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Chief Staff Engineer



OFFICE OF ENVIRONMENTAL QUALITY CONTROL
DEPARTMENT OF PUBLIC WORKS

200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

February 9, 1993

RALPH NAGAMINE, L.S., P.E.
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EASSIE MILLER, P.E.
Wastewater Reclamation Division

LLOYD P.C.W. LEE, P.E.
Engineering Division

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Solid Waste Division

BRIAN HASHIRO, P.E.
Highways Division

OFFICE OF ENVIRONMENTAL QUALITY CONTROL

FEB 10 P2:36

FIVE

Mr. Brian J. J. Choy, Director
Office of Environmental Quality Control
220 South King Street, 4th Floor
Honolulu, HI 96813

Dear Mr. Choy:

SUBJECT: NEGATIVE DECLARATION FOR THE CONSTRUCTION OF THE
LANAI INTEGRATED SOLID WASTE MANAGEMENT FACILITY,
TMK:4-9-2:01, LANAI, HAWAII

The Department of Public Works has reviewed the final environmental assessment for the construction of the Lanai Integrated Solid Waste Management Facility and has determined that the project will not have any significant impacts on the environment. On the basis of our determination, we are filing a negative declaration for this project.

Enclosed please find four copies of the final environmental assessment. We request that the notice of the final environmental assessment be published in the February 23, 1993 issue of the OEQC Bulletin.

Please feel free to contact Ms. Elaine Baker of my Solid Waste Division at telephone 243-7875 should there be any questions on this matter. Thank you.

Very truly yours,

A handwritten signature in cursive script, appearing to read "George N. Kaya".

GEORGE N. KAYA
Director of Public Works

GK:dw

Enclosures: (4)

24



1993-02-23-CA-FAA - Lanai Integrated Solid Waste Management Facility FEB 23 1993

**FINAL
ENVIRONMENTAL ASSESSMENT
LANAI INTEGRATED SOLID WASTE MANAGEMENT FACILITY
LANAI, HAWAII**

**COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS**

PROJECT NO. 21805.106

PREPARED BY:

**HARDING LAWSON ASSOCIATES
235 PEARLRIDGE CENTER, PHASE I
AIEA, HAWAII 96701**

&

**KRP INFORMATION SERVICES
1314 S. KING STREET, S. 951
HONOLULU, HAWAII 96814**

February 10, 1993

**FINAL
ENVIRONMENTAL ASSESSMENT
LANAI INTEGRATED SOLID WASTE MANAGEMENT FACILITY
LANAI, HAWAII**

**COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS**

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HONOLULU, HAWAII 96814**

February 10. 1993

**Final
Environmental
Assessment**

PROJECT: Lanai Integrated Solid Waste
Management Facility

LOCATION: Between Kaunalapau Gulch
and Kaunalapau Highway
Southwest Lanai

Tax Map Key: 4-9-2: 01

AGENCY: County of Maui
Department of Public Works
200 South High Street
Wailuku, Maui, Hawaii 96793
(808) 243 7875

CONSULTANT: Harding Lawson Associates
235 Pearlridge Center, Phase I
98-1005 Moanalua Road
Aiea, Hawaii 96701
(808) 486 6009

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CHAPTER I

DESCRIPTION OF THE PROPOSED ACTION

General Description

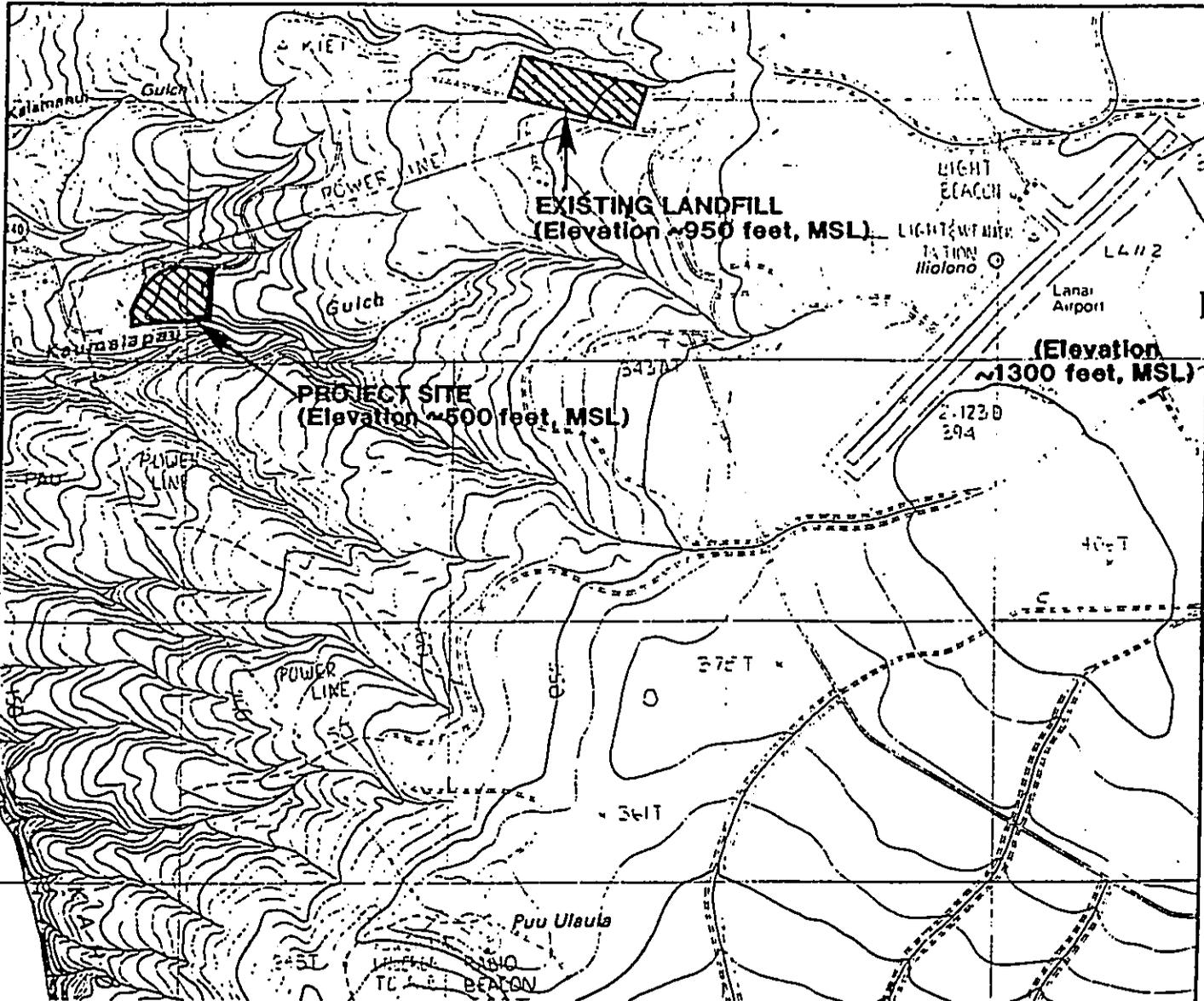
The County of Maui proposes to construct an integrated solid waste management facility on Lanai to replace the existing landfill. This landfill was opened in 1974 on a 10-acre site. It currently covers 18 acres and will reach its capacity in 1993.

The proposed facility will be located on the site of an existing quarry, on a portion of the property already excavated (the existing facility and proposed site are shown in Plate 1 and a proposed site plan in Plate 2). The project will use the westernmost (makai) portion of the quarry site. Approximately four acres will be used for landfilling initially. As the cells on the western part of the quarry are filled, landfill operations will continue eastward, following quarry operations.

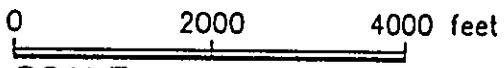
The remainder of the quarry site will be used for supporting facilities such as an attendant and maintenance buildings, a truck scale, and access roads. Areas will also be set aside for recycling, materials reuse, and green waste collection.

Project Description

In addition to the landfill, the facility design will include an office/weigh station at the entrance, a building for equipment storage and repair, a recycling area, a materials reuse center, and an above ground diesel fuel tank and pump.

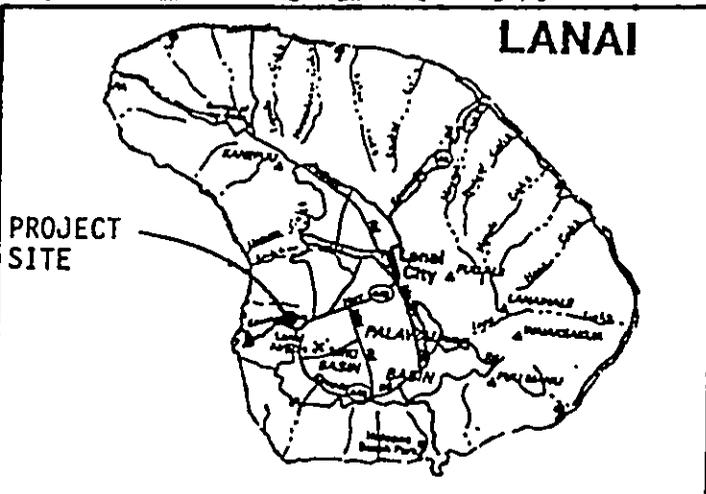


NOTE: Contours in meters.



SCALE

REFERENCE: USGS Topographic Map,
Lanai South, Hawaii
Provisional Edition 1984



DIETERICH POST REORDER NO. 148843



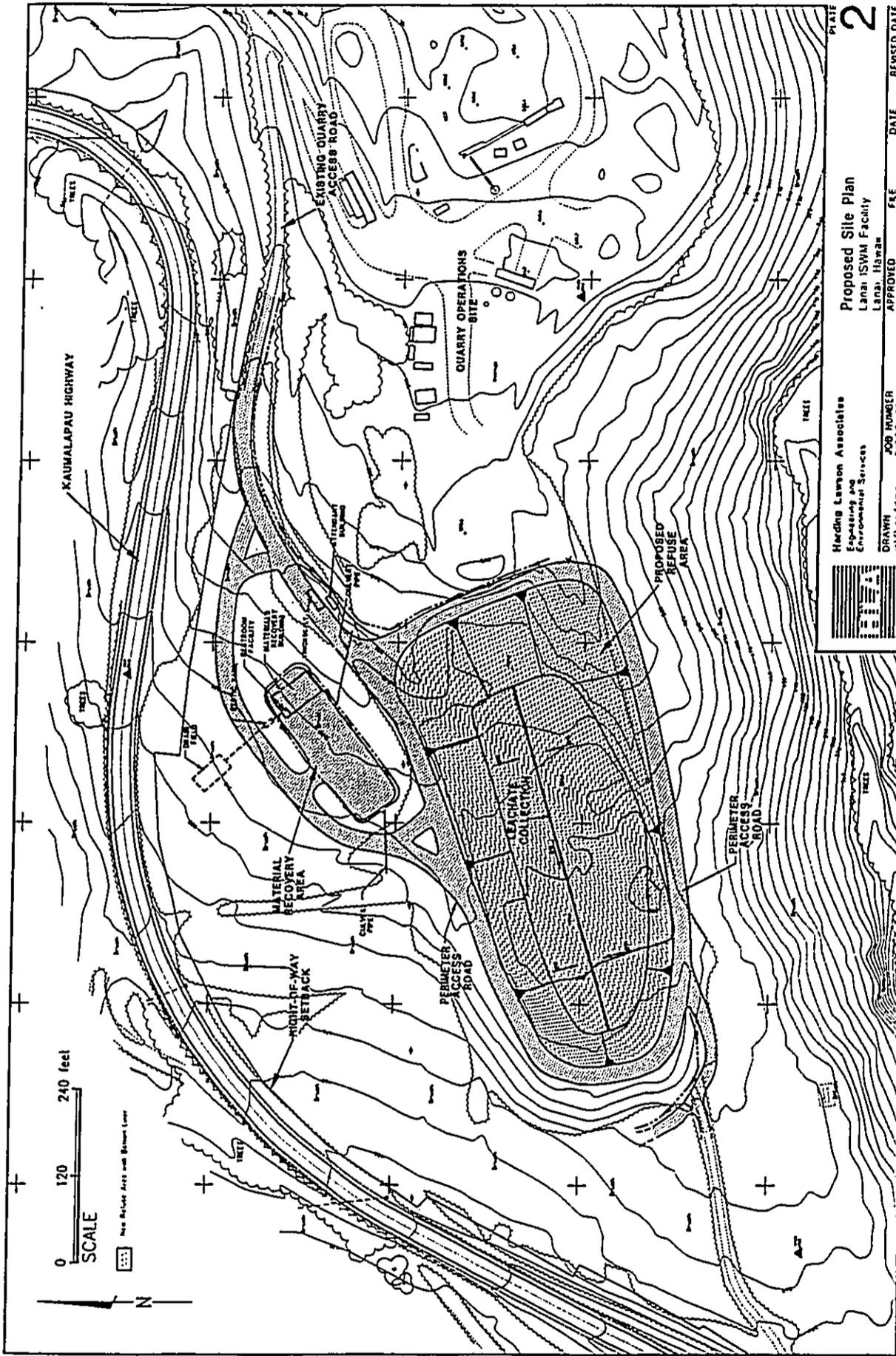
Harding Lawson Associates
Engineering and
Environmental Services

Location Map
Lanai Integrated Solid Waste Facility
Lanai, Hawaii

PLATE

1

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
stk	21805.102	<i>W</i>	10/92	



Heding Lawson Associates
 Engineering and
 Environmental Services
 Proposed Site Plan
 Lanai ISWM Facility
 Lanai, Hawaii
 DRAWN BY: JVA/ai/dm/j
 JOB NUMBER: 21805 105
 APPROVED: [Signature]
 DATE: 1/93
 REWISED DATE: [Blank]

PLATE 2

Landfill

The landfill cell construction will include additional excavation and grading, installation of a soil liner, and installation of a leachate collection system prior to the placement of refuse. The soil liner will consist of two feet of compacted native soil. The leachate collection system will consist of a layer of sand or gravel with a piping system to collect and remove leachate. A fence will be constructed around the facility to prevent deer from entering.

The refuse entering the landfill will be spot-checked to remove household hazardous waste from the waste stream before entering the landfill. The refuse will be compacted in the landfill with a bulldozer. At the end of each day, cover material will be placed on the refuse for vector control. An active area (exposed refuse) will not exceed three acres at any time. Once a cell is filled, the cell will be closed by placing a compacted soil layer on top in accordance with state and federal regulations.

Office/attendant building and computerized weigh station

The office/attendant building will be located at the entrance of the facility. The building will be adjacent to the truck scale; so that the scale's data indicator system can be maintained and used from within the building. The building that is proposed is an office trailer, which may be tied down after its wheels and axles have been removed. The size of the trailer will be approximately 8 by 20 feet (standard office trailer size). It will include a single office with two or three sliding windows. The interior will consist of wood (colonial oak) paneling, tile flooring, and fluorescent lighting. The exterior will consist of aluminum siding. The electrical system will be prewired and directed towards the panel box for external connection.

The truck scale will be used to weigh the incoming and outgoing vehicles to determine weights of refuse disposed and the associated

tipping fee. It is anticipated that the largest vehicles that will be weighed are the County's new automated refuse collection vehicle and the commercial hauler's front-loading vehicles. The tare weight of these trucks are estimated to be less than 20 tons and carry a load of less than 10 tons (the County refuse truck has a tare weight of 12.2 tons and a 22-cubic-yard capacity, approximately 6 tons). The lengths of these vehicles are estimated to be less than 30 feet (the County refuse truck is 28 feet in length).

Based on the size and weights of the trucks entering the facility, a scale that is approximately 30 to 40 feet in length and has a capacity of approximately 40 to 60 tons would be suitable. A data indicator system that can produce tickets, reports and have the potential to upgrade to include invoice production, is also planned.

Equipment storage and repair

The maintenance building will be used for heavy equipment storage and repair. The conceptual design is of an approximate 35- by 80- by 18-foot-high three-sided building with four 20-foot bays. The dimensions of the County refuse truck is approximately 9 by 28 by 13 feet. No doors are included in the preliminary design of the building, but roll-up doors may easily be added for security or severe weather conditions. A standard door size of 12 by 14 feet high would be used. The building system's structural design would be of a clear or multispan rigid frame with tapered or straight columns and roof beams. Because of the relatively strong winds observed on Lanai, wind uplift criteria will be considered in the design of the roof.

Materials reuse

A materials reuse building where people can bring in and pick up salvageable items will be provided. Two conceptual designs of the building have been developed. One is a three-sided pre-engineered metal building, approximately 20 by 30 by 12 feet high. Similar to the

maintenance building, roll-up doors may be added. The other design is a canopy structure where there are no walls, only a roof. The size of the canopy structure may be the same as the three-sided building, supported on steel columns, and constructed on a concrete slab-on-grade. The building will also contain restroom facilities.

Recycling

The recycling area will contain bins or designated areas for aluminum, glass, paper goods, and scrap metal. These goods will be stockpiled and either shipped off-island or to another site for processing. Off-site recycling programs (also called community diversion programs) will be implemented such that limited amounts of these materials will be entering the facility. Currently, aluminum cans are collected by senior citizens and stored at a community collection container located in Dole Park. Young Brothers ships the aluminum to Oahu at no charge. The County intends to expand the collection program to include additional participants, including students at Lanai High and Elementary School.

The County is also planning to purchase a glass pulverizer so that collected glass containers can be reused in asphalt for roadways and for other non-structural uses. The pulverizer will be located at either the landfill facility or the operating quarry site.

Paper and cardboard materials will be shredded, baled, used as animal bedding and then composted. This program will either be implemented by community groups or commercial interests such that paper and cardboard materials collected at the integrated solid waste management facility will be processed outside of the facility.

Scrap metal that is collected at the facility will be shipped to off-island end-users.

Green waste

Only residential green waste will need to be collected at the facility. Lanai Company disposes of its own green wastes and that generated by the commercial sector. Both the golf course and Lanai Diversified Agriculture handle their own green wastes. A space for green waste collection will be available, however, composting operations will not occur at the site. The green waste will be taken to a commercial composting facility. At the same time, an educational program on backyard composting will be undertaken by the County to encourage composting operations to take place outside of the facility and limit the quantities of green waste entering the site.

Household hazardous waste

At the present time, used oil is collected at the local gas stations on Lanai and shipped to Oahu for processing. Lanai Company has contracted for disposal of used batteries off-island. Other household hazardous wastes include paints, solvents, thinners, pesticides, cleaners and auto products. These products will not be collected at the landfill.

Since these products are reuseable, an exchange column will be placed in the local newspaper for those interested in exchanging household hazardous materials. Anyone with wastes to get rid of can call a toll free number to relay the name of the item, quantity, and name and phone number to County Solid Waste Division personnel who in turn relay the information to the person responsible for preparing the column. In addition, a household hazardous waste collection event will be held annually to collect unusable wastes. Household hazardous waste collected at these events will be disposed of off-island.

Above ground diesel fuel tank and pump

Location and installation of aboveground storage tanks are required to follow the Uniform Fire Code (1988 edition) and Maui County's

amendments. The location requirements are based on minimum distances from the property boundary and from any public way or important building. Aboveground storage tanks can only be installed for industrial use.

One aboveground storage tank is currently proposed for installation at the facility. The aboveground storage tank will be a 500-gallon capacity, secondary containment system with a concrete encasement. The tank will be placed on a concrete slab-on-grade. An electric-powered suction pump would be used to dispense fuel from the tank.

The County presently uses a 350-gallon-diesel tank truck located at the base yard. The existing tank is approximately three years old. Although the current plan is for a stationary aboveground storage tank, continuing to use the relatively new tank truck is a viable option. The tank truck will need to meet location and drainage system (for spillage) requirements similar to those for the aboveground storage tank. However, the capital cost of purchasing and installing a tank will be avoided until the tank truck requires a replacement.

Waste Generation Rates

The existing Lanai landfill site has served as the disposal site for municipal, agricultural, commercial, and light-industrial solid waste for the island of Lanai since 1974. Since that time, the resident population on Lanai has grown from 2,200 people to approximately 2,400 in 1990. The visitor population has increased in the last three years with the construction of two resort hotels. The de facto population in 1990 was 2,629 (DBEDT, 1991). According to Lanai Company, the projected future population growth is only expected to increase by approximately 1 to 2 percent over the next 20 years, with the dissolution of the pineapple industry on the island. Seasonal fluctuations, as seen in the quantities of waste received, have been minimal.

According to the landfill operator, one refuse collection vehicle makes approximately two trips to the landfill per collection day. The County collects residential refuse two times a week, and the collection vehicle has a capacity of approximately 20 cubic yards. Given the above estimates and assumed refuse density of 550 pounds (lbs) per cubic yard (cuyd), the residential contribution to the solid waste generation rate is 3.1 tons per day (tpd), average annual, based on a seven-day week.

Commercial, agricultural, and industrial/construction waste quantities are recorded at the landfill by the County according to weight or volume of waste and the associated fee. Because no scale exists at the landfill, records are based on visual estimates. Records for the 8 month period of June 1991 to January 1992 indicate that construction wastes averaged 19 tpd. Construction during this period included the completion of the Manele Bay Hotel and 150 residential homes. Long term, it is estimated that construction debris generated on the island will average 10 tpd.

Based upon these records and discussions with the County, the following current generation rates (tons/day) for commercial, agricultural, and construction activities were estimated for 1992:

Commercial (hotels, businesses)	3.70
Agricultural	0.13
Construction	10.00
Miscellaneous	0.07
Residential	3.10
Total	17 tons per day

Adding the residential contribution to the list of waste generation rates gives a total of 17 tons per day based on a seven-day week. Using the de facto population of 2,629 people, the daily current waste generation rate is 12.9 lbs/person/day. Excluding construction wastes, the waste generation rate is 5.3 lbs/person/day.

Projected Future Waste Generation Rate

The proposed landfill facility is anticipated to accommodate Lanai's refuse from 1993 to 2015. The resident population growth is projected at 1 to 2 percent over this entire period. The low projected growth rate is attributed to the dissolution of the pineapple industry on the island. However, the Lanai Company is hoping to increase their occupancy rate in the hotels, thus increasing the de facto population. Assuming a 2 percent residential growth and a 55 percent transient population growth over the next 20 years, the projected residential and de facto population in the Year 2015 is 2,475 and 3,800, respectively.

Based on the estimated current waste generation rate, excluding construction, of 5.3 lbs/day/capita, and the projected 2015 de facto population, approximately 10 tpd, excluding construction, will be generated. Construction debris was estimated at a rate of 10 tpd for 1992. According to Lanai Company, 700 new high-quality resort or retirement homes may be constructed, but no major complexes are planned. Since generation rates of construction debris and the time of generation are difficult to predict, the construction contribution was assumed to remain at 10 tpd from 1992 to 2015. Thus, the total waste generated by 2015 is estimated at 20 tpd.

Although waste generation has been fairly consistent with only minimal seasonal fluctuations, future waste generation rates are difficult to predict. They are highly dependent on population, time, duration and types of construction, and other similar factors. If the waste generation rate exceeds 20 tpd, construction and demolition debris could possibly be segregated and landfilled separately.

Waste Reduction Programs

According to state law, all counties are required to divert 25 percent of the waste generated within the county away from landfill disposal by 1995. By 2000, 50 percent of the waste generated is required to be

diverted from landfills. Based on the projected waste generation rate of 20 tpd for 2015 and the required diversion percentages, the following landfill disposal quantities are estimated (TPD):

Year	Waste Generation Rate	Waste Diversion Rate	Landfill Disposal Rate
1993	17	0	17
1995	18	4	14
2000 to 2015	20	10	10

Waste diversion programs, including recycling, composting, materials reuse, and household hazardous waste exchange, are planned to be implemented prior to or at the time the proposed facility is operational.

CHAPTER II

DESCRIPTION OF THE AFFECTED ENVIRONMENT

PHYSICAL CHARACTERISTICS

Location

The proposed integrated solid waste management facility site is in the southwestern region of Lanai, approximately 8,000 feet west of the Lanai Airport. It is bounded on the south by Kaumalapau Gulch. The site is a former quarry.

Geology

The island of Lanai is a volcanic dome. Because volcanic activity was restricted to the effusion of primitive basalt, the only major geological rock unit is Lanai basalt. There are sedimentary deposits in the lower reaches of valleys and in the Palawai depression which was formed when the caldera of the volcano collapsed. (Yuen, 1992)

Topography and Soils

The facility site is at an elevation of approximately 500 feet mean sea level (MSL), sloping in a westerly direction.

The surface soils in the vicinity of the site are classified as Molokai or Uwala silty clay loam (SCS, 1972). Saprolite and weathered basalt were found at depths of approximately 15 to 20 feet in an open cell at the old landfill site. Samples were taken of soil from the quarry and analyzed at HLA's soils laboratory. The quarry samples were classified using the Unified Soil Classification System as reddish brown elastic

silt. Because soil will be compacted to form a barrier beneath the landfill and also used as cover material, the sample was analyzed for its compaction capability. The sample had a saturated hydraulic conductivity of 6.6×10^{-6} cm/second when it was compacted at 2 percent above optimum moisture content and at 90 percent relative compaction.

Flood Hazard

The Federal Emergency Management Agency has not determined flood hazards for the facility site. There is no history of flooding problems in this area.

Water Quality

There are no perennial streams on Lanai, and no surface water systems or sources in use on the island (Yuen, 1992). Water flows through adjacent Kaumalapau Gulch as result of rains. Groundwater beneath the site is brackish, too saline for even agricultural use (Yuen, 1992). It occurs approximately 500 feet below ground surface.

Flora and Fauna

A field survey of the project area was undertaken in October, 1992, to document the bird and mammal species in the project area. The report is attached to this document as Appendix A.

The avifaunal survey covered the proposed site and neighboring areas, including the existing landfill. The main purpose of the study was to determine if the proposed activities at the selected site would result in an increase in bird populations that could interfere with aircraft utilizing the Lanai Airport.

Flight patterns, feeding habits, migratory patterns, and tendencies to congregate were examined. The study concludes that present bird

populations in and around the proposed site, including the existing landfill site, were not unusually large or different from those found at other similar habitats. At the existing landfill, fewer species were recorded and the number of birds were similar to those recorded at neighboring areas (other faunal census stations). No roosts of birds were found, and movement patterns seemed to focus toward gulches and a leaking water tank near the harbor. The birds in the vicinity are primarily "land" birds which do not fly higher than 50 to 100 feet in most situations. The study concludes that if the proposed site attracts quantities of birds similar to that found at the existing landfill, the facility should not pose a problem for the airport or its operations.

The avifaunal report notes that vegetation in the general area is composed of dry grass and brush with trees in the more protected and wetter gulches. There is no wetland habitat. The specific site of the proposed facility has been used for quarry operations and contains little vegetation. An additional botanical survey of the site was made in February 1993 to ensure that no rare, threatened or endangered species were present. This survey confirmed previous findings that vegetation at the site is not significant. The survey is attached as Appendix B.

Air Quality

The ambient air quality in the area is generally good.

Noise

Ambient noise levels are generally low, disturbed only by quarry operations and occasional aircraft and motor vehicles.

Aesthetics

The current use of the area is for quarry operations. The addition of the proposed integrated solid waste management facility is compatible with the current use and should not result in a significant change in the aesthetics of the area.

SOCIAL AND ECONOMIC CHARACTERISTICS

Land Ownership and Use

The portion of land planned for the location of the proposed integrated solid waste management facility is owned by the Dole Food Company and presently used as a rock quarry. The site is located along the Kaunalapau Highway, approximately 8,000 feet west of the airport at an approximate mean elevation of 500 feet mean sea level (MSL).

Historic/Cultural Resources

An archaeological field survey was conducted in February 1992. The survey confirmed that there are no archaeological or historic sites in the vicinity of the landfill.

Demography and Employment

The resident population of Lanai in 1990 was 2,426 residents, mostly living in Lanai City. The de facto population for the same year was estimated to be 2,629 (DBEDT, 1991). The Lanai Company projects that the population of the island to increase by only 1 to 2 percent over the next 20 years.

The County employs a small staff to collect refuse and to operate the current landfill. Two landfill operators are on site during hours of operation. A similar employment pattern is expected for the new facility.

Traffic and Utilities

Access to the site is from Kaunalapau Highway. An alternate entrance may be developed in order to separate traffic for the quarry from traffic for the integrated solid waste management facility.

There are no water, electrical or telephone services currently at the site. A water line at the quarry will be utilized for drinking and wash water. A septic tank and drains will be constructed to support the proposed restroom facilities. An electrical line at the quarry is also available to provide electricity to the site.

Permits

The County of Maui has a permit to operate the existing landfill. All federal and state requirements will be met in order that the new landfill will be able to continue operations without interruption.

CHAPTER III

PROBABLE IMPACTS OF THE PROPOSED ACTION AND MITIGATION MEASURES

PROBABLE IMPACTS AND MITIGATION MEASURES

Water Quality

The potential for groundwater contamination is tied to the existing groundwater flow direction and to the quantity of leachate which may be produced at the site. The percolation rate of leachate is a function of the disposal rate (currently estimated at 17 tpd and with the establishment of waste diversion programs, potentially less in the coming years) rainfall, and the type of landfill liner installed. The mean annual rainfall in the area of the proposed facility is 15 inches.

Groundwater beneath the proposed site is estimated to be brackish and unfit for human consumption or agricultural use (Yuen, 1992). Furthermore, this basal unconfined aquifer is hydrologically downgradient and isolated from the high-level body aquifer from which Lanai's domestic and agricultural water supply is obtained.

The Resource Conservation and Recovery Act (RCRA), Subtitle D regulations, include the requirement that municipal landfills be constructed with a leachate collection system, liners, surface water control facilities, and groundwater monitoring stations. The law provides for exemptions from these requirements, specified in Subparts D — Design Criteria, and E — Groundwater Monitoring, for qualifying small communities. There are four criteria for exemption:

- ◆ the landfill must receive less than 20 tons per day (tpd) of refuse;
- ◆ have no evidence of contributing to groundwater contamination;
- ◆ serve an area where no practicable disposal alternatives exist; and
- ◆ receive 25 inches or less of precipitation.

Because Lanai meets all these criteria, the County intends to apply for the exemption. A soil liner consisting of a two foot layer of onsite material compacted to provide a maximum permeability of 1×10^{-5} cm/second will be constructed. This will minimize the downward movement of leachate.

The landfill will be designed for a 50-year storm for surface water and leachate collection systems. The collected surface water will be monitored and treated if necessary by a NPDES permit before discharge.

Hazardous Wastes

No hazardous wastes will be accepted at the landfill facility.

Air Quality

Short-term effects on air quality, primarily dust, can be expected during operations. Dust and exhaust emissions from vehicles are limited by state and federal regulations. There will also be odors naturally associated with refuse operations.

Flora and Fauna

The proposed project will not have any adverse impacts on flora or fauna.

Because the site is located within 10,000 feet of a turbojet airport (actually approximately 8,000 feet west of the airport), the County must demonstrate that a bird hazard will not be posed by the landfill. There are very few birds, mainly mynahs and sparrows, at the present landfill. The avifaunal study conducted as part of the project concludes that the proposed facility should not pose a problem for the airport or its operations if it attracts quantities of birds similar to that found at the existing landfill,

The facility operators will monitor the number of birds at the site daily. If the number of birds increase significantly, additional design or operating controls may be implemented.

Noise

The major source of noise at the proposed facility will be from vehicles associated with refuse disposal, principally refuse trucks and bulldozers. There are no residences or businesses in the vicinity that could be affected.

Traffic and Utilities

There is adequate access to the site from Kaumalapau Highway via quarry access roads. An alternate entrance may be developed in order to separate quarry traffic from traffic going to the waste facility.

There are no water, electrical or telephone services currently at the site. These utility services are anticipated to be available at the time the facility is operational.

Historic/Archaeological Resources

There are no historic buildings or archaeological artifacts in the area that could be adversely affected by the project.

Social and Economic Conditions

Construction of the proposed integrated solid waste management facility is required to replace the existing landfill. Construction of the new facility, which will provide for materials reuse and recycling, will be an improvement over the old landfill. There will be no change in jobs or employment.

Aesthetics

The facility will be designed and built in conformance with county standards which requires appropriate landscaping.

FINDINGS AND DETERMINATION OF SIGNIFICANCE

Chapter 200 (Environmental Impact Statement Rules) of Title 11 Administrative Rules of the State Department of Health specifies criteria for determining if an action may have a significant effect on the environment. The relationship of the proposed project to these criteria is discussed below.

(1) *Involves an irrevocable commitment to loss or destruction of any natural or cultural resource;*

The selected site is a former quarry. No natural or cultural resource will be destroyed.

(2) *Curtails the range of beneficial uses of the environment;*

There are only a limited number of uses for a former quarry. The completed landfill will be more compatible with existing land forms than if the quarry were left in its present state.

(3) *Conflicts with the state's long-term environmental policies or goals and guidelines as expressed in Chapter 344, Hawaii Revised Statutes, and any revisions thereof and amendments thereto, court decisions or executive orders;*

The project does not conflict with long-term state environmental policies or goals. It is supportive of environmental goals relating to waste reduction, recycling, and proper disposal.

(4) *Substantially affects the economic or social welfare of the community or state;*

The proposed facility will not have any substantial effect on the economic or social welfare of Lanai. However, the absence of a facility for waste disposal would have an adverse effect on the economic and social welfare of Lanai.

(5) *Substantially affects public health;*

Public health is not threatened by existing landfill facilities and functions and there is no reason to expect that public health to be affected in the future by the new facilities.

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

The project does not involve substantial secondary impacts such as population changes or effects on public facilities.

(7) *Involves a substantial degradation of environmental quality;*

Environmental impacts will be minor. Because the proposed site was previously used for quarry operations, environmental impacts are anticipated to be minimal. The area is already disturbed.

(8) Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions;

The project is individually limited and has no cumulative effects or commitments to larger actions.

(9) Substantially affects a rare, threatened or endangered species, or its habitat;

There are no rare, threatened, or endangered species (plant or animal) on the project site.

(10) Detrimentially affects air or water quality or ambient noise levels;

Noise and dust cannot be totally mitigated during waste handling operations. However, their effects can be confined to the site and the immediate vicinity. There will be no adverse air pollution and noise effects on populated communities. Lanai City is approximately 5 miles northeast of the site.

There will be no adverse impact on water quality.

(11) Affects an environmentally sensitive area such as a flood plain, tsunami zone, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.

The use is consistent with existing land use regulations for the area.

Based on these findings, it has been determined that the proposed

project will not have a significant effect on the environment.

CHAPTER IV

ALTERNATIVES TO THE PROPOSED ACTION

PROJECT ALTERNATIVES

The following alternatives were evaluated as practicable disposal alternative to landfilling:

- ◆ Construct a transfer station on Lanai and transport waste off-island, disposing of the refuse at Central Landfill on Maui. Tractor trailer units would be used.
- ◆ Identical to the previous alternative except shipping containers would be used.
- ◆ Incinerate the refuse at H-Power on Oahu.
- ◆ Landfill refuse at a new Lanai Landfill assuming small community exemption is granted.
- ◆ Landfill refuse at new Lanai Landfill with no small community exemption.

Transfer Station with Tractor Trailer Units Alternative

Under the Central Landfill alternative a transfer station would be built on Lanai, where County collection vehicles, commercial handlers and citizens could drop off refuse and County employees could prepare the refuse for transport off-island. At the transfer station, refuse would be compacted and loaded into closed-top trailers, transported to Kaunapali Harbor, shipped to Kahului Harbor, and driven to the Central Landfill. The refuse would then be emptied from the trailers at the landfill and the empty trailers transported back to Lanai.

Transfer Station With Shipping Containers Alternative

This alternative is the same as above except that shipping containers would be used in place of the more standard transfer trailers. The shipping containers would also be treated as open-top trailers, whereby a backhoe is used to semi-compact the refuse instead of a stationary compactor with steel hopper. The use of containers would require a chassis and tractor instead of the tractor required for use with the trailers. This modification would be made to reduce the shipping costs. The containers are much less expensive than the trailers but the life is assumed to be only three years versus seven years for the trailers.

Land transportation between the transfer station and the harbor for off-island transfer would be provided by County employees. The distance between the proposed transfer station on Lanai and Kaunapali Harbor is approximately 2.5 miles. The distance between Kahului Harbor and Central Landfill is approximately 5 miles. One tractor would be purchased for both the Lanai and Maui operation. If the tractor were to require maintenance or repair, another tractor could be rented on a temporary basis.

Incinerate the Refuse at H-Power on Oahu Alternative

The H-Power alternative would require a transfer station on Lanai, barge transportation to and from Oahu, land transportation, and incineration at H-Power. Refuse would be hauled in containers. In the past, H-Power looked to the neighbor islands for refuse to burn. Recently, H-Power has been operating near capacity and although they have not yet refused refuse, establishing a contract with the City and County of Honolulu to accept Lanai's waste could be difficult. However, if statewide waste diversion programs become successful in reducing disposal quantities, H-Power may be willing to accept Lanai's waste.

SITE ALTERNATIVES

Four sites were considered for location of the proposed sanitary landfill. The location of these sites are shown in Plate 3.

Site 1: This site is located approximately one-half mile west of the Lanai Airport. Due to its close proximity to the airport and at the request of the Federal Aviation Administration (FAA), the site was rejected as an alternative.

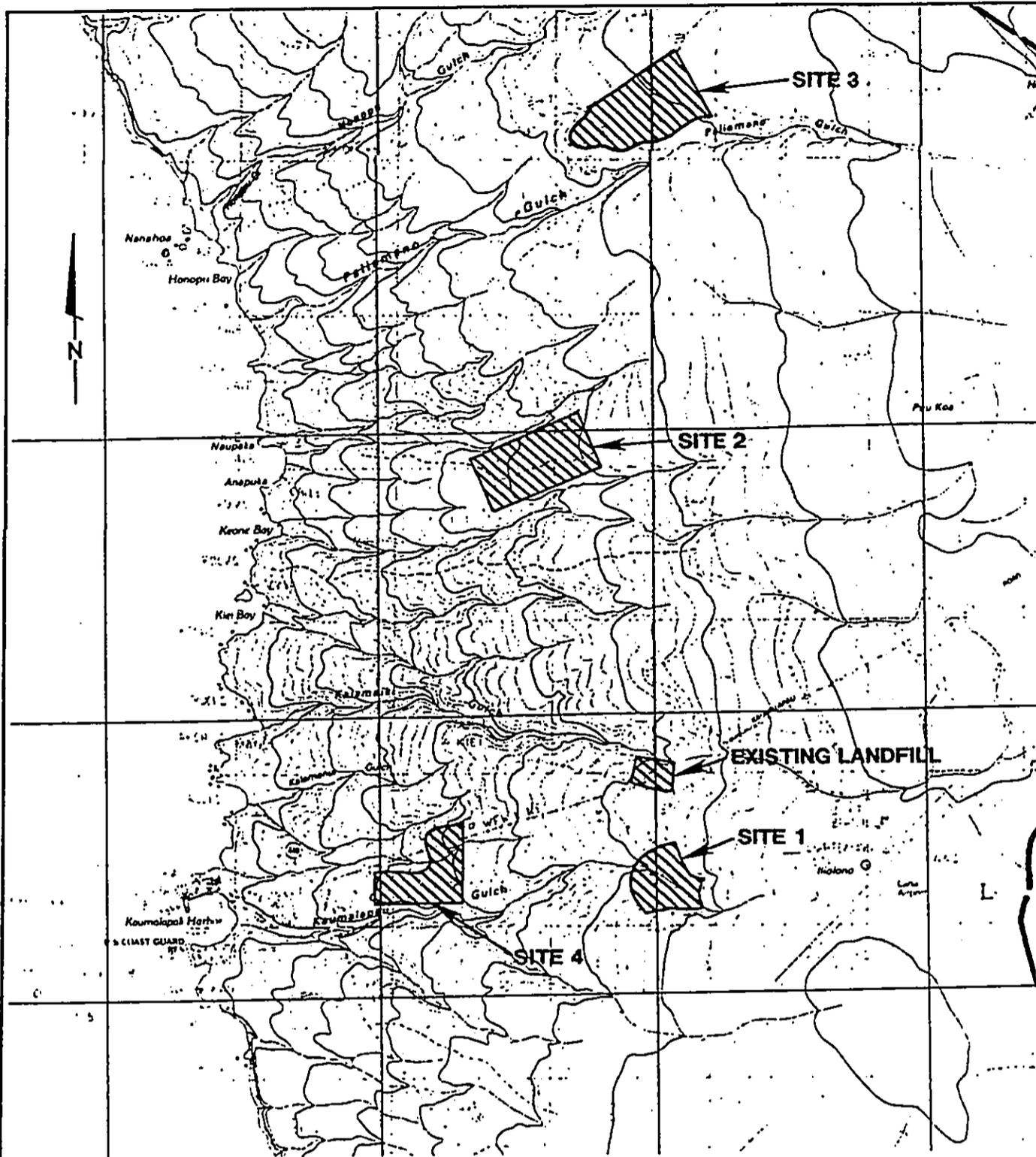
Site 2: This site is located approximately 9,500 feet northwest of the airport. An archaeological investigation revealed that a prehistoric shrine, believed to have been associated with the Hawaiian religion, was located at the site. The discovery of this historically significant feature precluded further consideration of the site for a landfill.

Site 3: This site is located on Paliomano Gulch, approximately 14,000 feet from the airport. A botanical survey undertaken as part of the preparation of an environmental impact statement for the use of this site found and identified red ilima, *Abutilon menziesii*, on the site. This shrub is registered as a rare and endangered species by both state and federal agencies. For this reason the site was dropped from further consideration.

Site 4: This is the proposed site for the landfill.

NO ACTION ALTERNATIVE

Under the "no action" alternative, the present landfill would not be replaced after it is closed. There would be no designated place for disposal of refuse. Since refuse would continue to be generated on Lanai, it would be either stockpiled at its place of generation or hauled to some other place and dumped. There would be a proliferation of illegal, unregulated dumps. This alternative is not acceptable under present environmental laws and regulations.



REFERENCE: USGS Topographic Map,
Lanai North, Hawaii, 1983.

0 2500 5000 feet
SCALE



Harding Lawson Associates
Engineering and
Environmental Services

Proposed Site Locations
Lanai Integrated Solid Waste Facility
Lanai, Hawaii

PLATE
3

DRAWN stk	JOB NUMBER 21805.102	APPROVED	DATE 10/92	REVISED DATE
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CHAPTER V

AGENCIES, ORGANIZATIONS AND INDIVIDUALS CONSULTED

CONSULTED PARTIES

A public information meeting on the proposed facility was held on Lanai on November 9, 1992. Approximately 18 people attended to seek more information and offer comments.

In addition, the following agencies were consulted during the preparation of this environmental assessment:

Federal Aviation Administration

U.S. Fish and Wildlife Service

State Department of Health

State Department of Transportation, Airports Division

State Historic Preservation Office

Lanai Company, Inc.

Lanai Diversified Agriculture

Three letters commenting on the draft environmental assessment were received. The letters and responses are attached at the end of this document.

REFERENCES

George A. Yuen and Associates (Yuen). *Water Resources Protection Plan, Volume II Appendix*. Honolulu, Hawaii. Review Draft, February 1992

Harding Lawson Associates. *Lanai Sanitary Landfill, Closure/Post-Closure Plan*. August, 1992.

Hawaii Commission on Water Resource Management (Commission), Department of Land and Natural Resources. *Maui County Water Use and Development Plan, Island of Lanai*. Honolulu, Hawaii. Review Draft, February 1992.

Hawaii Department of Business, Economic Development & Tourism (DBEDT). *State of Hawaii Data Book 1991*. Honolulu, Hawaii. November 1991.

U.S. Soil Conservation Service (SCS), *Soil Survey for the Islands of Kauai, Oahu, Maui, Molokai, and Lanai*. Honolulu, Hawaii. 1972.

International Archaeological Research Institute, Inc.

PREHISTORIC & HISTORIC INVESTIGATIONS • CULTURAL RESOURCES ASSESSMENTS & PLANNING • PALEOENVIRONMENTAL STUDIES

February 1, 1993

Harding Lawson Associates
235 Pearlridge Center, Phase I
98-1005 Moanalua Road
Aiea, Hawaii 96701

ATTN: Lene ichinotsubo

SUBJECT Comments on Draft Environmental Assessment, Lanai Integrated Solid Waste Management Facility, TMK 4-9-2:01.

This is to bring to your attention the apparent lack of information in the above document concerning the identification of significant historical or archaeological resources on the property. The wording of the Environmental Assessment document, is in fact quite misleading in this respect, stating that "According to the State Historic Preservation Division, there are no historic sites in the vicinity of the landfill" (page 13 of the E.A.). Since there was no survey, or no stated basis for not conducting a survey, there is certainly no reason to conclude that there are no historic sites. I seriously doubt that the State Historic Preservation Division intended to convey the interpretation your document has attributed to them.

I believe that an archaeological and historical inventory survey is essential in the present case given the fact that roughly 10 acres of land designated for use in "Supporting Facilities" represents previously unimpacted land that has not been subjected to massive disturbance. In addition, it is clear from the aerial photograph provided in the document that much of the periphery of the "Initial Landfill Area" has likewise not been subject to previous massive land alteration activities. This may represent up to several acres of land.

Based on my personal observations around the existing landfill area a few years ago, which is nearby and in a similar environmental setting, I believe it is likely that the unimpacted areas of the proposed new solid waste management facility will contain at least several significant archaeological sites. These sites most likely will consist of isolated prehistoric hearth features, though it is possible that larger and more complex sites may be present.

Prior to any further alteration of the area, I believe it is important to identify any such archaeological remains that may be present. If remains are in fact identified, then appropriate plans must be formulated for either their preservation or the mitigation of likely adverse impacts.

HAWAII: 949 McCully St., Suite 5, Honolulu, Hawaii 96826 Telephone: (808) 946-2548, 943-0628 Facsimile: (808) 943-0716
GUAM: P.O. Box 22621, GMF, Guam 96921 Telephone/Facsimile: (671) 734-2755

page 2
Feb. 1, 1993
Ms. Ichinotsubo

Should any test excavations or mitigation be undertaken at sites that may be found in the project area, these should be primarily oriented toward obtaining accurate chronological information, and also the wood species identification of charcoal remains found in the hearth features. This was not done in the earlier archaeological studies of the existing landfill location, yet it is extremely important that such paleoenvironmental information not be lost. This is the only means we have to understand the prehistoric vegetation and environment on Lanai, and the impact the prehistoric Hawaiians and historical ranching and plantation activities have had on the environment.

Because the land area that needs to be surveyed is rather small and because the expected archaeological remains should amount to only a few isolated features, I do not anticipate that the needed investigations will be a major burden either in terms of time or cost. However, documenting any archaeological remains that are present may be very significant in terms of preserving, understanding, and appreciating the cultural heritage of Hawai'i in general, and more specifically, that of the island of Lana'i.

Thank you for your attention.

Sincerely



J. Stephen Athens

General Manager and
Senior Archaeologist

cc:

Ms Agnes Griffin, State Historic Preservation Office
Mr. Sol Kahooalahala, Chairman, Lanai Archaeology Committee
Dr. Michael Graves, Dept. of Anthropology, Univ. of Hawaii

Harding Lawson Associates



February 10, 1993

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007LA

International Archaeological Research Institute, Inc.
949 McCully Street, Suite 5
Honolulu, Hawaii 96826

Attention: Mr. J. Stephen Athens

Gentlemen:

Response to Comment
Lanai Integrated Solid Waste Management Facility
Lanai, Hawaii

Thank you for your comment on the draft environmental assessment on the aforementioned project. We agree with you that an archaeological survey is warranted. Thus, such a survey was conducted on February 9, 1993, for the portions of the potentially affected areas that have not been previously altered (i.e., by quarry operations). Findings of the survey indicate that no evidence of significant historical or cultural resources were found in the areas of study. Enclosed is a copy of the letter report.

If you have any questions, please feel free to call.

Sincerely,

HARDING LAWSON ASSOCIATES

Gerald Friesen, P.E.
Associate Engineer

GF/LKI/kt

Enclosure

LINDA CROCKETT LINGLE
Mayor



BRIAN W. MISKAE
Planning Director

COUNTY OF MAUI
PLANNING DEPARTMENT

250 S. HIGH STREET
WAILUKU, MAUI, HAWAII 96793

February 3, 1993

Mr. David Wissmar
County of Maui, Solid Waste Division
200 S. High St.
Wailuku, HI 96793

Dear David,

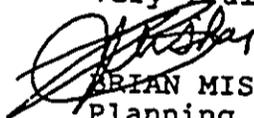
RE: Draft EA report for Lanai Integrated Solid Waste
Management Facility, TMK:4-9-02:Por. 01, Southwest Lanai,
Hawaii, (93/EA-02)

After reviewing the draft Environmental Assessment (EA) report
for the Lanai Integrated Solid Waste Management Facility (LISWMF),
we offer the following comments:

1. Unlike Lanai Company's forecast of 1% to 2% yearly population growth rate, the State's Maui Socio-Economic Forecast Study indicates an annual average growth rate from 1995 thru 2000 of 6%. How would this affect your landfill tonnage per day projections?
2. How many personnel are required to operate the facility?

Thank you for the opportunity to comment. If we can be of further assistance, please feel free to contact Gerry Unabia, AIA or myself of this office at 243-7735.

Very Truly Yours,


BRIAN MISKAE
Planning Director

cc: C. Yoshida
G. Unabia
K. Fairbanks


b:l1awmfea.ltr

Harding Lawson Associates



February 10, 1993

21805.106
0003LA

County of Maui
Planning Department
250 South High Street
Wailuku, Maui, Hawaii 96793

Attention: Mr. Brian Miskae, Planning Director
Mr. Gerry Unabia, Project Planner

Gentlemen:

Response to Comments
Lanai Integrated Solid Waste Management Facility
Lanai, Hawaii

Thank you for your comments to the draft environmental assessment for the aforementioned project. We would like to take this opportunity to respond to them.

If Lanai Company's forecast of 1 to 2 percent population growth is low and the annual average growth rate from 1995 through 2000 is actually 6 percent as forecast in the State's Maui Socio-Economic Forecast Study, the landfill tonnage rate projections will increase as follows:

Year	Waste Generation Rate	Waste Diversion Rate	Landfill Disposal Rate TPD
1993	17	0	17
1995	18	4	14
2000	20	10	10

Assuming the waste diversion goals of 25 percent by Year 1995 and 50 percent by Year 2000 are met, the landfill will be receiving approximately 10 tons per day by the Year 2000. If the waste diversion goals are not met, and more than 20 tons per day of refuse are received at the landfill, RCRA Subtitle D's Small Community Exemption will no longer be applicable.

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Environmental Services

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February 10, 1993
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0003LA
Mr. Brian Miskae and Mr. Gerry Unabia
County of Maui
Page 2

In response to your second question, a gatehouse attendant and equipment operator will be required to be at the landfill during its operating hours. A third employee will be responsible for refuse collection and maintenance.

Thank you again for your comments. If you have any questions, please feel free to call.

Sincerely yours,

HARDING LAWSON ASSOCIATES



Gerald Friesen, P.E.
Associate Engineer

GAF/LKI/rmc



University of Hawaii at Manoa

Environmental Center
A Unit of Water Resources Research Center
Crawford 317 • 2550 Campus Road • Honolulu, Hawaii 96822
Telephone: (808) 956-7361

February 7, 1993
EA:00016

Ms. Elaine Baker
Department of Public Works
County of Maui
200 South King Street
Wailuku, Hawaii 96793

Dear Ms. Baker:

Draft Environmental Assessment
Ilanai Integrated Solid Waste Management Facility
Ilanai

The referenced project proposes to construct an integrated solid waste management facility to replace the existing landfill on an existing quarry site. The project will initially use 20 acres of the westernmost portion of the site. Approximately 10 acres will be used for landfilling. The other 10 acres will be used for supporting facilities which will include: an access road, an office/weigh station at the entrance, a building for equipment storage and repair, a recycling area, a materials reuse center, and an above ground diesel fuel tank and pump.

Our review of the Draft Environmental Assessment (DEA) was prepared with the assistance of Paul Ekern, (Emeritus) Agronomy and Soil Science; Michael Graves, Anthropology; and Elizabeth Gordon, Environmental Center.

General Comments

Pursuant to the EIS Rules (Section 11-200-9; 11-200-10; 11-200-12, H.A.R.), Environmental Assessments are intended to provide sufficient information to evaluate the significance of potential impacts. Our reviewers have noted two areas in which additional information will contribute to a better basis for decision making, and we urge that the present EA be expanded to accommodate these concerns.

Topography and Soils (page 10-11)

The soil to be compacted to form a barrier beneath the landfill (ref. soil liner, page 2) and also to be used as cover material, is described in the DEA as Molokai or Uwala silty clay loam. One of our reviewers has expressed concern about the difficulty in attaining the moisture content

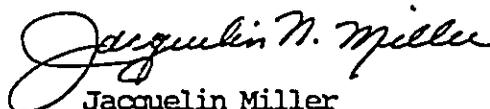
needed to get adequate compaction in the field. A statement should be made about the adequacy of the state of compactability and the degree of achieving this in the field. One of our reviewers has suggested that the use of a plastic liner in the field, along with the soil barrier, may be the better precaution (e.g., this has been done before on the island of Molokai).

Historic/Cultural Resources (page 13)

According to "the State Historic Preservation Division, there are no historic sites in the vicinity of the landfill." How was this determination reached? Was the area previously surveyed? If so, then this should be referenced in the document. If not, this is an important concern, particularly where the project involves 10 acres of previously unimpacted land. Our reviewers have urged that an archaeological survey should be conducted before construction begins.

Thank you for the opportunity to review this DEA. We hope that our comments are helpful.

Sincerely,



Jacquelin Miller
Associate Environmental Coordinator

cc: OEQC
Harding Lawson Associates
Roger Fujioka
Paul Ekern
Michael Graves
Elizabeth Gordon

Harding Lawson Associates



February 10, 1993

21805.106
0006LA

University of Hawaii at Manoa
Environmental Center
Crawford Hall 317
2550 Campus Road
Honolulu, Hawaii 96822

Attention: Ms. Jacquelin Milles

Ladies and Gentlemen:

Response to Comments
Draft Environmental Assessment
Lanai Integrated Solid Waste Management
Lanai, Hawaii

Thank you for your comments to the draft environmental assessment. We would like to take this opportunity to respond to them.

Your first comment expressed "concern about the difficulty in attaining the moisture content needed to get adequate compaction in the field." Soil samples were collected of the overburden material from the quarry site and tested for:

- Moisture content (ASTM D-2216);
- Atterberg limit (ASTM D-4318);
- Sieve analysis (ASTM D-422);
- Modified Proctor Compaction (ASTM D-1157); and
- Flexible-wall triaxial permeability (ASTM D-5084).

From the Atterberg limit and sieve analysis data, the samples were classified according to the Unified Classification System as sandy, elastic silt (MH) and borders on silt (ML). The compaction curve derived from the modified proctor compaction test indicated that the optimum moisture content is greater than the natural moisture content. Thus, achieving a moisture content greater than natural can be done with the introduction of water. Raising the moisture content to optimum or slightly wet of optimum will reduce the number of passes required to achieve the specified relative compaction. Based on the 90 percent relative compaction specification, a permeability of 6.6×10^{-6} cm/s was obtained from the flexible-wall triaxial permeability test.

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February 10, 1993
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Ms. Jacquelin Milles
University of Hawaii (Manoa)
Page 2

The soil barrier layer will be installed using 6-inch lifts to attain compaction throughout the 2-foot thickness. During construction, tests will be conducted to assure that the specified compaction requirements are met.

The use of a geomembrane (plastic) liner is an option that has been studied using a computer model "Hydrologic Evaluation of Landfill Performance" (HELP), for the proposed site location. The results indicated that the difference in leachate percolated from the landfill for the composite liner (geomembrane and soil layer) and the soil barrier layer as proposed is less than 0.5 percent. The relatively low difference in leachate percolation rates for the two options is due to high evaporation rates and little precipitation at the site.

In response to your second comment, an archaeological survey was conducted on the previously unimpacted land on February 10, 1993. According to the study, no surficial evidence of resources of historic or cultural significance was found. Enclosed is a copy of the survey.

Thank you again for your comments. Please feel free to call if you have any questions.

Sincerely yours,

HARDING LAWSON ASSOCIATES



Gerald A. Friesen P.E.
Associate Engineer

GAF/LKI:hkf

Enclosure: Archaeological Survey

APPENDIX A

Avifaunal Field Survey

FIELD SURVEY OF THE AVIFAUNA AND FERAL MAMMALS FOR THE
LANAI INTEGRATED SOLID WASTE MANAGEMENT FACILITY, LANAI

Prepared for
Harding Lawson Associates

Phillip L. Bruner
Assistant Professor of Biology
Director, Museum of Natural History
Environmental Consultant - Faunal (Bird & Mammal) Surveys

30 October 1992

INTRODUCTION

The purpose of this report is to summarize the findings of a one day (27 October 1992) field survey of the birds and mammals found on or near the proposed site of a new Integrated Solid Waste Management Facility, Lanai (Fig. 1). Also included are references to pertinent literature and unpublished faunal reports from similar lands.

The objectives of the field survey were to:

- 1- Document what bird and mammal species occur on the property or may likely be found there given the type of habitats available.
- 2- Provide some baseline data on the relative abundance of each species.
- 3- Where possible, describe the movement patterns of birds in this region of the island.

GENERAL SITE DESCRIPTION

The project site is located between the highway and Kaumalapau Gulch in the SW sector of Lanai (Fig. 1). The vegetation in this region is composed of dry grass and brush with tall trees in the

more protected and wetter areas of the gulches. A rock quarry operation has disturbed most of the site. The present landfill is located upslope and across the highway. No wetland habitat occurs on the proposed project site. The stream in Kaumalapau Gulch was dry and probably only contains water during heavy rains.

Weather during the field survey was clear and warm. Winds were strong (15-30 mph) from the NE.

STUDY METHODS

Field observations were made with the aid of binoculars and by listening for vocalizations. Attention was also paid to the presence of tracks and scats as indicators of bird and mammal activity. The entire site plus nearby lands were covered on foot. Faunal census stations (Fig. 1) were established and a series of eight minute counts at these stations provide the basis for the population estimates given in this report. Between these count stations any unusual observations of birds were also kept. Each count station was visited three times in order to obtain data on morning, mid-day and late afternoon faunal activity (see Table 1). Literature resources (Pratt et al. 1987; Hawaii Audubon Society 1989) and reports of bird observations made in somewhat similar habitat (Bruner 1989, 1991) were also consulted in order to acquire

a more complete picture of the potential species that could occur at this site.

Observations of feral mammals were limited to visual sightings and evidence in the form of scats and tracks. No attempts were made to trap mammals in order to obtain data on their relative abundance and distribution.

Scientific names used herein follow those given in Hawaii's Birds (Hawaii Audubon Society 1989), A field guide to the birds of the Tropical Pacific (Pratt et al. 1987) and Mammal species of the World (Honacki et al. 1982).

RESULTS AND DISCUSSION

Resident Endemic (Native) Birds:

No endemic species were recorded during the field survey. Pueo or Short-eared Owl (Asio flammeus sandwichensis) are known from Lanai but are listed as scarce (Hawaii Audubon Society 1989). This species hunts over forest as well as open range lands and agricultural fields. Pueo on rare occasions might occur in this sector of the island. No other endemic birds would be expected on this property.

Migratory Indigenous (Native) Birds:

Pacific Golden Plover (Pluvialis fulva) -

Plovers utilize open lands for foraging. Lawns, mud flats, and fields with short grass are preferred habitats. Prey items include insects, crustaceans and a wide variety of other small invertebrates. A total of five plover were recorded on the field survey. These birds were observed along side the highway or flying over the property. Johnson et al. (1981), Bruner (1983) and Johnson et al. (1989) have shown plover are extremely site-faithful on their wintering grounds (returning each day to the same spot and maintaining this behavior throughout their life time). Many plover also establish foraging territories which they defend vigorously. Such behavior makes it possible to acquire a fairly good estimate of the abundance of plover in any one area. These populations likewise remain relatively stable over many years (Johnson et al. 1989). The limited number of plover found on this survey was likely due to the shortage of suitable habitat.

Ruddy Turnstone (Arenaria interpres) -

Ruddy Turnstone forage on lawns and plowed fields as well as the intertidal zone. They usually occur in small flocks and are not known to be territorial but may exhibit some site-faithfulness tendencies (Fleisher 1985). Turnstones also compete with plover for many of the same types of prey. A total of 12 Ruddy Turnstone were recorded flying from Kaunapali Harbor area towards Lanai City.

The rocky shoreline at the mouth of Kaunapau Gulch may attract other shorebirds such as Wandering Tattler (Heteroscelus incanus).

Seabirds:

No seabirds were observed. The presence of predators like the Small Indian Mongoose (Herpestes auropunctatus), feral cats and dogs as well as human disturbance prohibits the project site from being suitable nesting habitat for seabirds. The steep walls of Kaumalapau Gulch may provide nesting or roosting habitat for seabirds. Observations made at dusk, however, did not record any seabirds returning to roost.

Resident Indigenous (Native) Birds:

No resident indigenous species were recorded. Black-crowned Night Heron (Nycticorax nycticorax) occur on Lanai but not at this location.

Exotic (Introduced) Birds:

A total of 11 species of exotic birds were recorded during the field survey. Table One shows the relative abundance of these species. The data are subdivided into morning, mid-day and late afternoon observations. The most numerous species were Zebra Dove (Geopelia striata) and Nutmeg Mannikin (Lonchura punctulata).

Species recorded in similar habitat (Pratt et al. 1987; Hawaii Audubon Society 1989; Bruner 1989, 1991) include: Barn Owl (Tyto alba), Ring-necked Pheasant (Phasianus colchicus), Gambel's Quail

(Callipepla gambelii), Black Francolin (Francolinus francolinus), Cattle Egret (Bubulcus ibis), Red-crested Cardinal (Paroaria coronata), Eurasian Skylark (Alauda arvensis), and Japanese Bush-warbler (Cettia diphone).

No large aggregations of birds were noted on the survey. The Myna roosts reported by USDA ADC in 1988 were not found on this survey. Birds were most abundant in the more densely forested gulches. Movement patterns of birds like doves and mynas appeared to be focused towards the more protected and heavily vegetated patches of dry forest. A leaking wooden water tank down slope of the quarry and near the highway provides drinking and bathing water for birds. A constant stream of birds were observed visiting this water source. Mammals also are drawn to this water as noted by the abundant tracks in the area.

Feral Mammals:

Three feral cats were observed near the present landfill along with one small dog. Rats and mice were not seen but undoubtedly occur throughout the area. A total of two Small Indian Mongoose (Herpestes auropunctatus) were also recorded near the current landfill. Axis Deer (Axis axis) tracks were found near Kaumalapau Gulch. Without a trapping program it is, however, difficult to conclude a great deal about the relative abundance of rats, mice, cats, dogs

and deer. Their numbers at this site are probably not dramatically different from similar habitats elsewhere on Lanai.

Records of the endemic and endangered Hawaiian Hoary Bat (Lasiurus cinereus semotus) are sketchy but the species likely occurs on Lanai (van Riper and van Riper 1982; Tomich 1986). Little is known of their natural history, distribution and ecological requirements. No bats were recorded on this project site.

CONCLUSION AND RECOMMENDATIONS

A brief survey can at best provide a limited perspective of the wildlife present in any given area. Not all species will necessarily be observed and information on their use of the site must be sketched together from brief observations and the available literature. The number of species and the relative abundance of each species may vary throughout the year due to available resources and reproductive success. Species which are migratory will quite obviously be a part of the faunal community only at certain times during the year. Exotic species sometimes prosper for a time only to later disappear or become a less significant part of the ecosystem (Williams 1987). Thus long term studies are better able to provide the insights necessary to understanding the population dynamics of birds and mammals in a particular area. Nevertheless, even brief

surveys can be useful in providing a starting point of baseline data.

SUMMARY OF FINDINGS

- 1- This region of the island provides a limited range of habitats for wildlife. Exotic (introduced) birds make up the bulk of the species. Some introduced birds known from Lanai were not recorded on the survey. This may be due to the briefness of the study or that no local populations of these species presently occur in the area.
- 2- The only migratory species recorded were the Pacific Golden Plover and Ruddy Turnstone. Neither were abundant in this area due to limited suitable habitat.
- 3- The endemic Hawaiian Owl (Pueo) forages in lowland open grasslands as well as in higher forested habitat. None were recorded on the survey. This species preys on rodents and could be attracted to this area if rat and mice populations were to increase following development of the solid waste facility. This would also be true of the introduced Common Barn Owl (Tyto alba). Barn Owls are nocturnal while Pueo will hunt during the day.
- 4- No unusual concentrations of feral mammals were observed on the survey. However, an intensive trapping program could provide a more definitive statement of mammal population dynamics at this site.

- 5- No large concentrations or roosts of birds were discovered. Movement patterns seemed to be focused towards the gulches and the leaking water tank.
- 6- Present bird populations in and around the proposed project site were not found to be unusually large or unique from those recorded at other similar habitats. In fact personal observations at the landfill at Kailua Kona revealed much larger bird populations than the present Lanai landfill. This may be due to several factors including different management techniques employed at each site.
- 7- The choice of the new site for the solid waste disposal is further from the airport and at a much lower elevation than the present landfill. If this new site attracts no more birds than the current landfill it should pose no problems to the airport and its operations. Should the mynas, doves and other birds increase dramatically at the new site they still may not necessarily be a threat to aircraft due to the distance and elevation of this site from the airport. Cattle Egrets are reported from Lanai (Hawaii Audubon Society 1989) but are not common. Should their numbers increase it would be wise to investigate control measures as this species has posed problems at Hilo airport.

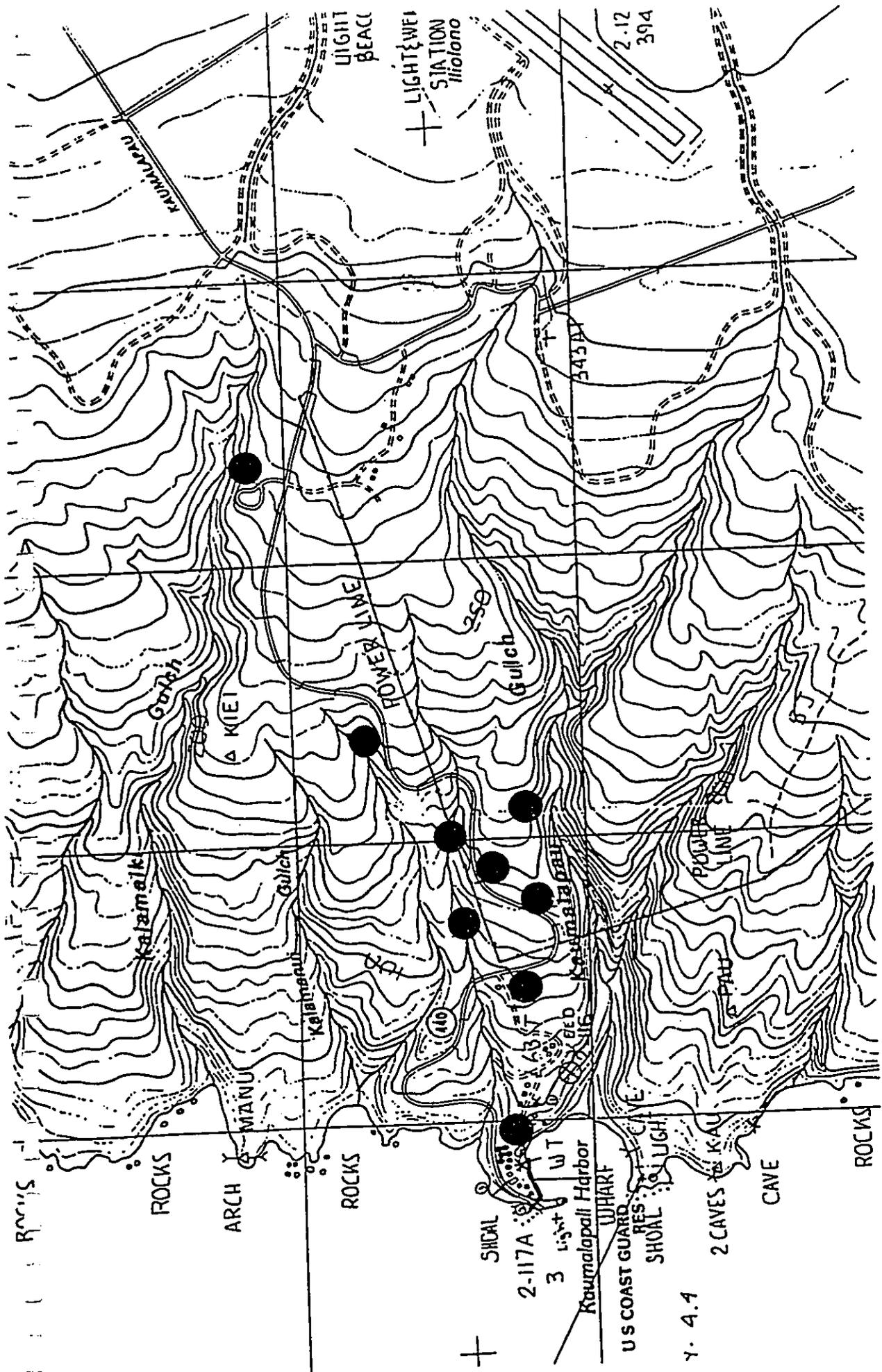


Fig. 1. Location of faunal survey with census stations shown as solid circles.

TABLE 1

Relative abundance of exotic birds recorded during morning, mid-day and late afternoon on 27 October 1992 on lands at and near a proposed solid waste management facility, Lanai.

COMMON NAME	SCIENTIFIC NAME	RELATIVE ABUNDANCE*		
		AM	Mid-day	PM
Gray Francolin	<u>Francolinus pondicerianus</u>	U= 4	0	U= 2
Spotted Dove	<u>Streptopelia chinensis</u>	U= 3	U= 2	C= 6
Zebra Dove	<u>Geopelia striata</u>	A=16	C= 8	A=14
Common Myna	<u>Acridotheres tristis</u>	C= 9	U= 3	C= 7
Japanese White-eye	<u>Zosterops japonicus</u>	U= 4	U= 2	C= 6
Northern Cardinal	<u>Cardinalis cardinalis</u>	U= 2	0	U= 1
Northern Mockingbird	<u>Mimus polyglottos</u>	R= 2	R= 1	0
House Finch	<u>Carpodacus mexicanus</u>	C= 8	U= 4	C= 6
House Sparrow	<u>Passer domesticus</u>	R= 9	0	0
Nutmeg Mannikin	<u>Lonchura punctulata</u>	A=12	A=11	A=10
Warbling Silverbill	<u>Lonchura malabarica</u>	R= 6	0	0

* (see page 12 for key to symbols)

KEY TO TABLE 1

Relative abundance = Determined by frequency on 8 min. counts in appropriate habitat.
Number which follows is average of all counts for that species in appropriate habitat.

A = abundant (ave. 10+)

C = common (ave. 5-10)

U = uncommon (ave. 1-4)

O = not recorded

R = recorded but usually not on 8 min. counts (number which follows is total recorded over the entire duration of the field survey)

ADDENDUM

Table 2 shows the data for the bird census taken at the existing landfill. Table 1 includes the data for all sites including the landfill. A comparison of the two tables reveals that fewer species were recorded at the existing landfill and the average numbers of birds for the morning (AM), mid-day and afternoon (PM) counts for all sites (Table 1) do not differ dramatically from the numbers tallied at the landfill (Table 2). In fact the numbers of birds found at the landfill site on the day of the survey were surprisingly low as noted in item six in the Summary of Findings section of the report.

Table 2

Relative abundance of exotic birds recorded during morning (AM), mid-day (MD) and late afternoon (PM) at the existing landfill on 27 October 1992. Numbers given are totals not averages as in Table 1.

Common Name	Scientific Name	AM	MD	PM
Gray Francolin	<u>Francolinus pondicerianus</u>	3	0	1
Spotted Dove	<u>Streptopelia chinensis</u>	2	3	4
Zebra Dove	<u>Geopelia striata</u>	12	9	8
Common Myna	<u>Acridotheres tristis</u>	2	0	3
House Finch	<u>Carpodacus mexicanus</u>	0	2	4
House Sparrow	<u>Passer domesticus</u>	9	0	0

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10 February 1993

Ms. Lene Ichinotsubo
Harding Lawson Associates
235 Pearlridge Center, Phase 1
98-1005 Moanalua Road
'Aiea, Hawai'i 96701

**SUBJECT: LANA'I SANITARY LANDFILL
BOTANICAL ASSESSMENT SURVEY**

Dear Lene:

As per your request, a botanical assessment survey of the new Lana'i landfill area was conducted on 08 February 1993. A large quarry pit will be the site of the proposed refuse area; the quarry is currently in use. Also planned for the project is a material recovery area and accompanying facilities. The existing quarry access road will be widened and improved.

The field studies focused on the undisturbed areas of the project site as native plant communities and, perhaps, rare plants are more likely to occur in such situations. An officially listed endangered species, the red-flowered 'ilima (Abutilon menziesii), is known from the dry shrublands on Lana'i. The undisturbed portions of the project site are the material recovery area, about 2 acres, and along both sides of the access road.

The vegetation on the material recovery site consists of an a'ali'i-'ilima shrubland. A'ali'i (Dodonaea viscosa), a native member of the soapberry family, forms low, rounded clumps, 3 to 4 ft. high. 'Ilima (Sida fallax) shrubs, 1 to 2 ft. high, form large patches between the a'ali'i clumps. Scattered between the shrubs are Guinea grass (Panicum maximum), which forms yellow-green tussocks up to 3 ft. high, and mats of pili grass (Heteropogon contortus). Plant cover is about 70 to 80%.

The a'ali'i-'ilima shrubland occurs along both sides of the access road, from the material recovery site to about half-way up the road. From about the half-way point to where it joins the

highway, the a'ali'i-'ilima shrubland is replaced, in places, by a Guinea grass and koa-haole association. Most of the koa-haole (Leucaena leucocephala) shrubs have died back at the top and have resprouted from the base. The dieback may have been caused by a heavy infestation of a Psyllid species, a sap-sucking insect. Scattered throughout the shrubland are a few trees of silk oak (Grevillea robusta), Formosan koa (Acacia confusa), and kiawe (Prosopis pallida).

A list of all the native species found during the field studies is presented below.

<u>Scientific name</u>	<u>Common name</u>
<u>Argemone glauca</u>	native poppy, pua kala
<u>Dodonaea viscosa</u>	a'ali'i
<u>Heteropogon contortus</u>	pili grass, pili
<u>Ipomoea tuboides</u>	Hawaiian moon flower
<u>Jacquemontia ovalifolia</u>	pa'u-o-Hi'i'aka
<u>Panicum torridum</u>	kakonakona
<u>Sida fallax</u>	'ilima
<u>Solanum americanum</u>	popolo
<u>Waltheria indica</u>	'uhaloa, hi'aloa, kanakaloa

None of the plants found during the field studies is a listed threatened and endangered species; nor are any proposed or candidate for such status (U.S. Fish and Wildlife Service 1989, 1990). All of the native species can be found in similar environmental habitats throughout the Hawaiian Islands. None are considered rare or vulnerable (Wagner et al. 1990).

The proposed project should not have a significant negative impact on the botanical resources.

Please do not hesitate to contact me should you have any questions regarding the report or the field studies.

Sincerely,


Winona P. Char

References

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CULTURAL SURVEYS HAWAII
Archaeological Studies

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February 9, 1993

Ms. Lene Ichinotsubo
Harding Lawson Associates
235 Pearlridge Center Phase 1
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Aiea, HI 96701

Subject: Post Fieldwork Report on Results of Archaeological Survey of a 2- to 3-Acre Parcel for the Lanai Integrated Solid Waste Management Facility, Kamoku, Lānaʻi.

Dear Ms. Ichinotsubo:

This letter is to report the results of the fieldwork investigation of a 2- to 3-acre parcel proposed for use as a waste management facility connected to a relocated Lanai landfill as well as an approximately one-mile long existing access road which will be widened to 75 feet.

The proposed facility (see enclosed maps) is located within the *ahupua'a* of Kamoku on the south side of the presently-used Kaumalapau Road. It lies at approximately 500 feet elevation *mauka* of Kaumalapau Harbor and between Kaumalapau Road (its north boundary) and an existing Quarry site (its south boundary). It is bounded to the west by the abandoned road bed of the old Kaumalapau Road. The proposed access road connects Kaumalapau Highway with an abandoned quarry pit and presently serves as the quarry operation access road.

The total land area of the facility is estimated to be 2-3 acres. The land slopes toward the valley to the north and is covered with ilima and native and introduced grasses. The vegetation stands 1-2 feet high but in many places forms a thick cover which leaves the ground surface exposed. The slope has some shallow erosional gullies with evidence of bulldozing along the upslope quarry side, and near the right-of-way for the highway to the north.

The land surface of the proposed facility was traversed on foot with east/west transects approximately 30-50 feet apart. The road survey was accomplished by walking the shoulder area from the highway to the quarry and back, so that both sides of the road were covered by survey. The survey took 3 hours for one archaeologist. Special attention was given to inspecting eroded areas for scatters of secondarily deposited cultural materials which may indicate an archaeological site. Also, high points in the landscape were given special attention in case buried alignments or small shelter sites were present. The landscape is generally free of boulders and the few rocks present appear to have fallen from the quarry operation upslope.

No archaeological or historical sites were found on this parcel of land or adjacent to the access road. Its location in a "barren zone" between the shoreline and the *mauka* settlement of Palawai Basin would indicate the potential for settlement here was less than for other areas. The archaeological survey of the adjacent presently operating quarry site by D. Borthwick of Cultural Surveys Hawaii in 1990 also resulted in negative findings.

Given the absence of archaeological potential demonstrated by the field investigation, it appears that construction of the solid waste management facility with a widened access road here will have no impact on archaeological resources. Further archaeological investigation is not recommended.

Thank you.

Sincerely,

Hallett H. Hammatt

Hallett H. Hammatt, Ph.D.

Encl. maps

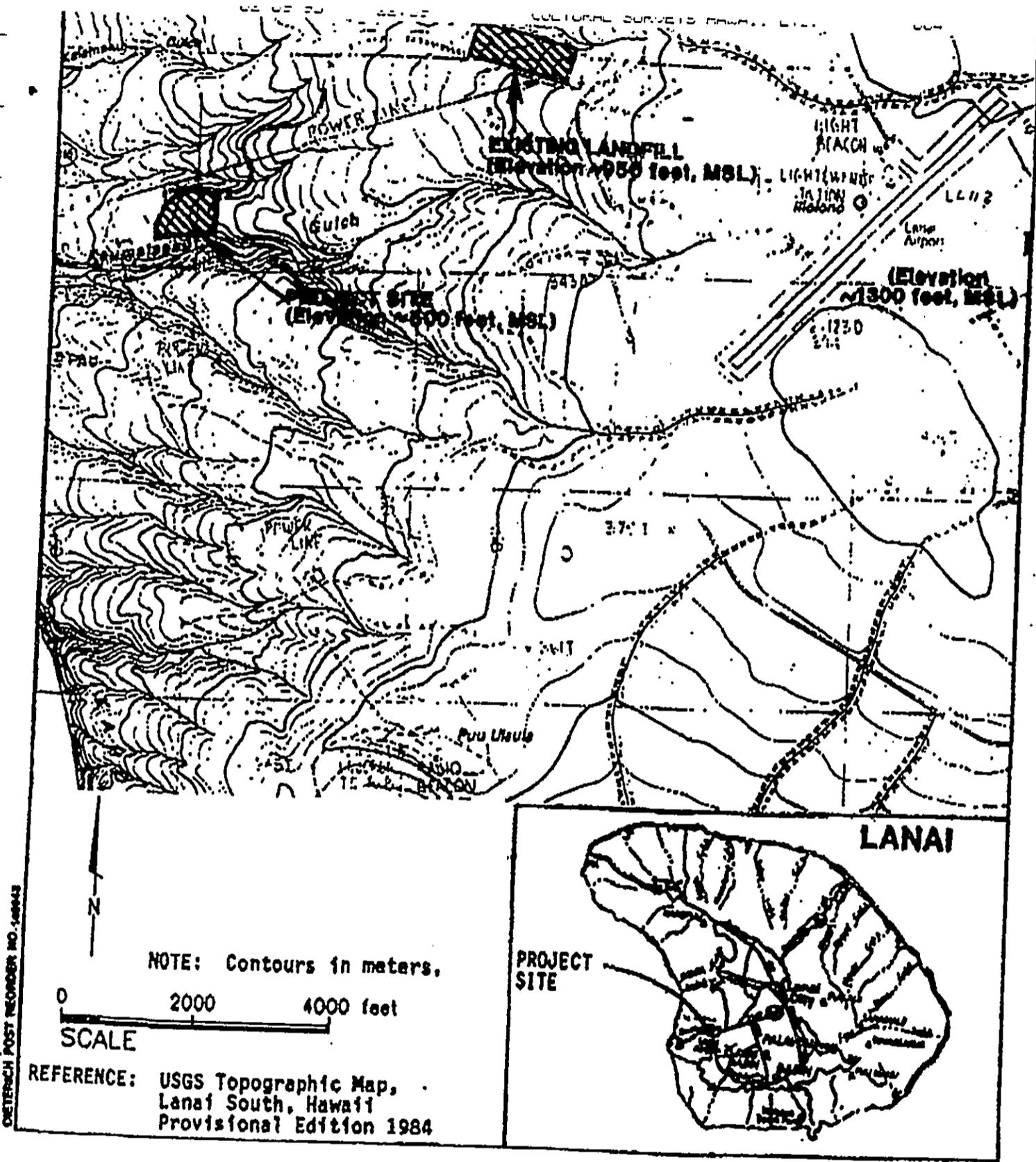


Figure 1 Proposed Solid Landfill Site, Lanai

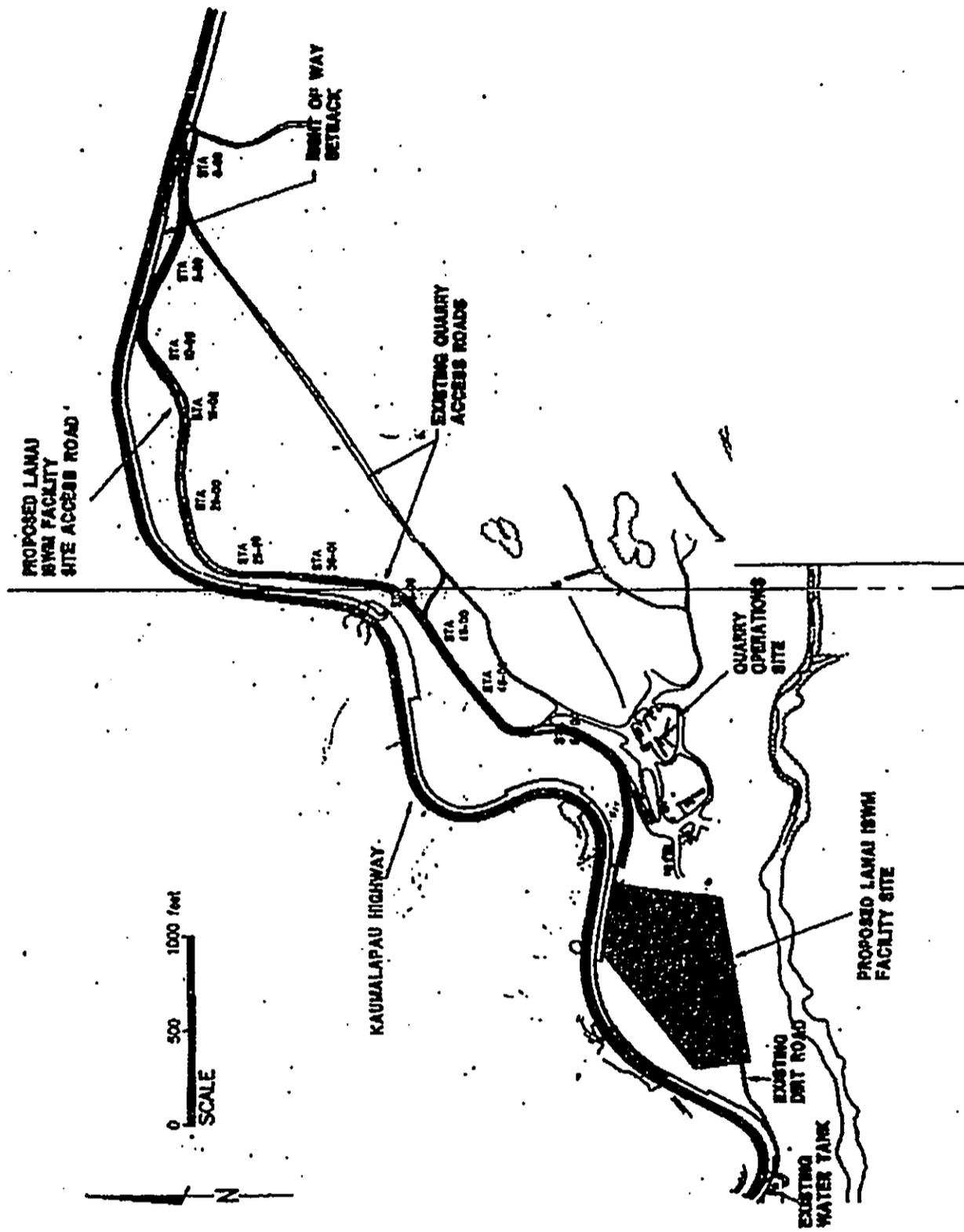


Figure 2 Proposed Landfill Site and Access Road

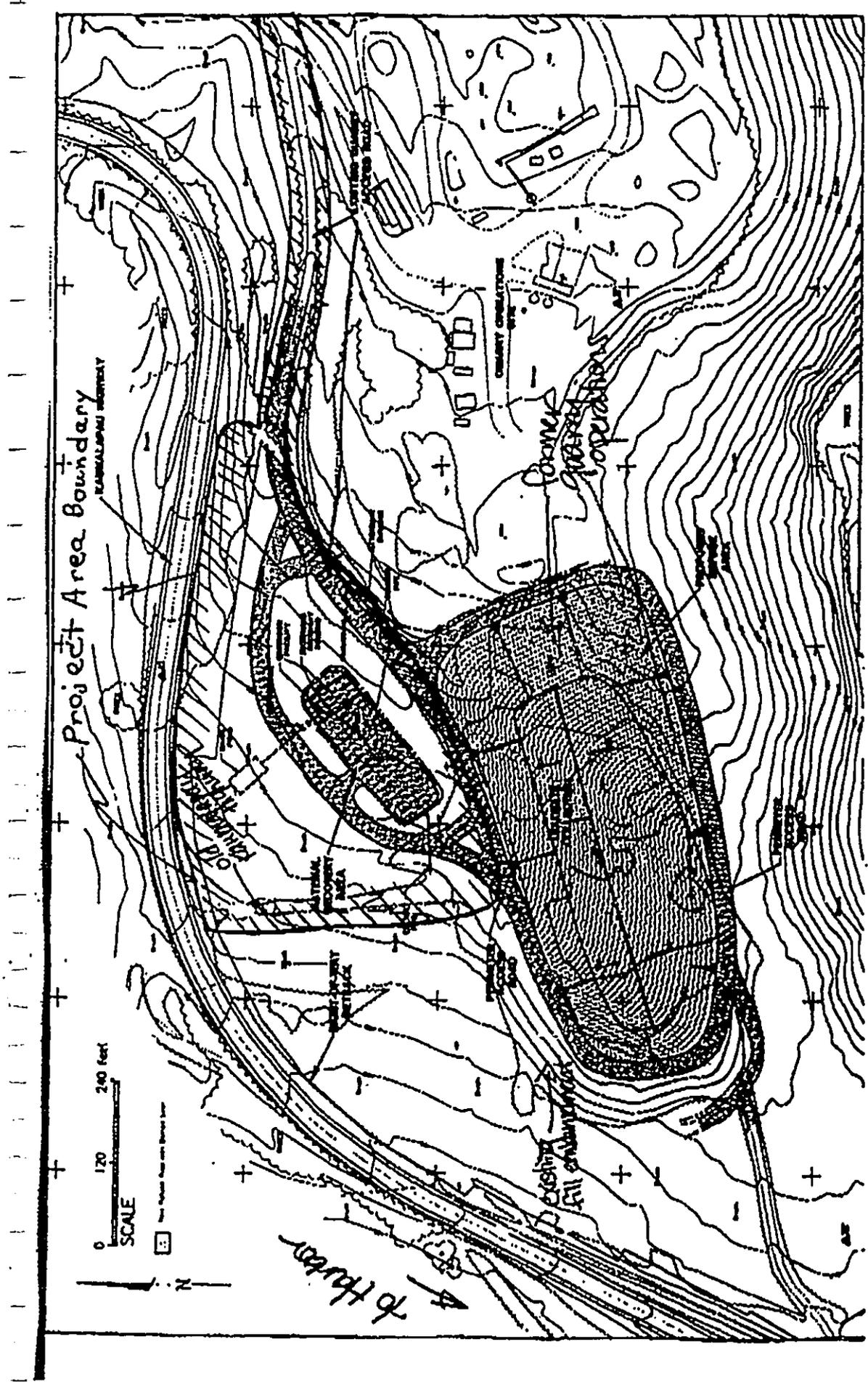


Figure 3 Location of Solid Waste Management Facility Showing Project Area Boundary