maunawili Elementary School (3.0 miles distant) in the future.

POLICE:

Being centrally located in the Kailua-Kaneohe urbanized area, the project site can be served by either the Kaneohe or Kailua police facility. However, the quarry area is normally covered by the Kailua Police Station personnel.

MEDICAL:

The City and County maintains ambulatory service at the Police-Fire Station Complex in Kailua Town. The distance is about 4 miles. The privately operated Castle Medical Center is located outside the valley at the entry to Kailua Town at the junction of Kamehameha and Kalanianaole highways, 3.5 miles away.

SECTION 3

THE RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE PLANS, POLICIES AND CONTROLS FOR THE AFFECTED AREA

While quarrying is an appropriative use of a natural resource, it provides an essential service to the entire community. The quarry products are used in one form or another for home construction, road building, high rise structures, public works improvements, reservoirs, airports and other such projects. Without quarry materials for concrete, tile blocks, bricks, man-sand and base materials, the economic well being of the County and State would be adversely affected.

Construction is an indicator of our economy. When construction is high, it suggests that elements of the State economy are moving ahead in areas such as: transportation - new and better roads, airports and harbor facilities; visitor industry - accommodations for tourists; housing - apartments and homes for local residents; business - new office buildings; and jobs - construction represents a billion dollar industry State-wide, providing 18,000 jobs of which 13,600 are on Oahu.

The Hawaii State Plan in its overall theme, goals, objectives and policies, lists in its finding and purposes: to provide for wise use of Hawaii's resources. Under its objectives and policies for the economy, the Plan states:

> "Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawaii's people.

A growing and diversified economic base that is not overly dependent on a few industries.

Planning for the State's economy with regard to federal expenditures shall be directed towards achievement of the objective of a stable federal investment base as an integral component of Hawaii's economy."

To achieve the general objectives, some of the policies include:

"Strive to achieve a sustained level of construction activity responsive and consistent with State growth objectives.

Encourage labor intensive activities that are economically satisfying.

Promote economic activities, especially those which benefit areas with substantial unemployment problems.

Encourage businesses that have favorable multiplier effects within Hawaii's economy."

Since the proposed Phase II project is located within the "Conservation District", it comes under the Department of Land and Natural Resources regulations: Sub-Title 1, Administration, Chapter 2, Conservation Districts. Said regulations covers the non-conforming aspect of the project by the provision in said regulations:

"Nonconforming use means:

(1) The lawful use of any building, premises or land for any trade, industry, residence or other purposes which is the same as and no greater than that established prior to October 1, 1964, or prior to the inclusion of the building, premises, or land within the conservation district; or "

Further, since quarrying is not a permitted use in any subzone, it becomes a "Conditional Use" which means a use, other than a permitted use, including subdivision, which may be allowed by the Board under certain conditions as set forth in said chapter and as determined by the Board.

The proposed Phase II project site is partly in the "G" and "L" subzones. The "G" or "General" subzone objective is to designate open space where specific conservation uses may not be defined, but where urban use would be premature. The "L" or "Limited" subzone objective is to limit uses where natural conditions suggest constraints on human activities, and incorporate land with a general slope of 40% or more.

In the Technical Reference Document relating to the Functional Plan for "State Conservation Lands Plan," a discussion of mineral resources makes reference to the need of quarry materials for industrial use. The Functional Plan has been approved as guidelines for State actions.

The project site is located within the boundary of the secondary planning area of the Kawainui Marsh Resource Management Plan. As such, particular attention has been given to developing mitigating measures relating to maintaining the water quality of the marsh and the protection of native birds that frequent the marsh lands. Refer to Figure 17.

As mentioned earlier, the City and County has designated the proposed Phase II project site as "Preservation" in its Comprehensive Zoning Code. Under the conditional uses and structures that may be allowed within the "P" or "Preservation" zone is listed: "Extractive industries, including the removal of sand, rock, soil and gravel." This is further defined under Article 2-D, Section 21-2.37 of the Comprehensive Zoning Code.

With regards to the ALISH program of the Department of Agriculture for classifying agricultural lands, the project site is not designated important, unique or other lands of importance. It is in the unclassified category.

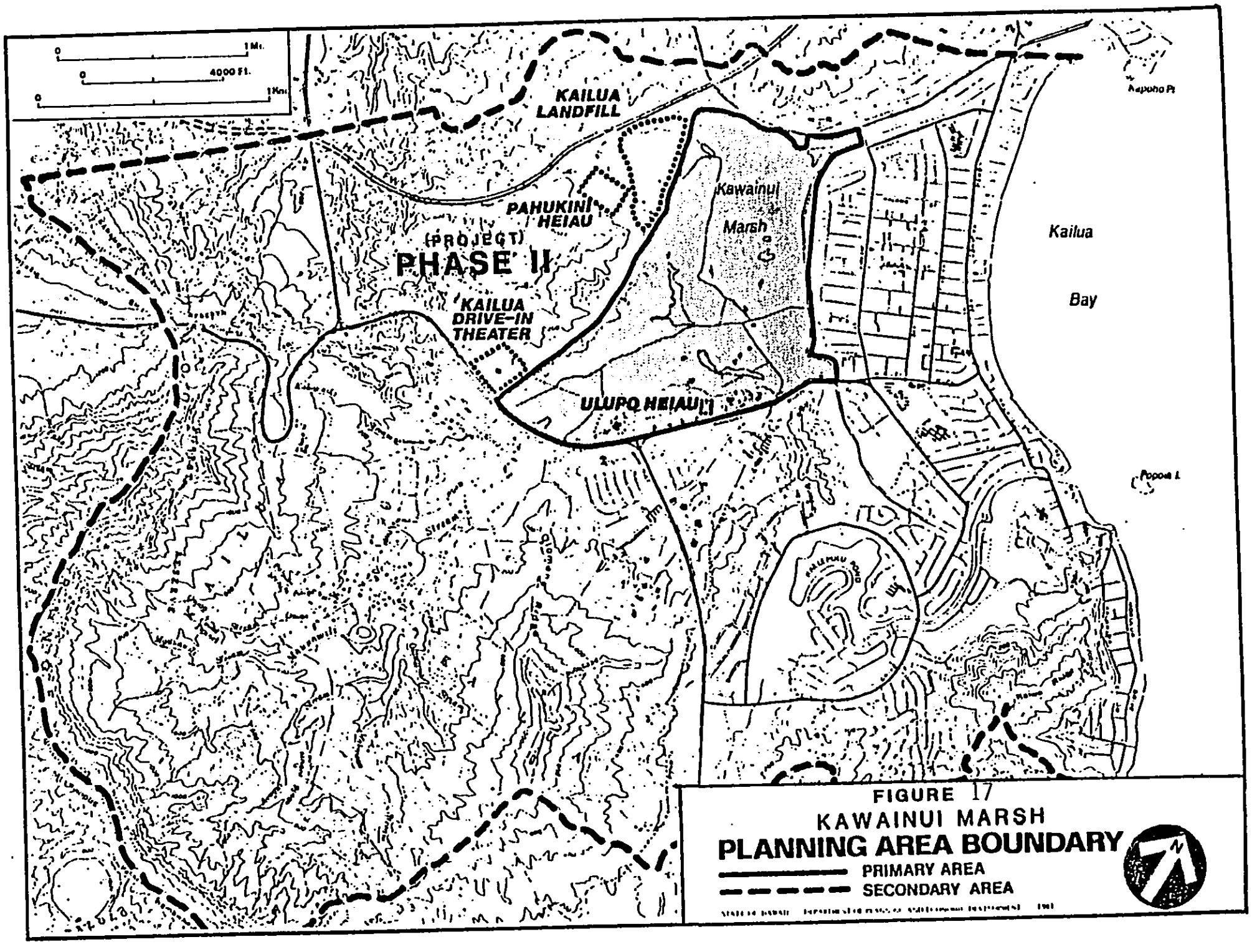


FIGURE 17

KAWAINUI MARSH

PLANNING AREA BOUNDARY

PRIMARY AREA

SECONDARY AREA

SECTION 4

PROBABLE ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. NOISE

The impacts caused by noise can be attributed to three sources. The first source of noise is generated by mobile construction equipment. Dump trucks, mobile equipment (dozers, power shovels, graders, water tank trucks, etc.) and batch concrete mix trucks are sources of noise impact. Table 5 lists noise sources and noise levels from construction equipment. Vehicular noise must conform to Title 11, Administrative Rules, Chapter 42, Vehicular Noise Control for Oahu.

Mitigation Measure: Since the quarry is in a rather isolated spot at a good distance from residential areas, the noise impact generated by trucks and other mobile construction equipment causes no discernible adverse impact to neighboring communities. The distance of the quarry to the nearest residences and the U-shaped ridge that surrounds the quarry attenuates the noise to acceptable levels. The trucks and batch mixers that daily enter and leave the quarry has been equipped with special mufflers. Out on the highway these vehicles do not generate any more noise that what is normally expected on public highways. Quarry mining activities are not carried out in the evening so mobile construction equipment noise impact is absent during evening hours.

Further, the quarrying and processing of quarry materials must comply with Title 11, Administrative Rules, Chapter 43, Community Noise Control for Oahu, inasmuch as the quarry processing plant is another source of noise impact. For the P-1 (Preserva-

TABLE 5

NOISE SOURCES, dBA

Source	Noise Level (Peak)	Distance From Source 50 Ft	100 Ft	200 Ft	400 Ft
Heavy Trucks	95	84-89	78-83	72-77	66-71
Pickup Trucks	92	72	66	60	54
Dump Trucks	108	88	82	76	70
Concrete Mixer	105	85	79	73	67
Jackhammer	108	88	82	76	70
Scraper	93	80-89	74-82	68-77	60-71
Dozer	107	87-102	81-96	75-90	69-84
Shovel	111	91	85	79	73
Loader	104	73-86	67-80	61-74	55-68
Grader	108	88-91	82-85	76-79	70-73
Caterpillar	103	88	82	76	70

(Environmental Impact Data Book: Golden, et al.)

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ion) district, the allowable noise levels at the property line are as follows:

Allowable noise Levels in dBA	
Daytime 7:00 a.m. - 10:00 p.m.	Nighttime 10:00 p.m. - 7:00 a.m.
55	45

Mitigation Measure: The conveyor belts, crushers, blenders, screening equipment, vibrating feeders, and other production machinery are for the most part housed and noise emanating from such sources are muffled to a great extent. Noise from this source is of less impact than from the mobile construction equip-

ment used to mine and quarry the rock materials.

The third source of noise is blasting operations. This topic is covered under VIBRATIONS.

B. VIBRATIONS (BLASTING EFFECTS)

Blasting operations cause noise and vibratory impacts due to the use of explosive materials. Blasting operations in the quarry are based on 6-1/2 inch diameter by 55 feet deep blast holes spaced normally on a 16 feet by 18 feet pattern. The maximum number of holes fired at any one time will not exceed 35 holes.

Mitigation Measure: A geological consultant has been retained to ascertain that proper blasting techniques are used with primary considerations given to safety and to maintain good community relations. Based on tests conducted by the U. S. Bureau of Mines and the geological consultant retained by Ameron HC&D, maximum levels for shock waves transmitted through the atmosphere (air vibration over-pressures) have been established. These levels are: particle velocity will not exceed 0.20 inches per second (10 percent of safe blasting limit as determined bvy the U. S. Bureau of Mines); and over-presssures at less than 120 decibels (the U. S. Bureau of Mines recommends a safe air wave over-pressure of 165 decibels). In actual practice, the experience at Kapaa Quarry has been 35 percent of the established particle velocity level and 70 percent of the established over-pressure decibel level.

In examining file documents regarding complaints on the Kapaa Quarry operations, only one formal complaint was on file. This was dated June 16, 1970. Working with State agencies, the blasting techniques were improved and no other complaint has been registered with government regulatory agencies. To ensure that the established levels are not exceeded, seismograph records are taken and analyzed by the geological consultant whenever primary blasts exceeds 15 holes.

A copy of the Ameron HC&D policy and procedure for blasting activity at Kapaa Quarry is attached as Appendix 5.

C. AIR QUALITY

The air quality of the project site is not expected to be changed. The project is within an area where national ambient air quality standards are being maintained.

Mitigation Measure: Dust control in the processing plant and in the open rock quarry area will continue. Constant wetting of the open area with truck-mounted sprinklers is a regular feature of quarrying operations. Within the processing plant, dust control is handled by baghouse dust collectors in 13 separate collectors. The baghouses are interconnected to the operating equipment they service and therefore, no equipment can operate without its attendant baghouse also in operation. Emissions from equipment exhaust meet industry control standards. The open character of the quarry also aids in preventing concentration of exhaust emissions. Before the crusher in Phase 2 can be built, the ne-

cessary State and Federal air pollution control permits must be obtained from the Department of Health. The permits required are: 1) to construct, and 2) to operate. The provisions of the Hawaiian Air Pollution control Regulations are applicable to this project.

D. TRAFFIC

Quarry traffic using the Kapaa Quarry Access averages 300 vehicles per day. These include batch concrete mix trucks and dump trucks that haul aggregates, gravel and sand. The Kapaa Quarry Access Road is also used by government and private vehicles that deposit refuse at the Kapaa Sanitary Landfill estimated at 400 vehicles on weekdays and 700 vehicles on weekends.

Mitigating Measure: The Kapaa Quarry Access Road is primarily an industrial use road. Since other public roads in the area can serve the general public use better, the road is used chiefly by vehicles going to and from the Kapaa Sanitary Landfill and the Kapaa Quarry; there is minimal traffic for other purposes. The present rate of traffic for the Kapaa Quarry Phase II project is not expected to add to the quarry traffic volume. The Phase II project merely supplants the Phase I quarry rock source which is expected to be depleted by 1988 and does not necessarily increase quarry traffic. According to the Environmental Impact Statement for the proposed Kalaheo Sanitary Landfill, traffic to the present Kapaa Landfill or its proposed replacement is not expected to be significantly altered as the landfill will continue to handle the refuse from the present general service area.

E. ARCHAEOLOCIAL FEATURES

Based on the archaeological survey of the area, only one site of probable historic importance was discovered.

Mitigating Measure: The test excavation recommended following the discovery of an archaeological site of importance was conducted by an archaeologist. The findings at the site numbered Site 50-0a-G6-31 was found to be void of interpretive potential on the basis of the common feature types represented and their location in an area that is difficult to reach. The potential for further research is obviated by the lack of a subsurface cultural deposit. Thus, the field mapping and test excavations have the mitigated the adverse effects of the proposed quarry construction on the research potential of the site.

Should, however, any archaeological remains be uncovered at any time during quarrying operations, the work will be stopped and the State Historic Preservation Officer (SHPO) notified. Work will resume upon clearance or direction from the SHPO.

F. GROUNDWATER

The Kapaa Quarry operations have not had any adverse impact upon upon groundwater nor likely to affect the groundwater.

Mitigating Measure: The quarry work is carried out to a bottom elevation of at least 250 feet above sea level and involves no activity touching the groundwater table. No chemicals are used that may infiltrate into the substrata basal water table.

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G. DRAINAGE

The Kapaa Quarry site is is not within any known flood plain. It lies with Zone D (FIRM), an area of undetermined, but possible, flood hazards. Experience at the project site since 1962 and earlier records of the owner indicate no flooding problems. The unidentified stream, commonly referred to as Kapaa Stream, collects site runoff and discharges outside the valley with little chance of buildup.

Mitigating Measure: Drainage control is accomplished in three ways. First, Kapaa Stream handles runoff from areas undisturbed by quarry operations. Second, spent process water (effluent from the slab washdowns, wetting aggregate on delivery trucks, batch plant water runoff, etc.) is diverted into a retention pond with overflow passing into a second pond. After satisfactory quality is achieved by sampling, the water is discharged into the natural drainage course. Third, the quarry floor and slopes are sloped to collect storm water in retention basins. Three containment basins have been constructed to hold the runoff from a 10-year storm with a rainfall rate of 12 inches in 24 hours. Two of the basins are slightly larger than an acre each and totals about 1,325,000 cubic feet of holding capacity. The third basin, 14.8 acres in size, is designed to contain a volume of 2,300,000 cubic feet. The total of the three ponds represents a retention capacity of 83 acre-foot. The Phase II area will similarly be designed for the retention of site runoff. See Figure 13.

Cleaning of the containment basins and retention ponds is done

about once a year. The cleaning process takes about 2 weeks. Approximately 5,000 cubic yards of material are removed which are then stockpiled. The retention capacity of the stormwater basins is 133,907 cubic yards, or over 27,000,000 gallons.

Figure 18, Stormwater Management Plan, is the current design scheme for the handling quarry effluent and runoff to prevent deterioration of the lower Kawainui Marsh waters. This plan is in compliance with the NPDES Permit No. HI-0020796 issued by the Department of Health. Prior to the issuance of the NPDES permit, an overtopping of the sedimentation pond occurred. Corrective measures have since been instituted to comply with the NPDES permit requirements. The same conditions of the present NPDES permit will apply to the Phase 2 project.

H. FLORA AND FAUNA

As a result of quarrying in the Phase II area, vegetation will be removed as a prelude to rock mining. The removal of vegetation will adversely affect the wildlife of the area that may inhabit the project site.

Mitigating Measure: The removal of vegetation does not warrant any special treatment as there are no species of special abundance or quality. At the termination of quarrying activity, the area will be revegetated providing replacement, though of different character.

As far as is known, there are no species of native land birds or animals present in the proposed project area. The alterations to

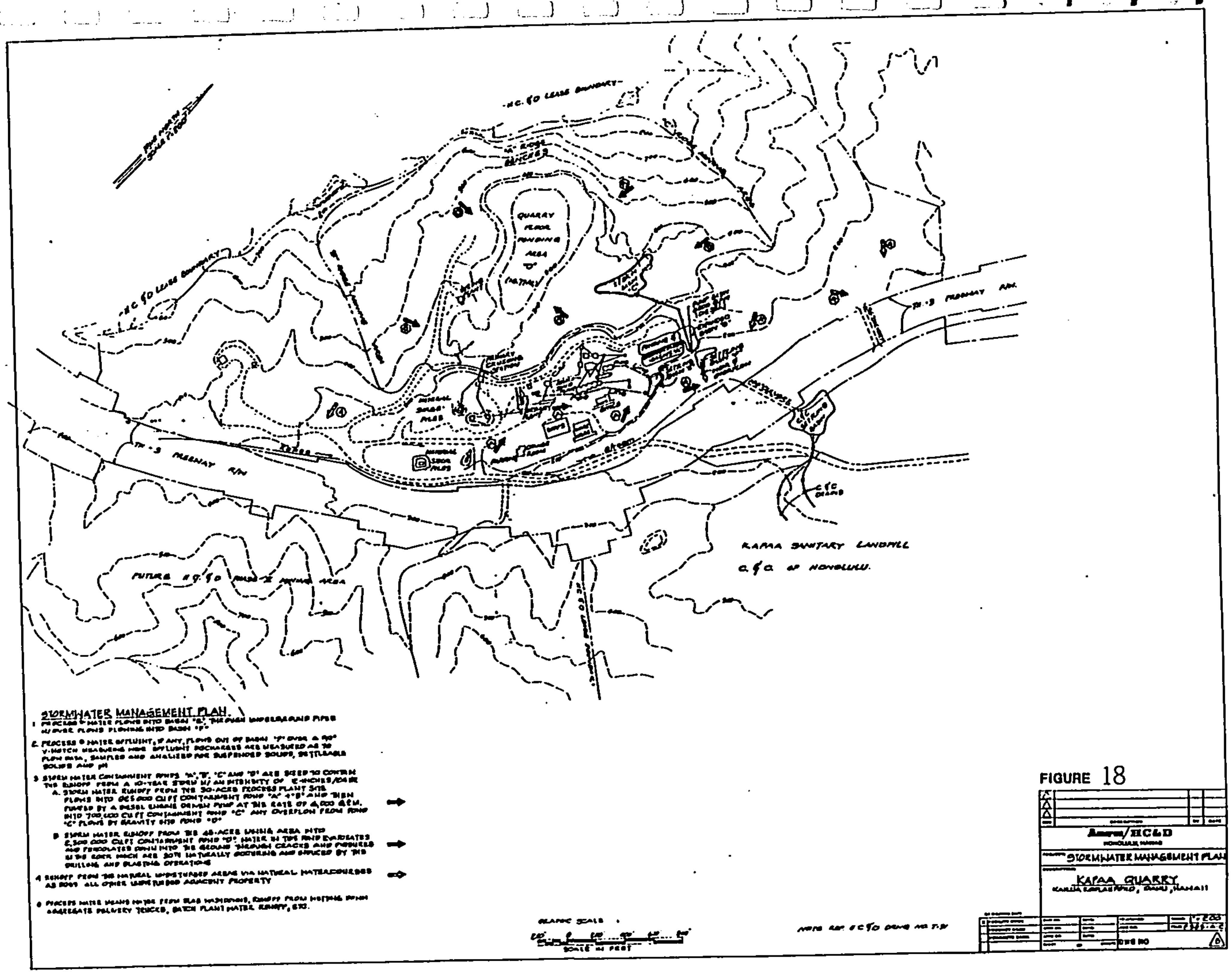
STORMWATER MANAGEMENT PLAN.
1 PROCESS WATER FLOWS INTO BASIN "E", THE FLOWS UNDERGROUND PIPES W/ OVER FLOWS FLOWING INTO BASIN "F"
2 PROCESS WATER EFFLUENT, IF ANY, FLOWS OUT OF BASIN "F" OVER A 90° V-NOTCH MEASURING WEIR. EFFLUENT DISCHARGES ARE MEASURED AS TO FLOW DATA, SAMPLED AND ANALYZED FOR SUSPENDED SOLIDS, SETTLEABLE SOLIDS AND pH
3 STORM WATER CONTAINMENT PONDS "A", "B", "C" AND "D" ARE SIZED TO CONTAIN THE RUNOFF FROM A 10-YEAR STORM W/ AN INTENSITY OF 6-INCHES/HOUR
A. STORM WATER RUNOFF FROM THE 30-ACRE PROCESS PLANT SITE FLOWS INTO 065,000 CU.FT CONTAINMENT PONDS "A" + "B" AND THEN PUMPED BY A DIESEL ENGINE DRIVEN PUMP AT THE RATE OF 4,000 GPM. INTO 700,000 CU.FT CONTAINMENT POND "C". ANY OVERFLOW FROM POND "C" FLOWS BY GRAVITY INTO POND "D"
B. STORM WATER RUNOFF FROM THE 48-ACRE MINING AREA INTO 2,500,000 CU.FT CONTAINMENT POND "D". WATER IN THE POND EVAPORATES AND PERCOLATES DOWN INTO THE GROUND THROUGH CRACKS AND FISSURES IN THE ROCK WHICH ARE BOTH NATURALLY OCCURRING AND INDUCED BY THE DRILLING AND BLASTING OPERATIONS
4 RUNOFF FROM THE NATURAL UNDISTURBED AREAS VIA NATURAL WATERCOURSES AS DOES ALL OTHER UNDISTURBED ADJACENT PROPERTY
5 PROCESS WATER MEANS WATER FROM SLAB WASHDOWNS, RUNOFF FROM WETTING DOWN AGGREGATE DELIVERY TRUCKS, BATCH PLANT WATER RUNOFF, ETC.
QUARRY FLOOR PONDING AREA "D" (NATURAL)
MINERAL AGGREGATE PILES
H.C.&D. LEASE BOUNDARY
TH-3 FREEWAY R/W
FUTURE H.C.&D. PHASE II MINING AREA
KAPAA SANITARY LANDFILL
C.&C. OF HONOLULU
GRAPHIC SCALE
SCALE IN FEET
Ameron/HC&D
HONOLULU, HAWAII
STORMWATER MANAGEMENT PLAN
KAPAA QUARRY
KANEOHE, OAHU, HAWAII

FIGURE 18

the area will eliminate wildlife from the site. Revegetation at the termination of quarrying activity will restore areas for eventual return of some wildlife. The four species of native birds classified as endangered, the Hawaiian duck, Hawaiian gallinule, Hawaiian coot and the Hawaiian stilt are all associated with water. They feed and nest along the shorelines of Kawainui Marsh on the other side of Ulumawao Ridge. Available evidence and observations indicate that the quarry activities, which have been ongoing in the valley since 1951, do not disturb or have any detrimental effects on these water birds. The closest boundary of the project area is approximately one-half mile from the nearest marsh shoreline. The two non-endangered native birds found in the marsh area, the black crowned night heron and the great frigate bird, as well as the migratory water fowl and migratory shorebirds should likewise not be disturbed by the proposed quarrying activity within the Phase II project area.

I. VISUAL

Quarrying is an appropriative use of a natural resource and as such there will be impact to the visual aspects of the proposed project site during and following mining operations. As noted earlier, the quarry site is exposed by the open end of the valley on the northeast and visible from the communities such as Kokokahi, Kailua and Kalaheo. The Phase I quarry face and plant structure are presently visible from the Nuuanu Pali Lookout. The H-3 highway section of Kapaa Valley is aligned directly with Nuuanu Pali Lookout and accentuates the disturbed areas. The

Phase II quarry face will not be visible from the Pali Lookout as is the case for the Phase I quarry.

Mitigating Measure: To minimize the adverse impacts caused by quarrying activity, there will be heavy reliance on the planting of trees, shrubs, vines and grasses. To date over $300,000 have been invested in the Phase I reforestation and beautification program. In the last two or so years, field research has been conducted to determine the types of large tree plantings that sustain growth on natural rainfall. These trees have been identified as the banyan, Indian rubber and native hau tree. In addition to shrubs and vines, these types of trees would be planted in the Phase II area. Under provisions of the Castle lease, Ameron HC&D is required to carry out a replanting program as described earlier in SECTION 1-D. Also, under the original CDUA: #OA-66/3/2/32, the following provision relates to landscaping requirements:

> "It is recommended further that the applicant (HC&D, Ltd.) landscape and restore all graded and excavated areas with the natural vegetation of the environment and that the office and shop areas be screened from the proposed H-3 alignment with planting of appropriate shrubs or trees in accordance with an approved landscape plan."

In Civil No. 30543, relating to the H-3 Interstate Highway, judicial decrees state:

> "(5) HC&D, Ltd., will bear the cost of lining the streambed in accordance with State and Federal highway standards required within the area of the the property leased by

Kapaa Trustees to HC&D, Ltd., commencing at Station 579+00 -- 144-inch culvert to drainage structure at Station 565+00, and necessitated by virtue of this condemnation action and the construction of the H-3 Inter-State Highway.

(6) The State will, at its own expense, screen the existing Kapaa Quarry office and shop areas from the H-3 alignment with planting of shrubs or trees as required by conditional use permit of HC&D, Ltd., granted by the Board of Land and Natural Resources on April 18, 1966."

As needed, a landscape consulting firm will be retained by Ameron HC&D to develop a landscape plan to supplement the State planting plan and to inspect the subsequent installation work. This plan, upon completion, will be submitted to the highway officials and the Department of Land and Natural Resources for approval. Controversy in the courts over the H-3 highway has delayed implementation of this effort to utilize professional landscape consultant services.

From the inception of the Kapaa Quarry Phase I project, advice on landscaping has been solicited from the affected community groups. At present, input from the Kailua Community Council, the Kailua Neighborhood Board, the Kailua Chamber of Commerce, the and the Lani-Kailua Outdoor Circle have been received. Continued consultation on landscaping of the quarry premises with these and other groups is an integral part of the replanting program and a vital part of the mitigation process.

A plant nursery has been started to accelerate the planting program. Initial and experimental plantings have been carried out since the mid-1970's. Over a quarter of a million dollars have been invested to date in the replanting program.

J. INFRASTRUCTURE

Those services such as: fire, police, telephone, water, etc. - are existing and will continue at the same level or volume.

Mitigating Measure: None required.

K. SOCIO-ECONOMIC

The number of employees at the Kapaa Quarry will not change significantly when the Phase II project begins inasmuch as the amount of quarry volume of work will remain at the same level. The sale of quarry materials is expected to remain at about the same level or volume, and except for predictable price increases which reflect cost of living and market fluctuation, the revenues derived from the sale of quarry products will continue to grow at a normal rate.

Mitigating Measure: None required.

SECTION 5

PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

Since quarrying is an appropriative use of natural resources of the land, there will be unavoidable change to the landscape. The proposed project will mine 56,000,000 tons of rock materials for use in the construction industry. Revegetation of the quarried areas will minimize the change of landscape form; however, the replanting program is a long term program and will only take place after quarrying operations have ceased in a particular area.

Noise from quarry activities and blasting effects are unavoidable but is expected to be within the guidelines or standards governing such impacts.

Air quality will be impacted, mostly from dust. While sprinkling and containment are mitigating measures, there will be times when a combination of dry weather and strong winds will result in some unavoidable fugitive dust escape.

The proposed project has been programed since exploratory surveys in 1962-64 proved the availability of the required resource. The movement from Moiliili to Kapaa Valley was a giant step forward in eliminating an adverse impact. The proximity of the Moiliili Quarry to Moiliili with its residences and shops and the growing needs of the University of Hawaii to expand were compelling reasons for the relocation from Moiliili to Kapaa Valley.

Further, Kapaa Valley was isolated from urban areas, the site was zoned agriculture by the City and County. For this reason, the entire valley was leased from the Castle Trust to provide for a long term (1964 to 2012 - a 48 year lease) following the initial move in 1949 to Kapaa Valley from Moiliili.

Relocation of the entire quarry operation to another site is not feasible since the extensive borings and geological and economic studies indicated that there are no other area having comparable characteristics as the Kapaa Valley site. The blue basalt to be mined is of Class "A" rating and of large quantity.

SECTION 6

ALTERNATIVES TO THE PROPOSED ACTION

No alternative site or sites were considered in the preparation of this Environmental Impact Statement inasmuch as the initial movement from Moiliili was based on studies conducted island-wide. The selection of Kapaa Valley as the Ameron HC&D quarry site was made after careful alternative site selection studies before 1949. Since the site was acquired by lease in 1964, quarrying activities in the interior of Kapaa Valley have been carried out and is expected to continue until the expiration of the lease in the year 2012. Any study of an alternative site for the present Kapaa Quarry would reach the same conclusion.

Expensive quarry processing equipment have been incrementally installed and the cost of relocating the facilities would be prohibitive. Since quarry operations must be continued, expensive equipment would have to be duplicated if forced to move to another site. Strong economic considerations preclude relocation to another site.

Constant improvements to quarrying operations have resulted in minimal adverse impact insofar as a quarry mining type of facility is concerned. Over the years, noise control, improved blasting techniques, dust suppression, traffic regulation, grading for drainage control, silt (sedimentation) basins and other like measures have been taken or built making the present operation least disruptive to neighboring communities.

The progress made by Ameron HC&D includes the manufacture of man-sand. This is sand manufactured from quarry rock as contrasted to the earlier use of coral beach sand. The result of this innovative process was instrumental in the enactment of State laws prohibiting the taking of beach sand for construction purposes. Ameron HC&D is the primary firm providing manufactured sand to the construction industry. While inland coral supplies have been crushed for use as sand, the basaltic manufactured sand is derived from the Kapaa Quarry source.

The selection of the present Kapaa Valley site for quarrying was based to a large extent on the project site topography which contributes the most to reducing adverse impacts by its relative isolation and its protective ridge line and hills besides being a source of excellent quarry material. It would be difficult to locate another quarry site with the advantageous features of the present site and its proximity to the area of highest use for quarry products.

SECTION 7

THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Quarry materials are an essential ingredient for the construction industry. Population growth results in demand for new homes. In an area where land is a premium, the trend is towards higher density uses through the erection of high rises. Population growth also leads to improved or new highways to accommodate today's mobile society. Economic growth means new office buildings and for Hawaii, new hotels for the tourist industry. These all require concrete products and base materials. Being an appropriative use of a natural resource, there will be significant environmental alteration from a visual standpoint. The land form will be changed. Revegetation can bring back some of the naturalness of the area, however, land form change is permanent.

A quarry can fulfill its mission as a source for construction materials and, while permanently altering the landscape, still be environmentally acceptable through the judicious use of practical and sound mitigating measures.

From the land owners' standpoint, the quarry use will result in a two fold benefit. During the quarrying period, revenues in the form of royalties will accrue to the owners. These revenues or royalties are much more than previously earned from grazing rentals. Upon completion of the quarry activity, the graded quarry floor will provide a better land form as contrasted to the ori-

ginal steep slopes of the valley. Whether or not it will return to agricultural or another use, the utility of the land will have been improved considerably. In the long term, the land owners will have a marginal land improved to a more productive form.

SECTION 3

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The proposed Phase II quarrying project will irretrievably result in the mining and exporting of Kapaa Valley rock materials for the construction industry. The removal of the side of the valley will permanenty alter the landscape. The quarrying activity will involve a non-renewable resource. During quarrying work, the land will be unavailable for agricultural use which is permitted at the present time. Agriculture may be revived upon the termination of the quarry lease.

From the public's standpoint, the visual change will be the most severe. However, the valley is inaccessible to the general public at this time. The valley is presently viewed from a distance and the changes of the land shapes are not readily apparent at this time. Nonetheless, when the H-3 highway is open, the public will travel between the Phase I and Phase II sites and will notice quarry activity. Landscaping of the H-3 roadsides will mitigate this; however, the tree planting program has not been started and being a long term project, landscape alteration will be easily noted by the public.

It will be several years before the visual effects of quarrying will have been minimized by a revegetation program.

SECTION 9

AN INDICATION OF WHAT OTHER INTERESTS AND CONSIDERATIONS OF GOVERNMENTAL POLICIES ARE THOUGHT TO OFFSET THE ADVERSE ENVIRONMENTAL EFFECTS OF THE PROPOSED ACTION

The supplying of quarry materials to the construction industry is required to meet growth demands. The State of Hawaii is active in supporting the economy and economic development. In a review of of the Hawaii State Plan, the State Department of Planning and Economic Development prepared a brochure which lists 51 policies supporting the economy and economic development. Throughout the Plan, the policies allude to growth, expansion of markets and building a sound economic base. Many of these policies are directly or indirectly involved with the construction industry. One of the policies state: "Strive to achieve a sustained level of construction activity responsive to, and consistent with, State growth objectives."

The construction industry requires basic raw materials such as rock. Land use regulations coupled with environmental concerns can provide for an acceptable procedure for the quarrying of basic raw materials such as basaltic rocks. As noted earlier, the City and County lists quarries as a conditional use in "Preservation" areas. This is similar in nature to the State "Conservation District" lands. Quarry uses are located in the "Conservation District" lands throughout the State for the most part. The protection and utilization of natural resources are a vital part of the State's conservation district regulations.

SECTION 10

LIST OF NECESSARY APPROVALS

Following is a list of the approvals required for the proposed Phase II project and the approving agencies:

1. Conservation District Use Permit - State Board of Land & Natural Resources.
2. NPDES Discharge Permit - State Department of Health.
   Air Pollution Control Permit - " " "
3. Grading, Excavation and Fill Permit - City and County Department of Public Works.
4. Certificate of Appropriateness - State Department of Planning and Economic Development.
5. Blasting Permit - O.S.H.A. Division, State Department of Labor and Industrial Relations.

SECTION 11

ORGANIZATIONS AND PERSONS CONSULTED
KAPAA QUARRY - PHASE 2 ENVIRONMENTAL IMPACT STATEMENT

DISTRIBUTION

OEQC:

State
Dept. of Agriculture
Dept. of Planning and Economic Development
Dept. of Health
Dept. of Transportation
U. H. (5)

Federal
Army
Navy
Soil Conservation Service
U. S. Army Corps of Engineers
U. S. Geological Survey
U. S. Fish and Wildlife Service
U. S. Marine Corps
U. S. Department of Transportation
U. S. Environmental Protection Agency

City and County
Board of Water Supply
Dept. of Planning
Dept. of Land Utilization
Dept. of Public Works:
Chief Engineer
Div. of Refuse
Div. of Wastewater Management
Fire Department
Police Department

Libraries
U. H. (2)
Regional (6)
Oahu, Waimanalo & Kailua (2)

Others and OEQC (10)

Sub-total: 46

DLNR:
Bd. Members (6)
Staff and Divisions (6)

Sub-total: 12

Private Organizations:
See attached list (27)

Sub-total: 27 TOTAL: 85

KAPAA QUARRY - PHASE 2

PRIVATE ORGANIZATIONS RECEIVING DRAFT E.I.S.

Harold K. Castle Trust
Hawaii Loa College
Consolidated Amusement Company
Kaneohe Chamber of Commerce
Kailua Chamber of Commerce
Kaneohe Neighborhood Board
Kailua Neighborhood Board
Kaneohe Outdoor Circle
Lani-Kailua Outdoor Circle
Olomana Community Association
Lanikai Community Association
Enchanted Lakes Community Association
Coconut Grove Community Association
Aikahi Community Association
Pikoiloa Community Association
Pali Golf Course
C.I.L.O.
General Contractors Association
Windward Oahu Chamber of Commerce
Hawaiian Memorial Park
Hawaii Audubon Society
Conservation Council of Hawaii
Sierra Club of Hawaii
Kailua Community Council
Kawainui Heritage Foundation
Hawaii Federation of Garden Clubs
Congress of Hawaiian People

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The following participated in the preparation of the assessment and/or this Environmental Impact Statement:

R. M. Towill Corporation

Bernice P. Bishop Museum, Department of Anthropology

Bernice P. Bishop Museum, Department of Botany

John F. Mink

W. Y. Thompson

AMERON H C & D Staff

February 1985

APPENDICES

APPENDIX 1

PHASE II EXPLORATORY CORE DRILLING RESULTS

PHASE II: TEST DRILLING ANALYSIS

TEST HOLE 10: Ground Elevation 800 feet.

Elevation	Material
800 - 786	Clay mixed with cinders
786 - 780	Soft decomposed clay mixed with cinders
780 - 776	Medium hard cinders
776 - 765	Soft decomposed cinders mixed with clay
765 - 750	Soft cinders
750 - 745	Very soft cinders
745 - 739	Soft cinders mixed with clay
739 - 709	Cinders and clay mixed
709 - 692	Soft cinders, mixed clay
692 - 684	Soft clay "dirt"
684 - 652	Medium hard decomposed rock
652 - 630	Medium hard decomposed rock
630 - 625	Hard decomposed rock
625 - 615	Medium hard decomposed rock mixed with soft clay
615 - 607	Soft clay mixed with medium hard rock
607 - 599	Hard fractured rock
599 - 590	Soft clay (or silt)
590 - 584	Hard fractured rock mixed with soft clay
584 - 577	Medium hard decomposed rock mixed with soft clay
577 - 570	Decomposed clay
570 - 564	Hard rock
564 - 560	Soft clay
560 - 554	Medium hard decomposed rock mixed with soft clay
554 - 545	Medium hard decomposed rock, soft clay in between
545 - 543	Soft decomposed rock mixed with soft clay
543 - 538	Medium hard decomposed rock, soft clay in between
538 - 521	Hard decomposed rock
521 - 500	Hard decomposed rock
500 - 493	Hard decomposed rock (fractured rock)
493 - 489	Hard decomposed rock (fractured rock)

Note: Depth of test hole was 311 feet. Drilling was carried out during the period of September 4, to November 8, 1962.

PHASE II: DRILLING ANALYSIS

TEST HOLE 11: Ground elevation 700 feet.

Elevation	Material
700 - 690	Clay dirt
690 - 674	Dirt
674 - 665	Hard decomposed rock
665 - 662	Hard fractured rock
662 - 660	Hard rock
660 - 647	Hard fractured rock
647 - 628	Hard rock
628 - 626	Hard decomposed rock
626 - 618	Hard rock mixed with soft decomposed rock
618 - 616	Hard fractured rock
616 - 608	Hard rock
608 - 606	Hard fractured rock
606 - 602	Hard fractured rock mixed with soft clay in between
602 - 598	Hard rock
598 - 588	Hard rock mixed with soft clay in between
588 - 580	Hard rock
580 - 575	Hard rock
575 - 533	Hard rock
533 - 527	Hard cracked rock
527 - 507	Hard rock
507 - 490	Medium hard rock
490 - 480	Hard and medium hard rock
480 - 470	Hard rock
470 - 464	Hard cracked rock
464 - 445	Hard rock
445 - 436	Hard rock, medium decomposed rock
436 - 426	Medium hard rock
426 - 406	Medium hard rock or hard decomposed rock
406 - 341	Hard rock
341 - 337	Medium hard rock
337 - 307	Hard rock
307 - 298	Medium hard rock
298 - 279	Medium hard rock
279 - 268	Hard rock
268 - 262	Medium hard rock
262 - 252	Medium or hard rock
252 - 242	Hard rock
242 - 211	Medium or hard rock

Note: Depth of test hole was 489 feet. Drilling was carried out during the period of September 4, to November 8, 1962.

PHASE II: DRILLING ANALYSIS

TEST HOLE 13: Ground elevation 302 feet.

Elevation	Material
302 - 291	Dirt
291 - 281	Dirt and soft decomposed rock, mixed
281 - 271	Medium hard clay or mud rock
271 - 261	Decomposed cinders or mud rock
261 - 251	Decomposed cinders
251 - 241	Decomposed cinders
241 - 237	Decomposed cinders
237 - 227	Mud rock
227 - 223	Medium hard decomposed cinders or mud rock
223 - 217	Soft clay, dirt
217 - 195	Very soft clay
195 - 177	Soft clay

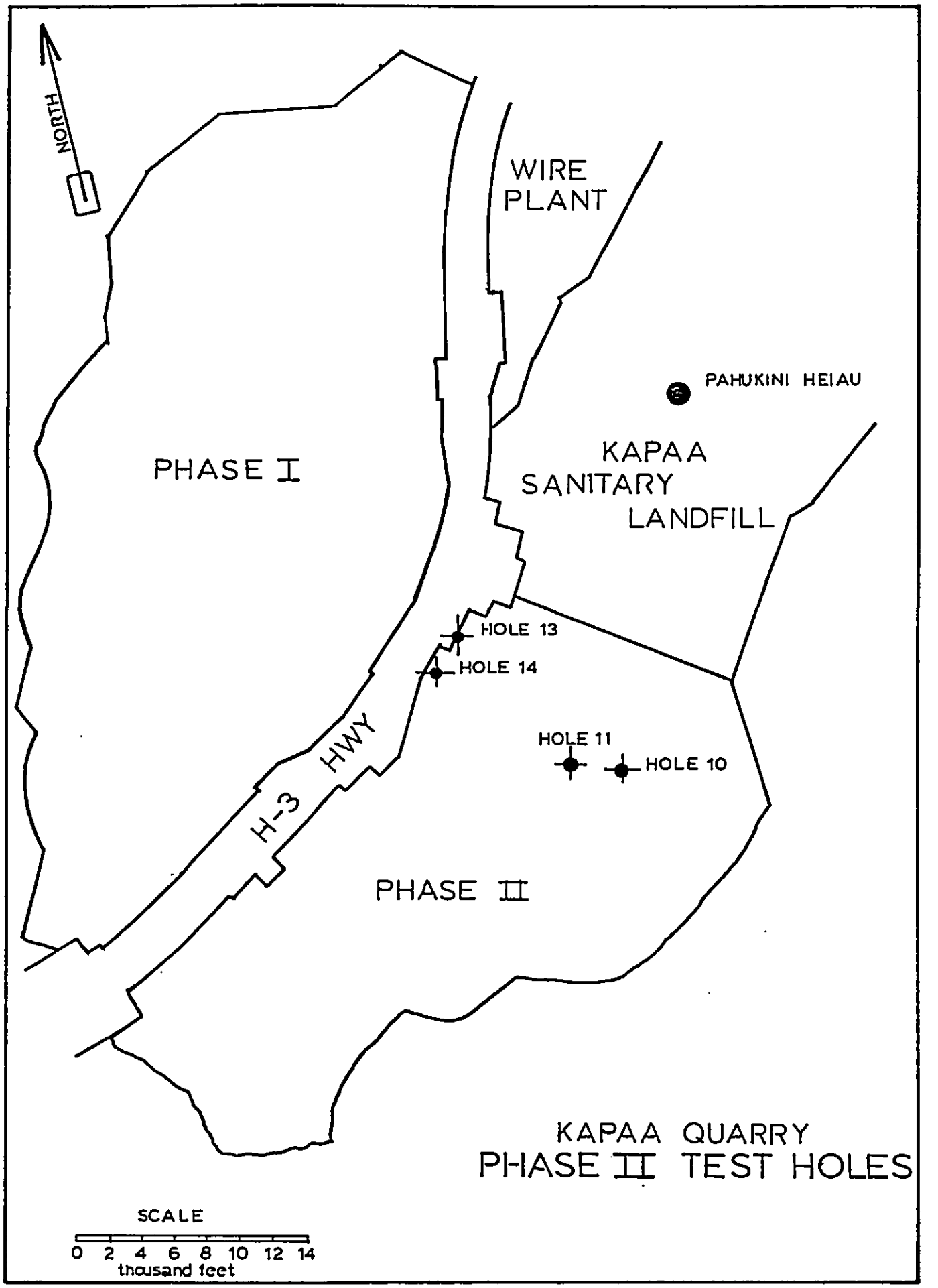
Note: Depth of test hole was 125 feet. Drilling was carried out from November 4, 1962 to November 8, 1962.

PHASE II: DRILLING ANALYSIS

TEST HOLE NO. 14: Ground elevation 310 feet.

Elevation	Material
310 - 307	Soft clay, dirt
307 - 299	Mud rock mixed with soft clay in between
299 - 290	Medium hard mud rock mixed with soft clay
290 - 286	Medium hard rock mixed with clay
286 - 282	Hard rock
282 - 280	Hard fractured rock
280 - 270	Medium hard mud rock mixed with soft clay
270 - 268	Hard fractured rock, loose rock
268 - 267	Medium hard loose rock, fractured rock
267 - 264	Medium hard rock, loose mud rock
264 - 261	Hard fractured rock mixed with soft clay in between
261 - 259	Hard fractured rock
259 - 256	Hard fractured rock mixed with clay
256 - 254	Hard fractured rock
254 - 251	Hard fractured rock
251 - 248	Hard fractured rock
248 - 238	Hard and medium hard rock
238 - 232	Hard rock
232 - 223	Hard rock with medium hard decomposed rock
223 - 213	Hard rock
213 - 207	Hard fractured rock
207 - 203	Hard fractured rock
203 - 200	Hard fractured rock
200 - 192	Hard rock
192 - 182	Hard rock
182 - 174	Hard rock
174 - 167	Hard rock
167 - 157	Hard and medium hard rock
157 - 149	Hard fractured rock
149 - 143	Hard fractured rock
143 - 133	Hard rock
133 - 123	Hard rock
123 - 118	Hard fractured rock
118 - 108	Hard rock
108 - 99	Hard rock
99 - 93	Hard rock
93 - 89	Hard decomposed rock
89 - 79	Hard rock mixed with hard decomposed rock
79 - 69	Medium hard rock mixed with hard decomposed rock
69 - 59	Medium hard rock mixed with hard decomposed rock
59 - 49	Hard and medium hard rock, mixed
49 - 39	Hard and medium hard rock, mixed
39 - 29	Hard and medium hard rock, mixed
29 - 19	Hard and medium hard rock, mixed
19 - 10	Hard and medium hard decomposed rock

Note: Depth of test hole was 300 feet. Drilling carried out from November 8, 1962 to December 6, 1962.


NORTH
WIRE
PLANT
PAHUKINI HEIAU
PHASE I
KAPAA
SANITARY
LANDFILL
HOLE 13
HOLE 14
HOLE 11
HOLE 10
H-3 HWY
PHASE II
KAPAA QUARRY
PHASE II TEST HOLES
SCALE
0 2 4 6 8 10 12 14
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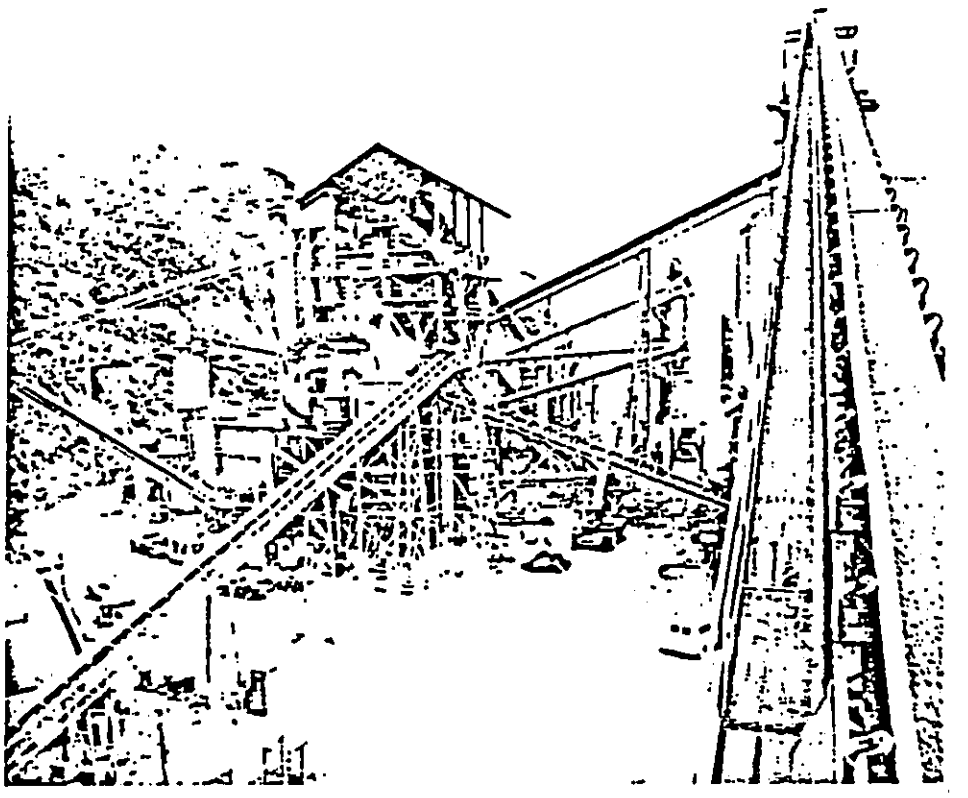
APPENDIX 2

KAPAA QUARRY OPERATIONS



The crushed basalt is carried on conveyor at right to storage silos. The dryer-cooler system is at left in front of the main screening tower.

HC&D, Ltd.'s new $9.5 million stone sand plant meets Hawaii's needs

This ultramodern 400-tph operation has many features and some firsts

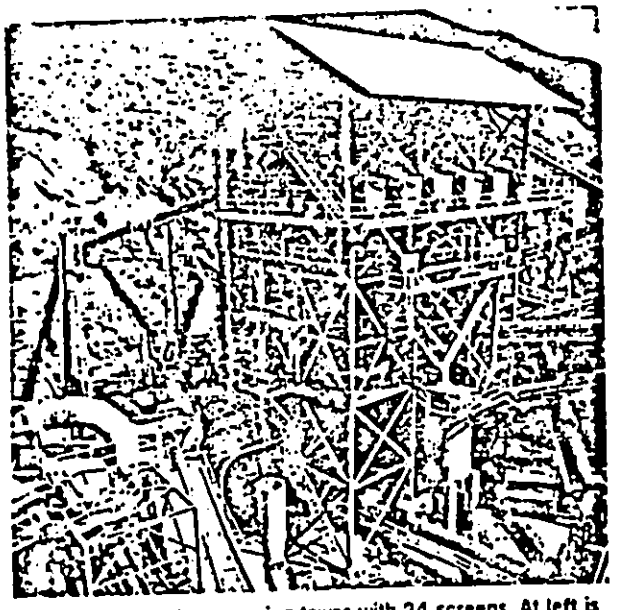
Early in 1976, HC&D, Ltd. of Honolulu, Hawaii, put into full operation the new $9.5 million manufactured sand plant at its Kapaa Quarry on Oahu near Kailua. Designed to produce 650,000 tons of this material per year on a single-shift operation, this plant will supply all of the company's needs and is capable of supplying the sand and other fine material requirements for the entire construction industry throughout Hawaii. It is producing about 400 tph of this sand from minus-3/8" dolomitic material from the company's modern 600-tph crushed stone plant at the Kapaa Quarry. The sand plant addition eliminates mining of sand on the island of Molokai and the barging operation to deliver it to Honolulu. Ground for this new plant was broken in April 1974.

HC&D, Ltd. was founded in 1908 as the Honolulu Construction & Draying Co. It was originally engaged in trucking, draying and construction. Prior to World War II, it had operated a small quarry and plant near Honolulu. In 1951 this was shut down, and a new and larger plant was built in the Lower Kapaa Valley. When this ran out of material, it was replaced by a new and modern 500-tph plant, which was in full operation early in 1968.* One of the products made was stone sand. Later, this plant was expanded to a capacity of 600 tph. This quarry has supplied all the division's aggregate requirements — except sand — since 1962, and now supplies all of Ameron's sand needs in Hawaii.

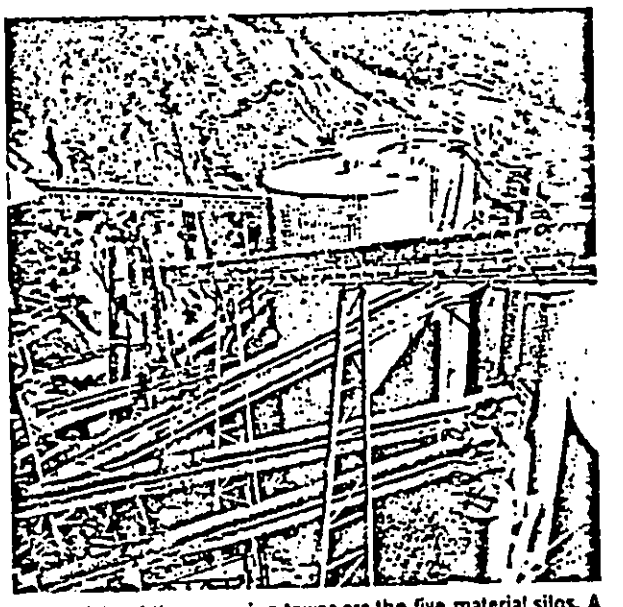
At the dedication of this plant on May 18, 1976, Eugene F. Folks, president of HC&D, said that it is one of the most innovative sand manufacturing plants, and produces a quality of sand equal to or superior to any known sand manufacturing plant in the United States. "It has the longest truck scale in the world, the most modern weighing equipment avail-

*See Pit & Quarry, May, 1969, pp. 96-9, 123, "Only two operators required for highly automated crushing and screening layout," by Harry F. Utley.

Pit & Quarry Reprint - January 1977



This view shows the screening tower with 24 screens. At left is the dryer-cooler system with its baghouse dust collector.



To the right of the screening tower are the five material silos. A large part of the 1-mile-conveyor system is shown.

able anywhere, and closed circuit television, which facilitates truck loadout. Its $1-million pollution control system insures environmental protection for Windward Oahu."

Other features of this plant are: the five slipform silos (plus four others); the main operations panel; screen feed distributors; 24 screens; special in-house-designed proportional splitter gates; complex automatic control system; control matrix; fiberglass in-house-designed conveyor covers; master Weighmaster panel for three scales; pneumatic ticket delivery system; "switchable" pneumatic fines handling system; "one man" operation; variable screen feed gates and weigh plates; new feed controlled by level of material in the crusher feed tank (rate change); material level rate of change in blend tanks controls gates; two 84" Gyradisc crushers; all equipment, including conveyors, completely covered (operator is "flying blind"); corrosion protection.

In the manufacturing process, the feed material is dried and cleaned before it is crushed. This is done by passing it through a dryer-cooler facility which reduces the moisture content of the aggregate from 4% to less than 2%. Also during this stage, 50% of the very fine (−200 mesh) particles are removed.

The material is then screened to separate those particles which already have the proper gradation out of the initial feed material. The remaining aggregate is crushed and screened until three gradations necessary to blend ASTM-C33 specification sand are achieved.

These categories of gradation are:

−4 x 8 (passes a 4-mesh screen, retained by a 8-mesh screen)

—8 x 16 (passes an 8-mesh screen, retained by a 16-mesh screen)

—16 x 100 (passes a 16-mesh screen, retained by a 100-mesh screen)

Primarily, the main concrete sand, ASTM-C33, is blended by mixing 67% of 16 x 100, 23% of 8 x 16 and 10% of 4 x 8 gradation. Any other proportion of the three gradations could be blended to supply specific customer needs.

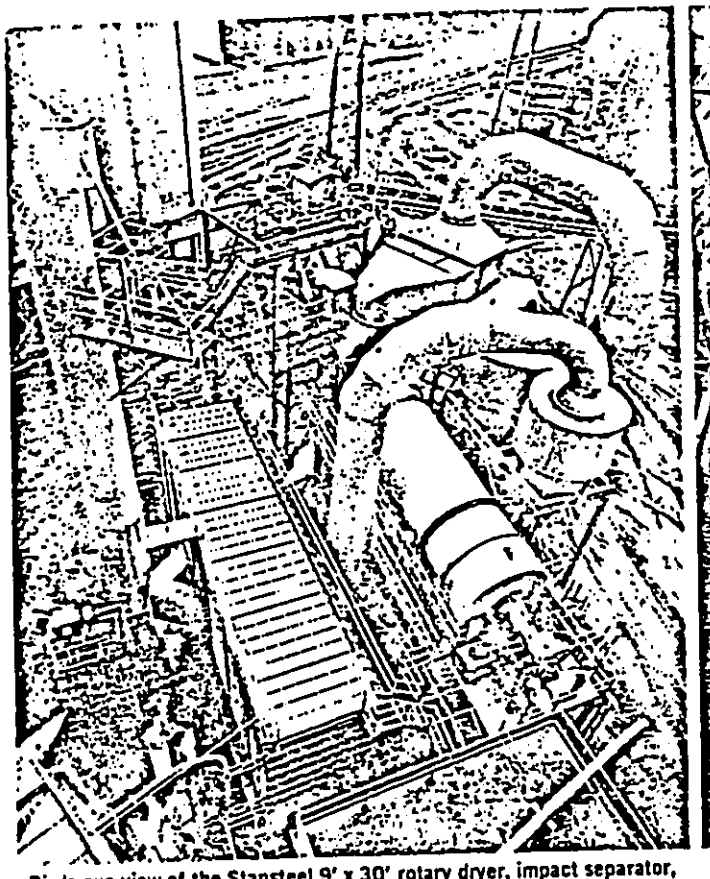
The manufacturing process creates about 85% of useable sand and about 15% of −200 dust. This "minus-200" dust is sold to local cement companies for use in their manufacturing process.

Dryer-cooler complex

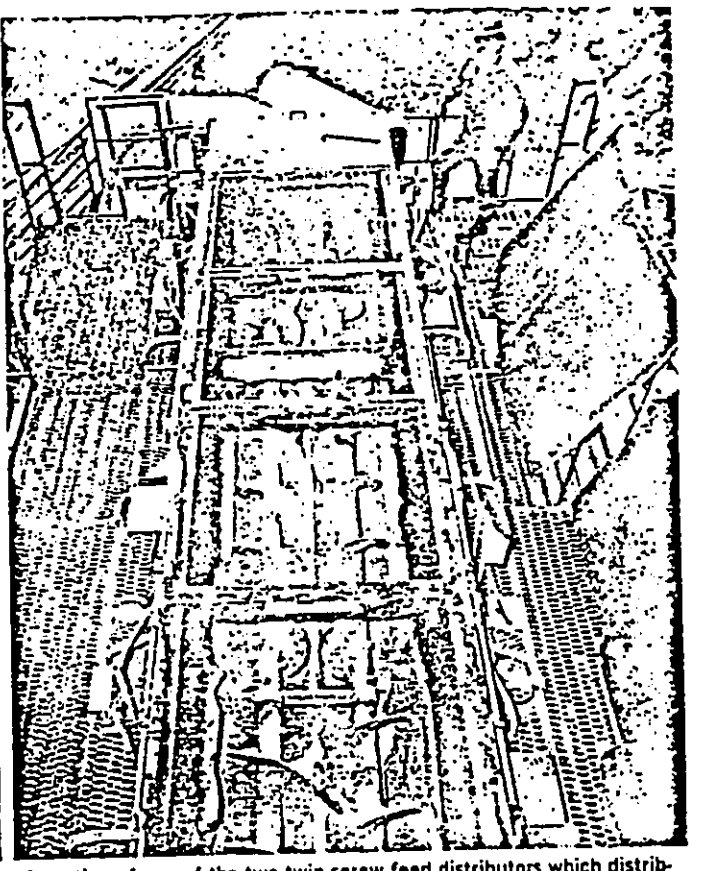
All incoming 5/16 x 0 feed material for the manufactured sand plant passes through a Stansteel 9' x 30' rotary dryer and an 8' x 30' rotary cooler. The dryer is equipped with a 162,000,000 Btu/hr Genco burner with a 100-hp blower. Dryer and cooler drives are both 100 hp with Falk motor reducers. Two things are accomplished in this system: Moisture content of feed material is reduced from an average 3½% to 2%, and surplus fines are removed. The drying is required to prevent blinding of the 16-mesh Tyspeed screening circuit and to allow efficient air separation of the −100m material. Capacity of this system is 400 tph. Although the cooler reduces the temperature of the material approximately 15°F, its main function is to assist in surplus fines removal.

Dryer temperatures are approximately 250°F. Provisions have been made for the possible future addition of an asphalt plant adjacent to the dryer-cooler. In this case, material would be diverted at the dryer discharge into a hot elevator. The burner is sized to be able to heat the material to 425°F in this case. Fuel used is a No. 5 fuel oil with low sulfur content and low viscosity. Fuel oil is pumped from a 55,000-gal. storage tank by a Tuthill 38-gpm pressure pump to the burner, with surplus oil recirculated back to a "hot well" in the 55,000-gal. tank. Two 75-kw in-line heaters boost oil temperature to 160°F.

A Stansteel 65,000-cfm, 350-hp reverse-air, double-wall hot baghouse provides air flow through the dryer-cooler. Inserted in the air flow ducting is a 10' square linear impact separator and two 10'-diameter cyclone separators. Fines reaching the baghouse are all −200m. Air-to-cloth ratio of the baghouse is 5.7 to 1, provided by



Birds-eye-view of the Stansteel 9' x 30' rotary dryer, impact separator, cyclone separators and 65,000 cfm hot baghouse dust collector. The dryer has a Genco 162-million-Btu burner.



A portion of one of the two twin-screw feed distributors which distributes over 800 tph of feed material to twelve 5' x 14" Tyler Ty-Rock vibrating screens.

936 8" x 8' Nomex bags. Cleaning of the continuous hot baghouse is accomplished by low-pressure air from a 100-hp fan. Two rows of 18 bags each are cleaned at a time on an automatic timed cycle. Damper valves for cleaning are operated by high-pressure air cylinders. Temperature probes in the air ducting to the baghouse read out on a dial scale on the operator panel and warn of high or low temperatures.

High temperatures will automatically shut the burner down to the low-fire position. All of the Genco burner controls and Stansteel baghouse controls were relocated from the separate control cabinets furnished with the equipment into the main operator control console.

Feed to the dryer is automatically maintained at the preset rate by a Ramsey belt scale and feed-rate controller, which adjusts one of the three Jeffrey 24" x 48" vibrating feeders located in the reclaim tunnel below the 2500-ton cold-feed storage silo (T8). The other two feeders can be controlled by rheostat controls on the operator console, if required.

Material collected by the impact separator and two cyclones can be directed to the cooler or to a pneumatic pumping system or, in the future, to a hot elevator for an asphalt plant. There is also a proportioning gate which will allow any portion to be directed to the cooler.

Screen feed distributor

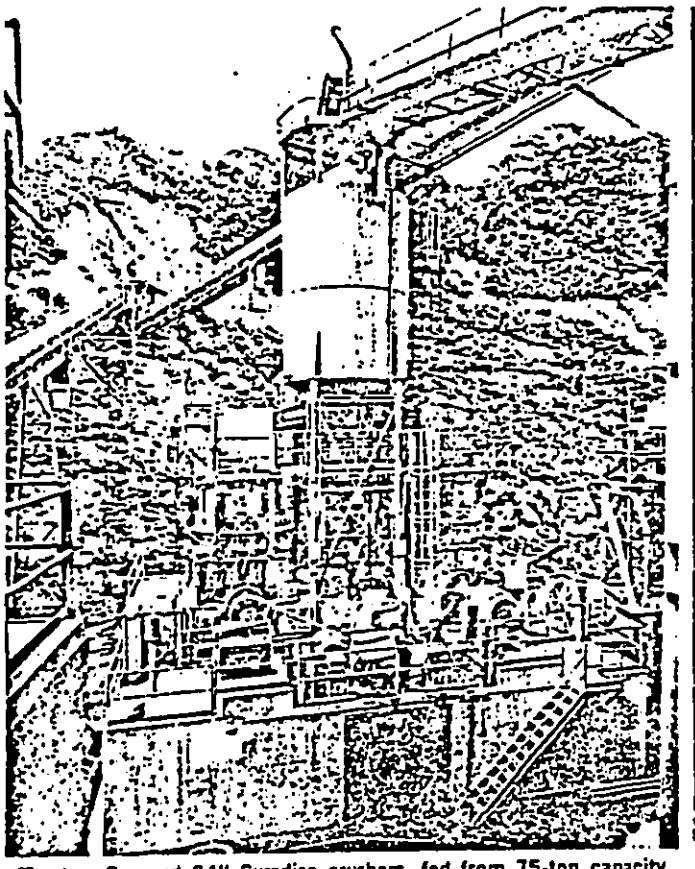
This unique system was designed by HC&D engineers after evaluation of at least six possible methods. They could find no existing system simultaneously and equally feeding this many screens. It is really two twin systems, each feeding six screens.

Incoming feed to distributors is by a single 36" conveyor belt (C34), dumping into a proportional splitter gate designed by HC&D. This gate can put anywhere from 100% to 0% of incoming feed into either distributor box. Normal run is 50/50. Percent going to each side is shown on an operator control panel. Two parallel 18" dia. x 28' long screw augers, placed 24" apart, move the feed toward the opposite end of the 4' wide x 6' deep x 29' long box. Augers are supported at 7' spacing by gray-iron bushed hanger bearings. Each auger has an independent drive of 20-hp., 1850-rpm motor, belt driving a Doris 25:1 screw conveyor gear box. Augers rotate at ±74 rpm.

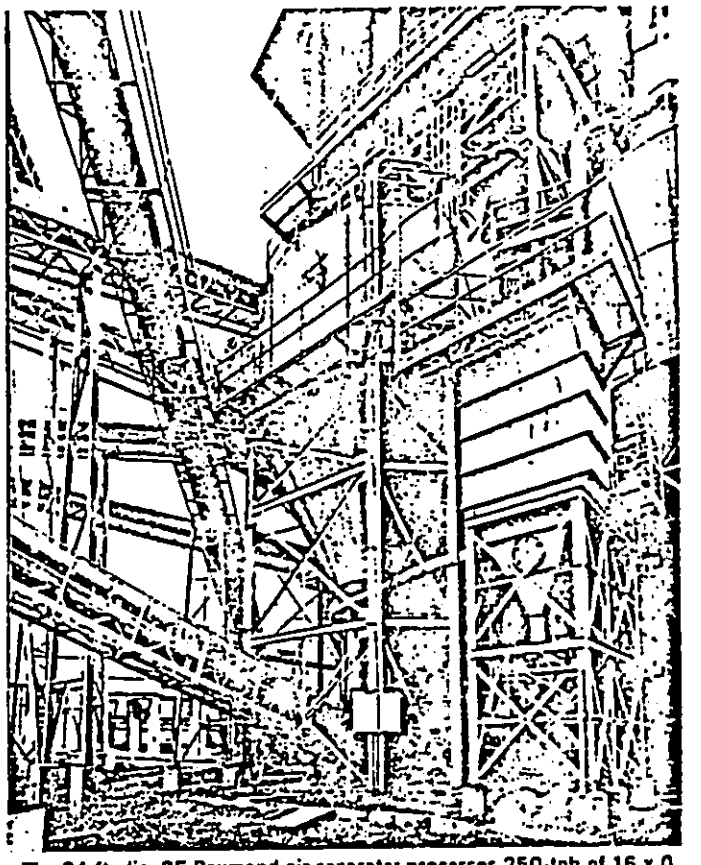
Looking down the box, one sees 3 screens on each side — Tyrock 5' x 14' double-deck. At each screen location, there is a 4½'-long gate that can be adjusted from a 4" height to full closure. Each gate is a two-in-one gate within a gate.

METRIC CONVERSION FACTORS

feet (ft.) x 0.3048 — meters (m.)
miles x 1.6093 — kilometers (km.)
cubic feet (cu. ft.) x 0.0283 — cubic meters (cu. m.)
cubic yards (cu. yds.) x 0.7646 — cubic meters (cu. m.)
short tons (s.t.) x 0.9072 — metric tons (m.t.)
horsepower, U.S. (h.p.) x 1.01387 — metric horsepower (m.h.p.)
degrees Centigrade — 5/9 (degrees Fahrenheit — 32)



The two Rexnord 84" Gyradisc crushers, fed from 75-ton capacity surge tank by two Jeffrey vibrating feeders, handle all of the fine reduction in the plant.



The 24-ft. dia. CE Raymond air separator processes 250-tph of 16 x 0 material into 16 x 100 and 100 x 0 fractions. Note specially designed fibreglass conveyor covers.

There is an Acme screw gearmotor-driven section within the main gate for fine adjustment, and an overriding air cylinder for open-close action for the main gate. The gearmotor is driven very slow for operator control — 1/16" in 3 seconds. Gates have potentiometers on the shafts, which send signals back to position meters on the operator console, which reads the number of sixteenths the gate is open. If a screen shuts down for any reason, the gate feeding that screen will close, and the proportional splitter gate at the feed will automatically shift slightly to send a little more feed to the opposite distributor box. Actually, if one screen shuts down, the opposite screen will also go down as two screens are lubricated by a common Farval mist lubrication system.

Between each variable feed gate and the screen below it, is a special inclined feed plate. This plate is hinged at the distributor box on antifriction bearings and is supported by a shaft-mounted torque arm held by a rod with a tension-type load cell. The material passing over the feed plate causes the load cell to resist a tensile force proportional to the amount of material passing over the plate. The load cell transmits a signal to the operator's panel, where it is read on an ammeter calibrated to indicate tph. Each feed plate was calibrated independently. Amp. draw on each of the four auger drive motors is also read out separately on the operator's panel. The operator therefore can read directly from the load cell meters, the tph being fed to each screen, and can modulate this amount by opening or closing the feed gates, adjusting the proportional splitter gate to the feed distributor boxes and adjusting total new incoming feed by rheostat controls on the panel for two of the four vibrating feeders under tank T9. Max. design capacity of each distributor box is 500 tph.

Model tests made

Before the auger distributor design was finalized, a 1/8-scale model was made and tests run in HC&D test laboratory to prove out theory. Also, a full-size mock-up of the feeder gate and feed weigh-plate was made and tested by HC&D to determine practicality and operational reliability of the system. Additional model tests were made by HC&D engineers in arriving at the final designs for the proportional splitter gates.

Screening circuit

Total maximum design capacity is 1000 tph, but normal flow will be 830 tph. To handle this tonnage, particularly in the −8m screening range, 24 screens are employed. Twelve Tyler 5' x 14' Tyrock screens make the 5/16 x 4m and 4m x 8m separations. Tyrock −8m throughs are fed to 12 Tyler 4' x 10' Tyspeed screens, where the 8m x 16m separation is made. One bank of six Tyrocks recombines the 5/16 x 4 and 4 x 8 and sends it all to the crushers. The other bank of 6 Tyrocks sends 92% of the 5/16 x 4 and 73% of the 4 x 8 back to the crushers. The remaining 8% of 5/16 x 4 is sent to an overhead loadout tank to be sold as roofing chips, and the remaining 27% of 4 x 8 is sent to one of the four tanks in the sand-blending circuit to be used in concrete sand.

The 8 x 16m overs from the twelve Tyspeed screens are combined and pass through two pro-

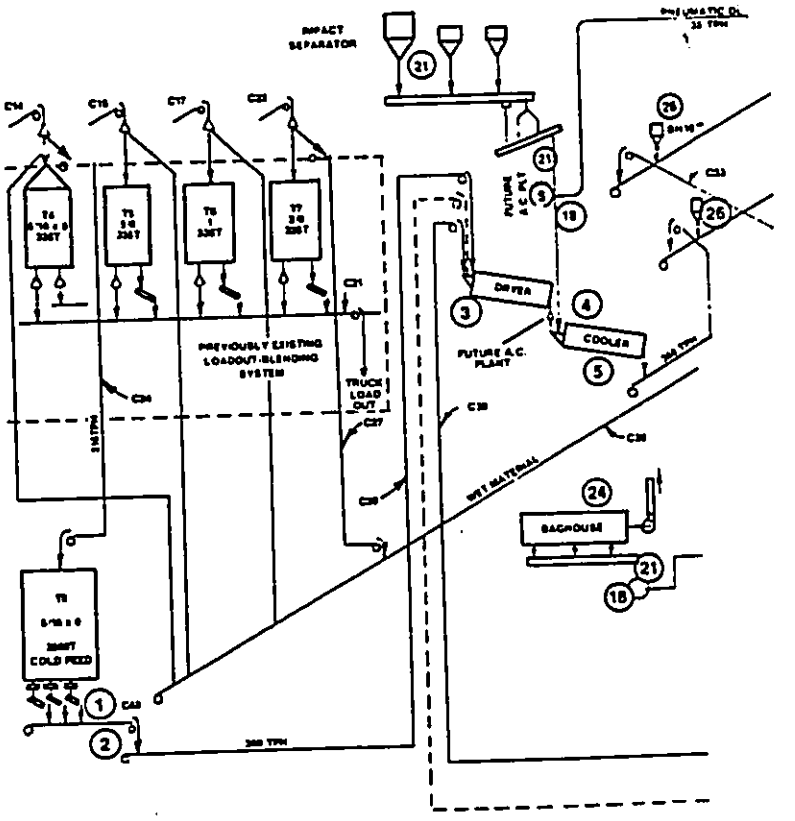
portional splitter gates. The first gate sends 40% of the material to one of the blending tanks for use in the sand blends. The rest goes to the second gate, where it is normally all sent to the crushers. A portion, however, can be sent to an overhead loadout tank to be sold as coarse sandblast sand. All −16m throughs are sent to the 24-ft. air separator.

Air separation circuit

All −16m fines from the screening circuit pass through the CE Raymond 24'-dia. Double-Whizzer air separator, where a 16 x 100m separation is made. The separator is direct-driven by a 500-hp motor, the only 4160v motor in the plant. Feed rate is 252 tph. Contrary to normal air separator use in cement plants, the tailings in HC&D's case is the product being sought, the 16 x 100. A manual externally adjusted damper blade allows the gradation of the 16 x 100 to be adjusted to maintain specification requirements. In case the full range adjustment of the damper blade is not sufficient, the whizzer blades themselves can be adjusted. This requires machine shutdown, whereas the damper can be adjusted with the machine running.

The −100m fines are transported by an airslide to a Praschak belt bucket elevator, where they are then discharged into either a CE-Raymond 14' Double Whizzer air separator or a dust fines holding tank. The 14' air separator is used for separating the 100m x nominal 200m fines required as one of the blend components for asphaltic concrete sand. This fraction contains about 8% 200 x 325m. Again, the 100 x 200 tailings are the product sought. They are transferred by a gravity airslide to the blending tank. The nominal

EQUIPMENT LIST
24" x 48" VIBRATING FEEDERS (7) — JEFFREY
CONVEYOR SCALES (4) — RAMSEY
9' x 30' ROTARY DRYER — STANSTEEL
152,000,000 BTU/HR BURNER — GENCO
8' x 30' ROTARY COOLER — STANSTEEL
18" DIA. x 29' TWIN AUGERS —
4' x 6' x 30' TROUGH (2) HC&D DESIGN
5' x 14' DOUBLE DECK TYROCK SCREENS (12) TYLER
4' x 10' DOUBLE DECK TYSPEED SCREENS (12) TYLER
24" x 60" VIBRATING FEEDERS (2) — JEFFREY
84" GYRADISC CRUSHERS (2) — REXNORD
24' DIA. AIR SEPARATOR — C. E. RAYMOND
7" x 80' BUCKET ELEVATOR — PRASCHAK
14' DIA. AIR SEPARATOR — C. E. RAYMOND
75 TON 10' x 121' TRUCK SCALE — DUDLEY CONLEY
75 TON 10' x 240' TRUCK SCALE — DUDLEY CONLEY
24" BELT FEEDERS — (3)
6' x 16' TRIPLE DECK SCREENS (2) —
HEWITT ROBBINS
MEDIUM PRESSURE PNEUMATIC
CONVEYING PUMPS (4)
LOW PRESSURE BLOWERS (4)
GRAVITY AIR SLIDES HC&D DESIGN
ROTARY AIR-LOCK FEEDERS (6) — SMOOT
36' DIA. CONCRETE SILOS (8)
24' DIA. CONCRETE SILOS (2)
65,000 CFM "HOT" BAGHOUSE — STANSTEEL
CONTINUOUS BAGHOUSES (5) — DUSTEX
INTERMITTENT BAGHOUSES (7) —DUSTY-DUSTLESS



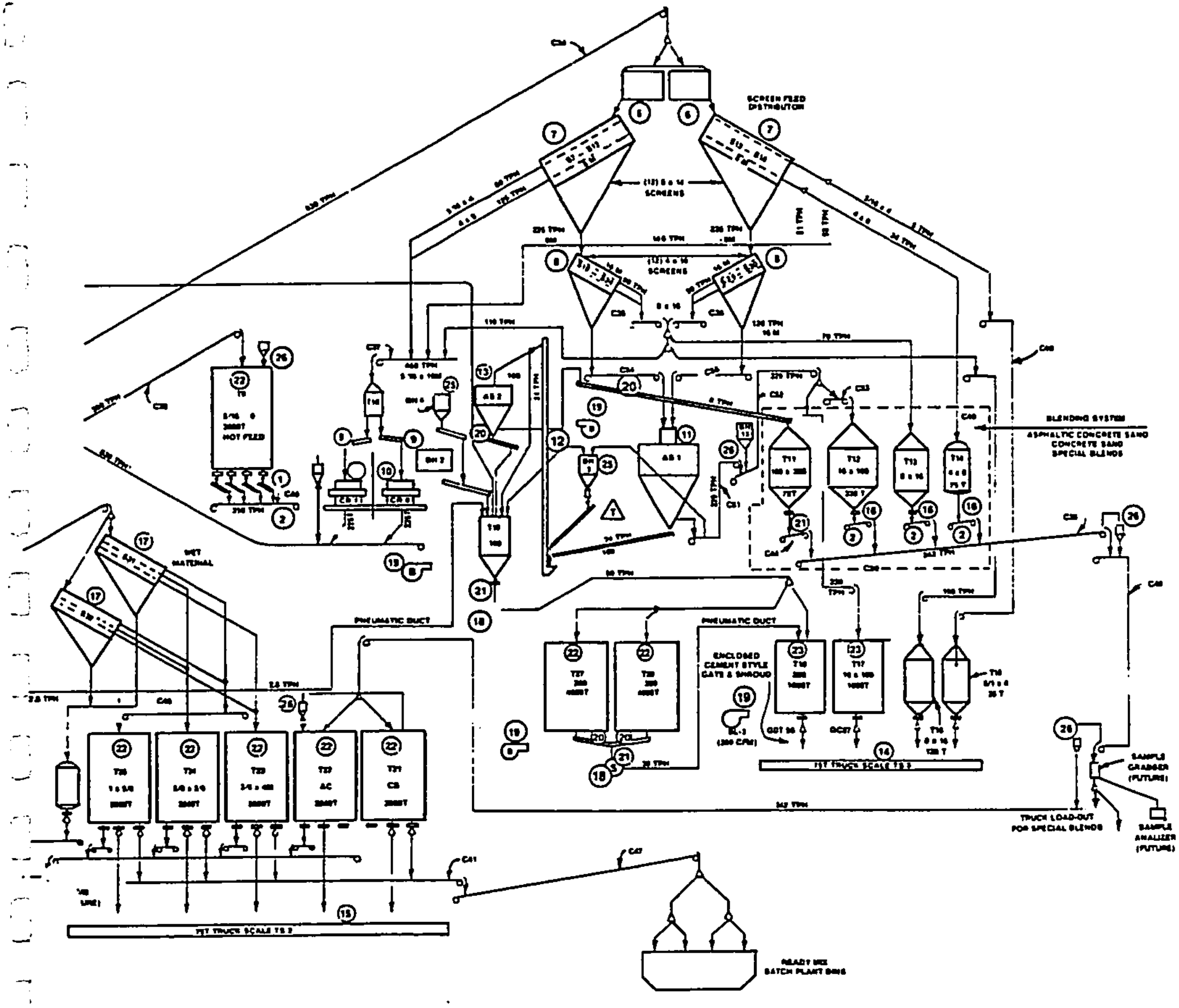
NOTES:
DOTTED LINES INDICATE FUTURE SYSTEM
FLOW RATES SHOWN ARE FOR CONCRETE SAND MODE
DASHED LINES INDICATE DUST CONTROL SYSTEM

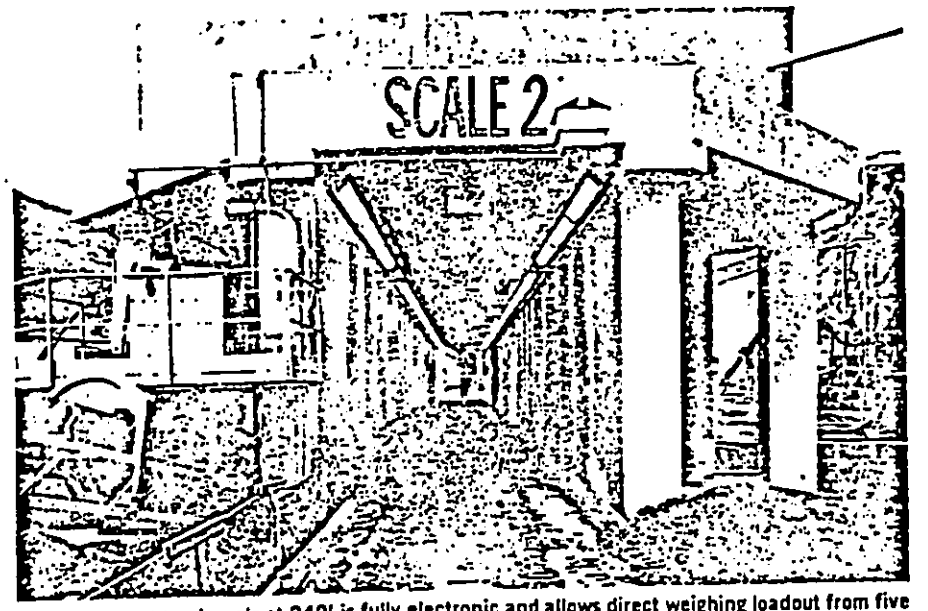
−200m is then transported, also by gravity airslide, to the dust-fines holding tank. When the fine-blend fraction for asphaltic concrete sand is not required, all of the −100m material is sent from the bucket elevator directly to the dust-fines holding tank T19. Because of the fluffed condition of the material as it is presented to the bucket elevator, it has a very low density of 57 lb. per cu. ft. The centrifugal discharge bucket elevator has 9" x 7" cast nylon buckets spaced 7" on center. The 14' air separator is belt-driven by a 75-hp motor.

Crushers

The 5/16" x 16m material off the screens goes to a common 75-ton surge tank (T10), ahead of the two 84" Rexnord Gyradisc crushers. The crushers are both belt-driven by 350-hp motors. Their product is mainly 16 x 100m.

The level measuring device in this tank samples level every 30 seconds (Ramsey chain-weigh system). This gives operator visual tank level information on ribbon meter in panel. It also compares current reading with previous reading — computes rate of change in level, if any; sends signal to two of the four vibrating feeders under T9 and tells them to either speed up or slow down. There are two 48" x 60" Jeffrey vibrating feeders under surge tank T10, one to each crusher. A Ramsey crush-r-trol system on each crusher keeps crusher motor at maximum power draw. If more or less than max., it tells the vibrating feeder to slow down or speed up. There are also level probes in the crusher bowl to tell system whether too high or too low. The operator can tell tph into crusher by reading % max. capacity from meter for feeder and compare with calibration chart. Each crush-





World's longest truck scale at 240' is fully electronic and allows direct weighing loadout from five 2,500-ton overhead concrete storage silos. Loadout conveyor is at left.

er has an independent automatic lubrication system, air-cooled. Complete system is interlocked so crusher won't start or will shut down if take-away conveyor is not running; no oil flow; oil too hot; oil pressure too low; air pressure for pneumatic seal too low or too hot. Crushers have independent air-cooled lube systems, air seals and hydraulic bowl adjusters.

Blending circuit

The blending circuit employs four blending tanks for 4x8, 8x16, 16x100 and 100x325 fractions. The first three are used for ASTM Specification C-33 concrete sand, and all four for asphaltic concrete sand. The 100x325 material is fed by a calibrated Smoot rotary air lock feeder, with a dc gearhead motor, onto a constant-speed feeder belt. Others feed through manually adjustable "head" gates to dc motor-driven belt feeders, each of which has a Ramsey Vey-R-Weigh belt scale. Blending is controlled by a special blend control system furnished by Ramsey Engineering. The blend control system is located in the operator's control panel. It has a 3-position blend selector knob: concrete sand, asphalt sand or special blend. The blend proportions for the concrete and asphalt sands are preset by adjustments made behind the panel by Product Engineering personnel. The blend proportions for the special blends can be set from the face of the panel by the operator.

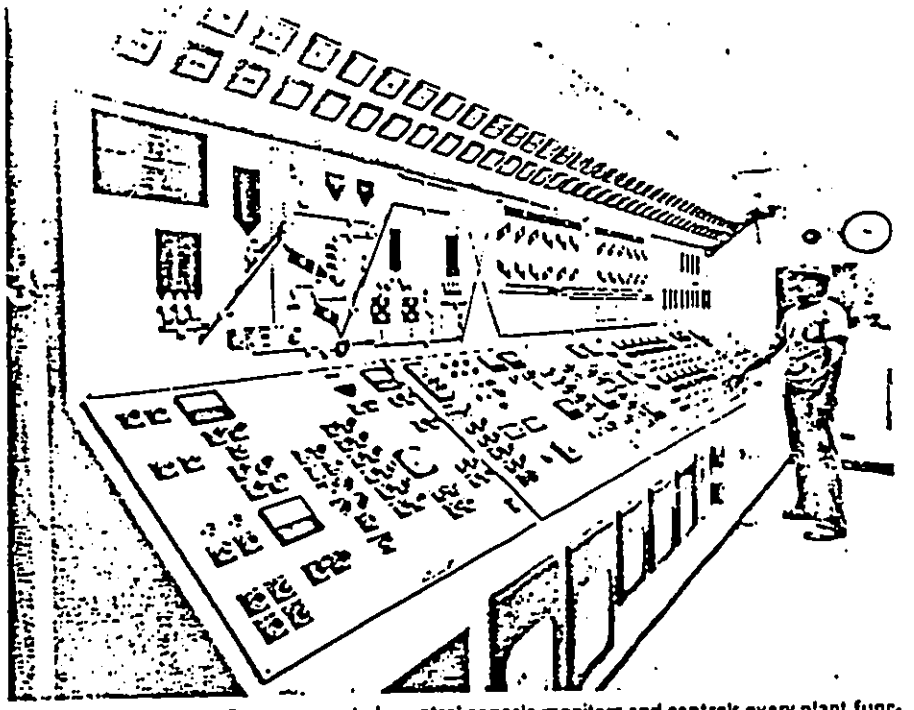
The operator also has a blend-rate dial where he can select the blend rate from 0 to 100% of full capacity of 350 tph. The blending system holds all other blend tank feeders to the 16x100 fraction feeder — the highest percentage fraction — so that for any blend feed rate, all fractions remain in the proper proportions. The blend selector knob is also interlocked to directional gates on the take-away conveying system, so that blended material cannot be put into the wrong storage silo. This is required due to a single take-away conveyor system. There is a separate 2500-ton storage silo for concrete sand and asphalt sand. Special blends are diverted to a chute at one of the conveyor transfer points and must be loaded directly into a truck. Only one blend may be made at a time. With the blend selector knob in the special blend position, by setting all blend proportion dials except one to 0%, the operator can load out any single one of the four sizes of fractions contained in the blending tanks. The steel blending tanks have conical bottoms and are sized to be roughly proportional to the amount of that fraction used in blending concrete sand. ASTM C-33 specification concrete accounts for about 90% of the output of the blending system.

Pneumatic dust handling system

Exclusive of the baghouses to take care of fugitive dust, all dust-fines are handled by four Smoot medium-pressure pneumatic conveying systems. To minimize piping, and to accommodate variable flow rates, all fines collected within the plant are first sent to an intermediate dust-holding tank (T19). Two of the pneumatic pumping systems are located at the dryer-cooler complex. The largest handles the fines from the impact-cyclone separator system at an average rate of 20 tph. A smaller system handles the fines collected by the hot baghouse at a rate of 3 tph. The dust-holding tank receives the fines from these two pneumatic conveying systems plus two baghouses, the 14' air separator or the bucket elevator discharge. From the dust-holding tank, a 50-tph pneumatic system conveys the fines to one of three silos: a 1000-ton concrete loadout silo, or one of two 4000-ton capacity concrete storage silos. This system automatically selects the loadout silo destination if it can hold the material. If this silo is full, a high level indicator automatically switches the flow to the second storage silo. If all three silos are full, the operator cannot start the plant. If at any time the level in the loadout silo drops 10%, the flow will automatically switch back to the loadout silo. The final 30-tph pneumatic conveying system transfers the fines from either one of the 4000-ton storage silos to the 1000-ton loadout silo. Again, this is all done automatically, depending on the level of the material in the loadout silo. These medium-pressure systems operate at approximately 15 psi.

Truck load out

The truck load-out system is all remote-controlled from a Weighmaster panel in the Kapaa office. Under the five silos is a 240' scale: each silo has five gates to accommodate various truck configurations. Any combination of gates can be opened simultaneously. Front and back of truck-trailer combination can be loaded at the same time. A 27-ton payload is out in less than 30 sec. — all automatic. Truck is directed to proper



The nineteen-foot long Ramsey operator's control console monitors and controls every plant function in one-man operation. Plant flow begins at left on diagrammatic flow panel.

silo and gate(s) by light at gate. The Weighmaster observes truck position and filling by closed-circuit TV; two cameras simultaneously view the proper silo — one looking forward, the other aft. These show on two monitors on the weighmaster console. The Weighmaster communicates with the driver by visual signal message panels at the scale: Forward — Reverse — Hold — Leave Scale. There is also audio communication at entry to scale at Stop-Go traffic signal. Ticket delivery is by vacuum-pneumatic delivery system. The truck leaves the scale and proceeds to the ticket pickup station, where delivery ticket is waiting. Intercom at these stations is also used. Each of the three scales has its own ticket pickup station. Incoming trucks stop alongside Scale 1 to give Weighmaster required pickup information and receive directions/instructions over intercom. Weighmaster can simultaneously weigh out and visually monitor three scales and load out on two scales. Scale 1 is used for special blend and ground storage material weighing, and can also accommodate Cat 769 off-highway trucks or large earthmoving scrapers. Closed circuit TV: 10 cameras for scale 2 (2 per silo) show on two monitors; two cameras for scale 3 show on two monitors; one camera, for scale 1 and incoming trucks, shows on one monitor.

Truck scales

The 240' long Dudley-Conley scale under the five silos is the longest truck scale in the world. Both scales are fully electronic with the 240' scale resting on 18 load cells and the 121' scale resting on 12 load cells. HC&D specially designed the scale-scale pit configuration to make pits waterproof and free of any aggregates from accidental spillage. The scales have 6" reinforced continuous concrete decks. They were designed and built by Dudley-Conley, Colton, Calif. The scale load-cell output goes to Data Weight electronic scale controls in the Weighmaster console. The scales are both 3' above grade with concrete approach and exit ramps.

Master control panel

The master control panel is a single integrated panel containing all controls for the entire manufactured sand plant, except the truck loadout. The panel was manufactured by Ramsey Engineering and designed by Ramsey and HC&D engineers. The 19' long, 8' high panel is arranged with all annunciator message lights on the overhanging top section; all graphics showing material flow are on the vertical section; all controls, direct reading meters, position indicators, etc., are on the sloped section; and all recording meters are on the vertical front panel. With all operating equipment completely covered, the operator is, in a sense, "flying blind"; hence the amount of information displayed to the operator and the amount of interlocks and sensing devices are much more complex than in an ordinary aggregate crushing and grinding plant.

Because of the complexity of the interlocking systems, the operator must follow a very definite procedure in the startup of the plant. Also due to the complexity of the control system, HC&D engineers devised a unique control matrix that lists all of the interdependencies of each piece of equipment, its method of control, actuation, annunciation, etc. A computer program was then developed for the complex matrix so that any change in the control system could be immediately fed into the computer and a printout received of the updated matrix. Finally, an elaborate 8½" x 11" loose-leaf Operator/Controls manual was developed by HC&D engineers and the electronics consultant, Electrocybernetics, containing complete information on plant startup/shutdown and operation, detailed information on specific pieces of equipment, colored graphic sheets showing the functional layout of the control panel, a copy of the control matrix, and single-sheet schematics of each control circuit. This manual is maintained in a current condition by HC&D's electrical department.

Belt conveyors

All belt conveyors in the plant were manufactured by Spaulding Equipment Co. in San Juan Capistrano, Calif., to HC&D specifications. There is approximately 3600 lineal feet of conveyors. Maximum belt speed is 300 fpm to minimize dust generation at conveyor discharge points. A unique feature of the conveyors is the conveyor covers, required to keep the material dry and prevent fines from becoming airborne. Requirements for these covers were: high resistance to the extremely corrosive atmosphere; extra-long side extensions to protect against the trade winds and wind-driven rain; effective water-tightness; easy access to the belt; and a color to blend with the natural environment.

After reviewing all commercially

available conveyor covers, it was found that none satisfied all of the specific requirements; so HC&D engineers designed their own. What evolved were unique molded fiberglass cover sections 8' long with an impregnated green coloring. Each section has one "belled" end and one plain end. The "belled" end laps over the plain end of the adjacent section by two inches. The "bell" ends face downhill on the conveyor. Four holes were cast into each section, two on either side, at a four-foot spacing to make troughing roller lubrication fittings accessible. Three sizes were fabricated, for 24", 30" and 36" conveyor widths. Lubrication access holes on both sides allow the covers to be used on conveyors with either left-hand or right-hand catwalks. The cover sides extend down beyond the top chord of the conveyor truss and rest in 1" equal leg angles tacked to the sides of the truss. Two circumferential depressions are formed into each 8' section to position vinyl hold-down straps and, together with increased thickness at the bell and plain ends, provide extra rigidity to the section. All conveyors utilize roller-bearing troughing and return idlers with single-point lubrication. All head pulleys are lagged. All drives 75 hp and less employ Dodge torque-arm reducers, while the 100-hp drives use Falk motor reducers.

Environmental controls

Inasmuch as the manufactured sand plant is a dry operation, the concern had to be with airborne particulate emissions. Dust collection is primarily handled by baghouse dust collectors totalling 104,500 cfm in 13 separate collectors. The largest of these is the hot baghouse at 65,000 cfm. The other 12 units range from 15,000 cfm for the screen tower to 1500 cfm for conveyor transfer points and silo vents. All baghouses employ exhaust fans. Dust problems were minimized by the total separate enclosure of all pieces of operating equipment, as well as all chutes, hoppers, conveyor head boxes, etc. All baghouses are interlocked to the operating equipment they service, so that at no time is the equipment operating without the attendant baghouse also in operation.

Concrete silos

All concrete silos have 9" walls and were cast by the slipform method, rising 9"/hr. on a continuous basis. The pouring deck became the soffit form for the roof pour. All silos are 36' I.D. except T17, T18 at 24' I.D. T8 and T9 were poured independently; each has an 8' x 12' poured-in-place reclaim tunnel. All tonnage capacities noted are in live tons. T8 and T9 rest on the ground. T8 is 80' high; T9 is 90' high. T27 and T28 rest on the ground and are 90' high. Thye have no reclaim tunnels now, but reinforcing steel was designed so tunnels could be holed through in the future. Material (−200m) is reclaimed by a fan-shaped system of air-gravity conveyors on the silo floor. T27 and T28 have common center wall and were slipformed together. T21 through T25, inclusive, rest on concrete columns 20' above the ground and 17' over the scale. These silos are 36' dia. x 65' high, and all have common connecting walls. All five were poured simultaneously in a continuous slipform pour. T17 and T18 are 24' dia. x 54' high silos resting on columns 20' above the ground and 17' over the truck scale. They have a common center wall. They are not connected to T27 and T28, but were slipformed at the same time. T27 and T28 were slipped up 20'; T27, T28, T17 and T18 were slipped up 54'; then T27 and T28 were slipped up an additional 16', making them 90' above the ground. All concrete silos were slipformed by Fegles Power Service, Minneapolis, Minn. All concrete was furnished by HC&D's Rex Wayfarer batch plant on the jobsite. Concrete was delivered to the silo pour by HC&D ready-mix trucks, elevated to silo pouring deck by crane and bucket, and deposited into job hopper on pouring deck. Distribution from job hopper to silo walls was by georgia buggies. Pre-formed hoop-reinforcing was placed as slipforming progressed — two layers in lower half of silo, one layer in top half. Wooden slipform was built on the jobsite; it was only 4' high. Fegles' specially-designed hydraulic jacking system, operated from the central pouring-deck-mounted console, elevated the form.

APPENDIX 3

BOTANICAL SURVEY REPORT

BOTANICAL RECONNAISSANCE SURVEY OF PROPOSED PHASE II KAPA'A QUARRY KO'OLAU POKO, O'AHU

by
Paul Kores
and
Joyce Davis

Department of Botany
Bernice P. Bishop Museum

Prepared for
Ameron HC&D

April 1979

INTRODUCTION

A botanical survey was conducted to inventory the vegetation present in the 160-acre site of the proposed Phase II Kapa'a quarry. A total of 32 man-hours was spent within the survey area by two botanists on March 7th and March 10th, 1979. Areas sampled included all the major ridges, the lower border of the property along the H-3 right-of-way, and each of the major valleys present. All plants encountered in the area were either field-identified (in the case of taxa familiar to the botanists), or tentatively identified in the field, collected, and brought back to Bishop Museum for comparison with the herbarium's reference collection of dried plant material. When the collections were identified a complete enumeration of all species present in the survey area was prepared. A total of 102 taxa were encountered; of these 101 were identified to genus, and 99 were identified to species.

RESULTS

The vegetation in the survey area consists predominantly of exotic weedy species intermixed with occasional indigenous or endemic species. Dominant exotic woody species present throughout the study area include *Psidium guajava* (yellow guava), *Eugenia cuminii* (Java plum), *Schinus terebinthifolius* (Christmas-berry), and *Leucaena leucocephala* (*koa-haole*). Also quite common on the ridges and especially in the valleys was *Samanea saman*, or monkeypod tree. All these species are widespread throughout the Hawaiian Islands and are generally associated with ecologically disturbed habitats. Non-woody exotics that were abundant in the area include *Spathoglottis plicata, Bidens pilosa, Lantana camara, Stachytarpheta cayennensis, Pluchea odorata, Trichachne insularis, Melinis minutiflora, Cenchrus ciliaris, Passiflora foetida,* and *Paederia foetida*. Remnants of the endemic and indigenous flora present include *Metrosideros collina* (*'ōhi'a-lehua*), *Osteomeles anthyllidifolia* (*'ūlei*), *Styphelia tameiameiae* (*pūkiawe*), *Wikstroemia* sp. (*'ākia*), *Mucuna gigantea* (sea bean), *Phyllanthus sandwicensis, Psilotum nudum* (*moa*), and *Sphenomeris chinensis* (*pala'ā*). These species are also widespread throughout Hawai'i; though not always associated with disturbed habitats, they frequently persist as isolated remnants once the endemic flora has been altered.

The area surveyed borders the recently constructed H-3 freeway right-of-way and is in the process of being invaded by additional exotic weeds that have developed on the graded areas along the roadway. Weedy species that are found along the roadway and lower border of the survey site, and which may become more widespread, include *Gnaphalium purpureum, Emilia sonchifolia, Emilia fosbergii, Bidens pilosa* var. *minor, Mimosa pudica, Triumfetta bartramia, Hyptis pectinata,* and *Buddleja asiatica*.

The taxa mentioned above represent only the most common species found throughout the survey area. A complete list of all species observed in the area is included at the end of this report.

Analyzing the area in more detail, the vegetation present can be divided into four broadly defined habitats. These are cutover slopes, open grasslands, stunted ridgetop forest, and valley floors. A brief description of these habitats, and a discussion of some of the more common elements present in each area, is given below.

Cutover or Graded Slopes

These are areas of the survey site bordering on the H-3 right-of-way that were heavily disturbed during the construction of the freeway. The original vegetation was completely removed during grading, along with much of the topsoil. These areas are now largely bare ground, sparsely covered with isolated, low-growing weeds, and will undoubtedly undergo further changes as more species move into the area. Approximately 22 species were observed throughout the habitat, all either exotic or indigenous. No endemic species were observed. The most prevalent species included *Spathoglottis plicata, Pluchea odorata, Erigeron bonariensis, Emilia sonchifolia, E. fosbergii,* and *Buddleja asiatica.*

Grasslands

These areas, generally confined to the lower portions of the ridges throughout the survey area, are characterized by several species of fairly tall-growing grasses, intermixed with an occasional herbaceous or shrubby species. The vegetation present throughout the habitat is largely of exotic or indigenous origin, with a scattering of a few endemics. Common grasses observed include *Andropogon virginicus, Cenchrus ciliaris, Melinis minutiflora, Pennisetum setaceum, Rhynchelytrum repens,* and *Trichachne insularis.* Exotic herbs present include *Spathoglottis plicata, Erigeron bonariensis, Bidens pilosa,* and *Erigeron karvinskianus.* Woody vegetation present includes *Leucaena leucocephala, Psidium guajava, Schinus terebinthifolius,* and a few endemic and indigenous species such as *Metrosideros collina, Styphelia tameiameiae* and *Osteomeles anthyllidifolia.*

Ridgetop Forest

The ridgetop habitat is characterized by low-growing shrubs and small exotic trees usually less than 3 meters tall, except for a few monkeypod trees. The understory consists of herbs, vines, and grasses. Occasional open areas of grassland are also present. Major woody components include *Schinus terebinthifolius, Schefflera actinophylla, Psidium guajava, Eugenia cuminii,* and *Wikstroemia.* Herbaceous climbers include *Passiflora subpeltata, P. foetida,* and *Cocculus ferrandianus.* Common herbs are *Psilotum nudum, Centella asiatica, Bidens pilosa, Sida fallax, Spathoglottis plicata,* and *Stachytarpheta cayennensis.*

Valley Floors

This was the richest habitat examined, with 54 species of plants observed during the survey. The valleys vary somewhat in size, species composition, and general appearance. The largest valley has a relatively broad, flat floor, with a small running stream. The trees are well developed and form a closed canopy overstory, which is dense enough to shade out most of the smaller weedy exotics. The understory is poorly developed, leaving the floor of the valley relatively open and free from woody exotics. *Oplismenus hirtellus* (*honohono* grass), carpets the ground. The smaller valleys do not show any evidence of running water and are generally only partially shaded by large trees; as a result these valleys have a fairly dense understory of small woody exotics and herbaceous weeds. The dominant trees are *Aleurites moluccana* (*kukui*), *Schefflera actinophylla* (octopus tree), and *Samanea saman* (monkeypod), with an occasional *Ficus microcarpa* (Chinese banyan). Herbaceous vegetation in the area includes *Canavalia cathartica, Paederia foetida, Passiflora edulis* f. *flavicarpa, Microlepia setosa,* and *Oxalis corniculata.* There are also a few interesting native species present throughout the habitat, such as *Mucuna gigantea, Erythrina sandwicensis,* and *Caesalpinia major.*

SUMMARY

The vegetation present throughout the survey area may be generally described as a fairly heterogeneous assembly of exotic weedy species interspersed with an occasional element of the remnant endemic flora. In each of these four habitats, exotic species form the major, dominant constituents. There are several indigenous and endemic taxa that are of possible botanical interest but none is endangered, threatened, or even considered rare. Specimens of *Alocasia macrorrhiza* (*'ape*), *Cordyline terminalis* (ti), *Morinda citrifolia* (*noni*), and *Schizostachyum glaucifolium* (*'ohe,* bamboo) were observed in the area, indicating some limited agricultural activities by early Hawaiians.

It should be noted that the vegetation present at the site has already been extensively disturbed on several occasions. Roads have been bulldozed throughout the site in conjunction with a geological survey and most recently

a freeway has been constructed along the lower border of the property. These activities have assisted the colonization of the area by exotic weedy species and the corresponding decline of the native flora formerly present. Future development of the area will have minimal detrimental effect on endemic species, as these are already largely absent from the site.

Plants Located in Survey Area

Scientific names are arranged alphabetically according to family.

Status

E - Endemic, native only to the Hawaiian Islands
I - Indigenous, native to Hawai'i and other areas as well
X - Exotic, introduced to Hawai'i, intentionally or accidentally
P - Polynesian introduction

Areas

V - Valley floors
R - Ridgetop forests
G - Grassy areas and forest margins
C - Cutover areas

Taxa	Common Name	Status	Area(s)
Ferns and Related Plants			
Psilotum nudum (L.) Griseb.	*moa*	I	V,R,G
Doryopteris decipiens (Hook.)J.Sm.		E	V
Elaphoglossum sp. (sterile)		?	C
Microlepia setosa (Sm.) Alston	*palapalai*	I	V
Microsorium scolopendria (Burm.) Copel.	*laua'e*	X	G,V,C,R
Nephrolepis exaltata (L.)Schott.	*kupukupu*, swordfern	I	G,V,C,R
Pellaea viridis (Forsk.)Prantl		X	G,V,R
Pityrogramma calomelanos (L.) Link	silver fern	X	C,G
Pteridium aquilinum (L.)Kuhn var. *decompositum*(Gaud.)Tryon	*kilau*, bracken	E	G
Sphenomeris chinensis (L.) Maxon ex Kramer	*pala'a*	I	C,G,R
Monocotyledons			
Araceae *Alocasia macrorrhiza* (L.) Sweet	*'ape*	X(P)	V
Commelinaceae *Commelina diffusa* Burm. f.	*honohono*	X	V
Cyperaceae *Carex wahuensis* C. A. Mey		E	G

Taxa	Common Name	Status	Area(s)
Monocotyledons (cont'd.)			
Liliaceae			
Cordyline terminalis (L.)Kunth	ti	X(P)	V,R
Orchidaceae			
**Epidendrum X Obrienianum* Rolfe		X	C,G,R
Spathoglottis plicata Bl.	Philippine ground Orchid	X	C,G,R
Poaceae (Grasses)			
Andropogon virginicus L.	broom's edge	X	G
Cenchrus ciliaris L.	buffel grass	X	R
Melinis minutiflora Beauv.	molasses grass	X	G
Oplismenus hirtellus (L.)Beauv.	*honohono-kukui*	X	V
Pennisetum setaceum (Forsk.)Chiov.		X	G
Rhynchelytrum repens(Willd.) C.E.Hubb.	natal red-top	X	G,R
Schizostachyum glaucifolium (Rupr.) Munro	*'ohe*	X(P)	R
Setaria geniculata (Poir)Beauv.	perennial foxtail	X	G,C
Trichachne insularis (L.) Nees	sour grass	X	G,C
Dicotyledons			
Anacardiaceae			
Mangifera indica L.	Mango	X	V
Schinus terebinthifolius Raddi	Christmas-berry	X	V,R,G
Apiaceae			
Centella asiatica (L.) Urban	Asiatic pennywort	X	R,G
Araliaceae			
Schefflera actinophylla (Endl.) Harms	Octopus tree		
Juvenile, exotic (undetermined sp.)			
Asteraceae			
Ageratum conyzoides L.	*maile-hohono*	X	V
Bidens pilosa var. *minor* Sherff			V
Bidens pilosa L. var. *pilosa*	Spanish needle	X	V,R,C
Emilia fosbergii Nicol.	red *pua-lele*	X	C,R,G
Emilia sonchifolia (L.)DC.	lilac *pua-lele*	X	C,R,G
Erigeron bonariensis L.	hairy horseweed	X	C,R,G
Erigeron karvinskianus DC.	daisy fleabane	X	R,G
Eupatorium riparium Regel	spreading mist flower	X	R,G
Gnaphalium purpureum L.	purple cudweed	X	C
Pluchea odorata (L.) Cass.	sour bush	X	V,R,G
Vernonia cinerea (L.) Less.	ironweed	X	V,C,G

*A primary hybrid between *E. ibaguense* X *E. secundum*.

Taxa	Common Name	Status	Area(s)
Dicotyledons (cont'd.)			
Bignoniaceae			
Spathodea campanulata Beauv.	African tulip	X	V
Caricaceae			
Carica papaya L.	papaya	X	V
Combretaceae			
Terminalia catappa L.	false *kamani*	X	C
Convolvulaceae			
Ipomoea alba L.	moonflower	X	V
Ipomoea obscura (L.) Ker.	small yellow morning-glory	X	V
Epacridaceae			
Styphelia tameiameiae (Cham.) F.v.M.	*pūkiawe*	I	G
Euphorbiaceae			
Aleurites moluccana (L.)Willd.	*kukui*	X(P)	V
Phyllanthus debilis Klein ex Willd.	phyllanthus weed	X	V,G
Phyllanthus sandwicensis F.v.M.	*pā-makani-māhū*	E	G
Lamiaceae			
Hyptis pectinata (L.) Poit.	comb hyptis	X	V
Plectranthus parviflorus Willd.	cockspur flower	X	R
Leguminosae			
Caesalpinia major (Medic.)Dandy & Exelt.	*kākalaioa*	I	V
Cajanus cajan (L.) Millsp.	pigeon pea	X	V
Canavalia cathartica (L.)Sweet	*mauna-loa*	X	V
Cassia leschenaultiana DC.	partridge pea	X	C,V,R
Cassia surattensis Brown	*kalamona*	X	G,R
Crotalaria pallida Ait. var. *pallida* (=*C.mucronata* Desv.)		X	G,C
Desmodium intortum var. *pilosius-chulum* (DC.) Fosb.	?	X	V
Desmodium uncinatum (Jacq.)DC.	Spanish clover	X	V,G,R
Erythrina sandwicensis Deg.	*wiliwili*	E	V
Indigofera suffruticosa Mill.	indigo	X	V
Leucaena leucocephala (Lam.) de Wit	*koa-haole*	X	V,G,R
Mimosa pudica L.	sensitive plant	X	C
Mucuna gigantea (Willd.) DC.	sea bean	I	V
Samanea saman (Jacq.) Merr.	monkeypod	X	V,R
Stylosanthes guyanensis (Aubl.) Sw.	pencil flower	X	V
Malvaceae			
Hibiscus tiliaceus L.	*hau*	X(P)	V
Sida fallax Walp.	*'ilima*	I	G,R
Sida rhombifolia L.	Cuba jute	X	G

Taxa	Common Name	Status	Area(s)
Dicotyledons (cont'd.)			
Menispermaceae			
Cocculus ferrandianus Gaud.	*huehue*	E	R,G
Moraceae			
Cannabis sativa L.	marijuana	X	R
Ficus microcarpa L.f.	Chinese banyan	X	R,V
Myrtaceae			
Eugenia cuminii (L.) Druce	Java plum	X	V,R,G
Metrosideros collina (J.R.& G. Forst.) Gray	*'ōhi'a-lehua*	E	R
Psidium cattleianum Sabine	strawberry guava	X	G
Psidium guajava L.	yellow guava	X	G,R,V
Oxalidaceae			
Oxalis corniculata L.	yellow wood sorrel	I	V,G
Passifloraceae			
Passiflora edulis Sims f. *flavicarpa* Deg.	yellow *liliko'i*	X	V
Passiflora foetida L.	love-in-a-mist	X	G,R
Passiflora subpeltata Ortega	white passion flower	X	G,R,V
Passiflora suberosa L.	*huehue-haole*	X	G,R
Piperaceae			
Peperomia leptostachya H.&A.	*'ala-'ala-wai-nui*	I	R,V
Proteaceae			
Grevillea robusta A.Cunn.	silk oak	X	R
Rosaceae			
Osteomeles anthyllidifolia (Sm.) Lindl.	*'ūlei*	I	G
Rubiaceae			
Morinda citrifolia L.	*noni*	X(P)	V,R
Paederia foetida L.	*maile-pilau*	X	V,G,R
Solanaceae			
Solanum nigrum L.	*pōpolo*	X	V,G
Sterculiaceae			
Waltheria indica L.	*'uha-loa*	I	G,R
Tiliaceae			
Triumfetta bartramia L.	burbush	X	V
Thymelaeaceae			
Wikstroemia sp.	*'ākia*	E	R,G
Verbenaceae			
Citharexylum caudatum L.	juniper berry	X	C
Lantana camara L.	*lantana*	X	R,G
Stachytarpheta cayennensis (L.C.Rich) Vahl.	vervain	X	C,V,R,G

APPENDIX 4

ARCHAEOLOGICAL RECONNAISSANCE REPORTS

ARCHAEOLOGICAL RECONNAISSANCE SURVEY OF SITE OF PROPOSED PHASE II KAPA'A QUARRY, ULUMAWAO RIDGE, KAPA'A, KO'OLAU POKO, O'AHU

by

Thomas S. Dye

Department of Anthropology
Bernice P. Bishop Museum

Prepared for

Ameron HC&D

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INTRODUCTION

Under contract to Ameron HC&D, members of the Department of Anthropology, Bernice P. Bishop Museum, completed an archaeological reconnaissance survey of approximately 160 acres of Ameron HC&D land on the northwest slope of Ulumawao Ridge, Kapa'a Valley, in the *ahupua'a* of Kailua, Ko'olau Poko District, O'ahu Island. This area is the proposed site of the Phase II Kapa'a Quarry. Fieldwork was completed on March 14th, 1979, under the direction of the author with the assistance of Paul Cleghorn.

Reconnaissance survey, designed to determine the presence or absence of archaeological and/or historical sites, is the initial step in determining action required to mitigate the adverse effects of the Phase II Kapa'a Quarry on the cultural resources of the area.

DESCRIPTION OF SURVEY AREA

Ulumawao Ridge, in the northern portion of Kailua *ahupua'a*, is part of the topographically mature NE-SW-trending Kailua Hills. Surrounding these hills on the N, W, and S is a broad, well-watered plain that slopes gently to the NE. To the E lies Kawai Nui Swamp.

The survey area, located on the northwest slope of Ulumawao Ridge, is bounded on the NW by the TH-3 freeway (which follows the floor of Kapa'a Valley), on the SE by the Ulumawao ridgeline, on the NE by the City & County Kapa'a Sanitary Landfill, and on the SW by the ridgeline at the head of Kapa'a Valley. Elevations range from c.[1] 200 ft to Ulumawao Peak at 995 ft above sea level.

The local terrain is rugged and mountainous. Small, intermittent streams have cut narrow, steep-sided, V-shaped valleys with poorly developed alluvial plains. Valley sides are covered with talus.

Soils in the area reflect both the severity of the slope and the igneous origin of the parent material. The upper steep slopes are blanketed with Helemano silty clay (Foote et al. 1972:40), a dark, reddish-brown, neutral soil developed in alluvium and colluvium. 'Alaeloa silty clay, a dark reddish-brown, medium-acid soil, is confined to the lower slopes (Ibid.:26). Both of these soils favor rapid runoff and pose severe erosional hazards if vegetation is removed. Kawaihāpai stony clay loam, a dark-brown, well-drained, neutral soil, derived from basic igneous rock and upland soils (Ibid.:64), has been laid down in drainage ways and alluvial flats within the survey area. The extreme stoniness of this soil would inhibit cultivation by modern methods. It is, however, very fertile.

The dominant vegetation is composed of recently introduced species; however, several native plants and feral cultigens, notably papaya (*Carica papaya*) and *'ape* (*Alocasia Macrorrhiza*), remain (see botany report).

PREVIOUS INVESTIGATIONS

This report presents results of the first archaeological investigations within the project area. No references to the immediate study area were found either in the records at the State Historic Preservation Office or in Hawaiian myths or legends. However, ethnographic and archaeological investigations in proximal areas provide data germane to the interpretation of data generated by the present survey.

Ethnographic data collected by Handy and Handy (1972) led to their conclusion that:

[1] c= circa, or approximately

> Kailua must formerly have been very rich agriculturally, having one of the most extensive continuous terrace areas on Oahu, extending inland one and a half miles from the margin of Kawainui Swamp. Terraces extended up into the various valleys that run back into the Koolau Range [Handy & Handy 1972:457].

This agricultural richness was supplemented by the freshwater fishpond (*loko wai*) at the present swamp at Kawai Nui. Given an estimated annual yield in prehistoric times of between 300 and 500 pounds of fish per acre (Kikuchi 1973:218), the 450 acres of Kawai Nui would have yielded between 135,000 and 225,000 pounds of fish per year.

McAllister (1933) noted two archaeological sites on Ulumawao Ridge, NE of the project area; only Pahukini Heiau (Site 359) remains. Holomakani Heiau (Site 360) on the slopes below Pahukini, was destroyed when the land it occupied was cleared for agriculture. Site 14, an adz quarry investigated in 1951 by Kenneth Emory, succumbed to quarrying operations (Sterling & Summers 1978:229).

Archaeological survey of a portion of Ulumawao Ridge immediately N of the project area did not reveal any sites (Environmental Impact Study Corp. 1977:2-61).

FIELD METHODS

An archaeological reconnaissance survey is designed to determine the presence or absence of sites within a specified area. These data are then used to formulate responsible recommendations on the nature and extent of further archaeological work necessary as mitigative action prior to large-scale construction activities.

Where a 100% sample of the entire area is not feasible, reconnaissance surveys require investigation designed to yield quantifiable data with a determinable probability of error. This is accomplished through use of a stratified, systematic-transect survey, with strata defined on the basis of the degree of slope. For the present survey area, which lacks a permanent stream, strata definition depended on designation of an arbitrary slope percentage, above which habitation or dry-land agriculture involving slash-and-burn techniques would be unfeasible. Slope percentages below this figure would allow habitation or slash-and-burn agriculture without undue risk of

failure on account of erosion or landslides. These microtopographic zones are as follows:

Zone 1: Slopes less than 40%
1a: ridge crests
1b: alluvial flats and small hanging valleys.

Zone 2: Slopes greater than 40%
This zone includes the vegetated taluvial slopes of the valley sides and numerous bare rock outcrops.

Zone 1 was designated the primary sampling stratum and was given the most intensive coverage. Zone II was accorded relatively less coverage. A satisfactory stratification of survey intensity was achieved by determining the effective transect width within each microtopographic zone while in the field and then walking sufficient transects to achieve a desirable level of intensity. Effective transect widths varied considerably within a microtopographic zone depending on the thickness and nature of the vegetation. The effective transect widths presented below are thus average figures. The narrowness of ridge crests insured that a single transect achieved a 100% sample of the zone surveyed. It is thus omitted from the following table.

Zone	Notes	Effective Transect Width
Ib	A dense canopy of *kukui (Aleurites moluccana)* with a low groundcover of *honohono* grass facilitated survey.	40 meters
II	Low, dense, scrub growth on steep slopes made observation difficult.	10 meters

Areas with a slope of less than 30% received the most intensive coverage, especially along the forested, intermittent river flats. Slopes greater than 30% received less coverage on the basis that they are less likely to have been utilized for either habitation or agriculture.

All transects were plotted on a topographic map provided by Ameron HC&D with a scale of 1:2,400. The approximate length of each transect was then computed from the map, with the resulting total from each microtopographic zone multiplied by the effective transect width, yielding an estimate of the area surveyed within each zone. These figures were then compared with the total area of each microtopographic zone as determined from the map. The resulting figure, a percentage of the zone surveyed, is thus a reliable estimate of the minimum survey intensity within the designated sampling strata.

When an archaeological feature was located, its position was plotted on the map, salient morphological features were noted, and photographs were taken.

SURVEY RESULTS

A total of approximately 23 acres, or 14.4% of the project area, was surveyed. The area surveyed in each microtopographic zone is as follows:

Zone	Total Acreage	% of Survey Area	Acres Surveyed	% of Zone Surveyed
Ia	< 1	< 1	< 1	20
Ib	27.5	17	15.3	55
II	132.5	83	6.9	0.5
TOTALS	160	100	c. 23	14.4

One area of possible prehistoric activity and two graded, historic-era dirt roads were located during reconnaissance survey. The area of possible prehistoric activity has been assigned Site Number 50-Oa-G6-31. The historic features are described below, but site numbers have not been assigned to them.

SITE DESCRIPTIONS

Site 50-Oa-G6-31

This site is a complex of features in an area measuring c. 25 meters E-W and 50 meters N-S, located in a small, hanging valley with abundant talus and an intermittent stream that is a tributary of the largest stream in the project area (Figs. 1, 2, & 4). Surface features include a rectangular level area, relatively clear of boulders and bounded at least partially on all sides by a stone terrace facing, and a cobble-paved area (Fig. 3). Five small terrace features border the intermittent stream N and S of the level area. The terrace facings are one boulder high and c. 5 meters long, paralleling the contour. Boulders at the ends of these facings may be uphill extensions that delimit the extent of each feature.

The level area is bounded on the N by a terrace facing (Fig. 3) and the c. 2.3-meter-wide cobble-paved area. A terrace face marks the entire E edge of the area, forms the SE corner, and intersects a massive rock outcrop. A slumped terrace defines the W edge of the area along the bank of the intermittent stream. The level area measures 12 meters N-S by 13 meters E-W. No surface artifacts were found.

Roads

The two modern, graded roads enter the survey area from the N. One road ends near the top of the knoll to the north of the project area's major valley, while the other follows below the crest of Ulumawao Ridge to a point about 100 meters from Site 50-Oa-G6-31.

DISCUSSION

The temporal origin of Site 50-Oa-G6-31 cannot be determined on the basis of surface evidence. The five small terraces resemble agricultural features, which, unless the stream regimen has drastically changed, would have accommodated a dry-land root crop such as *kalo (Colocasia esculenta)*, *'uala (Ipomoea batatas)*, *'uhi (Dioscorea* sp.), or *'ape*. The terrace facings on the E and S sides of the level area act to keep soil from slumping into the clearing, suggesting that this area may have been used for habitation rather than agriculture.

There is no direct data at this time that may be brought to bear on the question of whether the modern road is associated with this site. The lack of historic artifacts (e.g., glass, metal) at the site suggests, however, that they are not associated.

Impact of the Proposed Project on Archaeological Resources

Quarry development on the NW slope of Ulumawao Ridge would have a direct, adverse impact on Site 50-Oa-G6-31, ultimately resulting in complete destruction of the site.

Significance of Sites

The significance of archaeological sites is based upon potential for further research or interpretive display. Site 50-Oa-G6-31 is void of interpretive potential on the basis of the common feature types represented and their location in an area that is difficult to reach. Several research questions remain, however, whose answers may yield information important in interpreting the site. These questions include, but are not limited to, the following:

1) What is the temporal origin of the site?
2) What was the function of the large cleared area?
3) If the site is a prehistoric agricultural settlement, why was it located in the small hanging valley and not on the better watered, more spacious alluvial flat below?
4) What is the relationship of the site to:
   a) Kawai Nui Fishpond?
   b) Pahukini Heiau?

Recommendations

It is recommended that test excavations of Site 50-Oa-G6-31 be performed to:

1) Recover datable materials
2) Determine the nature of subsurface deposits
3) Determine the function of the large, cleared area
4) Determine the need for salvage excavation prior to construction activities.

This work would involve detailed locational and plane-table mapping of the site and excavation of c. 2 square meters within the large, cleared area to accomplish the goals outlined above.

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ARCHAEOLOGICAL PHASE I SURVEY AND TEST EXCAVATIONS, SITE 50-Oa-G6-31, KO'OLAU POKO, O'AHU

by
Thomas S. Dye
Member, Society of Professional Archaeologists

REPORT OF DETAILED ARCHAEOLOGICAL SITE INVESTIGATION IN PROPOSED PHASE II KAPAA QUARRY AREA.

CONCLUSIONS: NO FURTHER HISTORICAL SIGNIFICANCE. ANY ADVERSE EFFECTS ON THE ARCHAEOLOGY OF THE REGION HAVE BEEN MITIGATED.

Prepared for
AMERON HC&D

August 1979

DEPARTMENT OF ANTHROPOLOGY
BERNICE P. BISHOP MUSEUM

* COPY NO. 1 ON FILE IN FACILITY ENGINEERING DEPT. AMERON HC&D FILE # F202-7A

INTRODUCTION

Under contract to Ameron HC&D, members of the Department of Anthropology, Bernice P. Bishop Museum, conducted archaeological Phase I mapping and test excavation of Site 50-Oa-G6-31 in the northern portion of Kailua *ahupua'a*, Ko'olau Poko District, O'ahu. Fieldwork was performed on July 10 and 11, 1979, under the direction of the author with the assistance of Paul Cleghorn.

Archaeological Phase I mapping and test excavation, designed to accurately record the surface features of particular sites and to determine the presence or absence of subsurface deposits, is the second step in determining action required to mitigate the adverse effects of the proposed Kapa'a Quarry on cultural resources. Site 50-Oa-G6-31, the only archaeological site located during reconnaissance survey of the proposed quarry area, was reported by Dye (Ms.) in April 1979.

SITE ENVIRONMENT

Site 50-Oa-G6-31 lies nestled in a small hanging valley on the N side of Ulumawao Ridge, just NE and downslope from the summit at Ulumawao Peak (c. 995 ft above sea level) (Fig. 1). The valley has been cut by a small intermittent stream that forms at the coalescence of several rivulets just above the site, cascading over several waterfalls below the site before joining the largest stream in the project area. Helemano silty clay, a dark-brown soil (Foote et al. 1972:40), here developed primarily in colluvium, thinly blankets these steep slopes; this soil favors rapid runoff and poses severe erosional hazards if vegetation is removed. Average slope of the valley through the site is 30%, and mass wasting of the clay and of cobbles and boulders is readily apparent. Large boulders are found on the uphill sides of several young *kukui* trees; the scars in their bark attest to the force with which they were struck.

The vegetation at the site, dominated by a tall, closed canopy of *kukui* (*Aleurites moluccanna*) and carpeted below by a lush cover of *honohono* grass

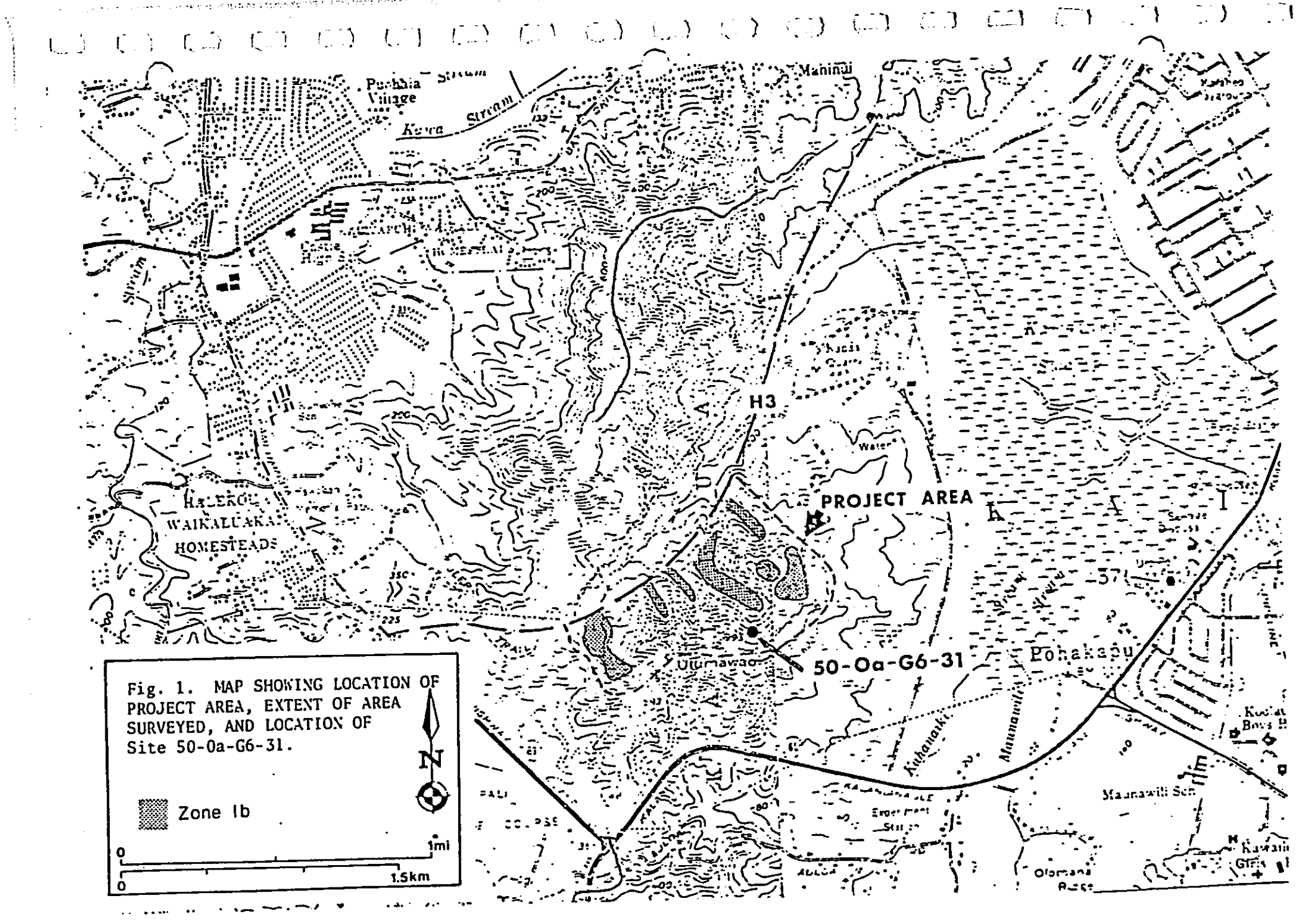


Fig. 1. MAP SHOWING LOCATION OF PROJECT AREA, EXTENT OF AREA SURVEYED, AND LOCATION OF Site 50-0a-G6-31.

(*Oplismenus hirtellus*) and a vine (*Ipomoea* sp.) is currently being invaded by an agressive, exotic association of guava (*Psidium guajava*) and octopus tree (*Schefflera actinophylla*). The *kukui* grove, now completely surrounded, has no outside source of seeds and thus must sustain itself. Two Polynesian introductions besides the *kukui* are present below the site; *'ape* (*Alocasia macrorrhiza*) grows in the bed of the intermittent stream and near seeps in the valley sides, while ti (*Cordyline terminalis*) is distributed more generally.

METHODS

The reconnaissance survey report recommended that site 50-Oa-G6-31 be thoroughly mapped and that c. 2 square meters be excavated within the main feature of the site, the large, cleared area, to:

(1) recover datable materials
(2) determine the nature of subsurface deposits
(3) determine the function of the large cleared area
(4) determine the need for salvage excavation prior to construction activities.

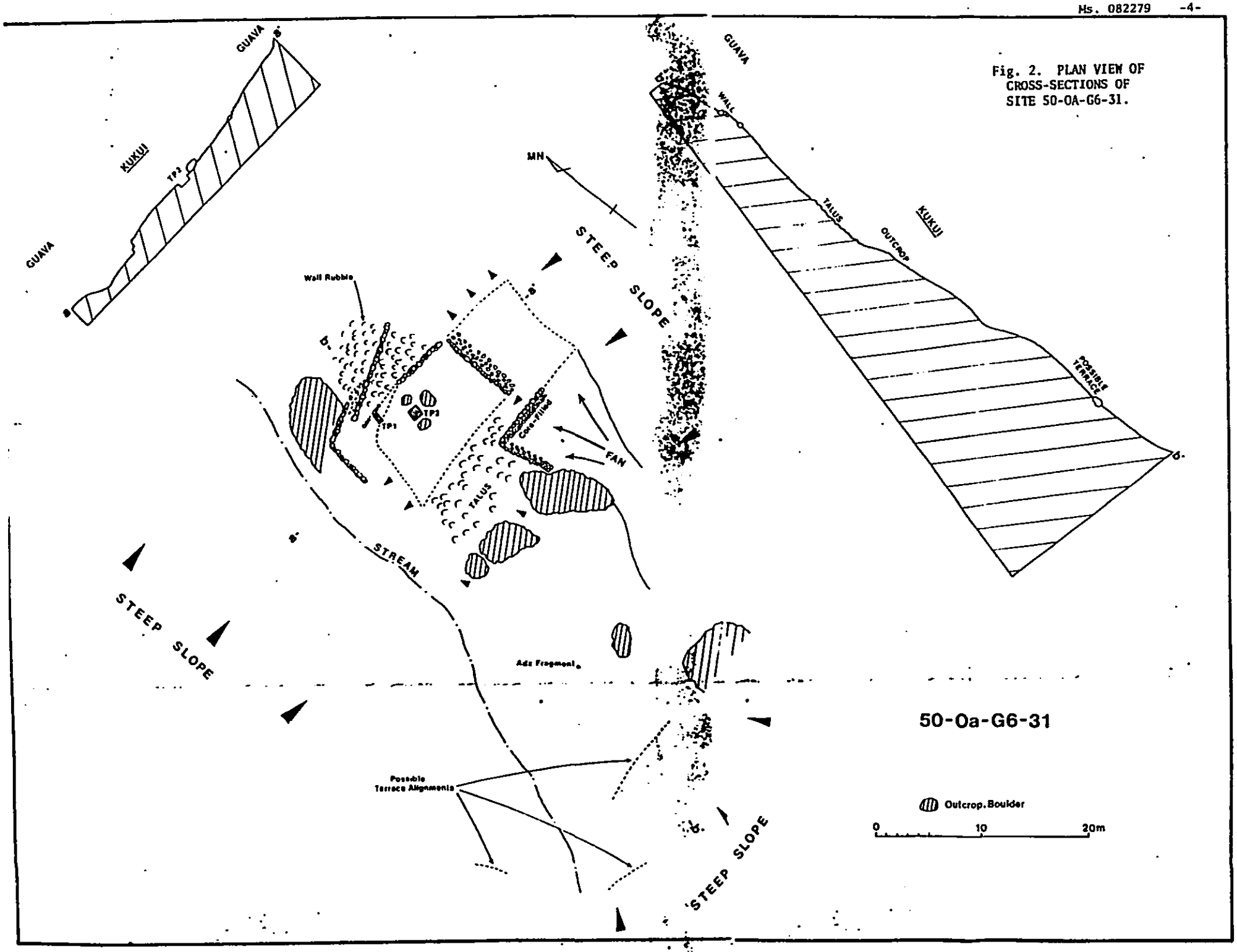
To accomplish these goals the site was plane-table mapped at a scale of 1:200 with telescopic alidade and metric stadia (Fig. 2). Two test pits, totaling 1.5 square meters in area were excavated to basal material with trowels following accepted archaeological methods.

An artifact collected from the surface was removed to the B. P. Bishop Museum for analysis. Photographs taken in the field are on file in the Department of Anthropology.

SITE FEATURES

The site itself occupies about .18 ha (.45 acre) of the hanging valley and consists of a level soil area bounded by a series of stone retaining walls (Fig. 2). North of the level area are three small probable terraces defined by one-course boulder alignments. Two terraces S of the level area, noted earlier (Dye Ms.:5), were not distinct enough upon reexamination to be defined as features.

Fig. 2. PLAN VIEW OF CROSS-SECTIONS OF SITE 50-0A-G6-31.



The level soil area was formed by the fortuitous presence of a large basalt outcrop, immediately upslope, that has served to divert the flow of colluvium to the W and into the intermittent stream. Colluvial flow over the boulder outcrop onto the level area is slight, consisting of stones and highly organic, fine, crumb-structured topsoil. The flow appears to be greatest in two breaks in the outcrop. Here a small percentage of soil mixed with pebbles and cobbles fans out onto the talus below. Some soil erodes over the top of the outcrop, but the amount seems to be small in comparison with the flow within the breaks. Boulders now present on the level area could have arrived by whatever path dictated by gravity.

Retaining walls perform two functions related to the flat area. Those to the S and E restrain the colluvial flow and thus augment the natural function of the outcrop, while those to the N and W keep soil on the flat area from eroding downslope.

Although continuing erosion has toppled several wall faces and only remnants of the upper courses remain, walls appear to be of two types. The most prevalent type has a single face of boulders that appear to have been laid up against an existing soil slope (Fig. 3). The other, more substantial, type of wall has two boulder faces with a core fill of cobbles and pebbles (Fig. 4). Both types are properly referred to as retaining walls, as they are not free-standing.

Two walls act to keep colluvium from spilling onto the level area. The first runs N for 5.2 meters from the basalt outcrop as a single boulder face. It turns at a right angle to the E and runs for 6.4 meters. The wall here is bifaced with a core fill, up to three courses (c. 40 cm) high (Fig. 5). Behind the wall is a colluvial fan, scattered with cobbles and small boulders.

Another single-face wall, 7.7 meters long, runs along the E edge of the level area. It is now one to two courses along its length; severe slumping at its S end has obscured its probable intersection with the bifaced, core-filled wall. The wall retains a fairly flat, nearly boulder-free soil terrace, approximately 57 square meters in area.

Two wall systems keep soil from eroding off of the level area. These appear to be single-face retaining walls, but excavation, described below, indicated that they may have been at least partially free-standing at the time of construction.

The lower wall system, which begins about 1.3 meters below the surface of the level area and rises to a maximum height of .93 meter, parallels the stream for 5 meters before it turns a slightly obtuse corner to the E for an additional 4.2 meters. The facing becomes indistinct at this point and another facing, about 1 meter above it, extends E for 9.3 meters. The maximum height of this upper facing is .55 meter.

The final system is an alignment that defines the N edge of the level area for 11 meters. Slumping and erosion have broken down the W portion of the alignment. The E end nearly intersects the N end of the W retaining wall.

The level soil area delimited by these retaining walls and the spread of talus below the rock outcrop cover approximately 96 square meters. A few scattered large boulders have come to rest on the W half of the area, while the E half remains clear.

Three possible one-course boulder terrace alignments are located between 30 and 40 meters upslope from the level area. The two alignments on the E side of the stream are 9 and 4.5 meters long and accurately parallel the contour. The single alignment, W of the stream, is 3.2 meters long.

Fig. 3. SINGLE-FACED, BOULDER RETAINING WALL, N OF LEVEL AREA, SITE 50-OA-G6-31.

Fig. 4. CONSTRUCTION DETAIL OF BIFACED, CORE-FILLED WALL, S OF LEVEL AREA, SITE 50-OA-G6-31.

Fig. 5. RETAINING WALL, N OF LEVEL AREA, SITE 50-OA-G6-31.

EXCAVATION

Two test pits were excavated in the level soil area. TP1, a 1.0-by-.5-meter pit, was excavated at the inner face of the alignment bounding the N edge of the level area, to expose the base of the alignment and because this is an area of soil deposition (Fig. 6). TP2, a 1-meter square, was excavated in the center of the level area (see Fig. 2). Neither pit yielded any cultural material or charcoal. Stratigraphy is described below.

TP1

Layer	Depth below Surface	Description
I	0-18 cm (avg.depth, 12 cm)	10YR4/3d* (brown) clay; medium crumb structure; abundant rootlets, *kukui* nuts; strong peds; plastic; sticky; clear, wavy boundary; no cultural material.
II	18-28+ cm	10YR6/4d (light yellowish-brown), mottled 10YR7/6d (yellow) clay; weak, subangular, blocky structure, breaks to fine peds; peds strong; very sticky; very plastic. Many angular basalt cobbles. No cultural material.
III	28-35 cm**	Sterile C horizon.

The alignment in the N face of TP1 originates in Layer II with three large cobbles surmounted by a small boulder. There is no evidence for cutting and filling during alignment construction (Fig. 7).

TP2

Layer	Depth below Surface	Description
I	0-12 cm	10YR3/3d*(dark-brown) clay. Medium crumb structure; strong peds; slightly plastic; slightly sticky; abundant rootlets and *kukui* shells; clear, wavy boundary. No cultural material.
II	12-27 cm	10YR4/2d (dark greyish-brown) clay; weak sub-angular blocky structure, breaks to strong peds; sticky; plastic; some angular pebbles and cobbles; no cultural material. Distinguished from Layer I by lack of *kukui* shells.
III	27+ cm**	Angular basalt pebbles and cobbles. Talus.

* Munsell Color Chart designation.
**To depth of excavation.

Fig. 6. TP1 AT THE N EDGE OF LEVEL AREA, SITE 50-OA-G6-31.

Fig. 7. N FACE OF TP1, Site 50-OA-G6-31. Note subsurface extension of alignment.

ARTIFACT

One basalt adz fragment was collected from the surface of the site (see Fig. 2). This artifact (no. 50-Oa-G6-31-1) measures 3.7 by 2.8 by 0.9 cm. It is dark-grey (5Y4/1) and polished on two facets. Polished areas measure 3.7 by 2.8 cm and 1.7 by 0.7 cm, and meet at a right angle, 1.6 cm long.

EVIDENCE FROM THE HISTORIC ERA

As noted in the report on the reconnaissance survey, a modern graded road approaches Site 50-Oa-G6-31 from the N, ending about 100 meters upslope of the site. No evidence was found during the present work to suggest any association between this road and the site.

Two cattle bones were noted, eroding down the large break in the outcrop N of the level area. Cattle were common in the area by 1840 (Devaney et al. 1976:70).

DISCUSSION

Due to the lack of datable materials, the temporal origin of Site 50-Oa-G6-31 remains undetermined. The adz fragment suggests that the site was utilized prior to the introduction of metal tools such as axes or machetes. Inferences on the time and nature of site utilization made on the basis of a single adz fragment, while inherently weak, are further debilitated by two considerations--that stone tools were used well into the historic period of Hawaiian history, and that the tool was found on a rapidly eroding surface and thus may have been transported for some distance from the site of initial deposition.

The hypothesis that the level area may have been used for habitation (Dye Ms.:6) seems unlikely due to the lack of subsurface cultural deposits, as revealed in excavation. The hypothesis that the site once functioned as an agricultural feature seems probable, but the poor condition of the surface

features due to erosion, coupled with the lack of subsurface cultural deposit in the area, suggests that this hypothesis is presently untestable.

SIGNIFICANCE

The significance of archaeological sites is based upon potential for further research or interpretive display. Site 50-Oa-G6-31 is void of interpretive potential on the basis of the common feature types represented and their location in an area that is difficult to reach. The potential for further research is obviated by the lack of a subsurface cultural deposit.

RECOMMENDATIONS

Site 50-Oa-G6-31, now completely mapped, has yielded all the data that it is likely to yield with presently available archaeological techniques. Phase I mapping and test excavations have thus mitigated the adverse effects of proposed quarry construction on the research potential of the site. Accordingly, no further archaeological work at Site 50-Oa-G6-31 is necessary. The site is not eligible for inclusion on the State or National Registers of Historic Places.

REFERENCES

Devaney, Dennis M., Marion Kelly, Polly Jae Lee, and Lee S. Motteler

1976 *Kāne'ohe: A History of Change.* Departmental Report Series 76-2. Dept. Anthropology, B. P. Bishop Mus.

Dye, Thomas S.

Ms. Archaeological Reconnaissance Survey of Site of Proposed Phase II Kapa'a Quarry, Ulumawao Ridge, Kapa'a, Ko'olau Poko, O'ahu (1979). Ms. 041679 on file in Dept. Anthropology, B. P. Bishop Mus.

APPENDIX 5

BLASTING PROCEDURES

Ameron
HC&D

Policy and Procedure

Page	Effective Date	Issue No.	Number
1 of 2	May, 1982		

KAPAA QUARRY BLASTING

PURPOSE

To document the policy and procedure for blasting at Kapaa Quarry

APPLICABLE TO

Ameron HC&D, Aggregates/Sand Department

POLICY

In blasting practice, every precaution must be taken to ensure safety to all employees and visitors at the quarry site as well as promoting good neighbor relations within the community by keeping ground vibration, air blast, fly rock, and dust within established standards.

1. SAFETY

   Safety will be the primary consideration in the transportation, storage, handling and use of explosives at Kapaa Quarry.

   a. Explosives will not be sold, transported, stored or used without the supervision of a person holding a current blasting permit from the State of Hawaii.

   b. The non-electric blasting system will be used whenever possible. Electric blasting may be used in secondary blasting depending on the drill pattern.

   c. All State and Federal regulations will be followed in loading and initiation of explosive charges.

   d. As a general rule, secondary blasting produces some fly rock and every precaution will be used to keep this at a minimum.

   e. Before a blast is fired, the following steps are required:

      1. All surplus explosives will be returned to the magazine.

      2. The area will be cleared of all personnel and vehicles to a safe distance under sufficient cover.

      3. All Shop office and Quarry personnel will be notified of the time of blast.

4. Department secretary will inform Main Office of blast time.

5. A warning signal will be given by the person in charge using a loud whistle:

   Six (6) long - clear area
   Wait two (2) minutes
   Three (3) short
   Wait ten seconds
   Blast
   One (1) long - all clear

2. COMMUNITY RELATIONS

   a. In primary blasting using a 6 1/2" hole, the maximum number of holes fired at one time will not exceed 35 holes.

   b. The maximum explosive weight per delay period will not exceed 1000 pounds.

   c. In secondary blasting using 3 1/2" holes, discretion will be used in loading explosives to minimize air blast.

   d. Seismograph monitoring of primary blasts exceeding 15 holes will be maintained.

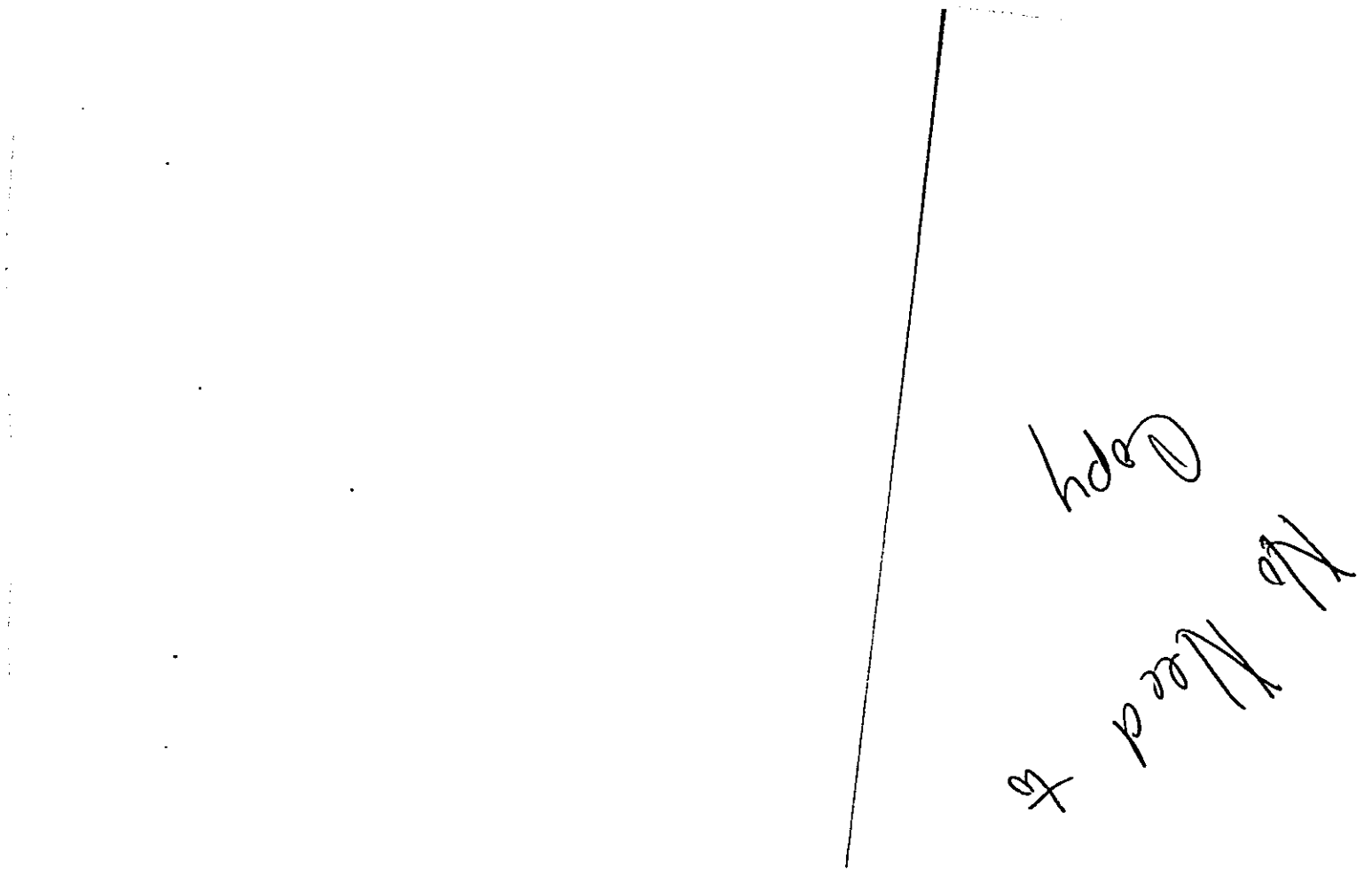
      1. Particle velocity is measured in inches per second and the safe blasting limit according to the U.S. Bureau of Mines is 2.0 inches/second. At Kapaa Quarry, particle velocity will not exceed 0.20 inches/second, i.e., only 10 percent of the safe blasting limit.

      2. Air blast or air wave overpressure is measured in psi or decibels. U.S. Bureau of Mines recommends a safe air wave overpressure of 0.5 psi which equates to 165 decibels. At Kapaa Quarry, we will attempt to keep air wave overpressure (air blast) at less than 120 decibels.

      3. Determination for seismograph location during blasting will be based on what area in the quarry is being blasted as well as historical community response to previous effects.

      4. Evans, Goffman and McCormick, Geological Consultants, will review seismograph film and make recommendations on a continuing basis. The Department Manager and Operations Superintendent will routinely review blast reports.

      5. Community complaints will be responded to immediately. Appropriate Unit Management will be notified.


Depth
Mud Level

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

February 15, 1984

Your: 1-14421-0-D

R. H. Towill Corporation
677 Ala Moana Boulevard, Suite 1016
Honolulu, Hawaii 96813

Gentlemen:

Thank you for the opportunity to review the draft environmental assessment for Phase II of the Kapaa Quarry project. We have a number of concerns to express.

Aquatic Resources

As an ephemeral stream, "Kapaa Stream" is likely to have very little value as habitat for aquatic life. From the standpoint of aquatic resources, therefore, our only concern with the proposed expansion is that eroded soils, dust, and rock be kept from washing down slope into Kawainui Marsh.

The environmental assessment notes that grading and silting ponds are used at the present site to prevent such effects. It states "a comparable drainage plan will be prepared before quarrying operations begin in the Phase II area" (p. 23), and "Spent process water . . . is (now) diverted into a retention basin . . . after satisfactory quality is achieved by sampling (sic), the water is discharged into the natural drainage course . . . storm water is captured in three containment ponds designed to hold the runoff from a 10-year storm . . ." (pp. 27-28). To the best of our knowledge, the present operation has not resulted in impacts adverse to aquatic resources in Kawainui Marsh. Provided that the "comparable plan," proposed but not yet developed, suffices to maintain adequate protection for the marsh, we have no objection to the action proposed.

Fauna

The discussion in Section 4.3.3.2 refers to previous surveys by Shallenberger (1977) and Conant (1981) of Kawainui Marsh and to a "biological field reconnaissance" of the project area conducted in September 1983. It is not clear whether the findings in Table 3 refer to the previous studies or the project reconnaissance. Obviously, the list of waterbirds on the first page of the

table refers to Kawainui, although the second page could include species found on the project site. The findings of the project field reconnaissance of September 1983 should be shown explicitly and provide details of how thorough this survey was. As presently written, this section is misleading and incomplete. Of greater importance is what fauna exists on the site, not at the marsh some distance away.

One species of land bird, the Golden plover, is likely to inhabit the subject area (roosts on cliffs, feeds on grassy areas). Also, quarrying activities will involve removal of vegetation which constitutes habitat for wildlife. Stating (Section 5.8.2.) that birds and mammals will just move elsewhere is erroneous, as habitat can support just so much wildlife, (in balance with food, nesting sites, and cover). A truer statement would be that the activity will eliminate wildlife, but that revegetation will eventually restore areas for these animals.

Although the proposed project will have no direct impact on waterbirds at Kawainui (see Section 5.8.2.), indirect effects are possible via Kapaa stream drainage which could contribute silt and spoil to Kawainui, with adverse results. (see page 13, first paragraph) This impact should be discussed.

There is no report of the "biological field reconnaissance" included among the appendices, as done for botany and archaeology. This omission should be rectified.

The assessment should address more fully indirect impacts on fauna as these can often be more serious than indirect. In other words, what effects on wildlife will be felt outside the project boundaries (i.e., Kawainui) as a result of vegetation removal, run-off, noise, etc.

Historic Sites

The project area is adjacent to Pahukini heiau, listed on the National Register of Historic Places. Archaeological surveys and test excavations were conducted in the project area by the Bishop Museum. Therefore, no further archaeological study is warranted. In the event that any previously unidentified sites or remains (such as artifacts, shell, bone, or charcoal deposits, human burials, rock or coral alignments, pavings, or walls) are encountered, Ameron should stop work and contact our historic sites office at 548-7460 immediately.

Recreation

While the subject area is within the Planning Area Boundary of the Resource Management Plan for Kawainui Marsh, it is not within the boundaries of the Kawainui Marsh Resource Management Plan itself. We note that visual concerns

have been addressed and the Phase II area will not be seen from the Nuuanu Pali Lookout. There are no other known public recreation concerns.

Water Resources and Erosion Control

Although the proposed expansion of quarrying operations is not expected to impact ground water resources, impact to the nearby Kapaa Stream should be considered further.

Containment of storm water and quarry process water is of concern. The existing Phase I site drainage plan is described and a statement is made indicating a comparable drainage plan will be prepared for Phase II prior to initiating quarrying operations. A drainage and storm water management plan should be included in any draft environmental impact statement (EIS).

Should the proposed quarry development require modification or alteration of the Kapaa Stream channel in any way, a permit from this department will be required in accordance with Title 13, Chapter 167, Administrative Rules, protecting instream uses of water in Windward Oahu.

Landscaping and restoration of graded and excavated areas should also be fully addressed in an EIS, as well as other proposed erosion and sedimentation control measures.

Conservation District

Phase II involves lands in the Conservation District. Accordingly, use of the area requires approval of the Board of Land and Natural Resources under Title 13, Chapter 2, Administrative Rules. After an application is filed for the requested use, a determination will be made within 30 days, whether an environmental impact statement is needed.

Sincerely,

SUSUMU OHO
Chairperson
and
State Historic Preservation Officer

R. M. TOWILL CORPORATION

677 ALA MOANA BLVD • SUITE 1016
HONOLULU HAWAII 96813
(808) 524-8200

Engineering • Planning • Photogrammetry • Surveying • Construction Management • Energy Systems

March 27, 1984

Reference: 1-14421-0-D

Mr. Susumu Ono, Chairman
Department of Land and Natural Resources
State of Hawaii
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

SUBJECT: Kapaa Quarry, Phase II
Kailua, Koolaupoko, Oahu

We appreciate your review of the draft environmental assessment for the Phase II project of the Kapaa Quarry. In response to your comments we wish to offer the following:

Aquatic Resources

We are pleased to note that based on the existing and proposed mitigation measures for protection of Kawainui Marsh from quarrying operations, there are no objections to the proposed action.

Fauna

The section on fauna was compiled by a wildlife biologist on the staff of R. M. Towill Corporation. It is based on extensive literature research, interviews and a site reconnaissance survey. The field survey was conducted during three days in September 1983. As is normal procedure for this type of survey, a pair of binoculars was used in the field work and observations were made during the early morning hours and late afternoon hours. In this respect, we did not add our staff's wildlife report to the appendices but incorporated findings in the assessment report itself. As noted, it is lengthy compared to the botanical and archaeological sections which reports by subconsultants have been appended.

We are sorry we did not identify the species found during the field reconnaissance survey. We have made this addition to the fauna list in our revised report.

We have also amended our statement to reflect the habitat alteration and its effect on wildlife as recommended by your staff.

With regards to the adverse impacts on Kawainui Marsh and the waterbirds which inhabit the area, it is our opinion that since quarrying operations have been going on for the past 30 years or more, any significant adverse impact would have surfaced by now. The stringent regulations in existence today prevent deterioration of Kawainui Marsh due to quarrying operations as described in the assessment report. The NPDES permit administered by the State Department of Health mitigates any possible adverse impact to the Kawainui Marsh waters.

Historic Sites

As stated in the assessment, should any archaeological remains be uncovered during quarrying operations, work will stop and the proper authorities notified.

Recreation

We are happy to note that the mitigation measures involving visual concerns are satisfactory.

Water Resources and Erosion Control

Any concern on the drainage aspects of the ephemeral "Kapaa Stream" is mitigated by compliance with the NPDES permit. This permit, administered by the Department of Health, ensures mitigation measures will be taken to prevent degradation of the Kawainui Marsh waters. A completed drainage plan will be prepared following the exploratory drilling program before any quarrying begins in the Phase II area in conformity with the Department's conservation district regulations.

As noted in the report, suspension of the H-3 Highway construction by the courts have delayed the work of the landscape architectural firm. Landscaping and revegetation requirements of the depleted quarry areas are contained in lease provisions and court decisions as described in the assessment report. Further, any landscaping plan for Phase II will be submitted to the Department for prior approval. This will be coordinated with the Department of Transportation, landowners, and interested groups such as the Kailua Garden Club and Outdoor Circle.

Thank you for your comprehensive review. Following approval for this non-conforming use, Ameron HC&D expects to work closely with your staff to continue quarrying operations in such manner so as to comply with applicable laws and regulations and to remain a good neighbor of the surrounding communities.

Very truly yours,

Frank T. Gandel / Chief Engineer
Engineering Department

FTS:wpc7

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
REGION NINE
Hawaii Division
Box 50206
Honolulu, Hawaii 96850 February [illegible], 1984

Mr. William Y. Thompson, Manager
Planning & Land Development Department
R. M. Towill Corporation
677 Ala Moana Blvd., Suite 1016
Honolulu, Hawaii 96813

Dear Mr. Thompson:

Subject: Draft Environmental Assessment, Proposed Kapaa Quarry Phase II Project, Kailua, Oahu, Hawaii

Thank you for the opportunity of reviewing the subject document.

We assume that the future conveyor belt system (Figure 3) will be located on the road beneath the existing underpass structure at H-3 Station 564+00.

We have no other comments to offer.

Sincerely yours,

for H. Kusumoto
Division Administrator

March 12, 1984

Mr. H. Kusumoto, Division Administrator
Hawaii Division, Region Nine
Federal Highway Administration
U.S. Department of Transportation
Box 50206
Honolulu, Hawaii 96850

Dear Mr. Kusumoto:

SUBJECT: Proposed Kapaa Quarry Phase II Project
Kailua, Oahu, Hawaii

We appreciate your review and comment on the draft environmental assessment for the Kapaa Quarry Phase II Project. In response to your helpful suggestion, we have added a statement regarding the use of the H-3 Highway underpass for vehicular traffic as well as for the future conveyor belt system.

Thank you.

Very truly yours,

Frank T. Sanpei
Chief Engineer

FTS:mh

UNITED STATES MARINE CORPS
MARINE CORPS AIR STATION
KANEOHE BAY, HAWAII 96863

IN REPLY REFER TO:
11000
15 FEB 1984

R. M. Towill Corporation
Attn: Mr. M. Y. Thompson
677 Ala Moana Boulevard, Suite 1016
Honolulu, Hawaii 96813

Dear Mr. Thompson:

Your letter, reference 1-14421-0-D of 27 January 1984, forwarded a copy of a draft environmental assessment for a proposed Kapaa Quarry project for review and comments. The limited response time allowed precludes any detailed review by the Station. However, based on a brief review, it appears that the proposed project will not have any significant impact on Marine Corps Air Station, Kaneohe Bay.

Thank you for the opportunity to review the draft assessment. If there are any questions, please contact LT. A. H. ECKERT, Public Works Officer, phone 257-2171.

Respectfully,

Alfred L. Mize

Alfred L. Mize
Lieutenant Colonel, U. S. Marine Corps
Director, Facilities Department
By direction of the Commanding Officer

Copy to:
Department of Land and Natural Resources, State of Hawaii
COMNAVBASE, Pearl Harbor
COMPACNAVFACENGCOM

March 13, 1984

Lt. Col. Alfred L. Mize
Director, Facilities Department
Marine Corps Air Station
United States Marine Corps
Kaneohe,Bay, Hawaii 96863

Dear Colonel Mize:

SUBJECT: Kapaa Quarry Phase II Project
Environmental Assessment

Thank you for reviewing the draft environmental assessment for the proposed Kapaa Quarry Phase II. We are presently working with Austin MCAD in finalizing the assessment.

Very truly yours,

Frank T. Sanpei
Chief Engineer

FTS:nh

CITY AND COUNTY OF HONOLULU

February 21, 1984

Mr. Francis T. Sanpei
R.H. Towill Corporation
677 Ala Moana Boulevard
Suite 1015
Honolulu, Hawaii 96813

Dear Mr. Sanpei:

Draft Environmental Assessment for the
Proposed Kapaa Quarry Phase II Project
Kailua, Oahu; Tax Map Key 4-2-15: 1

We have reviewed the subject Draft Environmental Assessment and find that the major issues and impacts have been identified and addressed.

For your information, the zoning for the site is P-1 Preservation and the Koolaupoko Development Plan designation is Preservation. The City and County of Honolulu has no jurisdiction over the site, however, as long as it is classified within the State Conservation District.

Thank you for the opportunity to review and comment on the Draft. We would appreciate receiving any subsequent documents or information regarding the proposal.

If you have any questions, please contact John Nakagawa of our staff at 523-4540.

Very truly yours,

MICHAEL H. McELROY
Director of Land Utilization

MHM:sl

March 13, 1984

Mr. Michael H. McElroy
Director of Land Utilization
Department of Land Utilization
City & County of Honolulu
650 So. King Street
Honolulu, Hawaii 96813

Dear Mr. McElroy:

SUBJECT: Draft Environmental Assessment for the Proposed
Kapaa Quarry Phase II Project - Kailua, Oahu, HI
Tax Map Key 4-2-15:1

We appreciate your review of the draft environmental report for the Kapaa Quarry Phase II Project. We have added the City and County's land use designation and zoning of the site. Thank you for calling this to our attention.

Very truly yours.

Frank T. Sanpei
Chief Engineer

FTS:mh

GEORGE R. ARIYOSHI
Governor

JACK K. SUWA
Chairman, Board of Agriculture

SUZANNE D. PETERSON
Deputy to the Chairman

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 So. King Street
Honolulu, Hawaii 96814

Mailing Address:
P. O. Box 22159
Honolulu, Hawaii 96822

February 2, 1984

R. M. Towill Corporation
677 Ala Moana Boulevard, Suite 1016
Honolulu, Hawaii 96813

Attention: Mr. W. Y. Thompson

Dear Mr. Thompson:

Re: Proposed Site for the New Kapaa Quarry
Phase II Project
TMK: 4-2-15: por. 1 Kapaa Valley, Oahu

The Department of Agriculture has reviewed the subject Environmental Assessment and does not have comments to offer.

Thank you for the opportunity to comment.

Sincerely,

JACK K. SUWA
Chairman, Board of Agriculture

"Support Hawaiian Agricultural Products"

March 13, 1984

Mr. Jack K. Suwa
Chairman
Department of Agriculture
1428 So. King Street
Honolulu, Hawaii 96814

Dear Mr. Suwa:

SUBJECT: Kapaa Quarry Phase II Project
Environmental Assessment

Thank you for reviewing the draft environmental assessment for the proposed Kapaa Quarry Phase II. We are presently working with Ameron HCSD in finalizing the assessment.

Very truly yours,

Frank T. Sanpei
Chief Engineer

FTS:mh

CITY AND COUNTY OF HONOLULU

OUR REFERENCE DI-JS

February 6, 1984

R. M. Towill Corporation
677 Ala Moana Boulevard, Suite 1016
Honolulu, Hawaii 96813

Attention: W. Y. Thompson

Gentlemen:

Thank you for giving us the opportunity to review the draft copy of an Environmental Assessment for the proposed site of the Kapaa Quarry Phase II Project. The proposed project does not appear to have any significant impact on the public facilities or services provided by the Honolulu Police Department. Therefore, we do not have any objections to your proposal at this time.

Sincerely,

DOUGLAS G. GIBB
Chief of Police

By Edwin Ross
EDWIN ROSS
Assistant Chief of Police
Administrative Bureau

March 13, 1984

Mr. Edwin Ross
Assistant Chief of Police
Administrative Bureau
Police Department
City & County of Honolulu
1455 South Beretania Street
Honolulu, Hawaii 96814

Dear Mr. Ross:

SUBJECT: Kapaa Quarry Phase II Project
Environmental Assessment

Thank you for reviewing the draft environmental assessment for the proposed Kapaa Quarry Phase II. We are presently working with Aaron HCSD in finalizing the assessment.

Very truly yours,

Frank T. Sanpei
Chief Engineer

FTS:mh

CITY AND COUNTY OF HONOLULU

February 16, 1984

DGP1/84-335

R. M. Towill Corporation
677 Ala Moana Boulevard, Suite 1016
Honolulu, Hawaii 96813

Attn: Mr. W. Y. Thompson

Gentlemen:

Proposed Site for the
New Kapaa Quarry Phase II Project
Kailua, Oahu, Hawaii

Our comments are as follows:

1. A completed section of the H-3 crosses through the Kapaa Valley immediately bordering the Quarry Phase II site. Quarry blasting procedures call for drilling a series of holes 6 1/2 inches in diameter by 55 feet deep spaced in a 16 by 18-foot pattern. The maximum number of holes fired at any one time is not expected to exceed 35 holes.

   We have a concern for H-3 motorists being potentially affected by each blast, in the form of unexpected shock vibrations or blast noise or heavy dust emissions. Tradewind patterns within the area will be generally moving from the quarry site to the H-3 from the east-northeast direction at an average speed of ten to fifteen miles per hour.

   The monitoring program described in the report may also need to pay particular attention to ensure that blast vibrations do not cause incremental structural damage to the H-3 section/Halekou Interchange as well as to homes of nearby communities.

2. Present access to Kapaa Quarry Phase II is from the Kapaa Quarry Access Road. Inasmuch as the access road is a private facility controlled by Kaneohe Ranch Company, Ltd., a general discussion describing arrangements to the long term permitted use of the quarry roadway for quarrying operations may be needed.

Sincerely,

RALPH KAWAMOTO
Planner

APPROVED:

WILLARD T. CHOW

March 13, 1984

Mr. Willard Chow, Director
Department of General Planning
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Attention: Mr. Ralph Kawamoto

Dear Mr. Chow:

SUBJECT: Proposed Site for the New Kapaa Quarry
Phase II Project - Kailua, Oahu, Hawaii

Thank you for your review of the assessment report for the Phase II project at Kapaa Quarry. In response to your concern on the effects of blasting upon the H-3 motorists, we wish to state that the passing motorists will most likely be unaware of the activity. Blasting is controlled and the sound is more of a dull thud. The noise of traffic will probably mask the explosive sound.

There will be some dust and if the wind is strong, it may be carried a distance. Since the Kapaa Quarry crew is experienced, small charges will be used in proximity of H-3. Further, wind conditions can be studied to set off the charges at a suitable period of low wind. Field conditions will govern the manner in which explosives are detonated.

The monitoring program detailed in the report has been developed to insure blast vibrations do not cause structural damage to any facility. Particular attention has been given to this aspect of quarrying operations. If changes from present practice are needed, such action will be done in consultation with the geologist who developed the present techniques. Ameron HCSD is committed to complying with regulatory provisions and maintaining good relations with the nearby communities.

Your comment on access to the project site has been clarified by an addition to Section 4.6.1 Roads. The new material reads as follows:

"The 1964 lease with the Harold K. L. Castle Trust provides a non-exclusive easement for access to Kalanianaole Highway over the Kapaa Quarry Access Road. Another easement permits the quarry to connect to Mokapu Boulevard.

"A final easement permits connection to Kamehameha Highway. This easement, running parallel to H-3 Highway, has not been established and no road has been constructed. These road easements are coterminous with the quarry lease which expires in 2012.

"The City and County also uses the Kapaa Quarry Access Road for access to the Kapaa Landfill Site with permission from the Castle Estate. A portion of the Kapaa Quarry roadway crosses the City owned Kapaa Landfill Site and is covered by an easement between the City and Ameron HCSD."

We appreciate your helpful comments at this early stage.

Very truly yours,

Frank T. Sanpei
Chief Engineer

FTS:mh

United States Department of the Interior

GEOLOGICAL SURVEY
Water Resources Division
P.O. Box 50166
Honolulu, Hawaii 96850

February 7, 1981

Mr. William Y. Thompson, Manager
Planning & Land Development Dept.
R.M. Towill Corporation
677 Ala Moana Blvd.
Suite 1016
Honolulu, Hawaii 96813

Dear Mr. Thompson:

Subject: Proposed Site for the New Kapaa Quarry Phase II Project; Kailua Oahu, Hawaii

The staff of the Hawaii District, U.S. Geological Survey, Water Resources Division, has reviewed the above draft copy of the environmental assessment report and has no comments to make at this time.

Thank you for the opportunity to review the above report which we are returning for your future use.

If we can be of further service, please don't hesitate to call us at 546-8331.

Sincerely,

Stan

Stanley F. Kapustka
District Chief

Enclosure

March 13, 1984

Mr. Stanley F. Kapustka
District Chief
Water Resources Division
Geological Survey
United States Department of the Interior
P.O. Box 50166
Honolulu, Hawaii 96850

Dear Mr. Kapustka:

SUBJECT: Kapaa Quarry Phase II Project
Environmental Assessment

Thank you for reviewing the draft environmental assessment for the proposed Kapaa Quarry Phase II. We are presently working with Ameron HC&D in finalizing the assessment.

Very truly yours,

Frank T. Sanpei
Chief Engineer

FTS:mh

HEADQUARTERS

0028:MKL:jam
5ser 123
10 FEB 1984

Mr. William Y. Thompson, Manager
R. M. Towill Corporation
677 Ala Moana Boulevard, Suite 1016
Honolulu, Hawaii 96813

Dear Mr. Thompson:

Proposed Site for the New Kapaa Quarry Phase II
Project, Kailua, Oahu, Hawaii

Your letter of January 27, 1984, addressed to the Pacific Division, Naval Facilities Engineering Command, has been referred to this Command for response.

The draft Environmental Assessment for the subject project has been reviewed, and the Navy has no comments to offer at this time.

Thank you for the opportunity to review the draft Environmental Assessment.

Sincerely,

M. M. DALLAM
CAPTAIN, CEC, U. S. NAVY
FACILITIES ENGINEER
BY DIRECTION OF THE COMMANDER

March 13, 1984

Captain M. M. Dallam
Facilities Engineer
Headquarters
Naval Base Pearl Harbor
Box 110
Pearl Harbor, Hawaii 96860

Dear Captain Dallam:

SUBJECT: Kapaa Quarry Phase II Project
Environmental Assessment

Thank you for reviewing the draft environmental assessment for the proposed Kapaa Quarry Phase II. We are presently working with Amoron HC&D in finalizing the assessment.

Very truly yours,

Frank T. Sanpei
Chief Engineer

FTS:ph

DEPARTMENT OF THE ARMY
PACIFIC OCEAN DIVISION, CORPS OF ENGINEERS
FT SHAFTER HAWAII 96858

February 8, 1984

Mr. William Thompson
R. M. Towill Corporation
677 Ala Moana Boulevard
Suite 1016
Honolulu, Hawaii 96813

Dear Mr. Thompson:

Thank you for the opportunity to review and comment on the environmental assessment for the Proposed Site for the New Kapaa Quarry Phase II Project, Kailua, Oahu, Hawaii. The following comments are offered:

a. The Department of the Army permit requirements are not applicable.

b. The proposed quarry site is situated in a Zone D, or area of undetermined but possible flood hazards, according to the Flood Insurance Study for Oahu prepared by the Federal Insurance Administration (FIA). Enclosure 1 is a portion of the flood hazard map for the Kailua area prepared as part of the FIA flood study, showing the approximate location of the proposed quarry site.

Sincerely,

Kisuk Cheung
Chief, Engineering Division

Enclosure

March 13, 1984

Mr. Kisuk Cheung
Chief, Engineering Division
Pacific Ocean Division
Corps of Engineers
Department of the Army
Fort Shafter, Hawaii 96858

Dear Mr. Cheung:

SUBJECT: Proposed Site for Kapaa Quarry Phase II Project
Kailua, Oahu, Hawaii

We appreciate your review and comment on the Kapaa Quarry Phase II environmental report. Due to the project site proximity to Kawainui Marsh, the quality of the plant effluent and run-off waters will have to comply with the provisions of the NPDES permit. The drainage aspects will be monitored by the State Department of Health.

Thank you.

Very truly yours,

Frank T. Sanpei
Chief Engineer

FTS:mh

BOARD OF WATER SUPPLY

[illegible]

[illegible], Vice-Chm.
ERNEST A. KATARI
KAYSE J. YAMASAKI

February 14, 1984

R. M. Towill Corporation
Suite 1016
677 Ala Moana Boulevard
Honolulu, Hawaii 96813

Attention: Mr. W. Y. Thompson

Gentlemen:

Subject: Your Letter of January 27, 1984 on the Proposed Site for the New Kapaa Quarry Phase II Project, Kailua

We have no objections to the proposed project and anticipate no adverse impacts to potable groundwater resources in the area.

If you have any questions, please contact Lawrence Whang at 527-6138.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

March 13, 1984

Mr. Kazu Hayashida
Manager and Chief Engineer
Board of Water Supply
City & County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843

Dear Mr. Hayashida:

SUBJECT: Kapaa Quarry Phase II Project
Environmental Assessment

Thank you for reviewing the draft environmental assessment for the proposed Kapaa Quarry Phase II. We are presently working with Aseron HCSD in finalizing the assessment.

Very truly yours,

Frank T. Sanpei
Chief Engineer

FTS:mh

CITY AND COUNTY OF HONOLULU

February 6, 1984

R. M. Towill Corporation
677 Ala Moana Blvd., Suite 1016
Honolulu, Hawaii 96813

ATTENTION: Mr. William Y. Thompson

SUBJECT: PROPOSED SITE FOR THE NEW KAPAA QUARRY
PHASE II PROJECT, KAILUA, OAHU, HAWAII

Gentlemen:

Thank you for the opportunity to review and comment on the proposed subject project.

Fire protection for the subject project is provided by the Aikahi Fire Station, which is approximately 2.2 miles away with supportive services from the Kailua Fire Station and the Kaneohe Fire Station, which is approximately 4.0 and 4.5 miles away, respectively. Also, we have projected in our Capital Improvement Program for FY 1986-87, a new fire station located on Kalanianaole Highway adjacent to the Maunawili Elementary School, which is approximately 3.0 miles away.

According to the guidelines of the ISO and the NFPA, fire protection for the subject project is considered adequate.

Very truly yours,

MELVIN H. NONAKA,
Fire Chief

MHN:ct/NSKW

March 12, 1984

Mr. Melvin H. Nonaka, Fire Chief
Fire Department
City & County of Honolulu
1455 So. Beretania Street, Room 305
Honolulu, Hawaii 96814

Dear Mr. Nonaka:

SUBJECT: Proposed Site for the New Kapaa Quarry
Phase II Project, Kailua, Oahu, Hawaii

We appreciate your review of the draft environmental assessment. Your helpful comments have been added to the section on fire protection.

Thank you very much.

Very truly yours,

Frank T. Sanpei
Chief Engineer

FTS:mh

DEPARTMENT OF TRANSPORTATION SERVICES

CITY AND COUNTY OF HONOLULU

RECD FEB 24 1984

February 22, 1984

TE1/84-361

Mr. William Y. Thompson, Manager
Planning & Land Development
Department
R. M. Towill Corporation
677 Ala Moana Boulevard, Suite 1016
Honolulu, Hawaii 96813

Dear Mr. Thompson:

Subject: Proposed Site for the New Kapaa Quarry
Phase II Project - Kailua, Oahu, Hawaii

We have no comments on your draft Environmental Assessment.

Sincerely,

WILLIAM A. BONNET
Director

March 13, 1984

Mr. William A. Bonnet
Director
Department of Transportation Services
Honolulu Municipal Building
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Bonnet:

SUBJECT: Kapaa Quarry Phase II Project
Environmental Assessment

Thank you for reviewing the draft environmental assessment for the proposed Kapaa Quarry Phase II. We are presently working with Ameron HC&D in finalizing the assessment.

Very truly yours,

Frank T. Sanpei
Chief Engineer

FTS:mh

United States Department of the Interior

FISH AND WILDLIFE SERVICE

[illegible]

FEB 14 1984

[illegible] Box 6307

Mr. William Y. Thompson
R. M. Towill Corporation
677 Ala Moana Boulevard, Suite 1016
Honolulu, Hawaii 96813

Dear Mr. Thompson:

The Service has reviewed the Draft Environmental Assessment (EA) for the proposed Kapaa Quarry Phase II Project which was forwarded to us with your letter of January 27, 1984. We offer the following comments for your consideration:

a. The EA should be updated to include drainage plans and maps of silt basins (Section 4.6.7) for the proposed project site. Maintenance of silt basins to prevent purging of accumulated sediments during storm periods also needs to be addressed.

b. Section 5.7 should discuss the potential effects of water drainage originating from the site on Marsh waterbirds and aquatic fauna.

c. Please list the mitigation measures "relating to maintaining the water quality of the marsh and the protection of birds that frequent the marsh lands" in the EA.

We appreciate this early opportunity to comment.

Sincerely,

Ernest Kosaka
Project Leader
Office of Environmental Services

cc: HDAR
HDF&W
EPA, San Francisco

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

March 13, 1984

Mr. Ernest Kosaka, Project Leader
Office of Environmental Services
Fish and Wildlife Service
United States Department of the Interior
P.O. Box 50167
Honolulu, Hawaii 96850

Dear Mr. Kosaka:

SUBJECT: Kapaa Quarry Phase II Project
Kailua, Oahu, Hawaii

Thank you for your review of the environmental assessment for the Kapaa Quarry Project, Phase II. In response to your comments, we wish to offer the following:

Comment a: Final drainage plans have not been developed at this time. After exploratory drilling has been completed, final drainage plans will be submitted to the Department of Land & Natural Resources. Maintenance and grading plans will also be prepared and submitted to the Department for approval before any work can start. This procedure is contained in the Conservation District Use Application regulations. Further, as explained in the assessment report, the NPDES permit issued by the Department of Health will ensure that measures will be taken to prevent deterioration of the lower Kawainui Marsh waters. We have added a statement on the cleaning of the basins:

"Cleaning of the silt basins (containment ponds) is done about once a year. The cleaning process takes about 2 weeks. Approximately 5000 cubic yards of material are removed and stockpiled. The retention capacity of the stormwater basins is 133,907 cubic yards."

We appreciate your calling this to our attention.

Comment b: Compliance with the NPDES permit issued by the Department of Health will mitigate potential adverse effects on the Kawainui Marsh waters. Further, being in a conservation district, the Department of Land & Natural Resources will also scrutinize the plans and operations of the quarry. The newly enacted streamflow regulations for Windward Oahu, administered by the Department of Land & Natural Resources, will also oversee the quarry operations as it relates to stream discharge.

Comment c: The response for comment b also applies to protecting the birds that frequent the marsh lands. As quarrying in Kapaa valley has been going on since 1950, any unmitigated adverse impact would have surfaced by now.

A copy of your letter will be forwarded to the Department of Land & Natural Resources for their information.

We appreciate your helpful comments at this early stage.

Very truly yours,

Frank T. Sanpei
Chief Engineer

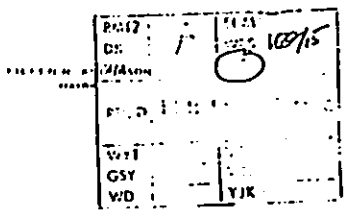
FTS:mh

cc: Susumu Ono, Chairman, DLNR

DEPARTMENT OF PUBLIC WORKS

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813



ENV 84-45

February 13, 1984

Mr. William Y. Thompson
R. M. Towill Corporation
677 Ala Moana Boulevard, Suite 1016
Honolulu, Hawaii 96813

Dear Mr. Thompson:

SUBJECT: Environmental Assessment for Kapaa Quarry Phase II Project
Kailua, Oahu, Hawaii
Reference 1-14421-0-D

We have reviewed the subject assessment, Reference 1-14421-0-D and have the following comments:

1. The proposed drainage plan for Phase II is acceptable.

2. In Figure 2, Lease for Current Quarry Operations, the cross-hatched area denoting City and County jurisdiction is not fully correct. The segment (outlined in yellow) adjacent to the Wire Fabrication Plant, H-3, and Kapaa Quarry Road is not currently under our control. You may want to consider showing the Kapaa Sanitary Landfill site without the cross-hatching, similar to the area representing the H-3 freeway.

3. The City and County is not experiencing any problems with Cattle Egret at the landfill site. Although, the description of the bird's activity at the landfill site is not incorrect, we prefer a more passive description such as "A few Cattle Egret are seen daily in the city's Kapaa Landfill feeding on the flies which are attracted to the landfill activity."

4. The proximity of the Phase II sector to the Pahukini Heiau warrants special precaution during blasting and quarrying operations which might induce structure movement of the heiau.

He ke aloha pumehana,

MICHAEL J. CHUN
Director and Chief Engineer

Attachment

March 16, 1984

Dr. Michael J. Chun
Director and Chief Engineer
Department of Public Works
City & County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Dr. Chun:

SUBJECT: Environmental Assessment for Kapaa Quarry Phase II
Project - Kailua, Oahu, HI - Reference 1-14421-0-D

We appreciate your review and comments on the draft assessment report. Thank you for calling our attention to the boundary of the City's Kapaa Landfill site. We did not realize that Parcel 4, shown on the Site Plan dated May 21, 1975 which we used as reference, is not under City jurisdiction. Correction to the map has been made.

With respect to the Cattle Egret, we have revised the Section in the EA to read, "Cattle Egrets are regularly seen in the vicinity of the project area because of the nearby City and County Kapaa Sanitary Landfill. These birds follow...."

The Pahukini Heiau will be monitored to prevent any damage to this historic landmark. The heiau is at least 1500 feet from the Ameron HC&D boundary. There will be an additional buffer zone as quarrying is expected to be carried to the boundary line. The consulting geologist will prescribe whatever precautions as may be necessary to protect the stability of the heiau. The State Department of Planning and Economic Development has also cautioned us about this matter.

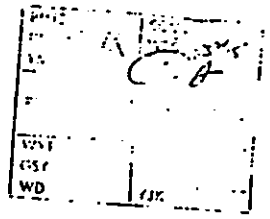
Thank you for your helpful comments.

Very truly yours,

Frank T. Sanpei
Chief Engineer

FTS:mh

[illegible] Memorial Park
Cemetery Associations



February 13, 1984

R.M. Towill Corporation
677 Ala Moana Blvd. Suite 1014
Honolulu, HI 96813

Gentlemen:

SUBJECT: Proposed Site for the New Kapaa Quarry Phase II Project
Kailua, Oahu, Hawaii

After reviewing the proposed expansion of Kapaa Quarry, I see two areas that may be a concern to Hawaiian Memorial Park.

First of all, the location of the second phase in relationship to the Park may present an unsightly visual effect.

Second, in your report it is mentioned that blasting will be done to breakup the mountain area. What effect will this have on Hawaiian Memorial Park?

It may be that I am reading the [illegible] incorrectly. If so, I would appreciate a clarification on the new site location before further comment.

Please feel free to contact me at your convenience.

Sincerely,

Henry M. Howlett, Vice President Operations Manager
Cemeteries and Facilities Department

HMH:dmo

March 13, 1984

Mr. Henry M. Howlett
Vice President/Operations Manager
Cemeteries and Facilities Department
Hawaiian Memorial Park
45-425 Kamehameha Highway
Kaneohe, Hawaii 96744

Dear Mr. Howlett:

SUBJECT: Proposed Site for the New Kapaa Quarry
Phase II Project - Kailua, Oahu, Hawaii

We appreciate your review of the draft environmental report for the Kapaa Quarry Phase II Project. Your concerns were forwarded to Mr. [illegible] West of Ameron HC&D. We believe the Phase II quarry site operations will not cause any significant adverse impact to the Hawaiian Memorial Park facility as the Phase II site is at a greater distance from your [illegible].

Should you require further clarification, please call me.

Very truly yours,

Frank T. Sarpei
Chief Engineer

FTS:mh

OTHER COMMENTS ACKNOWLEDGED

AND

COMMENTS RECEIVED AFTER COMPLETION OF ASSESSMENT

GEORGE R. ARIYOSHI
GOVERNOR

RMT2		SCM	WES 105760
DK		FTS	
YM			
REC'D FEB 28 1984 RMTC			
WYT		DTM	
GSY		WS	
WD		YJK	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION

WAYNE J. YAMASAKI
DIRECTOR

STP 8.9712

February 22, 1984

Mr. William Y. Thompson, Manager
Planning & Land Development Dept.
R.H. Towill Corp.
677 Ala Moana Blvd., Suite 1016
Honolulu, Hawaii 96813

Dear Mr. Thompson:

Proposed Kapaa Quarry Site, Phase II
Environmental Assessment
TMK: 4-2-15

We do not foresee any impacts upon the state highway system from the development of the Kapaa Quarry's Phase II. However, when the grading plans are available they should be submitted to the Highways Division to insure that there will be no encroachment within the highway right-of-way.

Very truly yours,

Wayne J. Yamasaki
Director of Transportation

United States Department of Agriculture
Soil Conservation Service

P.O. Box 50004
Honolulu, Hawaii
96850

February 21, 1984

RMT2		SCM	WES 105723
DK		FTS	
YM			
REC'D FEB 1984 RMTC			
WYT		DTM	
GSY		WS	
WD		YJK	

Mr. W. Y. Thompson
Planning & Land Development Department
R.H. Towill Corporation
677 Ala Moana Boulevard, Suite 1016
Honolulu, HI 96813

Dear Mr. Thompson:

Subject: Proposed Site for the New Kapaa Quarry Phase II Project
Kailua, Oahu, Hawaii

We reviewed the subject draft environmental impact statement and have no comments to make.

Thank you for the opportunity to review this document.

Sincerely,

FRANCIS C.H. LUM
State Conservationist

The Soil Conservation Service is an agency of the Department of Agriculture

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII

EILEEN R. ANDERSON
MAYOR

RECEIVED

Facility Engineering Dept.

RECEIVED

MICHAEL M. McELROY
DIRECTOR

LU3/31-3312(JN)

September 4, 1984

Mr. Susumu Ono, Chairperson
Board of Land & Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

Conservation District Use Application (CDUA) No. OA-5/29/81-1702
For Proposed Kapaa Quarry Phase II Project at Kapaa Valley,
Koolaupoko, Oahu, Hawaii; Tax Map Key 4-2-15: 1

We have reviewed the environmental assessment for the proposed project and find that the major issues and potential impacts have been identified and addressed.

It is recommended that the EIS include the following:

1. Visual analysis with photos showing the site from different view points.

2. Reference: Page 23, Drainage

   Comment: "Satisfactory quality" of the spent process water to be discharged into the natural drainage course should be defined in terms of water quality parameters. Also, the conditions of the NPDES permit should be disclosed.

If there are any questions, please contact John Nakagawa of our staff at 523-4548.

Very truly yours,

MICHAEL M. McELROY
Director of Land Utilization

MMM:sl

cc: Mr. T. E. Bastis

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET

EILEEN R. ANDERSON
MAYOR

MICHAEL M. McELROY
DIRECTOR

LU5/84-2502(RF)

May 23, 1984

Mr. Frank T. Sanpei
Chief Engineer
R.M. Towill Corporation
677 Ala Moana Boulevard, Suite 1016
Honolulu, Hawaii 96813

Dear Mr. Sanpei:

Kapaa Quarry, Phase II
Tax Map Key 4-2-15: 1

We have reviewed the location of the proposed project and find that it lies outside the Special Management Area.

If you have any questions, please call Mr. Robin Foster of our staff at 527-5027.

Very truly yours,

Loretta Chee

MICHAEL H. McELROY
Director of Land Utilization

MHM:ey

DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT
KAMAMALU BUILDING, 250 SOUTH KING ST., HONOLULU, HAWAII
MAILING ADDRESS: P.O. BOX 2359, HONOLULU, HAWAII 96804

GEORGE R. ARIYOSHI, Governor
KENT M. KEITH, Director
JOHN R. PINGREE, Deputy Director
MURRAY E. TOWILL, Deputy Director

COPY

Ref. No. 8687

February 2_, 1984

EMT2		SCM	
DK		WES	
YM		FTS	
RECD FEB 27 1984 EMTE			
WT		DCM	
		WH	
		VM	

The Honorable Susumu Ono
Chairperson
Board of Land and Natural Resources
1151 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Ono:

Subject: Environmental Assessment for Kapaa Quarry Project, Phase II, Oahu

We have reviewed the subject document and offer the following comments with respect to the relevant objectives and policies of the Hawaii CZM Program.

Coastal Ecosystems: Promote water quantity and quality planning and management practices which reflect the tolerance of fresh water and marine ecosystems and prohibit land and water uses which violate State water quality standards. (Chapter 205A-2(c)(4)(D), HRS)

The subject document addresses impacts on Kawainui Marsh and near-shore waters of Kailua Bay, from the perspective of storm water management and effluents which result from the proposed quarry operation. Storm waters would be ponded prior to flowing through the natural drainage system and Kapaa Stream to the marsh and bay beyond. Effluents resulting from the wetting down of rock crushing processes would flow through a series of settling ponds before they reach the marsh and bay.

We recommend that in addition to the Department of Health permits that are required for the drainage plan, that the Department of Land and Natural Resources (DLNR) be consulted with respect to its implementation of the Kawainui Marsh Resource Management Plan. In addition, the applicant should also be aware of the newly established DLNR stream management objectives that are being applied to Windward Oahu.

Historic Resources: Protect, preserve, and where desirable, restore those natural and man-made historic and pre-historic resources in the coastal zone management area that are significant in Hawaiian and American history and culture. (Chapter 205A-2(b)(2)(A), HRS)

The location of the proposed Phase II quarry operation will take place on the western slope of Ulumawao Ridge. In view of the proximity of registered historic sites and a nominated historic district at Kawainui Marsh,

a survey was conducted at the subject site. The findings indicate that there is little of unique historic value that would merit preservation of restoration.

However, we believe it is important to note that the proposed quarry activity will occur near the end of Ulumawao Ridge, which is the site of Pohukini Heiau. It is our understanding that the rock walls of the heiau are not very stable and thus may be affected by the blasting associated with a quarry operation. This aspect of the proposed activity should be brought to the attention of the State Historic Preservation Officer.

Scenic and Open Space Resources: Insure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline. (Chapter 204A-2(c)(3)(B), HRS)

The nature of the proposed activity requires the alteration of natural landforms; however, the impacts will be mitigated in part by a planned program of replanting. Phase II of the quarry operation will extend only to the crest of the west slope of Ulumawao Ridge and, thus, will not be visible from most of the Kawainui Marsh and Kailua Town to the East. Subsequent replanting on the West slope and Kapaa Valley will partially restore vistas from the Northeast.

Thank you for the opportunity to review and comment on the subject document.

Very truly yours,

Kent M. Keith

Kent M. Keith

cc: Office of Environmental Quality Control
✓R.M. Towill Corporation

United States Department of the Interior

FISH AND WILDLIFE SERVICE
100 ALA MOANA BOULEVARD
P O BOX 50088
HONOLULU, HAWAII 96850

RD		SCM	
bk		WES	
YM		FTS	

RECD SEP 4 1984 RMTC

BT		DKM	
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1084

ES
Room 6307

AUG 2 0 1984

Mr. Susumo Ono
Chairperson, Board of Land
and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, Hawaii 96809

Re: Conservation District Use Application (CDUA) for Proposed Kapaa Quarry Phase II Project at Kapaa Valley, Oahu, Hawaii

Dear Mr. Ono:

The Service has reviewed the referenced CDUA and offers the following comments for your consideration.

The drainage control for the Kapaa Quarry Phase II includes three containment ponds designed to hold the run-off from a 10-year storm with a rainfall rate of 12 inches per 24 hours. These run-off containment ponds have a retention capacity of 83 acre-feet. Our calculations (see attachment) suggest that the volume generated during a 12-inch rainfall from a 10-year storm is 120 acre-feet. At the peak discharge rate of 661.5 cfs for a 10-year storm, the containment ponds would be filled in about 1.5 hours. It is unclear from Section 5.7 what the residence time for silt and clay particles will be in these containment ponds. While our analysis is relatively unsophisticated, it raises questions about the adequacy of these ponds to hold the run-off of a 10-year storm and to prevent discharge of sediments into Kapaa Stream and Kawainui Marsh. The Environmental Assessment (EA) should include a technical discussion regarding the design standards for the retention ponds, specifically, the criteria used to determine the retention capacity. It would be valuable to include a drainage plan similar to the existing Stormwater Management Plan for Kapaa Quarry Phase I for analysis.

The EA needs to include a discussion on the volume and types of sediment that will be discharged into Kapaa Stream during a storm. This will aid in determining the amount of sediment discharged into the marsh and its potential effects on the marsh. Data on the effluent from the Phase I quarry operations should be included.

The EA for the project states that spent process water will be discharged into the "natural drainage course" after satisfactory quality is achieved. We assume that the "natural drainage course" refers to Kapaa Stream. It is unclear what the criteria for "satisfactory quality" is and how this will be determined, especially during a storm.

When quarrying operations are over, the quarry floor will be covered with a 2-foot layer of soil and revegetated. The present soil layer includes a 10-inch topsoil layer and a 48- to 50-inch subsoil layer. The Service suggests that the land reclamation include a subsoil layer of sufficient depth to allow better drainage and support for the overlying topsoil.

The Resource Management Plan for Kawainui Marsh (RMPM) is the guiding document for developments occurring within the Kawainui Marsh Watershed. It provides the objectives, policies, and implementing actions relevant to the ecological, cultural, and economic components of Kawainui Marsh. Protecting water quality is one of the five principal elements identified for protecting the ecological resources of the Marsh. Specific policies call for the existing grading and erosion control ordinanaces be enforced and that special conditions be applied to minimize the sedimentation impacts from development. Recommended actions include developing criteria for monitoring the discharge of sediments into the Marsh and developing and maintaining a system to monitor the quality and quantity of influent streams and overland flows to the Marsh. Since the proposed quarrying operations fall within the secondary boundaries of the Marsh, consistency with the RMPKM is essential.

The existing Stormwater Management Plan attempts to reduce the potential negative impacts of the quarry operations on Kawainui Marsh. Protecting Kawainui Marsh from sedimentation caused by Phase II quarry operations would represent only an incremental increase of the present safeguards and operations. The Service urges the implementation of strict measures to safeguard the Marsh from further sedimentaion.

We appreciate this opportunity to comment.

Sincerely yours,

William Kramer
Acting Project Leader
Office of Environmental Services

Enclosure

cc: DPED
DF&W
EPA, San Francisco
R. M. Towill Corporation

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

Calculations of runoff volume and peak discharge rate for a 10-year storm. The source for determining these values was the Erosion and Sediment Control Guide for Hawaii (U.S. Soil Conservation Service, 1981).

Runoff Volume

Assumptions:

1. hydrologic soil group B
2. land use description: streets and roads, dirt
3. CN = 80
4. rainfall rate: 12 inches/24 hours

From Table 24, runoff depth = 9.45 inches
= 0.79 feet

Affected area = 152 acres
= 6,621,120 $feet^2$

Runoff volume generated from a 10-year storm with a rainfall rate of 12 inches per 24 hours =

(.79 feet) (6,621,120 $feet^2$) = 5,230,685 $feet^3$
= 120 acre-feet

Peak Discharge Rate

Assumptions:

1. steep slope
2. type 1 storm
3. CN = 80

From Section 4, peak discharge rate = 70 cfs/inch of runoff

(9.45 inches of runoff) (70 cfs/inch of runoff) = 661.5 cfs

containment pond volume = 83 acre-feet
= 3,615,480 $feet^3$

3,625,000 $feet^3$/661.5 cfs = 5,466 sec
= 1.5 hours

KAILUA NEIGHBORHOOD BOARD NO. 31
[illegible]

June 22, 1984

Susumo Ono, Director
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu Hawaii 96813

Dear Mr. Ono:

This is in regard to the Ameron H C & D site in the Kapaa Quarry, Kailua.

We have recently toured the site, and are distressed at the lack of landscaping and poor planning on the part of Ameron. Therefore, we are of the opinion that Ameron's request for permission to conduct industrial development on state conservation land in order to facilitate its Phase II be denied until such time as the company can prove that it will indeed provide acceptable on-site landscaping improvements.

We believe this is the position of other community groups that have also viewed the site of the proposed quarry operations.

Very truly yours,

Donna Wong

Donna Wong, Chair
Planning and Zoning Committee

cc: George West, Ameron H C & D
Councilwoman Welcome Fawcett
Councilman David Kahanu

XC: [illegible] 6/5/84

COMMENTS RECEIVED DURING THE 30-DAY REVIEW PERIOD

(April 8, 1985 to May 8, 1985)

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858

April 16, 1985

Mr. Susumu Ono, Chairman
Board of Land and Natural Resources
P. O. Box 621
Honolulu, HI 96809

Dear Mr. Ono:

Thank you for the opportunity to review and comment on the Environmental Impact Statement for Kapaa Quarry-Phase 2, Kapaa Valley, Koolaupoko, Oahu. The following comments are offered:

a. Work in the proposed Phase 2 is outside the regulatory jurisdiction of the Corps of Engineers.

b. According to the Flood Insurance Study for the City & County of Honolulu (Jan. 1983), conducted by the Federal Insurance Administration, the project site is within Zone D area of undetermined, but possible flood hazards.

Sincerely,

Howard S. Kobayashi
Actg C, Engineering Division

Copy Furnished:

Mr. George West, Dept. EIS
Ameron HC&D
P. O. Box 29968
Honolulu, HI 96820

Post Office Box 29968
Honolulu, Hawaii 96820
(808) 841-0911
Cable Address: Honcontra

Ameron
HC&D

May 9, 1985

District Engineer
U. S. Army
Fort Shafter, HI 96858

Attention: Mr. Howard S. Kobayashi

Dear Sir:

Subject: Kapaa Quarry - Phase 2 E.I.S.

Thank you for your review of the Kapaa Quarry - Phase 2 Environmental Impact Statement (E.I.S.)

Your statement in sub-paragraph b. of your letter is reflected on page 56 of the E.I.S.

In the section under "Comments Received During the Assessment Process," please note that Mr. Kisuk Cheung of the District Engineer's office had called this matter to our attention in his letter dated February 8, 1984.

We appreciate the U. S. Army District Engineer's review and helpful comments.

Sincerely,

G. N. West

George N. West

GNW:cc

cc: Mr. Susumu Ono, Chairman
Dept. of Land and Natural Resources w/attachment

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
REGION NINE
Hawaii Division
Box 50206
Honolulu, Hawaii 96850

RECEIVED
85 APR 10 A8:35

STATE OF HAWAII

April 9, 1985
IN REPLY REFER TO
HEC-HI

Mr. Susumu Ono, Chairman
Board of Land and Natural Resources
State of Hawaii
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

Subject: Draft Environmental Impact Statement, Kapaa Quarry - Phase 2

Thank you for the opportunity of reviewing the subject document.

We offer the following comments for your consideration:

Although the 1964 easement with the H. K. L. Castle Trust may permit a connection to the Kamehameha Highway, any future connection in the vicinity of the H-3 Halekou Interchange must not compromise the operating capacity or safety of that Interstate Highway facility.

We also assume that this easement would not be located within the fully access - controlled H-3 freeway right-of-way.

Sincerely yours,

H. Kusumoto
Division Administrator

By N. L. Arthur
N. L. Arthur
Assistant Division Administrator

Roger ____ Post ____
Abi ____ Library ____
Anne ____ Maeda ____
Dean ____ Barbara ____
File in WQT "Hold"
To Carol For ____

Post Office Box 29968
Honolulu, Hawaii 96820
(808) 841-0911
Cable Address: Honcorera

Ameron
HC&D

May 9, 1985

Mr. N. L. Arthur, Assistant Division Administrator
U. S. Department of Transportation
Federal Highway Administration
P. O. Box 50206
Honolulu, HI 96850

Dear Mr. Arthur:

Subject: Kapaa Quarry - Phase 2 E.I.S.
Ref.: HEC-HI

We appreciate your review of the Kapaa Quarry - Phase 2 Environmental Impact Statement (E.I.S.) and comments to the State Department of Land and Natural Resources.

In response to your comment regarding the 1964 easement from the H. K. L. Castle Trust, the following statement appears on page 43 of the E.I.S.:

"A final easement permits connection to Kamehameha Highway. This easement, running parallel to the H-3 highway, has not been established and no road has been constructed. These road easements are co-terminus with the quarry lease which expires in 2012." (Underlining added.)

As stated, the easement has not been established. Should any roadway be designed to access on Kamehameha Highway, it is understood that the State DOT and the Federal Highway Administration must be consulted and approval obtained. Your letter is a reminder to the applicant that connection to Kamehameha Highway is not to be taken for granted.

Thank you.

Sincerely,

George N. West

GNW:lcc

cc: Mr. Susumu Ono, Dept. of Land & Natural Resources w/attachment

Post Office Box 29968
Honolulu, Hawaii 96820
(808) 841-0911
Cable Address: Honcontra

Amerron
HC&D

COMMENTS RECEIVED FROM THE FOLLOWING PERSONS/ORGANIZATIONS REQUIRED ONLY AN ACKNOWLEDGMENT:

Kazu Hayashida, Manager	Board of Water Supply, City & County
Herbert K. Muraoka, Director	Building Department, City & County
Jack K. Suwa, Chairman	Board of Agriculture, State of Hawaii
Capt. Henry J. Rinnert	Facilities Engineer, U. S. Navy
Tom T. Nekota, Director	Dept. of Parks & Recreation, C&C
Alvin K. H. Pang, Director	Dept. of Housing and Community Development
Wayne J. Yamasaki, Director	Dept. of Transportation, State of Hawaii
Philip J. Bossert, Ph.D., Pres.	Hawaii Loa College
Frank K. Kahoohanohano, Chief	Fire Department, City and County
Brenner Munger, Ph.D., Manager	Environmental Dept., Hawaiian Electric Co.
Russell L. Smith, Jr., Director	Dept. of Public Works, City and County
Francis C.H. Lum, State Conservationist	U. S. Department of Agriculture
Edwin T. Murabayashi, EIS Coordinator	University of Hawaii at Manoa
Donald A. Clegg, Chief Planning Officer	Dept. of General Planning, City & County
John E. Hirten, Director	Dept. of Transportation Services, C&C
Douglas G. Gibb, Chief	Police Department, City & County
Lt. Col. R. G. Wilmes, Director, Facilities Dept.	U. S. Marine Corps
Howard S. Kobayashi	U. S. Army

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96843

April 4, 1985

Mr. Susumu Ono, Chairperson
Board of Land and Natural
Resources
State of Hawaii
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

Subject: Draft Environmental Impact Statement for Kapaa Quarry, Phase 2, TMK: 4-2-15:1

Thank you for giving us the opportunity to comment on the draft environmental document. We have no comments to add to our appended letter of February 14, 1984.

If you have any questions, please contact Lawrence Whang at 527-6138.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Mr. George West

Roger ____ Post ____
Aki ____ Library ____
Anne ____ Maude ____
Dean ____ Barbara ____

File in WRT "H.12"
To Carol For ____

B-10

BUILDING DEPARTMENT

CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

HERBERT K. MURAOKA
DIRECTOR

April 8, 1985

Mr. Susumu Ono, Chairman
Board of Land and Natural Resources
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

Subject: Kapaa Quarry, Phase 2
Draft Environmental Impact Statement

We have reviewed the Environmental Impact Statement for the proposed Kapaa Quarry, Phase 2 project and have no comments.

Thank you for the opportunity to review the draft EIS.

Very truly yours,

Herbert K. Muraoka

HERBERT K. MURAOKA
Director and Building Superintendent

cc: Ameron HC&D
J. Harada

Roger ____ Post ____
Aki ____ Library ____
Anne ____ Maude ____
Dean ____ Barbara ____

File in DGT "Hold"

GEORGE R. ARIYOSHI
GOVERNOR

JACK K. SUWA
CHAIRPERSON, BOARD OF AGRICULTURE

SUZANNE D. PETERSON
DEPUTY TO THE CHAIRPERSON

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 So. King Street
Honolulu, Hawaii 96814

Mailing Address:
P. O. Box 22159
Honolulu, Hawaii 96822

April 4, 1985

MEMORANDUM

To: Mr. Susumu Ono, Chairman
Board of Land and Natural Resources

Subject: Environmental Impact Statement (EIS) for
Kapaa Quarry Phase II Project
Ameron HC&D
TMK: 4-2-15: 1 Kapaa Valley, Oahu

The Department of Agriculture has reviewed the subject EIS and does not have any comments to offer.

Thank you for the opportunity to comment.

Jack K. Suwa

JACK K. SUWA
Chairman, Board of Agriculture

cc: Mr. George West, Ameron HC&D
OEQC (w/EIS document)

Roger _____ Post _____
Aki _____ Library _____
Anne _____ Maude _____
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To Carol For _____

39 K

DEPARTMENT OF THE NAVY
HEADQUARTERS
NAVAL BASE PEARL HARBOR
BOX 110
PEARL HARBOR, HAWAII 96860-5020

RECEIVED
85 APR 8 A9:09

IN REPLY REFER TO:
9510
Ser 002B/649
4 APR 1985

DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

Mr. Susumu Ono, Chairman
Board of Land and Natural Resources
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

DRAFT ENVIRONMENTAL IMPACT STATEMENT
KAPAA QUARRY-PHASE 2

The draft Environmental Impact Statement for the Kapaa Quarry-Phase 2 has been reviewed, and we have no comments to offer. Since we have no further use for the EIS, the EIS is being returned to the Office of Environmental Quality Control, by copy of this letter.

Thank you for the opportunity to review the draft EIS.

Sincerely,

HENRY J. RINNERT
Captain, CEC, U. S. Navy
Facilities Engineer
By direction of the Commander

Copy to:
Mr. George West, Dept. EIS
Ameron HC&D
P. O. Box 29968
Honolulu, HI 96820

Office of Environmental Quality Control

Roger _____ Post _____
Aki _____ Library _____
Anne _____ Maude _____
Dean _____ Barbara _____
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To Carol For _____

DEPARTMENT OF PARKS AND RECREATION

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU HAWAII 96813

FRANK F. FASI
MAYOR

TOM T. NEKOTA
DIRECTOR

RECEIVED
'85 APR 17 P1:34
OFFICE OF BOARDS & COMMISSIONS
STATE OF HAWAII

April 12, 1985

Honorable Susumu Ono, Chairman
Board of Land and Natural Resources
State of Hawaii
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

Subject: Kapaa Quarry - Phase 2 Project
Draft Environmental Impact Statement

We have reviewed the draft EIS and have no substantive comments to offer at this time.

Sincerely yours,

Tom Nekota

TOM T. NEKOTA, Director

TTN:jf

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To Carol For _____

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE [illegible]

FRANK F. FASI
MAYOR

ALVIN K. H. PANG
DIRECTOR

STATE OF HAWAII

April 29, 1985

Mr. Susumu Ono, Chairman
Board of Land and Natural
Resources
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

Subject: Environmental Impact Statement
Kapaa Quarry - Phase 2
Kapaa Valley, Koolaupoko, Oahu
152 Acres

The proposal of the quarry operation at Kapaa Valley, windward Oahu, has been reviewed by this Department.

We understand that the quarry operation is necessary to supply an essential construction material. The topography of the site isolates the quarry activity from the residential areas; noise impacts are mitigated by the distance of the proposed site from built-up areas and air quality is maintained by areal water sprinkling and installation of dust collectors in the processing plant. Thus, we see no adverse impact of the proposed development to the environment.

We will retain the draft EIS report in our files.

Sincerely,

for ALVIN K. H. PANG

cc: Mr. George West
Dept. EIS
Ameron HC&D
P.O. Box 29968
Honolulu, HI 96820

Roger _____ Post _____
Aki _____ Library _____
Anne _____ Maude _____
Dean _____ Barbara _____

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To Carol for _____

S83

GEORGE R. ARIYOSHI
GOVERNOR

WAYNE J. YAMASAKI
DIRECTOR

DEPUTY DIRECTORS
JONATHAN K. SHIMADA, Ph.D.
WALTER T.M. HO
CHERYL D. SOON
ADAM D. VINCENT

IN REPLY REFER TO:

STP 8.10581

RECEIVED
85 MAY 2 P1:20
DEPT OF LAND & NATURAL RESOURCES
STATE OF HAWAII

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

April 30, 1985

MEMORANDUM

TO: The Honorable Susumu Ono, Chairman
Board of Land and Natural Resources

FROM: Director of Transportation

SUBJECT: KAPAA QUARRY - PHASE 2
ENVIRONMENTAL IMPACT STATEMENT

Thank you for the opportunity to review this statement.

The document recognizes the need to coordinate the landscaping plans with our Highways Division.

Wayne J. Yamasaki

Roger _____ Post _____
Aki _____ Library _____
Anne _____ Maude _____
Dean _____ Barbara _____

File in WYT Hold
To Carol For _____

A'OLE I KAUPO'O ANA NO • Founded 1963
Hawaii Loa College
45-045 Kamehameha Highway • Kaneohe, Oahu, Hawaii 96744 • 808-235-3641

OFFICE OF THE PRESIDENT

May 6, 1985

Mr. Susumu Ono, Chairman
Board of Land and Natural Resources
P. O. Box 621
Honolulu, HI 96809

Dear Mr. Ono:

This is to inform you that I have no comment on the draft EIS for the "Kapaa Quarry-Phase 2 project that was prepared pursuant to Chapter 343, Hawaii Revised Statutes and the Rules and Regulations of the Environmental Quality Commission.

Sincerely,

Philip J. Bossert, Ph.D.
President

cc George West

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU
1455 S. BERETANIA STREET, ROOM 305
HONOLULU, HAWAII 96814

FRANK F. FASI
MAYOR

FRANK K. KAHOOHANOHANO
FIRE CHIEF

LIONEL E. CAMARA
DEPUTY FIRE CHIEF

May 7, 1985

Mr. Susumu Ono, Chairman
Board of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

Subject: Kapaa Quarry - Phase II

Thank you for the opportunity to review and comment on the EIS subject project.

We have no comments to make at this time.

Sincerely,

FRANK K. KAHOOHANOHANO
Fire Chief

FKK:lm
cc: Mr. George West - Ameron HC&D
Administrative Services Bureau

HAWAIIAN ELECTRIC COMPANY, INC. • PO BOX 2750 • HONOLULU, HAWAII 96840

ENV 2-1
NV/G

Brenner Munger, Ph.D., P.E.
Manager
Environmental Department
(808) 548-6880

May 2, 1985

Mr. Susumu Ono, Chairman
Board of Land and Natural Resources
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

Subject: *Environmental Impact Statement for the Proposed* Kapaa Quarry Phase II Project

We have reviewed the subject Environmental Impact Statement and have no comments since electric service will not be requested.

Thank you for the opportunity to comment on this document.

Sincerely,

Brenner Munger

Brenner Munger, Ph.D., P.E.
Manager, Environmental Department

SLC:cal

cc: Mr. George West, Dept. EIS ✓
Ameron HC&D

655

DEPARTMENT OF PUBLIC WORKS

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813

RECEIVED
85 MAY 6 P3:01
DEPT. OF LAND
& NATURAL RESOURCES
STATE OF HAWAII

FRANK F. FASI
MAYOR

RUSSELL L. SMITH, JR.
DIRECTOR AND CHIEF ENGINEER

ENV 85-98

May 2, 1985

Mr. Susumu Ono, Chairman
Board of Land and Natural Resources
State of Hawaii
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

Re: EIS for Kapaa Quarry - Phase 2,
Koolaupoko, Oahu, Hawaii

We have reviewed the subject EIS and have no additional comments to offer.

Very truly yours,

RUSSELL L. SMITH, JR.
Director and Chief Engineer

cc: Mr. George West,
Ameron HC&D

Roger ____ Post ____
Aki ____ Library ____
Anne ____ Maude ____
Dean ____ Barbara ____
File in WQT HLD
To Carol For ____

P.101

636

United States Department of Agriculture

Soil Conservation Service

P.O. Box 50004
Honolulu, Hawaii
96850

RECEIVED

May 2, 1985 85 MAY 6 A 9:13

DEPT. OF LAND
& NATURAL RESOURCES
STATE OF HAWAII

Mr. Susumu Ono, Chairman
Board of Land and Natural Resources
P.O. Box 621
Honolulu, HI 96809

Dear Mr. Ono:

Subject: Draft EIS - Kapaa Quarry Phase II Project, Koolaupoko, Oahu

We reviewed the subject draft environmental impact statement and have no comments to offer.

Thank you for the opportunity to review this document.

Sincerely,

FRANCIS C.H. LUM
State Conservationist

cc:
Mr. George West, Dept. EIS
AMERON HC&D
P.O. Box 29968
Honolulu, HI 96820

Roger	Post
Aki	Library
Anne	Maude
Dean	Barbara
File in	W9T Hilo
To Carol For	

The Soil Conservation Service
is an agency of the
United States Department of Agriculture

50

★U.S. Government Printing Office: 1983—420-839/1578

cc: B. Thompson

University of Hawaii at Manoa

Water Resources Research Center
Holmes Hall 283 • 2540 Dole Street
Honolulu, Hawaii 96822

25 April 1985

Mr. Susumu Ono, Chairman
Board of Land and Natural Resources
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

SUBJECT: Environmental Impact Statement for the Proposed Kapaa Quarry Phase II Project, TMK: 4-2-15:1, March 1985

We have reviewed the subject EIS and have no comment to offer. Thank you for the opportunity to comment. This material was reviewed by WRRC personnel.

Sincerely,

Edwin T. Murabayashi
EIS Coordinator

ETM:jm

cc: George West, Ameron

B.0.

DEPARTMENT OF GENERAL PLANNING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

DONALD A. CLEGG
CHIEF PLANNING OFFICER

GENE CONNELL
DEPUTY CHIEF PLANNING OFFICER

85 APR 29 P2:01
STATE OF HAWAII

KK/DGP 4/85-1019

April 26, 1985

Honorable Susumu Ono, Chairman
Board of Land and Natural Resources
Department of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

Environmental Impact Statement for the
Proposed Kapaa Quarry Phase II Project
Kailua, Oahu; Tax Map Key 4-2-15: 1

We have reviewed the subject Environmental Impact Statement and find that the major issues and impacts have been identified and addressed.

Thank you for the opportunity to offer our comments.

Sincerely,

Donald Clegg

DONALD A. CLEGG
Chief Planning Officer

cc: Mr. George West, Ameron HC&D

Roger ______ Post ______
Aki ______ Library ______
Anne ______ Maude ______
Dean ______ Barbara ______

File in WQT Hold
To Carol For ______

65

DEPARTMENT OF TRANSPORTATION SERVICES

CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOHN E. HIRTEN
DIRECTOR

TE4/85-1369
PL 3006-85

April 16, 1985

Honorable Susumu Ono, Chairman
Board of Land and Natural
Resources
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

Subject: Environmental Impact Statement
for Kapaa Quarry - Phase 2

We have reviewed the EIS for the above project and have no comments.

We thank you for providing us this opportunity to review and comment on the project.

Sincerely,

JOHN E. HIRTEN
Director

APR 10 1985

cc: Mr. George West
Ameron HC&D
Mr. Bill Thompson

POLICE DEPARTMENT

CITY AND COUNTY OF HONOLULU

144

8.0

1455 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96814 AREA CODE (808) 943-3111

FRANK F. FASI
MAYOR

DOUGLAS G. GIBB
CHIEF

LAUREN FERREIRA
DEPUTY CHIEF

OUR REFERENCE EFS-JS

APR 12 A 8:26

STATE OF HAWAII

April 10, 1985

Mr. Susumu Ono, Chairman
Board of Land and Natural Resources
P. O. Box 621
Honolulu, HI 96809

Dear Mr. Ono:

We have reviewed the environmental impact statement for the Kapaa Quarry, Phase 2, and have found nothing in it that requires our comment. However, we do appreciate the courtesy extended to us in this matter.

Sincerely,

DOUGLAS G. GIBB
Chief of Police

By Edwin Ross
EDWIN ROSS
Assistant Chief of Police
Administrative Bureau

cc: Mr. George West, Dept. EIS
Ameron HC&D
P. O. Box 29968
Honolulu, HI 96820

UNITED STATES MARINE CORPS

MARINE CORPS AIR STATION
KANEOHE BAY, HAWAII 96863-5001

IN REPLY REFER TO:

6280
FDPP

0 9 MAY 1985

Mr. Susumu Ono, Chairman
State of Hawaii
Board of Land and Natural Resources
P. O. Box 627
Honolulu, Hawaii 96809

Dear Mr. Ono:

We have reviewed the Environmental Impact Statement (EIS) on Kapaa Quarry-Phase 2 forwarded to us by the State of Hawaii Office of Environmental Quality Control in their letter of 29 March 1985, and are directing this reply to you per their request.

Based on this review, it appears that the proposed project will not have any significant impact on Marine Corps Air Station, Kaneohe Bay. This confirms our earlier statement submitted in our letter (reference FDPP/WN/sh 11000 of 15 February 1984) to R. M. Towill Corporation, the preparer of the draft environmental assessment, which was included in the "comments received" appendix to the EIS.

Thank you for the opportunity to review the EIS. If there are any questions, please contact Dr. Diane Drigot, Environmental Protection Specialist, phone 257-2171.

Respectfully,

R. G. WILMES
Lieutenant Colonel, U. S. Marine Corps
Director, Facilities Department
By direction of the Commanding Officer

Copy to:
QEQC (L. N. Uyehara)
Ameron HC&D (G. West)

344

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858

April 16, 1985

85 APR 17 A9:23

STATE OF HAWAII

Mr. Susumu Ono, Chairman
Board of Land and Natural Resources
P. O. Box 621
Honolulu, HI 96809

Dear Mr. Ono:

Thank you for the opportunity to review and comment on the Environmental Impact Statement for Kapaa Quarry-Phase 2, Kapaa Valley, Koolaupoko, Oahu. The following comments are offered:

a. Work in the proposed Phase 2 is outside the regulatory jurisdiction of the Corps of Engineers.

b. According to the Flood Insurance Study for the City & County of Honolulu (Jan. 1983), conducted by the Federal Insurance Administration, the project site is within Zone D area of undetermined, but possible flood hazards.

Sincerely,

Howard S. Kobayashi
Actg C, Engineering Division

Copy Furnished:

Mr. George West, Dept. EIS
Ameron HC&D
P. O. Box 29968
Honolulu, HI 96820

Roger _____ Post _____
Aki _____ Library _____
Anne _____ Maude _____
Dean _____ Barbara _____
Phyllis 344 - HOLD
To Carol For _____

University of Hawaii at Manoa

Environmental Center
Crawford 317 • 2550 Campus Road
Honolulu, Hawaii 96822
Telephone (808) 948-7361

May 8, 1985

RE:0413

Mr. Susumu Ono, Chairman
Board of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

Draft Environmental Impact Statement
Kapaa Quarry Phase II
Kapaa Valley, Oahu

The Environmental Center has conducted a review of the above cited document with the assistance of Paul Ekern, Water Resources Research Center; Jacquelin Miller and Juliane Mansur, Environmental Center.

The DEIS describing the second phase for quarrying operations by Ameron HC&D is generally a well prepared document. We do, however, have two areas of concern that we would like to call to your attention.

Replanting program

An inconsistency is noted between the proposed and required landscaping schedules cited on page 7 and 11 of the DEIS and the practices observed. According to the terms of the lease agreement for phase I (1964), each bench was to be covered with top soil and replanted as operations ceased on that bench. Similar procedures are to be followed for phase II. However, no landscaping or replanting of the phase I quarried areas has taken place. Presumably, some other condition in the lease, has effectively negated the requirement for landscaping, probably the condition in paragraph (e), page ii, that negates the requirement if topsoil is not available at the site. Since the phase II plan lease is to be similar to the phase I, it seems likely that the lease provision requiring periodic landscaping during phase II will be similarly circumvented.

If soil loss and sedimentation to adjacent properties, the marsh and similar critical areas can be demonstrated to be minimal, then the concerns associated with the delay in landscaping will be largely aesthetic. However, our reviewers have provided information (see next section) which implies that the sediment loss may not be insignificant. In view of this information as well as the aesthetic considerations we suggest that landscaping of each bench be required immediately upon completion of quarrying operations on that particular bench. Furthermore, we suggest that paragraph (e) be rephrased to require use of sediments caught in the containment basins and retention ponds, along with any necessary fertilizers, for planting on the benches if topsoil is unavailable.

Sedimentation rates and detention basins

Pages 28 and 29. The sediment discharge of Kamooalli stream is used as the basis for estimating the normal rate of sediment discharge of Kapaa Stream to Kawainui Marsh as 846 tons per year, or about 1.51 tons per acre per year for the Kapaa Stream drainage basin. We note (p. 57) that about 5000 cubic yards per year of sediment are trapped in the containment basins and retention ponds for the quarry. Assuming a cubic yard of sediment weighs about a ton, the sediment capture is 5000 cubic yards per year or 45 tons per acre for the quarry area, about 30 times the estimated sediment yield of Kapaa Stream. The efficiency of the containment basins and retention ponds is thus critical. Unless the basins and ponds are drawn down between storms, the fine material, constituting perhaps about 20 percent of the total sediment load, probably represents suspended material that is not captured by the ponds and basins. (For further material information see the attached copy of Ekern, 1976.)

Please refer to our discussion on landscaping for suggestions on the reuse of the sediment in the retention ponds.

We appreciate the opportunity to comment on the DEIS.

Yours truly,

Doak C. Cox
Director

cc: OEQC
George West, Ameron HC&D
Paul Ekern
Jacquelin Miller
Juliane Mansur

Post Office Box 29968
Honolulu, Hawaii 96820
(808) 841-0911
Cable Address: Honconstr

Ameron
HC&D

May 10, 1985

Mr. Doak C. Cox, Director
Environmental Center
University of Hawaii at Manoa
Crawford 317, 2550 Campus Road
Honolulu, HI 96822

Dear Mr. Cox:

Subject: Kapaa Quarry - Phase 2 Environmental Impact Statement
Kapaa Valley, Koolaupoko, Oahu

Thank you for your review of the Kapaa Quarry - Phase 2 E.I.S. and your thoughtful comments to Chairman Susumu Ono. In response to your comments, we would like to state the following:

Replanting program

Response: The replanting program has been very slow in getting started. This has led to questions regarding the validity of the planting program mandated by conditions of the lease. Unfortunately, the quarrying operations are only now nearing the point where finished benches will be available for replanting. Up to now, only a small area where quarrying had ceased has been replanted. This small site was used as a test plot and the results have been good. The survival rates of trees and shrubs have been tested and should prove invaluable to the wide-scale replanting program. A more aggressive replanting program will be under way as additional quarry benches are only now reaching their finished levels.

Your suggestion that the sediment captured in the retention basins be used to supplement the topsoil will be pursued. Up to now, the sediment has been stockpiled on the site or used as cover material for the nearby City landfill.

Sedimentation rates and retention basins

Response: The 5,000 cubic yards of removed sediment referred to on page 57 include sediment from both the stormwater containment basins and the separately maintained dust control process water ponds. As a result of improvements with the

air-borne dust collection system, wherein much less water is used, we are able to maintain the process water ponds without discharge. We agree that maintenance of the stormwater containment basins is important.

Your comments have been most helpful. Thank you very much.

Sincerely,

G. N. West

George N. West
Manager, Kapaa Quarry

GNW:lcc

cc: Mr. Susumu Ono, Chairman
Board of Land and Natural Resources

8 May 1985

Mr. Sumuau Ono, Chairman
Board of Land and Natural Resources
P. O. Box 621
Honolulu, Hawai'i 96809

Re: Draft Environmental Impact Statement (DEIS) for "Kapaa Quarry-Phase 2"

Dear Mr. Ono:

Our organization appreciates the opportunity to comment on the subject DEIS.

We have one general comment and some specific comments. The general observation relates to the requirement in the EIS Regulations (1:31) that cumulative effects of the action be taken into consideration in evaluating a proposed project. We note that the effect of the action on the company involved and the construction industry has been stated (p. 42). However, no mention is made in the DEIS about the cumulative effect of this project when other proposals for the area (such as the 78-acre industrial "park" and its proposed infrastructure) are brought into the equation. Since the agency is required to consider cumulative effect, it would seem that the DEIS should make clear the total picture. This is especially important, when as in this case, the other action is subject to a different jurisdiction (i.e., City and County of Honolulu).

Specific Comments:

p. 5: At the bottom of the second paragraph, it is noted that the 1966 CDUA approval specified "that quarry work for Phase I was to be confined to 160 acres, more or less." Elsewhere (e.g., p. 26) it is stated that "the present quarry area accounts for 227 acres." If the present site has "slopped over" by over 1/3 of the area it was expected to occupy, what guarantee is there that the expansion to Ulumawao will remain at the stated 152 acres?

p. 6: Figures 4 & 4A following this page are implied to be from 1966 CDUA application but are undated.

p. 7: (also other references) The revegetation referred to at the bottom of the second paragraph is the same set of good intentions that were enunciated for the 1966 application. However, to date, despite efforts in this direction, replanting has not worked. We understand the plants chosen were inappropriate, and that sprinkler systems broke down soon after they were first used. Covering up to 50 feet of rock wall with anything will be very difficult.

p. 69: The statement (middle of second paragraph) that "changes of the land shapes are not readily apparent at this time" is inaccurate. The only place from which one cannot see the effect of the current quarry on Mahinui peak is when one is directly behind either Ulumawao or Mahinui peak.

Na Kia'i Pono 'O Kawai Nui

KAWAI NUI HERITAGE FOUNDATION
P.O.BOX 1101 KAILUA, HAWAI'I 96734

Specific comments, cont'd:

p. 31 and appendix 4 (Archaeology): The reports are dated 1979. Although the body of the DEIS notes the later findings of Dr. John Craft that the present Marsh was once a bay, the archaeological report could not take that into account, since the report predated that finding. We would like to see an updated report that looks at the significance of site 50-Oa-G6-31 in light of Craft's work. Considering the site's proximity to Pahukini heiau, and its now demonstrated closeness to the shoreline, could the site have been a pu'u honua?

We will look forward to receiving a copy of the final EIS, as well as notice of the time at which public comments on the CDUA will be taken by the Board.

Sincerely,

Susan E. Miller

Susan E. Miller
President

cc: Mr. George West

Na Kia'i Pono 'O Kawai Nui

KAWAI NUI HERITAGE FOUNDATION
P.O.BOX 1101 KAILUA, HAWAI'I 96734

Post Office Box 29968
Honolulu, Hawaii 96820
(808) 841-0911
Cable Address Honcontra

Ameron
HC&D

May 11, 1985

Kawai Nui Heritage Foundation
P. O. Box 1101
Kailua, HI 96734

Attention: Susan E. Miller, President

Gentlemen:

Subject: Kapaa Quarry - Phase 2 Environmental Impact Statement, Kapaa Valley, Koolaupoko, Oahu

We have received a copy of your letter commenting on the Kapaa Quarry - Phase 2 E.I.S. We would like to respond to the comments and answer some of the questions that have been posed.

General comment on cumulative effect of industrial park.

Response: There are no definite plans for the proposed industrial park. Therefore, no information is available for consideration that can be included in this E.I.S. We agree that an industrial park will have a cumulative effect if it is to be developed. It is at such time that the cumulative effect, if any, should be discussed.

Specific comments:

Response: The 227 acres that are delineated as Phase I is the total area above the H-3 highway. However, only 160 acres comprise the actual working area of the Phase I quarry in accordance with the 1966 COUA provisions. Similarly, 152 acres is the estimated total area below the H-3 highway. The actual quarry will be less than the 152 inasmuch as quarrying is not expected near the Ulumawao Ridge line nor adjacent to the H-3 highway.

Response: The maps shown as Figures 4 and 4A show the proposed Phase 2 project and proposed test drilling sites. The map that is used is the 1966 map; however, the information shown is current. In Appendix 1, we have included a map that shows the test drilling sites and a tabulation of the results. This work was performed in 1962 as noted.

Response: It is true that the revegetation efforts to date are very minimal from a visual standpoint. This is due to the fact that most of the quarry area is still being worked on. However, test plantings on a small area where quarrying has been completed show great promise. Many tree and shrub specimens were tested and several plants appear to be excellent candidates for the major replanting program. It is also true that some plants were complete failures and some trouble was experienced with the sprinkler system. However, the sprinkler system was only to help the test plantings. It is obvious that the plants to be selected must be able to survive on their own without artificial watering. Some trees (see page 60) have proven that they can survive in the restored areas. A more aggressive replanting program will be under way since more of the quarry benches are reaching their finished levels.

Response: With regard to the visual changes, our complete statement was: "The valley is presently viewed from a distance and the changes to the land shapes are not readily apparent at this time." In a case like this, it depends on a person's personal viewpoint or evaluation. However, the next sentence goes on to state: "Nonetheless, when the H-3 highway is open, the public will travel between the Phase I and Phase II sites and will notice quarry activity." We certainly are aware of the visual impact of the quarry and do not wish to imply otherwise.

Response: The archaeological reconnaissance survey performed by the Bishop Museum staff is comprehensive in interpreting the historical aspects of the project site. The significance of the site 50-)a-G6-3 has already been determined by the Bishop Museum staff. The full reports of the initial survey and subsequent test excavation are provided in the Appendices. Their conclusion, which is logical and appropriate for the situation, is quoted on page 32 and in the full text of their report contained in the Appendices.

We hope we have clarified your questions to Chairman Ono. In your earlier testimony, you raised questions relating to the hydrological/geological aspects of the quarry operations. As you can see, we added considerable information to this section. We trust your earlier concerns have been answered. Thank you for submitting your comments to Chairman Ono.

Sincerely,

George N. West
cc: Mr. Susumu Ono

May 7, 1985

Mr. Susumo Ono, Chairperson
Department of Land and Natural Resources
P. O. Box 621
Honolulu, Hi. 96809

RE: Draft EIS - Kapaa Quarry Phase II

Dear Mr. Ono:

Thank you for the opportunity to review the draft EIS on the proposed Kapaa Quarry Phase II.

Lanikai Association has long been in favor of preserving and protecting the open-space/greenbelt areas that have been established in and around the Kailua/Waimanalo/Kaneohe area by our state conservation laws. We feel that further intrusion into these areas violated the intent of the law and will cause adverse affects on the surrounding communities.

Therefore, although this development does not have immediate effects on our community, it does affect the larger community of Kailua, of which we are a part, and also the adjacent communities of Kaneohe and Waimanalo. Already, unsightly scars from Phase I of the Quarry's operations mar the hillsides surrounding their site.

We feel that further extension of quarrying operations will grossly affect the following:

1. water runoff into Kaiwaimui Marsh and then into Kailua Bay with increased pollution to both bodies of water.
2. destruction of hills and ridges that separate the communities of Kailua and Kaneohe, thus changing the face of the natural landscape with possible unforseen erosion and changes in natural drainage patterns.
3. damage to historic sites from digging, blasting, and increased heavy vehicular traffic.
4. disruption to the habitats of native birds due to changes in the ecology of the existing marsh.
5. but, most important, land lost from our diminishing supply of openspace left in conservation on Oahu in general and Kailua/Kaneohe/Waimanalo in particular.

We urge you to carefully consider the impact of further commercial industrial development in conservation areas adjacent to residential

communities and the adverse effects such development would have on the environment of said communities.

Sincerely,

Barbara J. (Hoppy) Smith
Chairman, Land Use Committee

cc: Mr. George West, Dept. EIS
Amerom, HCAD

Post Office Box 29968
Honolulu, Hawaii 96820
(808) 841-0911
Cable Address: Honconra

Ameron
HC&D

May 9, 1985

Ms. Barbara J. Smith
Chairman, Land Use Committee
Lanikai Association

Dear Ms. Smith:

Subject: Kapaa Quarry - Phase 2 Environmental Impact Statement, Kapaa Valley, Koolaupoko, Oahu

Thank you for the Lanikai Association's review of the Kapaa Quarry - Phase 2 E.I.S. We would like to respond to the five points you raised in your letter relating to the extension of the quarrying operations.

Point 1: The water run-off from the Kapaa Valley into Kawainui Marsh at present is the run-off from the undisturbed areas of Kapaa Valley. The quarry area run-off is controlled by retention basins under a NPDES (National Pollution Discharge Elimination System) permit which is administered by the State Department of Health. The permit will be amended to include the Phase 2 area. Run-off, as we have stated in the E.I.S., will be controlled and not contribute to increasing pollution of the marsh and Kailua Bay.

Point 2: Under the proposed project plan, the hills and ridges that separate the communities of Kailua and Kaneohe will not be quarried. The Ulumawao ridge line will not be touched by the project. Only the inside slope face of the Kapaa Valley will be quarried. Drainage of quarried areas will be managed under the NPDES permit described above.

Point 3: The concern for historic sites led to an archaeological reconnaissance survey of the project site by the Bishop Museum staff. As noted in the E.I.S. (with reference to Appendix 4), the area, as far as can be ascertained, is devoid of any significant historical site. The increased heavy vehicular traffic you refer to will not be due to the Ameron HC&D operations. As noted in the E.I.S., the same number of equipment that now handles the Phase 1 quarry will handle the proposed Phase 2 site. In short, the Phase 2 area will replace the Phase 1 area which will be depleted in a few years; the equipment will remain essentially unchanged.

Ameron
HC&D

Point 4: The habitat of the native birds will not be affected by this project, as stated in the E.I.S. The changing ecology of Kawainui Marsh will not be caused by quarry operations. Under the "Resource Management Plan for Kawainui Marsh," changes to the character and ecology of the marsh are expected to occur. The history of Kawainui Marsh shows that it has evolved from its volcanic origin to a drainage basin that captures the flows from Maunawili and Kahanaiki streams and, to some extent, Kapaa Stream.

Point 5: The loss of open space will be a factor. The Kapaa Quarry Phase 2 site is in the Conservation District; no change in land use classification is being requested. What is occurring is the change in the face of the landscape. The steep slopes are being quarried and the appearance of the valley is being changed. The barren view of the quarried hillsides is distracting; however, with the mandated replanting program, some of the naturalness of the area is expected to return. Sections 7 and 8 of the E.I.S. discuss this aspect of the project.

We appreciate the thoughtful review given by your Association. Ameron HC&D is committed to quarrying Kapaa Valley in a manner so as to reduce possible adverse environmental impacts. Over the years, Ameron HC&D has sought to be a good neighbor of those residing in the Kailua-Kaneohe region and will continue to pursue this philosophy.

Thank you.

Sincerely,

George N. West
Manager, Kapaa Quarry

GNW:lcc

cc: Mr. Susumu Ono, Chairman
Board of Land and Natural Resources

consolidated amusement co, ltd.

May 8, 1985

Mr. George West, Dept. EIS
Ameron HC&D
P.O. Box 29968
Honolulu, Hawaii 96820

RE: KAPAA QUARRY - PHASE 2
ENVIRONMENTAL IMPACT STATEMENT DRAFT

Dear Mr. West:

Consolidated Amusement Company wishes to address the following comments relevant to your proposed Kapaa Quarry-Phase 2 and its relationship to our adjacent Kailua Drive-In theatre:

1. The Environmental Impact Statement has no reference to nor consequences that our operation would experience as a result of the precariously close proximity of the Phase 2 quarry.

2. We are particularly concerned as to how the operational noise and the blasting would effect us.

   a. What would be the normal audible decibel level that would be generated to our location?

   b. Will blasting noise and vibrations be an adversity to our operations and building structural integrity?

   c. Would quarry operations and blasting result in excess dust and soot settlement upon our property?

3. Inasmuch as there is an exceptionally high truck-traffic on Quarry Road and because this road services our operation and we have had past problems, we wish to express our concern with on-going road maintenance upkeep.

290 Sand Island Road P.O. Box 30548 Honolulu, Hawaii 96820 (808) 847-1985
Cable Address: Muse, Honolulu Telex: 7430201
Consolidated Theatres Consolidated Warehouse Consolidated Distributors

Thank you very much for allowing us to provide these comments.

Best regards,

Floyd Williamson
Division Manager

FW/hpc

cc: Art Gordon - Consolidated Amusement Co., Ltd.
Aki Chun - Consolidated Amusement Co., Ltd.

Post Office Box 29968
Honolulu, Hawaii 96820
(808) 841-0911
Cable Address: Honcontra

Ameron
HC&D

May 10, 1985

Mr. Floyd Williamson
Division Manager
Consolidated Amusement Co., Ltd.
P. O. Box 30548
Honolulu, HI 96820

Dear Mr. Williamson:

Subject: Kapaa Quarry - Phase 2 Environmental Impact Statement, Kapaa Valley, Koolaupoko, Oahu

Thank you for your review of the draft E.I.S. for the Kapaa Quarry - Phase 2 project. In response to the questions you have raised, we wish to state the following:

Question 1: We did not specifically study the Kailua Drive-In Theater site; our study was the general region surrounding the Kapaa Quarry facility. In this respect, we received a similar inquiry from the Hawaii Loa College administration. We were able to meet with the college officials and go over the project in detail with regard to the nearby college facilities. They are satisfied with our explanations and we expect to check with them from time to time as work proceeds. The E.I.S. covers the probable impacts; we find no evidence that the operations in the Phase 2 area will cause any significant adverse impact to your theater facility.

Question 2a: The normal audible decibel level that would be generated by the quarry operations cannot exceed the sound pressure levels shown in Section 21-2.21 of the City and County Comprehensive Zoning Code. The Department of Health also has the authority to seek compliance with noise levels in accordance with its regulations. We are enclosing our letter to Health Director Leslie Matsubara who had called this matter to our attention.

Blasting, which causes vibrations, is also regulated by the CZC. This is covered by Section 21-2.22.

Appendix 5 of the E.I.S. covers these impacts in detail to show the mitigating controls exercised by Ameron HC&D.

Since the Drive-In Theater operates in the evening when quarry operations are usually shut down, we are puzzled as to the specific problems you may have.

Question 2b: Same response as given for 2a.

Question 2c: Dust and soot are controlled by various means which are described under Section 4(C) of the E.I.S.

Statement 3: With regard to the past problems you have had on the Quarry Road, we will refer this matter to the City and County Department of Public Works. As stated in Section 2(C), page 54, of the E.I.S., the Quarry Road is a non-exclusive eastment. In this respect, the C & C Department of Public Works shares in the maintenance of the road. The arrangement provides for maintenance by the City and County with materials furnished by Ameron HC&D.

Due to the late arrival of your letter, we were unable to contact you as to the specific problem(s) you may have. Ameron HC&D will be happy to send an engineer to go over any specific item of concern to you.

Thank you for taking time to review and comment on the E.I.S. As we have said time and again, we wish to be a good neighbor; please don't hesitate to call us.

Sincerely,

George N. West
Manager, Kapaa Quarry

GNW:cc

cc: Mr. Susumu Ono, Chairman
Board of Land and Natural Resources

HAWAII'S THOUSAND FRIENDS

Ke aloha o kakou 'aina, Oia ka mana ku pa'a. Panoanoa ka 'aina, Manoanoa ka po'e.
The love of the land, is the power for us to stand fast. Rare is the land, many are the people.

May 8, 1985

Mr. Susumu Ono, Chairman
Board of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

RE: Kapaa Quarry-Phase 2/Amerron, HC & D applicant

Our organization is a non-profit corporation promoting responsible land use planning and management in Hawaii. We seek, among other actions, to provide a voice on behalf of the public interest in forums where land use decisions are made.

Thank you for the opportunity to offer our comments on the proposed Quarry Phase-2 project for expansion of Ameron, HC & D quarrying operations.

After reviwing the Draft E.I.S for Kapaa Valley, we recommend the the Final E.I.S incorporate information/explanation of several of the proposed programs as listed, in order to mitigate the adverse impacts as perceived by a project of this sort.

Land use/Zoning:

Although the wetland, flood control, and cultural values of Kawainui Marsh have been widely recognized, a variety of use conflicts along its periphery for development pruposes are incompatible within an area designated as Preservation/Conservation. We believe that the expansion of the Kapaa Quarry will also infringe on an already highly sensitive and ecologically significant area, Kawainui. We have noted that the applicant has stated working along with the Kawainui Management plan, however, the substantive studies performed under federal jurisdiction, has not been referenced or discussed in the draft EIS.

Furthermore, we question the reasoning behind exlcusion of a study of cummulative impacts on physical, biological, and social well-being of the affected community.

A serious problem associated with mineral resource development is the possibility of release of trace elements in hazardous concentration

Blaisdell on the Mall, Suite 402 • 1154 Fort Street • Honolulu, Hawaii 96813 • (808) 536-1296

into the Environment. Trace Elements when leached from mining wastes and concentrated in water, soil, or plants, maybe taxic or may cause disease in people and animals. The basic idea of a secure landfill, is to confine the operation to a particular area/location, control the leachate that drains from waste, and collect and treat that leachate. What programs has been implemented at existing facility in order to address the possibility of leaching into the Marsh by means of run-off into Kapaa Stream. Also, given that operations of the Quarry ceased, and area utilized as a landfill, what commitment is there to not expand landfill site once the area is considered "depleted"? Is there proposed testing/monitoring incorporated into the proposed operation expansion that will address these concerns? By what method are the siting of sediment basins determined?

Natural Environment

Geology: Has shown that the soils contain high amounts of clay, and states that run-off is considered medium to very rapid, and increasing when development/urbanization occurs. Also, erosion is a very serious and considered very severe. Will projected catchment basins consider the amount/levels of run-off, erosion, and eventual increase sedmintation that will result in the expansion?

Social Impacts:

Visual/Aesthetic: The impacts of quarrying are irreversible, in that once the operation begins there is no way to reverse the damage. The projected expansion, as well as the landfill, and auto dump, will deter from the integrity of the community. In consideration of the area as one of steady growth, how can you justify the interest of location in the area that is a literal eyesore. Given that the existing quarry operations will cease, and the auto dump relocated we believe that the area should be reclaimed given its proximity to this unique wildlife sanctuary and cultural resource. Regarding the proposed replanting, there has been an attempt to introduce vegetation that cannot survive on the striped side of Nahinui, which was an entirely separate operation. Once striped of the topsoil, efforts of replanting have and will continue fail.

Cultural/Archaeological

We are disappointed in the Draft EIS discussion of the archaeological sites which would be destroyed by the proposed mining project. We are surprised that there is no mention of other known archaeological sites in Kapa'a Valley which would be impacted by the project, if effected. We trust that the final EIS will contain full discussions of all such sites, their cumulative significance, and the magnitude of the project on all.

Although the Kawainui Archaeological, Cultural, and Historic District was declared eligible for listing in the National Register of Historic Places (automatically qualifying the District for Hawai'i state Register of Historic Places listing, under state law), on July 13, 1979, receiving widespread public attention at about the same time test excavations were being performed at Site 50-Oa-G6-31, no mention of this action is ever mentioned in the archaeological report. This action, taken with knowledge that Pahukini Heiau, located between the two sites is also listed in the National Register, would appear to make necessary a discussion of the possible and likely relationships between the three sites. Yet other sites of the area include the hidden pond walls and other structures present along the stream in Kapa'a Valley, which are not even alluded to in the Draft EIS.

It is important that an EIS be timely, discuss all alternatives, and be complete. With regard to this section of the Draft EIS, we find much that is outdated, narrow, and incomplete.

In the initial reconnaissance survey, the archaeologist asked, "What is the relationship of the site to: a) Kawai Nui Fishpond? b) Pahukini Heiau?." Will the final EIS answer this question? Other questions raised in the six-year-old report which we hope will be answered in the Final EIS that are not addressed in the DEIS are, "What is the temporal origin of the site? What was the function of the large cleared area? If the site is a prehistoric agricultural settlement, why was it located in the small hanging valley and not on the better watered, more spacious alluvial flat below?"

We understand that answers to these still pertinent and unanswered questions were to be addressed by the subsequent (July, 1979) Test Excavations Phase. The fact that no definitive answers were forthcoming testifies to the fact that the scope of work was inadequate to provide the answers. To attempt to draw meaningful conclusions from work at only two small, barren pits totalling only 1.5 square meters out of a complex of features in an area of 1,250 square meters is unfair to the professionals involved. This means that this unusual complex remains inadequately evaluated archaeologically and culturally. We recommend additional testing of the site through additional subsurface explorations and a meaningful literary and cultural search.

Criteria for listing archaeo/cultural/historical sites are not solely dependent on just one branch of anthropological discipline. Archaeology provides but one aspect of the total knowledge necessary to evaluate our heritage. In the case of Site 50-Oa-G6-31, there is a complex of features typical of ancient Hawaiian construction located in an unusual setting in a high, hanging valley one ridge over from a great, walled luakini (sacrificial) heiau attributed to a 12th century chief having ties to Tahiti. The site is significantly wooded with forests of Polynesian-introduced kukui trees, is carpeted by honohono grass and sweet potato vines, and there are also present the 'ape and ki. All of these plants were important to the native Hawaiians and were brought with them in their Pacific travels, and may be considered a part of the cumulative significance of the site, and provide clues for the original forestation of the nearby terrain with the other sites. Will the FEIS deal with an ethnobotanical evaluation of the site and its significance in relation to the other nearby sites?

In the references pertinent to archaeological/cultural/historical considerations, we are disappointed to find that while the Resource Management Plan issued by the Department of Planning and Economic Development in 1983 is listed, none of the substantive studies leading to the plan are referenced. Will the FEIS make use of such documents as the "Historical Study of the Kawainui Marsh Area," by Marion Kelly and Barry Nakamura of the Bishop Museum, or "Archaeological Excavations in Kawainui Marsh," by Jane Allen-Wheeler of the Bishop Museum, whose maps evidence the hidden taro terraces of Kapa'a Valley, buried by severe infill from prior and existing quarrying operations, exacerbated by subsequent landfill operations in the same locale. These were still in use into the 1920s. Will these structures be referenced in the FEIS, and discussion made of their relationships to the sites found in the high valley, Kawainui Fishpond, Pahukini Heiau, and to Holomakani Heiau which was destroyed by the same quarrying operations at the original Kapa'a site?

Hawaiian culture did not exist in a site-separated vaccuum, any more than modern society does. We will hope that the FEIS will make these relationships clear, both by expanding sub-surface exploration in the high valley, and along the Kapa'a Stream bed and mouth of Kap'a Valley toward Kawainui Marsh; and through a vastly expanded literary search, plus an ethnobotanical evaluation.

Finally, despite an archaeologist's pre-disposition to call data-collection "mitigation," we would like to point out that "to mitigate" has nothing in common with "todestroy." We believe the mountain sites will be a valuable adjunct to the trail system linking the cultural sites of the Kawainui District, having great interpretive potential for our citizens and visitors. We will look forward to a more realistic discussion of this aspect of what is a viable alternative to the destructive proposal being examined in the Environmental Impact Statement process.

Again, thank you for the opportunity to offer our comments, which were prepared by our volunteers, Richard Busekrus and Martha Diaz-Colon.

Sincerely,

Muriel B. Seto

Muriel B. Seto
Executive Director

cc: Ameron HC & D, Mr. George West
Department of Planning and Economic Development, Coastal Zone Management Division
Kailua Neighborhood Board
Kailua Community Council
Kawainui Heritage Foundation
Society for Hawaiian Archaeology
Sierra Club
Conservation Council

Post Office Box 29968
Honolulu, Hawaii 96820
(808) 841-0911
Cable Address: Honcontra

Ameron
HC&D

May 9, 1985

Ms. Muriel B. Seto, Executive Director
Hawaii's Thousand Friends
Blaisdell on the Mall, Suite 402
1154 Fort Street
Honolulu, HI 96813

Dear Ms. Seto:

Subject: Kapaa Quarry - Phase Environmental Impact Statement

We have received a copy of your comprehensive review of the Kapaa Quarry - Phase 2 E.I.S. and would like to respond to your questions.

1. Land Use/Zoning
   Response: As stated in the E.I.S., Kapaa Quarry existed prior to the enactment of the Land Use Law. The area was zoned agriculture and the quarry was a permitted use. Under the initial Conservation District Regulation 4, a quarry was a permitted use. The use of the property TMK: 4-2-15:1 for quarrying purposes has been established over the years. The present CZC of the City & County states that quarrying can be permitted as a conditional us.

   We find no evidence of trace toxic elements being released into the atmosphere to the detriment of the community. Also, the drainage aspects have been fully covered in Section 2 of the E.I.S.

   The only landfill being planned for the valley area is the Kalaheo Landfill by the City and County. Our current planning for both Phase 1 and Phase 2 quarry operations does not include landfills.

2. Natural Environment
   Response: Section 2 adequately covers run-off including sedimentation. The catch (or retention) basins will be designed after quarrying plans have been determined after test drilling results are obtained. The retention basins will be designed in accordance with the NPDES requirements and will have to be approved by the State Department of Health.

3. Social Impacts
   Response: We can only respond to the quarry operations; the landfill and auto dump are beyond the scope of this E.I.S. As we state in the E.I.S., there will be permanent alteration to

the landscape. See Section 7 and 8. However, with a vigorous replanting program as part of the mitigation measures included in this project, the visual aspects of the valley should be restored to some extent. A replanting program will be submitted to the State for approval as required now for Phase 1, and for Phase 2 at the appropriate time.

4. Cultural/Archaeological
   Response: We believe the work performed by the Bishop Museum Departments of Anthropology and Botany are adequate for the purposes of this E.I.S. For example, your question: "What is the relationship of the site to: a) Kawai Nui Fishpond? b) Pahukini Heiau? Will the final E.I.S. answer this question?" The answer is given in the E.I.S. The archaeologists in their survey located only one area of interest and recommended that Site 50-Oa-G6-31 be excavated for possible answers. The recommended excavation was subsequently carried out by Bishop Museum archaeologists and their conclusion was that, due to the lack of datable materials from the test site, the temporal origin of the site remains unanswered. The site was void of interpretive potential and had yielded all the data it is likely to yield.

   As to your request for additional sub-surface explorations, the E.I.S. contains the statement that should any archaeological remains be uncovered during quarrying operations, the work will be stopped and the State Historic Preservation Officer notified. Ameron HC&D has had an archaeological investigation conducted and feels that for the purposes of the E.I.S., it is adequate. This does not mean that archaeological remains do not exist on the site. Ameron HC&D will not probe the whole valley for some yet unknown archaeological feature; however, if during the course of operations some remains are unearthed, steps will be taken to have such remains evaluated and work would proceed only upon approval of the State HPO. We do not doubt the fact that the early Hawaiians may have been in the project area. However, no remains of significant importance have been located to justify additional studies on this aspect of the project.

While we cannot agree with your recommendations for additional studies, we do appreciate the wide scope of the review conducted by you and your associates.

Sincerely,

George N. West
Manager, Kapaa Quarry

cc: Mr. Susumu Ono

Q.D.

313

THE LANI-KAILUA OUTDOOR CIRCLE
P. O. BOX 261
KAILUA, HAWAII 96734

RECEIVED

April 17, 1985
85 APR 19 P2:00

DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

Susumu Ono, Chairman
Dept. of Land and Natural Resources
Kalanimoku Building
1151 Punchbowl St.
Honolulu, Hawaii

Dear Mr. Ono,

The Lani-Kailua Outdoor Circle must continue to oppose any development which can jeopardize the Kawai Nui Marsh's designation as a National Historic Educational, Cultural, Recreactional Park.

The impact of the recently proposed "light-industrial area, the enlarging of the City's Solid Waste Landfill and now the proposed extension of Ameron's Quarry operations all make a negative impact on the Marsh.

The newly proposed Ameron Phase II extension is a hazard to our environment and can destroy not only the marsh's cultural, educational, recreational use but can cause much despair among the Kailua community and neighboring communities because:

* There will be destruction of the slopes surrounding Kapa'a Valley with no guarantee that agriculture can be implemented once the slopes are levelled. Phase I areas are still bare.
* Blasting sounds can impact on the normal quiet of the existing homes, Kalaheo High School, Castle Hospital, and Hawaii Loa College.
* Blasting will also impact on the substructure of the land near and surrounding the marsh. This "cracking" of the earth will permit contamination which will eventually pollute the marsh.
* The proposed "holding ponds" as described in Ameron's EIS report, cannot prevent contaminated water from

Roger _____ Post _____
Abl _____ Library _____
Anne _____ Maude _____
Dean _____ Barbara _____

File in WAT - HLD
To Carol For _____

THE LANI-KAILUA OUTDOOR CIRCLE
P. O. BOX 261
KAILUA, HAWAII 96734

entering the marsh when there is heavy rain. These ponds will contain contaminantes and sedimentation from the processing plants.

* The smoke stacks on Phase I property are presently emitting smoke and dust which is visible from many vistas in and around the marsh and the nearby community. The air is being polluted with smoke and dust particles. This will surely double with the proposed Phase II.
* Increased traffic by heavy trucks and a need for widened roadways for ingress and egress.
* The use of heavy equipment such as; jackhammers, shovels, graders, caterpillars, vibrating feeders, dump trucks, crushers, etc. can certainly impact on the neighboring communities as well as the marsh.

Since Ameron may be servicing the needs of the potential future growth of the islands, why not find a more suitable site on another island where building of new high rises, offices, shopping centers are being planned.

Our Kawai Nui Marsh is unique and is a much needed flood control area. It must be preserved, not destroyed, only enhanced.

We must continue to demand government vigilance against contamination of the marsh. The Five-Year Plan developed by the State gives us a future for an educational, cultural, recreational center in Kailua for all of our island visitors as well as our citizens.

Thank you,
Marie Gormaine
Marie Gormaine, Public Affairs
Liz Keller
Liz Keller, President LKOC

Post Office Box 29968
Honolulu, Hawaii 96820
(808) 841-0911
Cable Address: Honcontra

Ameron
HC&D

May 10, 1985

The Lani-Kailua Outdoor Circle
P. O. Box 261
Kailua, HI 96734

Attention: Marie Gormaine/Liz Keller

Subject: Kapaa Quarry - Phase 2 Environmental Impact Statement,
Kapaa Valley, Koolaupoko, Oahu

Your extensive review of the Kapaa Quarry - Phase 2 E.I.S. is appreciated. In response to your comments, we wish to state the following:

The alteration of the slopes surrounding Kapaa Valley is unavoidable in a quarrying operation. The Phase 1 area is still bare for the most part as quarrying operations are still being carried out. However, some areas have been replanted and these test plots indicate that vegetation can thrive in restored areas. We have shown these replanted areas to interested persons. Your club is invited to inspect these premises. Ameron HC&D has received recommendations from groups such as your organization with regard to a landscaping plan for the quarry and will certainly seek community input for the Phase 2 project site. The agricultural aspects of the replanted areas still remain to be proven; however, the disposition of the replanted areas will be made by the land owner.

Blasting sounds are controlled as described in the E.I.S. This impact is of particular concern to Ameron HC&D and over the years improvements have been made to minimize the effects of blasting operations. We have not received any complaints on blasting effects in recent years, which we trust is an indication of Ameron HC&D's concern for the nearby communities.

Blasting is controlled and no major "cracking" of the ground is expected. The geology and hyrology of the area is adequately described in Section 2 of the E.I.S. The massive thick lavas are not expected to show any definite cleavage fracture pattern. The thick lavas of the vent are not expected to contain any weak plane to cause "cracking" of the ground. Monitoring of the blasting operations will ensure compliance with environmental regulations.

The "holding ponds" are designed and constructed in accordance with applicable provisions of the NPDES regulations (National Pollution Discharge Elimination System). This regulation is enforced by the State Board of Health. Conformance with the NPDES permit is expected to prevent pollution of Kawainui Marsh from quarry operations.

The "smokestack" that you refer to is the stack of a dust emission wet scrubber. The "smoke" is actually steam which is nothing more than vaporized water. Also, your reference that plant emissions will double due to the Phase 2 operations is incorrect. Phase 2 will replace the Phase 1 quarry as it may be depleted in a few years.

As stated in the E.I.S., there will be no increase in traffic due to the Phase 2 operations. The volume of materials from the Kapaa Quarry facility will essentially remain unchanged. Widening of the roadway, which is a non-exclusive easement, if required, will not be due to Ameron HC&D operations. The roadway, built by Ameron HC&D and maintained jointly with the City and County, is primarily an industrial road. The present traffic is not expected to increase significantly due to the City's landfill operation and Ameron HC&D's quarry operation.

The use of heavy equipment at the Kapaa Quarry facility has been going on since 1964. No change in the use of heavy equipment is planned; therefore, your statement that the Phase 2 project "can certainly impact on the neighboring communities as well as the marsh" cannot be substantiated.

The suggested relocation of the quarry to another island is economically prohibitive in order for Ameron HC&D to properly serve Oahu. We have carried out our operations in such fashion so as not to cause any adverse environmental impacts not only to Kawainui Marsh but to the general area. We expect to maintain this policy as we would like to be good neighbors with the community in which we operate.

As we have done in the past, we will continue to consult with the Outdoor Circle for recommendations on the replanting and landscaping plan.

Please express our thanks to your membership for the interest shown in our project.

Sincerely,

George N. West
Manager, Kapaa Quarry

cc: Mr. Susumu Ono, Chairman
Board of Land and Natural Resources

CNW

KAILUA NEIGHBORHOOD BOARD NO. 31
c/o KAILUA SATELLITE CITY HALL
302 KUULEI ROAD
KAILUA, HAWAII 96734

May 8, 1985

Susumo Ono, Chairman
State Department of Land and Natural Resources
P.O. Box 621
Honolulu, HI 96809

Subject: Environmental Impact Statement for the Kapaa Quarry Phase II

Dear Mr.Ono:

Our major concern with the expansion of the Quarry to a site across the valley is the environmental destruction which will occur to the land. We do not feel that present efforts to mitigate the impact at the present Quarry site have or will be adequate. We are also concerned because "the project site is located within the boundary of the secondary planning area of the Kawainui Marsh Resource management plan." (p. 50).

We would particularly like to address the following:

1. Air Quality (p.54)

   At the present time in Phase I of the Quarry operation there is a constant cloud of dust/smoke (?) covering most of that part of the valley even though dust control measures are in effect. There are no plans to improve the situation. Why not?

2. Drainage (p. 56-57)

   Since Kapaa Stream is feeding into Kawai Nui Marsh we are concerned that too much of the natural run-off from rain will be prevented from entering the stream and thereby lower the water level in the Marsh itself. We are also concerned that unwanted sediment will further pollute the Marsh.

3. Visual (p. 59)

   The present Quarry site is highly visible from many points. The proposed site will also be visible from different points. Just because tourists will probably not have to view it from the Pali, does this make it any less ugly? Don't residents count? We have to look at it every day!

Mitigating Efforts: "To date over $300,000 have been spent in Phase I reforestation and beautification program." (p. 59). All of that money, time and effort has been spent on a program that to our eyes has been totally ineffective. In the Ameron lease from Castle it is specified that they are required to replace two feet of topsoil on cut areas if it is available on the site. We submit that this an extremely inadequate plan for a reforestation program. We think a landscape consulting firm is needed now. Consulting with Kailua Community groups in regards to replanting is not enough. The program has left bare ugly gashes in the rock face visible to all. Even when viewed at close range it is obvious that the program is a complete failure. If it is not possible to "beautify" Phase I, how can the detrimental visual impact of Phase II be mitigated to anyone's satisfaction?

This Board cannot approve this EIS until something definite is provided for an effective long term reforestation program.

Sincerely,

Norma Wong
Chairman

cc: Lanikailua Outdoor Circle
Kawai Nui Heritage Foundation
Ameron
Councilmember David Kahanu
Councilmember Welcome Fawcett
Kailua Chamber of Commerce
Neighborhood Commission

Post Office Box 29968
Honolulu, Hawaii 96820
(808) 841-0911
Cable Address Honconstra

Ameron
HC&D

May 10, 1985

Kailua Neighborhood Board No. 31
c/o Kailua Satellite City Hall
302 Kuulei Road
Kailua, HI 96734

Attention: Ms. Donna Wong, Chairman

Gentlemen:

Subject: Kapaa Quarry - Phase 2 Environmental Impact Statement, Kapaa Valley, Koolaupoko, Oahu

We have received your comments and appreciate your review of the E.I.S. document. In answer to the questions raised, we would like to respond as follows:

Question 1: Air Quality

Response: There is no dust/smoke covering most of that part of the valley. This past year, an asphaltic concrete batching was installed and what escapes from the plant is hot steam. The steam is the result of using the hot water to "scrub" the plant emissions. The plant construction and operation are covered by permits issued by the State Department of Health under the Hawaii Air Pollution Regulations.

Question 2: Drainage

Response: Your concern that the Kapaa Quarry retention basins prevent the run-off from draining into Kawainui Marsh is a point well taken. First, Kapaa Stream is an intermittent stream. On the U.S.G.S. maps, which are the basis for geographic information, Kapaa Stream is not listed. Second, only part of the Kapaa Valley run-off is captured in retention basins. Third, the Kapaa Valley drainage basin is less than 10% of the drainage area that discharges into Kawainui Marsh. The retention basin serves to prevent sediment from quarry operations reaching the marsh. This feature is our primary concern - that the quality of water from an intermittent stream (which is dry when the marsh area needs water the most) does not pollute the marsh waters due to quarry operations.

Question 3: Visual

Response: The visual aspects of the Phase 2 project were not confined solely to views from the Nuuanu Pali Lookout. If you will read page 59 again, you will see that we had written: "As noted earlier, the quarry site is exposed by the open end of the valley on the northeast and visible from the communities such as Kokokahi, Kailua and Kalaheo." Since Nuuanu Pali is an important visitor destination site and under the jurisdiction of the State Departmen of Land and Natural Resources, we wanted to assure the State that we had covered a broad area in evaluating the visual aspects of the project. According to the Hawaii State Data Book for 1983, 903,000 persons stopped at the Pali Lookout.

As to the beautification or replanting efforts, we disagree that it has been "totally ineffective." However, the major replanting effort has not been started. Most of the quarry area is still being worked over. What has been done and what is encouraging are the test sites on the upper benches where replanting has been started. The results have been very good. The variety of trees that have done well in the restored areas have been identified and these are described on page 60. We agree that a landscape consultant to prepare replanting plans is needed now. But, as we mention in the E.I.S. (page 61), the delay caused by H-3 lawsuits has stalled work in this area. Ameron HC&D intends to cooperate with the State and Federal Highway officials in developing an integrated landscaping plan. We feel that this will be in the best interest of all, and, as we have stated, we intend to consult (or have the landscape consultant meet) with local groups who wish to provide input in this matter. Ameron HC&D will work closely with the Board of Land and Natural Resources to develop an effective replanting program, you may be sure.

Thank you for your review of the E.I.S. Most likely, the Board of Land and Natural Resources will consider your views in making their decision, especially the replanting program.

Sincerely,

George N. West
Manager, Kapaa Quarry

GNW:cc

cc: Mr. Susumu Ono, Chairman
Board of Land and Natural Resources

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

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

LESLIE S. MATSUBARA
DIRECTOR OF HEALTH

COPY

In reply, please refer to:
EPHSD

May 1, 1985

MEMORANDUM

To: Mr. Susumu Ono, Chairperson, Board of Land & Natural Resources

From: Director of Health

Subject: Environmental Impact Statement (EIS) for Kapaa Quarry-Phase 2, Kapaa Valley, Koolaupoko, Oahu

Thank you for allowing us to review and comment on the subject EIS. We submit the following comments for your consideration:

Environmental Permit

As noted in Section 6(G) - Drainage, AMERON HC&D (operators of the Kapaa Quarry) presently maintains a State NPDES permit for their existing operation. The NPDES permit imposes effluent limitations on any process water discharges. In addition, the Kapaa Quarry is required to maintain a stormwater management plan. Any new point discharges from Phase 2 of the Kapaa Quarry project will be subject to the same conditions of the present NPDES permit.

A statement (pg. 9) was made that a crusher plant will be erected within the Phase 2 area at an appropriate time to reduce the size of the quarried material. Before any processing facility can be located at the project site, the appropriate State and Federal air pollution control permits must be obtained from the Department of Health.

Section 10, List of Necessary Approvals, did not list the requirements of the air pollution control permits (State Authority to Construct and Permit to Operate) and possibly that of a Federal Prevention of Significant Deterioration permit. Since the permit processing may be lengthy, depending on the classification of the source, sufficient time should be allocated for the source determination, application submittal, and the permit review process.

Noise

Noise from activities associated with quarrying and the processing of quarried material must comply with the provisions of Title 11, Administrative Rules Chapter 43, Community Noise Control for Oahu.

We realize that the statements are general in nature due to preliminary plans being the sole source of discussion. We, therefore, reserve the right to impose future environmental restrictions on the project at the time final plans are submitted to this office for review.

LESLIE S. MATSUBARA

cc: Ameron HC&D

Post Office Box 29968
Honolulu, Hawaii 96820
(808) 841-0911
Cable Address: Honconcra

Ameron
HC&D

May 9, 1985

Mr. Leslie S. Matsubara, Director
State Department of Health
P. O. Box 3378
Honolulu, HI 96801

Dear Mr. Matsubara:

Subject: Kapaa Quarry - Phase 2 Environmental Impact Statement, Kapaa Valley, Koolaupoko, Oahu

Thank you for your comments. As you pointed out, there is an NPDES permit in force for the Kapaa Quarry operations. We have amended the E.I.S. to state the following:

"The same conditions of the present NPDES permit will apply to the Phase 2 project."

We have also amended the E.I.S. to include the following:

"Vehicular noise must conform to Title 11, Administrative Rules, Chapter 42, Vehicular Noise Control for Oahu. Further, the quarrying and processing of quarry materials must comply with Title 11, Administrative Rules, Chapter 43, Community Noise Control for Oahu. For the P-1 (Preservation) District, the allowable noise levels at the property line are as follows:

Allowable Noise Levels in DBA

Daytime	Nighttime
7:00 a.m. - 10:00 p.m.	10:00 p.m. - 7:00 a.m.
55	45

Under the air quality section, we have added the following:

"Before the crusher in Phase 2 can be built, the necessary State and Federal air pollution control permits must be obtained from the Department of Health. The permits required are: 1) to construct, and 2) to operate. The provisions of the Hawaiian Air Pollution Control Regulations are applicable to this project."

Ameron
HC&D

Under the List of Necessary Approvals, we have added the following:

"Air Pollution Control Permits - Department of Health"

We appreciate the helpful comments provided and look forward to working with your department upon approval of the COUA for the Phase 2 project. Your staff has been very helpful in assisting us in the preparation of this E.I.S. Thank you.

Sincerely,

George N. West
Manager, Kapaa Quarry

GNW:lcc

cc: Mr. Susumu Ono, Chairman
Board of Land and Natural Resources

344

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858

April 16, 1985

RECEIVED
85 APR 22 A9:23
STATE OF HAWAII
DEPARTMENT OF LAND & NATURAL RESOURCES

Mr. Susumu Ono, Chairman
Board of Land and Natural Resources
P. O. Box 621
Honolulu, HI 96809

Dear Mr. Ono:

Thank you for the opportunity to review and comment on the Environmental Impact Statement for Kapaa Quarry-Phase 2, Kapaa Valley, Koolaupoko, Oahu. The following comments are offered:

a. Work in the proposed Phase 2 is outside the regulatory jurisdiction of the Corps of Engineers.

b. According to the Flood Insurance Study for the City & County of Honolulu (Jan. 1983), conducted by the Federal Insurance Administration, the project site is within Zone D area of undetermined, but possible flood hazards.

Sincerely,

Howard S. Kobayashi
Actg C, Engineering Division

Copy Furnished:

Mr. George West, Dept. EIS
Ameron HC&D
P. O. Box 29968
Honolulu, HI 96820

Roger ____ Port ____
Alu ____ Library ____
Anne ____ Maude ____
Dena ____ Barbara ____
File in W47 - Hold
To Carol For ____

Post Office Box 29968
Honolulu, Hawaii 96820
(808) 841-0911
Cable Address: Honconts

Ameron
HC&D

May 9, 1985

District Engineer
U. S. Army
Fort Shafter, HI 96858

Attention: Mr. Howard S. Kobayashi

Dear Sir:

Subject: Kapaa Quarry - Phase 2 E.I.S.

Thank you for your review of the Kapaa Quarry - Phase 2 Environmental Impact Statement (E.I.S.)

Your statement in sub-paragraph b. of your letter is reflected on page 56 of the E.I.S.

In the section under "Comments Received During the Assessment Process," please note that Mr. Kisuk Cheung of the District Engineer's office had called this matter to our attention in his letter dated February 8, 1984.

We appreciate the U. S. Army District Engineer's review and helpful comments.

Sincerely,

George N. West

GNW:cc

cc: Mr. Susumu Ono, Chairman
Dept. of Land and Natural Resources w/attachment

GEORGE R. ARIYOSHI
GOVERNOR

LETITIA R. UYEHARA
DIRECTOR

TELEPHONE NO.
548-6915

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
550 HALEKAUWILA STREET
ROOM 301
HONOLULU, HAWAII 96813

May 3, 1985

Mr. Susumu Ono, Chairman
Board of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

Subject: Draft Environmental Impact Statement for Kapaa Quarry-Phase 2, Kapaa Valley, Koolaupoko, Oahu

We have reviewed the subject environmental impact statement and offer the following comments:

1. Noise and vibrations--Although the quarry is isolated from residential areas as the EIS claims, it is fairly close to Hawaii Loa College. Since quarrying activities may continue until the year 2012, it is important to assess the noise levels and the effects of vibrations accurately and assure that they will not present a problem to the college.

2. Visual--All quarrying activities should stop well before reaching the ridge line. The ridge line should be protected to insure that quarrying cannot be seen from Kamehameha Highway looking east and from Kalanianaole Highway looking north.

Thank you for providing us the opportunity to review this EIS.

Sincerely,

Letitia N. Uyehara
Director

cc: Mr. George West, Ameron HC&D

Post Office Box 29968
Honolulu, Hawaii 96820
(808) 841-0911
Cable Address: Honconra

Ameron
HC&D

May 9, 1985

Ms. Letitia N. Uyehara, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, HI 96813

Dear Ms. Uyehara:

Subject: Kapaa Quarry - Phase 2 Environmental Impact Statement, Kapaa Valley, Koolaupoko, Oahu

We appreciate your comments to Mr. Susumu Ono, Chairman, Board of Land and Natural Resources. With regard to your comments, we wish to state the following:

Comment 1: Ameron HC&D will continue to control noise and vibrations by closely monitoring its operations. As we mention in the E.I.S., the last complaint we received was in 1970. Improvements in the form of strict controls over our blasting procedures appear to have eliminated complaints about noise and vibration.

Comment 2: No work will be performed to alter the ridge line. Emphasis will be placed on the replanting program. This is covered not only in provisions for project approval but by the land owner in the conditions of the lease.

Thank you for your review.

Sincerely,

George N. West
Manager, Kapaa Quarry

GNW:lcc

cc: Mr. Susumu Ono, Chairman
Board of Land and Natural Resources