

OEQC LIBRARY

Final Environmental Impact Statement
for
Panaewa Zoological Garden
Panaewa, South Hilo, Hawaii
Department of Parks and Recreation
County of Hawaii

HI

III

NOTICE

ALL reference material borrowed from this library will be on a 30-day loan period, limited to ONE RENEWAL ONLY.

If borrowed material is not returned when DUE, is DAMAGED, or LOST, there will be a REPRODUCTION CHARGE OF 25¢ PER PAGE.

OFFICE OF ENVIRONMENTAL QUALITY CONTROL
550 Halekani St. Rm. 301
Honolulu, HI 96813 Ph: 548-6915

FINAL ENVIRONMENTAL IMPACT STATEMENT

FOR

PANAWEA ZOOLOGICAL GARDEN

PANAWEA, SOUTH HILO, HAWAII

(PURSUANT TO GOVERNOR'S EXECUTIVE ORDER DATED AUGUST 23, 1971)

BY

DEPARTMENT OF PARKS AND RECREATION

COUNTY OF HAWAII

May 1975

TABLE OF CONTENTS

	Page
Introduction	1
Project Description	1
Site Description	3
Surrounding Land Use	7
Existing Land Use Regulations	7
Environmental Impact	8
Any Adverse Environmental Effects Which Cannot Be Avoided Should the Proposal Be Implemented	13
Alternatives to the Proposed Action	13
Relationship Between Local Short-term Uses of Man's Environment and the Maintenance and Enhancement of Long-term Productivity	14
Irreversible and Irretrievable Commitment of Resources	14
Economic and Social Costs and Benefits	14
References	16
Appendix (Figures and Tables)	
Figure 1 Zoo Improvements (Map)	17
Figure 2 Zoo Site (Map)	18
Figure 3 Geological Map	19
Figure 4 Waiakea Rainfall	20
Figure 5 Surface Wind Patterns (Map)	21
Figure 6 Surrounding Land Use (Map)	22

	Page
Table 1 Floristic Checklist	23
Table 2 Checklist of Vertebrates	26
Table 3 Checklist of Zoo Animals (Phase I)	27
Table 4 Waste Water Load Factors	30

Correspondence

FINAL ENVIRONMENTAL IMPACT STATEMENT

FOR

PANAWEA ZOOLOGICAL GARDEN

PANAWEA, SOUTH HILO, HAWAII

DEPARTMENT OF PARKS AND RECREATION

COUNTY OF HAWAII

INTRODUCTION

The County of Hawaii through its Department of Parks and Recreation is in the process of developing an integrated recreational complex on 172 acres of State land at Panaewa, 5 miles south of Hilo. The Department of Land and Natural Resources (State of Hawaii) on April 28, 1972 approved Hawaii County's Conservation District Use Application for development of a racetrack, rodeo arena, zoological-botanical garden and other recreational facilities (bridal paths, polo fields, etc.) at the Panaewa site. The first phase of development (racetrack, rodeo arena, and stable facilities) was constructed during 1973-74, and is currently operational. Funds have now been appropriated and plans completed for relocation of the temporary County Zoo to permanent facilities at the Panaewa site.

PROJECT DESCRIPTION

Historical Background

In 1968 a 2 acre temporary children's zoo was constructed adjacent to Onekahakaha Beach Park in Hilo. The location while convenient to beachgoers, was considered temporary because: 1) there were no adjacent areas available for expansion; 2) the site is located in a primary tsunami inundation zone; and 3) the presence of tidal ponds and the zoo's adjacency to swimming beach areas created a potential for contamination of near coastal waters.

The small children's zoo, in spite of its temporary and inadequate facilities, has proved to be one of the most popular attractions operated by the Department of Parks and Recreation, with nearly 90,000 visitors during 1974. Questionnaire surveys conducted in conjunction with preparation of the State Comprehensive Outdoor Recreation Plan

(SCORP)¹ yielded information on public desires for future recreational development. In contrast to Oahu, the neighbor islands (no island by island breakdown) expressed a first choice (40%) for more historic and cultural facilities such as ". . . zoos, aquarium, natural museum, and cultural center, and the like," as opposed to further emphasis on the more traditional outdoor recreation activities (31%), such as camping, swimming, playing fields, etc. Because of the site limitations at Onekahakaha, plans were initiated in 1972 to relocate the facility to a 30 acre site at the Panaewa recreational complex.

Planned Improvements

Relocation of the County Zoo to Panaewa has enabled comprehensive masterplanning, incorporating the most innovative advances in zoo-design and construction. The new zoo will undertake the integration of naturalistic animal and plant exhibits with a comprehensive environmental education curricula emphasizing basic animal ecology and behavior, wildlife conservation, Hawaiian natural history, and Indo-Pacific biogeography. Research interests will center on the propagation of endangered island species.

Planned site improvements and structures for the first phase of zoo construction are illustrated in Figure 1, and include the following:

- 1) A utility grid
- 2) Parking lot (82 cars, and space for buses)
- 3) Entry gateway and administrative offices (2 non-public toilets)
- 4) Zoo pavilion including covered and open picnic areas (with multimedia facilities for zoo education programs) (8 public toilets)
- 5) Children's Zoo Pavilion (primate exhibits)
- 6) Walk-through Aviary
- 7) Zoo service and food preparation, storage building (1 non-public toilet)
- 8) Various animal display exhibits (e.g. "Mauna Kea Mountain", "Sumatran Swamp", etc.)
- 9) Service and footpaths connecting exhibits (0.85 miles, 10 feet wide, paved)

All engineering and architectural planning for the first phase is now complete. Approximately \$960,000.00 (60% County, 40% State; additional funds pending) has been appropriated for the first phase

of zoo construction. Construction is estimated to take one year, with commencement dependent upon approval of the Environmental Impact Statement.

Following phase one, subsequent construction phases will occur over a period of years, as funds become available, and will include new animal exhibits, expanded service facilities, a caretaker's cottage, etc. Under the conditions of the Conservation District Use Application (#11, see page 8), commercial activities are prohibited. However, if this condition can be modified, it is proposed to develop a public refreshment concession in the second phase of zoo construction.

SITE DESCRIPTION

Physical Environment

Location: The proposed zoo site is located along Stainback Highway, one mile southwest from its intersection with State Highway 11, in the Waiakea Homestead area, South Hilo District. The State-owned land identified as tax map key 2-4-04:1, and a portion of 2-4-08:1, consists of 172.577 acres. The zoo is expected to occupy approximately 30 acres of this area (see Figure 2). The County racetrack and rodeo arena complex presently occupies an adjacent 50 acres within this parcel.

Topography and Geology: A detailed topographic survey of the proposed zoo site has been completed. Elevations range from a maximum of 452 feet at the south corner to a minimum of 368 feet in the north. The terrain is moderately undulating, the results of compression ridges formed in the prehistoric lava flows that cover the area. The numerous hillocks and depressions have a relative relief of 10-15 feet.

No well defined stream courses or drainage channels exist on the project site. Standing water is absent. Due to high substrate permeability overland runoff is absent, even during periods of intense and prolonged rainfall.

With respect to surface geology, prehistoric lava flows from Mauna Loa cover the project site (see Figure 3). The lava consists of permeable beds of A'a. The prehistoric lavas veneer a layer of Pahala ash averaging 8-10 feet in thickness.² This ash bed is shown where it outcrops on the surface as a dotted pattern on Figure 3.

Soils: Soil within the project site are classified as Papai Extremely Stony Muck, and are characterized as well drained, thin, extremely stony, and largely organic in nature.³ They also exhibit very high permeability and a very slight erosion hazard.

The Soil Conservation Service's Capability Rating is VII, indicating a soil with very severe limitations, that make it unsuited for cultivation, and that restrict its use largely to pasture and range, or woodland or wildlife uses.

Where present, soil within the project site averages 3-12 inches in depth. Bare rock outcrops cover 10-20% of the project site.

Ground Water: A basal freshwater lens is located under the whole Waiakea area. At the project site this lens is estimated to lie at about 14 feet above sea level, or 384-448 feet below the surface.⁴ Potable water for the Hilo Municipal water system is pumped from basal wells (Panaewa Wells 8-3, 8-3A; see Figure 3), located approximately 1.5 miles down gradient from the proposed zoo site.

Climate: The climate at the project site is generally humid and tropical, and characteristic of windward location in the Hawaiian Islands. Temperatures in the proposed zoo area are similar to those of adjacent Keaau, with an average monthly temperature of 70.1°F in January and 74.1°F in July. Because of the increased elevation, and the inland location, temperatures average 1-2°F lower than those of adjacent Hilo.

Rainfall in the project area can be extrapolated from records maintained at the Waiakea Agricultural Experiment Station located approximately 1/2 mile west of the proposed site (see Figure 2). Rainfall at the Experiment Station averages 160-170 inches annually (vs. 140-150 inches at coastal locations in metropolitan Hilo).⁵ The seasonal distribution of this average rainfall is illustrated in Figure 4-a. The precipitation is relatively well distributed throughout the year, although exhibiting a weak winter maxima, which reflect the occurrence of "Kona storms" (cold front cyclonic disturbances). The Hilo area is also characterized by high seasonal and annual variability in rainfall (i.e. sharp departures from average conditions), with frequent extended periods of intense rainfall or drought.

The potential adverse effect of high rainfall on use of zoo facilities should be reduced because precipitation is heavily concentrated during the evening hours, rather than the peak use period (see Figure 4-B).⁶ Zoo exhibits will also emphasize animals adapted to a tropical rain-forest setting.

Wind patterns within the subject area have been extrapolated from records maintained at the Hilo Airport (located 5 miles to the north). Wind Rose data is presented in Figure 5. In general, strong tradewind circulation bearing from north to east prevails during the day, while at night the subsidence of cold mountain air (from Mauna Loa and Mauna Kea) produces a shallow and relatively weak gravity wind bearing from the west and southwest.⁵

Biological Characteristics

A detailed biological survey of the proposed zoo site was conducted over a four month period (September-December, 1974).

Flora and Vegetation: A floristic checklist of plants within the project site is presented in Table I. Sixty-five species were identified within the boundaries of the project site; of this number, 47 (72%) are considered exotic, recently introduced species. The remaining 18 native species include 10 (15%) endemic to the Hawaiian Islands. The endemic species present are relatively common in forest areas of the South Hilo and Puna Districts, and none are presently considered to be in danger of extinction. The floristic dominance of exotic species in the area reflects the past effect of human landscape modification. Major fires devastated forests in the project area during 1926 and 1931. Reforestation was effected by planting and aerial broadcast of tree seeds (from a variety of exotic species). The success of this project is evidenced by the presence today of a substantial number of thriving exotic tree species. The herbaceous vegetation is also dominated by opportunistic exotic weeds which have penetrated the area from adjacent disturbed habitats (rodeo arena, pasture land, Agricultural Experiment Station, Stainback Highway, etc.)

While from the floristic standpoint, the forest at the project site may be characterized as largely exotic; in terms of species abundance, native trees prevail. Of the 552 trees (with BHD 6") recorded on the project site, the four most abundant species were:

Ohia.....	338	(61.2%)
Kukui.....	62	(11.2%)
Lama.....	45	(8.2%)
African Tulip.....	30	(6.9%)

In general, the forest is of a scrubby nature, lacking a closed canopy, with trees averaging 20-40 feet in height. This stand structure is characteristic of forests in an intermediate stage of successional

development, influenced by a relatively youthful (though pre-historic) volcanic substrate, and subjected to past fire damage. Commercial forestry values are negligible.

Fauna: The invertebrate fauna at the proposed zoo site was not systematically or quantitatively surveyed, however, exotic ant species and mosquitoes were the most common groups encountered. A checklist of the vertebrate fauna inhabiting the project site is presented in Table II.

Among the vertebrates, exotic species predominate, and in fact, only one endemic species (Hawaiian Hawk), and one endemic sub-species (Hawaiian Owl) are known definitely to occur in the general area of the project site. The Hawaiian Hawk or I'o is restricted in distribution to the Island of Hawaii, and is officially designated an endangered species. The Hawk is occasionally seen circling and soaring over the Panaewa and Waiakea forest areas, as well as the adjacent urban and sub-urban areas of Hilo. No nests, roosts, or other direct use indications have been observed within the specific limits of the zoo site.

While not actually observed at the project site, the Hawaiian Hoary Bat, Lasiurus cinereus semotus, (an officially endangered sub-species) is frequently seen in the Hilo vicinity, and may occur in the Panaewa forest area.⁷ Repeated field observations conducted during the bats' prime activity period (early morning and evening) failed to confirm its presence in or adjacent to the proposed zoo site.

Historic Site

No obvious historic or archaeological sites were discovered during the detailed topographic mapping of the area. No significant archaeological or historic sites have been recorded from recently developed areas adjacent to the site.

Access and Utilities

Stainback Highway provides access to the site (see Figure 2). It was constructed and is owned and maintained by the State Department of Social Services and Housing. About 30 feet of the 80 foot right-of-way has been cleared, with 18 feet improved by paving.

Electrical power and telephone lines service the Stainback Highway. A 0.05 mg. County water tank is located directly opposite the proposed zoo site. This tank is connected to the County water system (including the Panaewa Well) serving the Waiakea and Panaewa areas.

development, influenced by a relatively youthful (though pre-historic) volcanic substrate, and subjected to past fire damage. Commercial forestry values are negligible.

Fauna: The invertebrate fauna at the proposed zoo site was not systematically or quantitatively surveyed, however, exotic ant species and mosquitoes were the most common groups encountered. A checklist of the vertebrate fauna inhabiting the project site is presented in Table II.

Among the vertebrates, exotic species predominate, and in fact, only one endemic species (Hawaiian Hawk), and one endemic sub-species (Hawaiian Owl) are known definitely to occur in the general area of the project site. The Hawaiian Hawk or I'o is restricted in distribution to the Island of Hawaii, and is officially designated an endangered species. The Hawk is occasionally seen circling and soaring over the Panaewa and Waiakea forest areas, as well as the adjacent urban and sub-urban areas of Hilo. No nests, roosts, or other direct use indications have been observed within the specific limits of the zoo site.

While not actually observed at the project site, the Hawaiian Hoary Bat, Lasiurus cinereus semotus, (an officially endangered sub-species) is frequently seen in the Hilo vicinity, and may occur in the Panaewa forest area.⁷ Repeated field observations conducted during the bats' prime activity period (early morning and evening) failed to confirm its presence in or adjacent to the proposed zoo site.

Historic Site

No obvious historic or archaeological sites were discovered during the detailed topographic mapping of the area. No significant archaeological or historic sites have been recorded from recently developed areas adjacent to the site.

Access and Utilities

Stainback Highway provides access to the site (see Figure 2). It was constructed and is owned and maintained by the State Department of Social Services and Housing. About 30 feet of the 80 foot right-of-way has been cleared, with 18 feet improved by paving.

Electrical power and telephone lines service the Stainback Highway. A 0.05 mg. County water tank is located directly opposite the proposed zoo site. This tank is connected to the County water system (including the Panaewa Well) serving the Waiakea and Panaewa areas.

SURROUNDING LAND USE

Current zoning and land use on parcels adjacent to the proposed zoo is illustrated on Figure 6. The County racetrack - rodeo arena occupies 50 acres adjacent to the project site on the northeast. To the southeast are chicken and anthurium farms in the Panaewa Farmlots area. Directly across Stainback Highway from the project site, 1,000 acres of Waiakea Forest Reserve land has recently been cleared for sugar cane cultivation by Puna Sugar Company. To the southwest and northwest, the site abuts both unimproved and improved pasture land and scrub forest. The University of Hawaii's Waiakea Experimental Farm is located about 1,500 feet to the southwest of the zoo site, and includes a 195 acre tract planted with vegetable crops, fruit and nut trees, sugar cane, flowers and grasses, and also houses the U.S. Department of Agriculture's Entomological Research Division.

Within a one mile radius of the project site (see Figure 5) there are only about 12 farm and non-farm residences. Beyond this radius to the north are the State Land Use Commission urban boundaries and the residential areas of suburban Hilo.

EXISTING LAND USE REGULATIONS

The existing characteristics and physical status of the area have been previously mentioned. The parcels are located within the State Land Use Conservation District and the uses are thus regulated wholly by the Department of Land and Natural Resources. Urban type developments are not anticipated for the general vicinity. Under the County of Hawaii General Plan, continued agriculture and forest reserve land uses are foreseen for the general area with open uses for the specific proposed site. The Department of Land and Natural Resources has stated that the proposed zoo facilities would not conflict with any of their programs for the area.

At its meeting of April 28, 1972, the Board of Land and Natural Resources approved the County's Conservation District Use Application for the development and construction of the public recreational facilities under discussion here. The Board authorized actions necessary to withdraw the area within TMK 2-4-08:1 from the Waiakea Forest Reserve. They also approved of and recommended to the Governor the issuance of an executive order setting aside the entire site, including the portion of TMK 2-4-08:1 if and when it is withdrawn from the Waiakea Forest Reserve, to the County of Hawaii's Department of Parks and Recreation for public recreational use.

In approving the Conservation District Use Application, the Board of Land and Natural Resources set forth the following conditions:

- 1) A sewage disposal system shall be installed which meets the approval of the Department of Health and the County Department of Water Supply.
- 2) Toxic chemicals shall not be stored or used on the site.
- 3) The facility shall be closed to public use after 6:00 p.m. each day except on special occasions.
- 4) All animal solid waste shall be carted away from the site and distributed or deposited in a manner which avoids water contamination or breeding of pests.
- 5) All work plans shall be subject to the approval of the Chairman . . .
- 6) Prior to initiating construction, the applicant shall submit landscaping plans to the department for approval. The landscaping work shall be done simultaneously with or immediately following completion of the construction work.
- 7) The applicant shall give notice to the department upon commencement and completion of the project.
- 8) All debris from the project shall be removed from the area to approved sanitary disposal sites.
- 9) Upon termination of the use, the area shall be restored to a suitable condition, satisfactory to the department.
- 10) The applicant shall comply with all applicable statutes, ordinances, rules and regulations of the Federal, State and County governments.
- 11) Use of the site shall be limited to non-commercial public recreational activities (exact language to be drafted by the Office of the Attorney General).
- 12) At any time, should it be shown that the proposed use is detrimentally affecting the County Water Source, then the Use Permit may be terminated at the discretion of the Board of Land and Natural Resources.

ENVIRONMENTAL IMPACT

Forest and Wildlife Values

Except for the restoration efforts proposed in the development plans for the new zoo (see below) there are no plans to restore the pris-

tine forest and wildlife values of the project site, which have been substantially modified or destroyed through past human activity. The remaining forest area is small, and heavily penetrated by exotic species, and the area lacks long-term integrity due to surrounding non forest land uses.

The proposed zoo will have a relatively small impact on the existing vegetation and wildlife. The zoo structures and exhibits have been designed to harmonize with, and incorporate existing natural vegetation and topography. It is estimated that less than 10% of existing trees will require removal to accommodate zoo structures, exhibits, and construction access.

In support of the zoo's "Hawaiian Natural History Zoo Education Program", substantial replanting with native Hawaiian trees and plants (and additional species from the Indo-Pacific area) will be initiated during the first phase of zoo construction. The project should have no adverse effect with respect to endangered species. Some native endangered species will be reintroduced to the area in naturalistic exhibits designed to facilitate captive propagation and behavioral study.

Water Quality

Based on the results of a detailed geological and water quality survey of the general project area, the project site potential for ground water contamination resulting from the zoo's location superadjacent to an important basal water resource, does not appear to present a serious environmental problem.

Harold Stearns (1972) undertook a study of the potential for ground water contamination that would result from the clearing and sugar cane planting of 1,000 acres of Waiakea Forest Reserve land located directly across Stainback Highway from the proposed zoo site (this project has been approved). Stearns concluded that there was no danger of polluting the Panaewa Wells (8-3, 8-3A) from fertilizers or herbicides associated with cane cultivation. This conclusion was based on the following factors:

- 1) Pollutants reaching the water table would have to percolate through 50 feet of lava rock, then through 8 feet of impermeable clayey ash and finally through an additional 330-380 feet of interbedded ash and lava.
- 2) The low permeability ash layer would tend to shunt percolating water north eastward (down gradient), and it is possible that such water would not reach the water table until after it passed seaward of the wells.
- 3) The high rainfall of the area would greatly dilute any pollutants.

- 4) Analysis of water samples taken from wells 9A-9B, (immediately surrounded by thousands of acres of sugar cane) and 9-2, 9-12 (located in the Keaau Macadamia Nut orchards) drilled in geologically similar strata near the proposed site (see Figure 3) revealed nitrate concentration at a maximum of 1.3 ppm. (vs. a public health standard of 45 ppm.) and maximum herbicide concentrations of 0.00017 ppm.; far below the 0.1 allowance established by the Handbook of Toxicology (pages 743-752). It should be here reinstated that these water quality data are based on samples taken from wells immediately surrounded by agricultural land, while the proposed zoo site is located 1.5 miles from the County's Panaewa well.
- 5) The use of cesspool waste disposal systems by 15-20 private residences and the Hawaii 2000 Outdoor Recreation Center, all located within 2000-3000 feet of the Panaewa Wells, have not contributed, in any measurable way to pollution of well water.

While the potential for ground water contamination resulting from the development of the proposed zoo, appears minimal, design features for the new zoo will include the following facilities and procedures to further diminish the risk of ground water contamination:

- 1) While the zoo will emphasize exhibits of small and medium sized animals, not anticipated to generate a large waste disposal problem; any large animal's solid wastes will be trucked from the site to an approved disposal site.
- 2) Projected waste water load (Table 4) for the zoo is very small, and widely dispersed over the large project area. Based on these load factors, and subsequent design modifications and upgrading, the Hawaii District Environmental Engineer (State Health Department) has given approval in principle (Meeting of April 30, 1975) to a waste disposal system employing 6 cesspools (for human and animal wastes) and 6 drywells (for daylighted pond water). Location of these facilities is shown in Figure 1. All recommendations of the Department of Health have been incorporated into project specifications.

Air Quality

As a result of site location (relative to surrounding land use), nature of the proposed zoo exhibits, and prevailing atmospheric circulation patterns, it is anticipated that a nuisance from fugitive dust and animal odors will not present a significant problem. As illustrated in Figure 5, the prevailing wind direction would largely disperse air over the project site in direction away from the populated suburban areas of Hilo. Winds would bare toward these suburban areas only about 13% of the time, in addition only about 12

inhabited residences occur within a one mile radius of the proposed zoo site, and given the lands largely agricultural zoning (see Figure 6), future urban encroachment would be limited.

The existing operation of the County racetrack - stables (22 horses in resident) adjacent to the proposed zoo site, has not suffered from any serious odor problem. Cattle operations and chicken farms in the immediate area likewise have not generated significant odor problems, as evidenced by the lack of complaints from the few nearby residents.

The zoo exhibits have been designed to facilitate efficient cleaning and maintenance, and again, because of the zoo's stated emphasis on small and medium sized animals no significant odor problem is anticipated.

The emission of fugitive dust during the construction phase should be minimized by the generally moist and coarse nature of the substrate, and because the existing vegetation will be left, as nearly as possible intact. There will be no large barren soil areas exposed to potential aeolian erosion. Standard dust abatement procedure will be implemented during the construction phase as warranted.

Air pollution resulting from automobile traffic generated by the new zoo is not anticipated to produce significant adverse environmental impact on the health of humans, animals or plants. Peak use is not expected to exceed 300 cars per day or 75 cars per hour.

Drainage

Changes in existing drainage patterns as a consequence of paving and structures will be minimal due to the small proportion of impervious surfaces, (approximately 10%) in relation to the entire area. No well defined stream courses or drainage channels exist at the project site as a result of the high substrate permeability. Zoo exhibits and structures have been designed to blend with existing topography, and thus minimize the need for extensive grading and terrain modification, which adversely effect runoff and drainage.

Access and Utilities

The portion of Stainback Highway which serves as access to the site may eventually require improvements to handle the increased traffic load generated by the new facility and other facilities planned in the future. An adequate supply of water (estimated average demand 0.06 mgd) is available from the County system. A storage tank and booster pump will be installed at the site to improve pressure and storage capabilities.

Noise

Construction: The impact of construction noise will be dampened by the surrounding vegetation, and because of site isolation noise should not pose a nuisance to residential areas. Fewer than 6 (farm and non-farm) residences occur within a 1/2 mile radius of the project site, and there are no major residential areas with a 1 mile radius.

Operations: Continuous or recurrent loud noise will not be associated with zoo operations. Some animal noises will occur within the zoo, however they are not expected to pose any nuisance, on the contrary, such noises add to the aesthetic enjoyment of the zoo environment.

Landscape Aesthetics

The visual impact of the proposed development will be minimized by maintenance of the forest environment, and the absence of tall or massive contrasting structures. Utility lines will be buried. Landscaping and footpaths within the project site will increase opportunities for aesthetic appreciation of the forest environment.

Exotic Animals, Animal Diseases and Vector Control

All animal enclosures have been designed (in consultation with zoo professionals) to exceed minimum standards (species specific) for safe, humane, and escape proof confinement. In contrast to more traditional cage structures, the new zoo will emphasize open moated enclosures, with innovative exhibits designed to incorporate natural vegetation and topography.

The possible introduction and transmittal of exotic animal diseases to either wild or domestic livestock will be eliminated by strict adherence to all quarantine, and post entry control regulations of relevant State and Federal agencies. A list of animals proposed for exhibition (Phase I) is presented in Table 3.

A licensed veterinarian (retained on contract by the County) will oversee animal health and sanitation at the new zoo.

A program of vector control will be implemented at the new zoo, utilizing successful procedures presently in operation at the Onekahakaha Children's Zoo. Rodent trapping and the use of disinfectants, along with multiple daily washdown of cages will be employed. Daylighted ponds will be chemically treated or drained at frequent intervals.

ANY ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED SHOULD
THE PROPOSAL BE IMPLEMENTED.

Alterations of the physical terrain and vegetation which would occur if the proposal were implemented are unavoidable environmental effects. The extent of adverse effects stemming from such alterations would be kept as minimal as possible by following the General Requirements and Covenants of the County Department of Public Works. It is felt that the positive environmental effects of the proposed development as manifest in: improved recreational access to the forest area; and exhibits and educational programs that will emphasize conservation and Hawaiian natural history; will more than offset any adverse environmental impact resulting from the proposed development.

ALTERNATIVES TO THE PROPOSED ACTION

- 1) No New Zoo Development. Failure to construct the new zoo would necessitate continued operation of the inadequate temporary zoo at Onekahakaha Beach Park. Existing site facilities are not suited for long term use, as cages and structures are small and of a temporary nature. The present zoo site is already masterplanned for alternate use as playing fields and open space during forthcoming expansion and improvement of Onekahakaha Beach Park. It would be impossible to achieve the zoo's long term educational and recreational objectives at the existing site.
- 2) Alternative sites: The area of land needed for such a zoo facility, with mixed forest cover complementary to the proposed exhibits, restricts the number of alternative sites available. Also related to size was the need for utilizing State owned land, as acquisition of private property on this scale would further increase overall costs. A site which had adequate acreage, proximity to the Island's major population center, ease of acquisition, access, and compatible surrounding land use in a rural setting, was located along Stainback Highway. The proposed site is adjacent to the County Racetrack and Rodeo facility, within an area masterplanned for integrated recreational development. The site is also located within a rainforest type climate, which was required for development of a zoological garden with a rainforest motif. The proposed site has been designated for zoo development in the County recreational master plan, and has been approved for this use, under a special use permit issued by the State Department of Land and Natural Resources (April, 1972). Alternate large tracts

of State owned land are located in the vicinity of Hilo Airport, however, airport noise would disturb animals and visitors, and access and utilities to the interior are non-existent. Further, much of the land near the airport is under the jurisdiction of other State agencies which have prior plans for their development:

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

Under proposed development plans the site would continue to maintain much of its forest character as zoo exhibits will integrate existing topography and vegetation. A modest long term improvement in forest values would result from a policy of control and selective removal of exotic weeds and replanting of native trees and plants. Both short term and long term use will enhance environmental education and recreational opportunities, and preserve open space.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

This project will commit future generations to this area for educational and recreational activities. This project will commit land, labor and material resources. The construction materials, energy, and land used in this project will be irretrievable. There will be some retrieval of resources (land and materials) when the present temporary zoo at Onekahakaha Beach Park is vacated. Previously committed energy and maintenance costs will be shifted to the new site with relocation of the zoo.

ECONOMIC AND SOCIAL COSTS AND BENEFITS

The cost of the zoo facilities (Phase I) is estimated at 1.3 million dollars (with additional capital expenses of 2 - 2.7 million to be committed over a period of years, in subsequent phases). Relocation of the zoo will permit needed expansion of playing fields and open space at Onekahakaha Beach Park. There will be no displacement of economic activities, residential housing or other activities, associated with development of the proposed site. The present inadequate zoo is one of the most popular attractions operated by the County Department of Parks and Recreation. Relocation and expansion of the County Zoo will facilitate the development of innovative educational exhibits and the implementation of research

and instructional programs emphasizing basic ecological principles, wildlife conservation, and Hawaiian Natural History. The expanded educational and recreational programs will offer significant social benefits to the Big Island Community. The benefits derived from this project, resulting from use of educational and recreational facilities, are intangible, and immeasurable in comparison to capital outlay. Because of the unique exhibits proposed for the new zoo (e.g. the Hawaiian Natural History Exhibit), unavailable at even the larger mainland zoos, the facility is expected to appeal to island visitors as well as local residents. Given the relative lack of tourist related facilities in the Hilo area the new zoo may be expected to contribute to stated community goals of extending visitor length-of-stay in east Hawaii.

REFERENCES

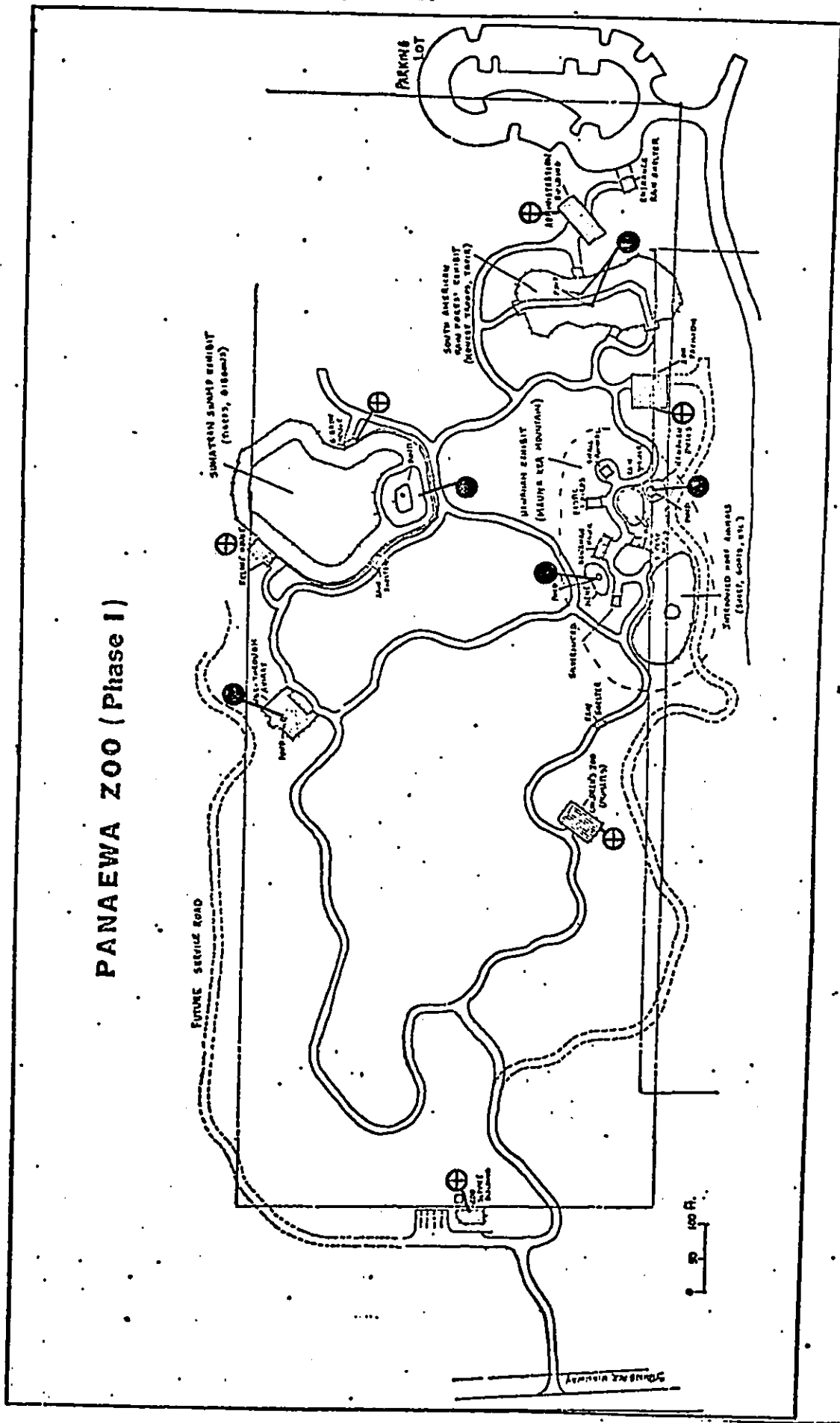
- (1) State Department of Planning and Economic Development, State Comprehensive Outdoor Recreation Plan, December 1971, 300pp.
- (2) Stearns, H., Geology of The State of Hawaii, Pacific Books, 1966, 266pp.
- (3) U.S. Soil Conservation Service, Soil Survey of Island of Hawaii, State of Hawaii, December 1973, 115pp.
- (4) Stearns, H., "Possible Effects on the Hilo Wells of Growing Sugar Cane on Land near Keaau, Hawaii," (Unpublished Consultants Report), 1972, 2pp.
- (5) Department of Land and Natural Resources, Basic Water Resources Data: Island of Hawaii, Report R34, 1970, 188pp.
- (6) Department of Geography, University of Hawaii, Atlas of Hawaii, University of Hawaii Press, 1973, 221pp.
- (7) Tomich, P. Q., Mammals of Hawaii, Bishop Museum Press, Special Pub. #57, 1969, 238pp.

REFERENCES

- (1) State Department of Planning and Economic Development, State Comprehensive Outdoor Recreation Plan, December 1971, 300pp.
- (2) Stearns, H., Geology of The State of Hawaii, Pacific Books, 1966, 266pp.
- (3) U.S. Soil Conservation Service, Soil Survey of Island of Hawaii, State of Hawaii, December 1973, 115pp.
- (4) Stearns, H., "Possible Effects on the Hilo Wells of Growing Sugar Cane on Land near Keaau, Hawaii," (Unpublished Consultants Report), 1972, 2pp.
- (5) Department of Land and Natural Resources, Basic Water Resources Data: Island of Hawaii, Report R34, 1970, 188pp.
- (6) Department of Geography, University of Hawaii, Atlas of Hawaii, University of Hawaii Press, 1973, 221pp.
- (7) Tomich, P. Q., Mammals of Hawaii, Bishop Museum Press, Special Pub. #57, 1969, 238pp.

APPENDIX

FIGURE 1.



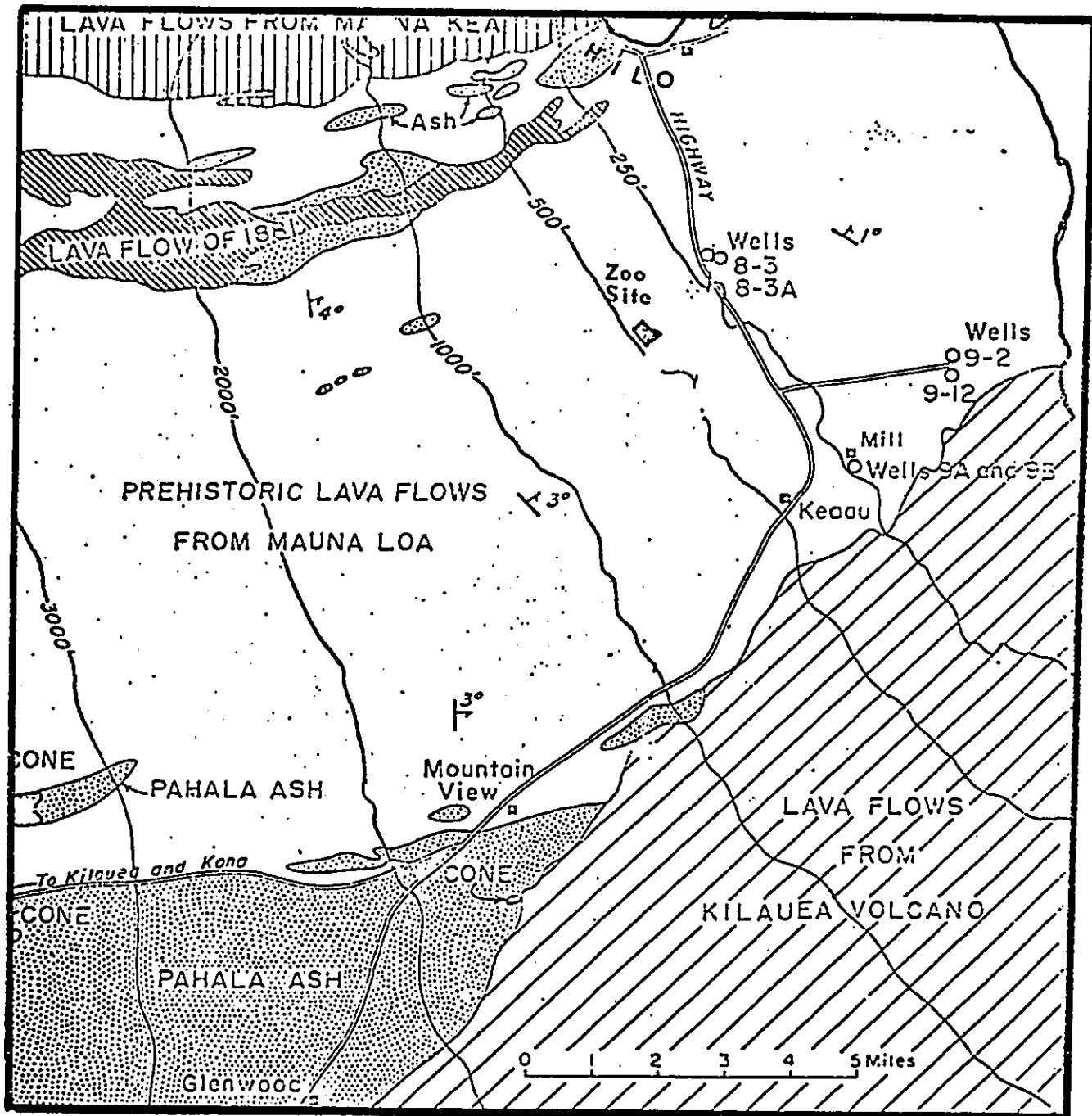
CESSPOOLS ⊕

DRYWELLS ⊙

FIGURE 2.

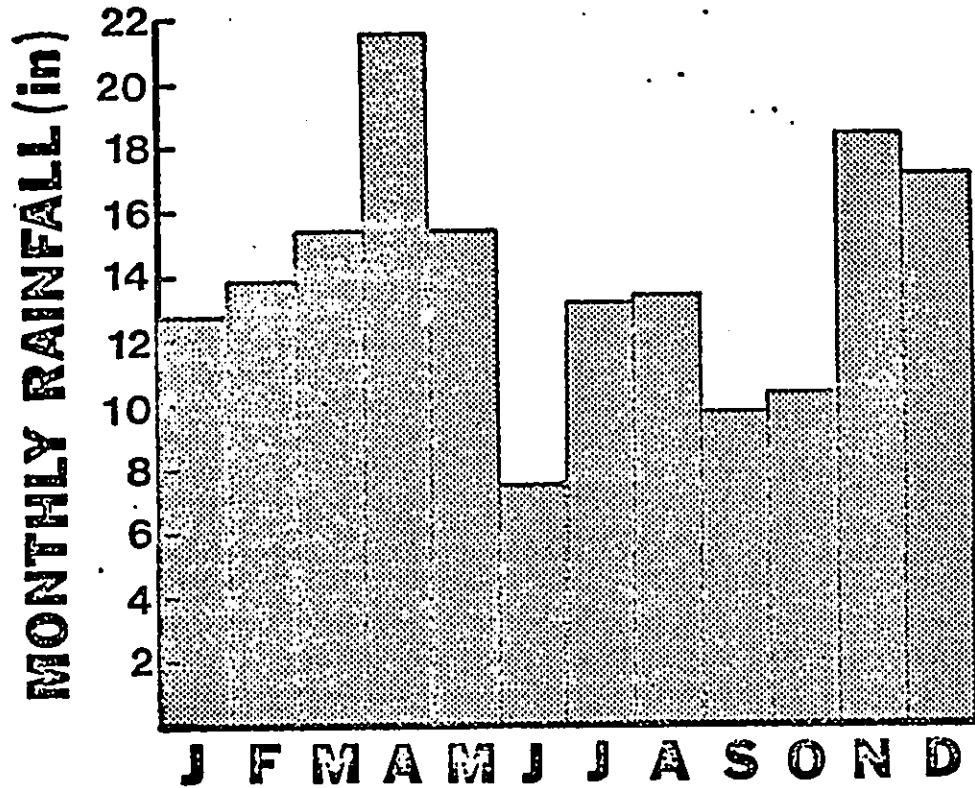


FIGURE 3.

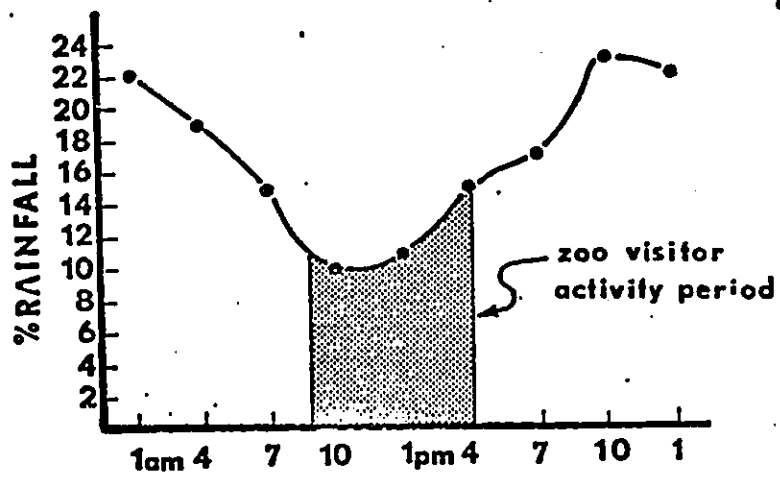


GEOLOGIC MAP OF THE KEAAU AREA, HAWAII
By H. T. Stearns, Consulting Geologist, Mar. 21, 1972

WAIAKEA AG. STATION



a.



b.

FIGURE 4.

- a) Seasonal distribution of rainfall.
- b) Diurnal rainfall frequency, averaged for three hour periods and expressed as a percentage of total rainfall.

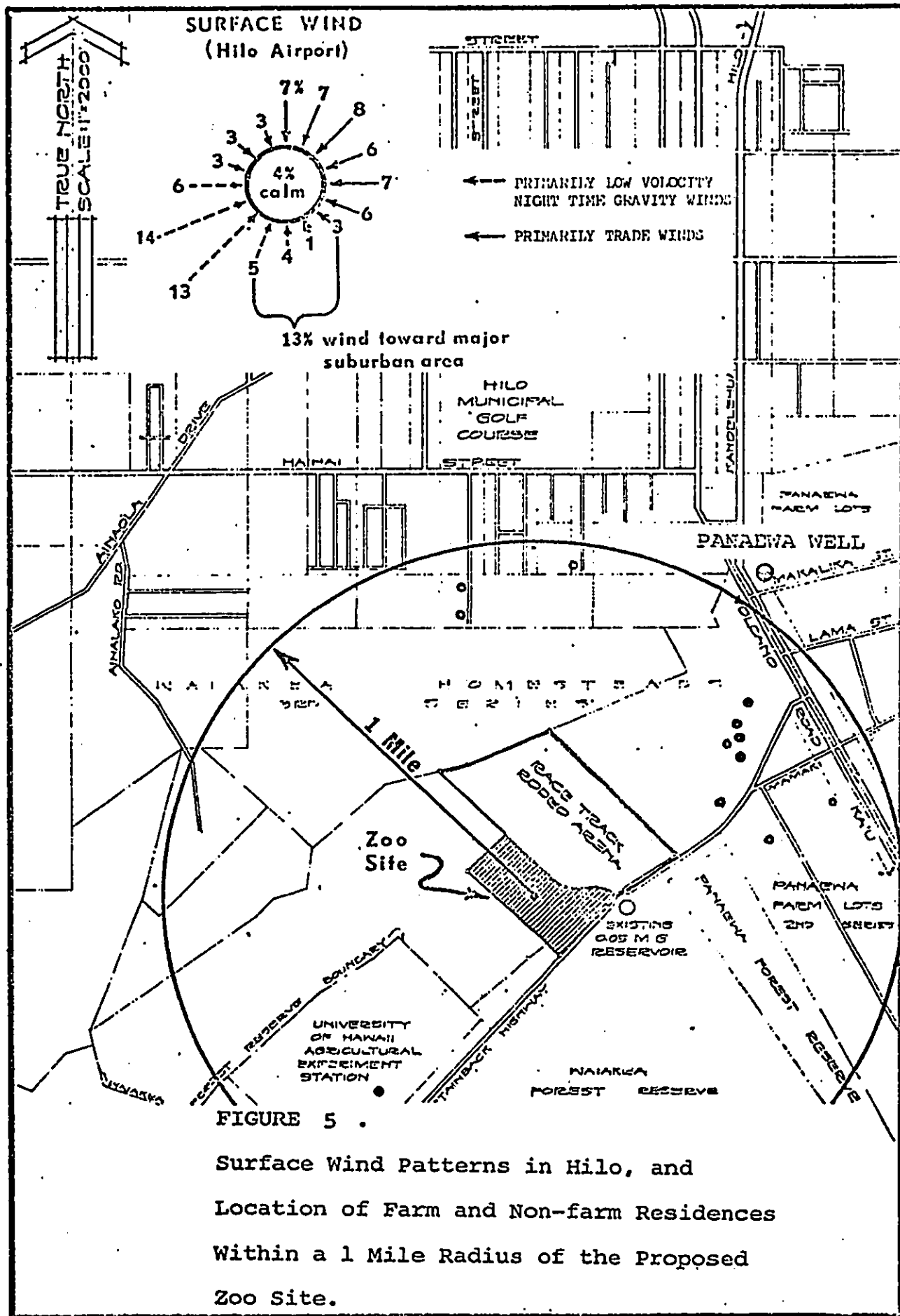


FIGURE 5 .
 Surface Wind Patterns in Hilo, and
 Location of Farm and Non-farm Residences
 Within a 1 Mile Radius of the Proposed
 Zoo Site.

● FARM & NON-FARM RESIDENCES

FIGURE 6.

SURROUNDING ZONING AND LAND USE

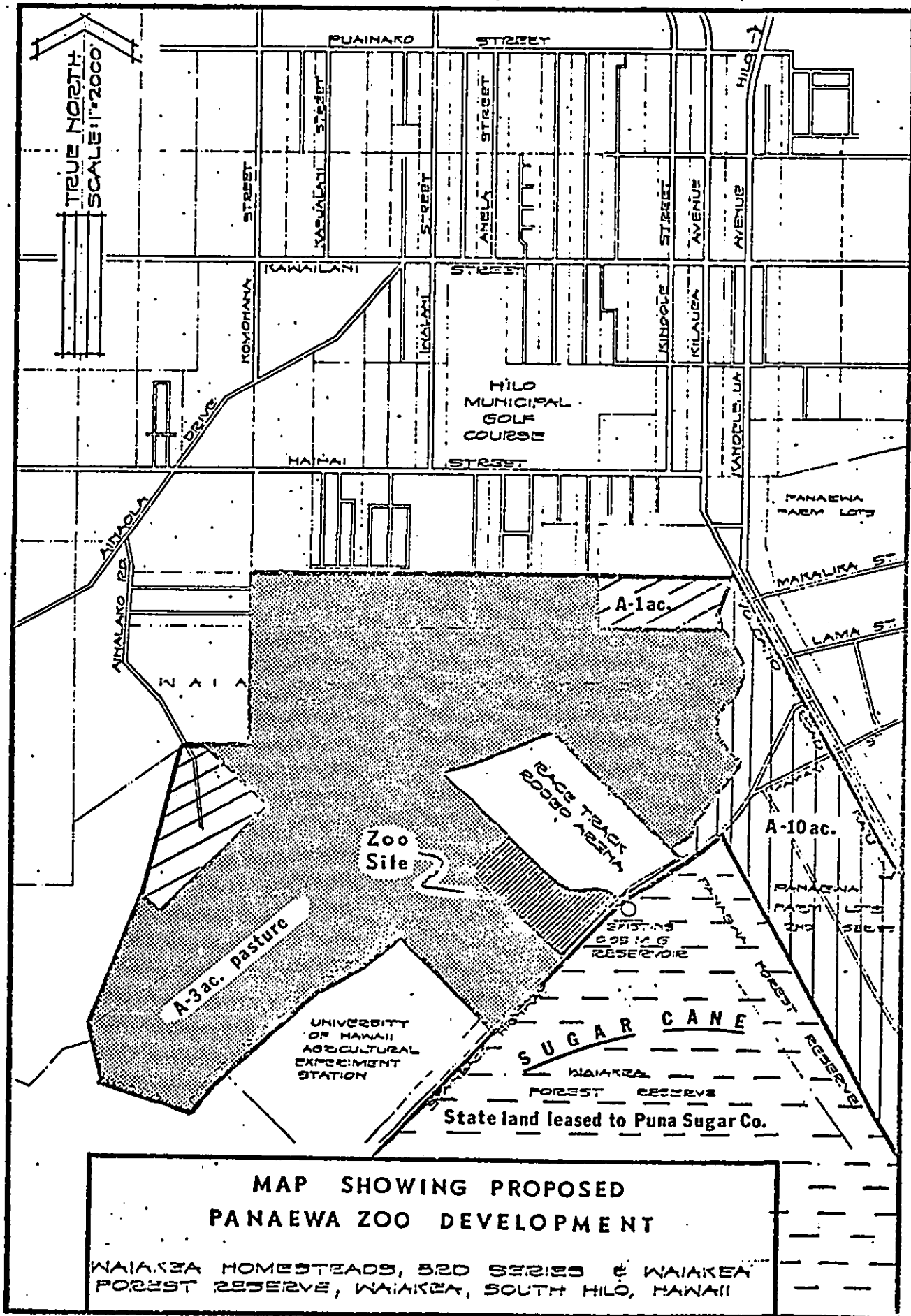


TABLE 1

FLORISTIC CHECKLIST

PANAWEA ZOO SITE

<u>Common or Hawaiian Name</u>	<u>Scientific Name</u>
1. Wililaiki or Christmas berry	X <u>Schinus terebinthifolius</u>
2. Octopus or umbrella tree	X <u>Brassaia actinophylla</u>
3. Kawau or Hawaiian holly	E <u>Ilex anomala</u>
4. African tulip	X <u>Spathodea campanulata</u>
5. Maile hahono	X <u>Ageratum conyzoides</u>
6. Hamakua-pamekini or mist flower	X <u>Ageratina (Eupatorium) riparia</u>
7. None	X <u>Erigeron sp.</u>
8. Sour bush	X <u>Pluchea odorata</u>
9. Beggar tick or stick tight	X <u>Bidens pilosa</u>
10. Wandering Jew or honohono	X <u>Commelina diffusa</u>
11. Sweet potato	X <u>Ipomoea batatas</u>
12. None	X <u>Cyperus sp.</u>
13. Bamboo	X <u>Bamboo sp.</u>
14. Hapu'u i'i	E <u>Cibotium splendens</u>
15. Hapu	E <u>Cibotium sp.</u>
16. Hoi	X <u>Dioscorea sp.</u>
17. Lama or native persimmon	I <u>Diospyros sp.</u>
18. Kukui or candlenut tree	X <u>Aleurites mollucana</u>
19. Macarange	X <u>Macaranea grandifolia</u>
20. False staghorn fern or uluhe	I <u>Dicranopteris linearis</u>
21. Molasses grass	X <u>Melinis minutiflora</u>

<u>Common or Hawaiian Name</u>	<u>Scientific Name</u>
22. Palm grass	X <u>Setaria palmifolia</u>
23. None	X <u>Coleus sp.</u>
24. Avocado	X <u>Persea americana</u>
25. Partridge pea	X <u>Cassia leschenaultiana</u>
26. Pua hilahila or sensitive plant	X <u>Mimosa pudica</u>
27. Kikania - pipili or Spanish clover	X <u>Desmodium uncinatum</u>
28. Parkia (note: uncertain)	X <u>Parkia javanica</u>
29. Ti	X <u>Cordyline terminalis</u>
30. Star of Bethlehem	X <u>Hippobroma longiflora</u>
31. None	X <u>Hibiscus sp.</u>
32. Indian Rhododendron or Malabar melastome	X <u>Melastoma malabathricum</u>
33. None	X <u>Ficus sp.</u>
34. Pride of India or Chinaberry	X <u>Melia azederach</u>
35. None	X <u>Ficus sp.</u>
36. Trumpet tree	X <u>Cecropia peltata</u>
37. Kolea	E <u>Myrsine sp.</u>
38. Southern bayberry or wax myrtle	X <u>Myrica cerifera</u>
39. Guava or kuawa	X <u>Psidium guajava</u>
40. Strawberry guava or waiawi	X <u>Psidium cattleianum</u>
41. Allspice	X <u>Pimenta officinalis</u>
42. Java plum	X <u>Eugenia cumini</u>
43. Ohia lehua	E <u>Metrosideros collina</u>
44. Bamboo orchid	X <u>Arundina bambusifolia</u>
45. Chinese ground orchid	X <u>Phaius tankervillias</u>
46. Malayan ground orchid	X <u>Spathoglottis sp.</u>

<u>Common or Hawaiian Name</u>	<u>Scientific Name</u>
47. Sugar palm	X <u>Arenga pinnata</u>
48. None	X <u>Palm sp.</u>
49. Pandanus or hala	E <u>Pandanus odoratissimus</u>
50. Ie' ie	E <u>Freycinetia arborea</u>
51. Pohapoha	X <u>Passiflora sp.</u>
52. Thimbleberry	X <u>Rubus rosaefolius</u>
53. Kopiko	E <u>Psychotria spp.</u>
54. Maile pilau	X <u>Paederia foetida</u>
55. None	X <u>Melochia umbellata</u>
56. White moho	X <u>Heliocarpus americana</u>
57. Mamaki	E <u>Pipturus sp.</u>
58. Golden dewdrop	X <u>Duranta repens</u>
59. Lantana	X <u>Lantana camara var aculeata</u>
60. False vervain	X <u>Stachytarpheta sp.</u>
61. Awapuhi melemele (yellow ginger)	X <u>Hedychium flavescens</u>
62. Awapuhi keokeo (white ginger)	X <u>Hedychium coronarium</u>
63. Awapuhi kuahiwi (mountain ginger)	X <u>Zingiber zerumbet</u>
64. Gunpowder tree	X <u>Trema orientalis</u>

X = Introduced

I = Indigenous

E = Endemic

TABLE 2

CHECKLIST OF VERTEBRATES

PANAWEA ZOO SITE

The following vertebrates are known to occur in or adjacent to the proposed
Panaewa Zoo site.

	<u>Hawaiian or Common Name</u>	<u>Scientific Name</u>
A. <u>FISH:</u>	None	None
B. <u>AMPHIBIANS:</u>	1. Bullfrog	X <u>Rana sp.</u>
	2. South American Toad	X <u>Bufo marines</u>
C. <u>REPTILES:</u>	None	None
D. <u>BIRDS:</u>	1. Chinese Thrush; Hwa-mei	X <u>Trochalopteron canorum</u>
	2. Rice bird	X <u>Carpodacus mexicanus obscurus</u>
	3. Mynah; Piha'e-keho	X <u>Acridotheres tristis</u>
	4. Cardinal; Ulaula	X <u>Richmondia cardinalis</u>
	5. Japanese White eye; Mejiro	X <u>Zosterops palpebrosus japonicus</u>
	6. Linnet, papaya bird; Ai-nikana	X <u>Carpodacus mexicanus frontalis</u>
	7. Hawaiian Hawk; I'o	(E) <u>Buteo solitarius</u>
	8. Owl; Pueo	E <u>Asio flammeus sandwicensis</u>
	9. English sparrow; Manu liilii	X <u>Passer domesticus</u>
	10. Lace-neck dove; Ekaho	X <u>Streptopelia chinensis</u>
	11. Barred dove	X <u>Geopelia striata striata</u>
	12. Ring-necked pheasant; Kolahala	X <u>Phasianus colchicus torquatus</u>

E. MAMMALS:

Hawaiian or Common Name

Scientific Name

1. Mongoose

X Herpestes auropunctatus
auropunctatus

2. Norway rat

X Rattus norvegicus

3. Polynesian rat; 'iole

X Rattus exulans

4. House mouse

X Mus musculus

X = Exotic

I = Indigenous

E = Endemic

(E) = Endangered Species

Table 3

Checklist of Zoo Animals (Phase I)

<u>Common or Hawaiian Name</u>		<u>Scientific Name</u>
<u>Mammals</u>		
1. Siamang (Gibbon)	(E)	<u>Symphalangus syndactylus</u>
2. Woolly Monkey		<u>Lagothrix lagotricha</u>
3. Black Howler Monkey		<u>Aloutta villosa</u>
4. Capuchin Monkey		<u>Cebus capucinus</u>
5. Rhesus Macaque		<u>Macaca (Rhesus) mulatta</u>
6. Long-tailed Macaque		<u>Macaca irus</u>
7. Sumatran Tiger	(E)	<u>Panthera tigris</u>
8. South American Tapir	(E)	<u>Tapirus terrestris</u>
9. Agouti		<u>Dasyprocta punctata</u>
10. Malayan Sun Bear		<u>Helarctos malayensis</u>
11. African Lion		<u>Panthero leo</u>
12. Giant Anteater		<u>Myrmecophaga tridactyla</u>
13. Polynesian Rat		<u>Rattus exulans hawaiiensis</u>
14. Mongoose		<u>Herpestes auropunctatus</u>
15. Hawaiian Bat	(E)	<u>Lasiurus cinereus semotus</u>
16. Coatimundi		<u>Nasua narica</u>
17. Raccoon		<u>Procyon lotor</u>
18. Ringtailed Lemur	(E)	<u>Lemur catta</u>
19. Feral Hawaiian Goats		<u>Capra hicrus</u>
20. Feral Hawaiian Sheep		<u>Ovis aries</u>
21. Wild Pigs		<u>Sus scrofa</u>

<u>Common or Hawaiian Name</u>		<u>Scientific Name</u>
<u>Birds</u>		
22. Hawaiian Hawk	(E)	<u>Buteo solitarius</u>
23. Hawaiian Owl		<u>Asio flammeus</u>
24. Hawaiian Duck		<u>Anas platyrhynchos wyvilliana</u>
25. Nene	(E)	<u>Branta sandvicensis</u>
26. Amakihi		<u>Loxops virens</u>
27. Apapane		<u>Himatione sanguinea</u>
28. Mynah Bird		<u>Acridotheres tristis tristis</u>
29. Rice Bird		<u>Euphorbia lactea</u>
30. Cardinal		<u>Richmondia cardinalis</u>
<u>Reptiles</u>		
31. American Alligator	(E)	<u>Alligator mississippiensis</u>
32. American Crocodile		<u>Crocodylus acutus</u>
33. South American Iguana		<u>Amblyrhynchus cristatus</u>
34. South American Red-foot Tortoise		<u>Testudo denticulata</u>
35. Galapagos Tortoise	(E)	<u>Geochelone elephantopus</u>
36. Hawksbill Sea Turtle	(E)	<u>Eretmochelys imbricata</u>

NOTE: Importation, capture and/or shipment (intrastate or interstate) of all livestock subject to approval by relevant State and Federal agencies.

(E) = Endangered Species, acquisition subject to Federal (USDI and USDA) approval.

Table 4

WASTE WATER LOAD FACTORS - PANAWEA ZOO

SUBSTRATE PERMEABILITY: Papai series organic soil overlies prehistoric aa lava at the project site. The U.S. Soil Conservation Service has determined substrate permeability at 6.3-20 inches/hr.

CESSPOOL LOAD: The use of 6 cesspools is proposed to handle human and animal wastes at the project site.

<u>Cesspool</u>	<u>Building</u>	<u>Building No. (blueprints)</u>	<u>Load Factor (Gal/day/capita)</u>	<u>x Users (estimated max.)</u>	<u>total load (gal/day)</u>
1	Administration	2	20	3	60
2	Utility-service	18	20	3	60
3	Zoo pavilion	5	5	200	1,000
4	Gibbon house (primate quarters)	13	25	2 (cages)	50
5	Feline house	14	50	3 (cages)	150
6	Children's Zoo	17	50	4 (cages)	200

Total daily waste water 1,520 gal/day

Note: This 1520 gal/day is spread among 6 cesspools, over an area of 30 acres. Current Department of Health standards allow a maximum of 8 residential units/acre serviced by cesspools. At an estimated load factor of 100 gal/capita x 4 residents per unit x 8 units per acre, current allowable waste discharge is 3200 gal/acre/day. Based on our 30 acre area, the 1520 gal/day total waste load equals 50 gal/day/acre, or 1.56% of the current maximum allowable load for cesspool discharge.

DRYWELL SUMPS: It is proposed that daylighted pond water (including rainwater and runoff into ponds) will be periodically drained into drywell sumps. The 6 ponds with a total capacity of 30,400 gal will be serviced by individual drywells.

<u>Drywell</u>	<u>Pond</u>	<u>Pond code (blueprints)</u>	<u>Capacity (gal)</u>	<u>Draining/Refill Interval</u>	<u>Water Use (gal/day)</u>
1	Tiger cage	"A"	28,000	Twice yearly	153
2	Nene pen	"B"	100	Daily	100
3	Aviary	"F"	100	Daily	100
4	Duck pond	"C"	900	Weekly	128
5	Rainforest	"D"	900	Weekly	128
6	Rainforest	"E"	400	Weekly	57

Total 666 gal/day

Note: This 666 gal/day is spread among 6 drywell sumps over an area of 30 acres, equaling 22 gal/day/acre or 0.68% of the current maximum allowable per acre load for cesspools.

CORRESPONDENCE

GEORGE R. ARIYOSHI
GOVERNOR



RICHARD E. MARLAND, PH.D.
DIRECTOR

TELEPHONE NO.
548-6915

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

April 28, 1975

The Honorable Herbert T. Matayoshi
Mayor
County of Hawaii
County Building
Hilo, Hawaii 96720

ATTN: Mr. Juvik, Department of Parks and Recreation

Dear Mayor Matayoshi,

SUBJECT: Draft Environmental Impact Statement for Panaewa
Zoological Garden, Panaewa, South Hilo, Hawaii

This Office has completed its review of the subject EIS. As of this date, we have received a total of eleven (11) comments, nine (9) of these were previously forwarded to you. For your convenience, a list of all commentators as well as the remaining comments are attached.

Provided below is a brief summary of this Office's comments.

COMMENTS

We hope that the conditions of the CDUA will be waived to permit a public refreshment concession. This would be of great benefit to the zoo visitors.

Was the study by Harold Stearns (1972) done only for the 1,000 acres of Waiakea Forest Reserve across Stainback Highway? Or was the proposed zoo site also included in the study?

This Office is generally agreeable to the facilities and procedures being proposed to reduce the risk of ground water contamination. However, we recommend that your efforts to protect the ground water supply be closely coordinated with County of Hawaii's Department of Water Supply and the State's Department of Health.

*copy given to
Juvik*

Page 2

Please note that the U.S. Army Engineering Division's September 1970, Report R37, indicates the project site is subject to sheet flow damages. The EIS seems to say otherwise. We suggest that this discrepancy be looked into.

RECOMMENDATIONS

For brevity, we have not summarized each agency's comments. We recommend that they each be given individual concern with written responses sent to them indicating how specific concerns were considered, evaluated, and disposed. This Office would appreciate a copy of these responses.

For the final EIS, we recommend that: 1) all comments and your responses be incorporated to the final EIS and 2) a copy of the final EIS be sent to those individuals who provided substantive comments to the draft EIS.

Thank you for the opportunity to review the subject draft environmental impact statement. We sincerely look forward to the final environmental impact statement.

Sincerely,



Richard E. Marland
Director

Attachments

LIST OF COMMENTORS

DATE OF RECEIPT

STATE

Department of Agriculture	April 3, 1975
*Department of Planning and Economic Development	April 4, 1975
Department of Health	April 21, 1975
*Department of Transportation	April 24, 1975

FEDERAL

Bureau of Sport Fisheries and Wildlife	April 14, 1975
*Department of the Air Force	April 14, 1975
U.S. Army Engineering Division	April 21, 1975
*Department of the Army	April 24, 1975

COUNTY OF HAWAII

*Department of Public Works	April 2, 1975
*Department of Water Supply	April 2, 1975

UNIVERSITY OF HAWAII

Environmental Center	April 22, 1975
----------------------	----------------

*No comments



DEPARTMENT OF PARKS & RECREATION
COUNTY OF HAWAII

Herbert Matayoshi, Mayor
Milton Hakoda, Director

May 8, 1975

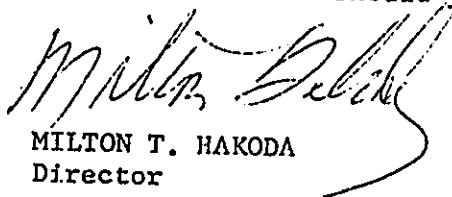
Dr. Richard E. Marland, Director
Office of Environmental Quality Control
State of Hawaii
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

RE: Final EIS for Panaewa Zoological Garden

We appreciate your prompt handling of our Draft EIS for the Panaewa Zoological Garden. Comments and recommendations in your letter of April 28, 1975, along with those of other reviewers, have been incorporated in the preparation of our Final EIS for the Panaewa Zoological Garden. Enclosed please find 20 copies.

Concerning your question relative to the scope of Harold Stearns Study (1972), while dealing specifically with a 1,000 acre parcel lying adjacent to the zoo site, the research dealt in general with the Panaewa forest area (including the zoo site) and to the extent that soils, geology and vegetation are similar throughout the area, his conclusions apply to the zoo site. In addition, orientation and distance from the Panaewa Well is similar for both sites (see Figures 5-6, Final EIS).

Please contact us should you have any additional questions or comments.


MILTON T. HAKODA
Director

encs.

EDWARD K. HARADA
MAYOR

EDWARD K. HARADA
CHIEF ENGINEER



BUREAUS AND DIVISIONS:
AUTOMOTIVE EQUIPMENT & MOTOR POOL
BUILDING CONSTRUCTION AND INSPECTION
PLANS AND SURVEYS
ROAD CONSTRUCTION AND MAINTENANCE
SEWERS AND SANITATION
TRAFFIC SAFETY AND CONTROL

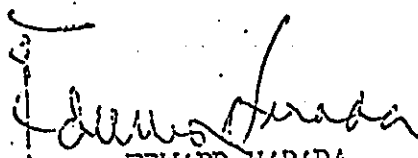
COUNTY OF HAWAII
DEPARTMENT OF PUBLIC WORKS
25 AUPUNI STREET
HILO, HAWAII 96720

March 31, 1975

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

SUBJECT: DRAFT E.I.S. - PANAEWA ZOOLOGICAL GARDEN
Panaewa, South Hilo, Hawaii

Thank you for the subject draft copy for our review. This department is in accord with the project.


EDWARD HARADA
Chief Engineer

cc: Mayor
Parks & Recreation Department
Planning Department

GEORGE D. HIRAYASHI
GOVERNOR



JOHN FARIAS, JR.
CHAIRMAN, BOARD OF AGRICULTURE

YUKIO KITAGAWA
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF AGRICULTURE
1420 SO. KING STREET
HONOLULU, HAWAII 96814

April 2, 1975

MEMORANDUM

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

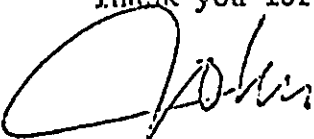
Subject: Draft EIS for Panaewa Zoological Garden
Panaewa, South Hilo, Hawaii

The Department of Agriculture has reviewed the statement for content and agricultural impact. Generally, the statement is well drafted and complete. The only significant agricultural impact relates to security measures for control of introduced species. Full compliance with plant and animal quarantine regulations is expected.

Protection of basal water quality will be a major concern. Reference is made to the report of Harold Stearns (1972) which relates to the potential intrusion of agricultural chemicals. It should be noted that increased urban densities will have a greater impact than agriculture. Agricultural chemicals are generally applied to achieve full utilization in the vegetative growth. Small losses to the ground or surface water would increase the cost of operations.

In contrast, cesspools and others waste handling systems are not designed to utilize wastes. Increasing use of the Panaewa area for recreation and low density urban development can have a far more significant impact than agricultural use. Careful consideration of waste treatment is noted in the statement. The type and quantity of waste should be projected to enable an assessment of future cumulative impact.

Thank you for the opportunity to review this matter.


John Farias, Jr.
Chairman, Board of Agriculture

JF:dsh



DEPARTMENT OF PARKS & RECREATION

COUNTY OF HAWAII

Herbert Matayoshi, Mayor

Milton Hakoda, Director

May 8, 1975

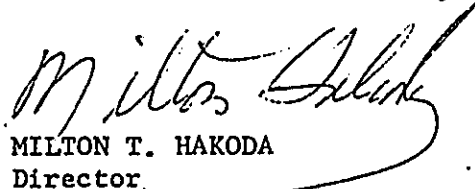
Mr. John Farias, Jr., Chairman
Board of Agriculture
1428 South King Street
Honolulu, Hawaii 96814

RE: Draft EIS for Panaewa Zoological Garden

We appreciate your comments on our Draft EIS for the Panaewa Zoological Garden. Enclosed is a copy of our final EIS for the project incorporating revisions suggested by various reviewing agencies.

With respect to your concern for the protection of basal water quality, please direct your attention to Table 4 of the final EIS which project waste water load for the zoo project. We have met with the Department of Health regarding waste water disposal methods. Due to the generally low load factors, they have agreed in principle to our waste disposal plan incorporating both cess-pools and drywells. This plan has also been approved by the County Department of Water Supply.

Should you have any additional questions or comments, please feel free to contact us directly.


MILTON T. HAKODA
Director

encls.



DEPARTMENT OF PLANNING
AND ECONOMIC DEVELOPMENT

GEORGE R. ANIYOSII
Governor

HIDEYO KOGU
Director

FRANK SKRIVANEK
Deputy Director

Kamamahu Building, 250 South King St., Honolulu, Hawaii • Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

April 2, 1975

Ref. No. 3346

MEMORANDUM

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

FROM: Hideto Kono, Director *[Signature]*

SUBJECT: Draft EIS for Panaewa Zoological Garden, Panaewa,
South Hilo, Hawaii

We have reviewed this draft statement and find that it has adequately assessed the probable environmental effects that can be anticipated as a result of the proposed project.

We would also like to indicate our concurrence with the proposed development since it is consistent with the objectives of the State Comprehensive Outdoor Recreation Plan.

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



United States Department of the Interior

FISH AND WILDLIFE SERVICE

~~NUMERICAL DATA FOR THE YEAR 1974~~

Division of River Basin Studies

821 Mililani Street

Honolulu, Hawaii 96813

Reference: RB

April 10, 1975

Interim Director
Office of Environmental Quality Control
550 Halekaiwila Street, Room 301
Honolulu, Hawaii 96813

Dear Sir:

We have reviewed the draft Environmental Impact Statement for Panaewa Zoological Garden, Panaewa, South Hilo, Hawaii and offer the following comments:

Exotic Animals and Animal Diseases (second paragraph, page 12). The statement should specifically mention that Federal and State authorization would be required to acquire migratory birds or threatened and endangered species. We further recommend that the animals so designated be identified in Table 3.

We appreciate the opportunity to comment on the subject draft Environmental Impact Statement.

Sincerely yours,

Maurice H. Taylor

Maurice H. Taylor
Area Supervisor

cc: Reg. Dir., RB
Portland



DEPARTMENT OF PARKS & RECREATION

COUNTY OF HAWAII

Herbert Matayoshi, Mayor

Milton Hakoda, Director

May 8, 1975

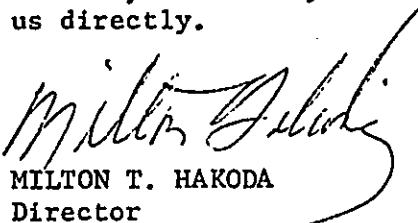
Mr. Maurice H. Taylor
Area Supervisor
Fish and Wildlife Service
821 Mililani Street
Honolulu, Hawaii 96813

RE: Draft EIS for Panaewa Zoological Garden

We appreciate your comments on our Draft EIS for the Panaewa Zoo. Enclosed is a copy of our final EIS for the project, incorporating revisions suggested in your letter of April 10, 1975, along with those of other reviewers.

While not specifically stated in the Draft EIS, compliance with both Federal and State regulations governing endangered and migratory species, as well as general import and post entry controls, was implicit. We have added a compliance statement to the final EIS and identified those species covered by endangered species legislation.

Should you have any additional questions, please feel free to contact us directly.


MILTON T. HAKODA
Director

encs.

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII



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

April 15, 1975

GEORGE A. L. YUEN
DIRECTOR OF HEALTH
Audrey W. Mertz, M.D., M.P.H.
Deputy Director of Health
Henry N. Thompson, M.A.
Deputy Director of Health
James S. Kumagai, Ph.D., P.E.
Deputy Director of Health

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

MEMORANDUM

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

From: Deputy Director for Environmental Health

Subject: Draft Environmental Impact Statement (EIS) for Panaewa Zoo, Panaewa,
South Hilo, Hawaii

Thank you for allowing us to review and comment on the subject EIS.

The following is a summary of staff comments and concerns:

(a) Sanitation

- (1) Measures shown on plans for wastewater disposal seem to be inadequate and undesigned. It should be designed by a competent sanitary engineer based on Department of Health approved, tested design parameters (percolation, effluent quality and volume, etc.).
- (2) Solid waste disposal is unsolved. Detailed plans required for collection, handling, and disposal.
- (3) Septic tanks may alleviate some of the problems.
- (4) Aerobic wastewater treatment or recycling of the wastes would be the most proper solution.

(b) Pollution

- (1) Possible contamination of Panaewa Wells is not dealt with sufficiently. What will be the impact on drinking water from Panaewa Wells if contamination will occur? (Biological, chemical, turbidity, etc.)
- (2) What will be the impact of possible odor dispersion to habitable areas. Wind data referred to is incorrect.

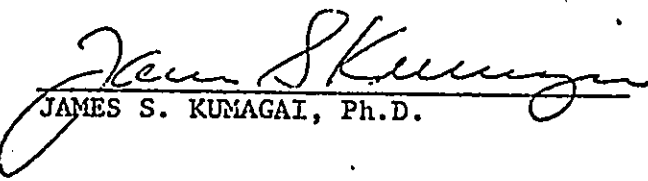
April 15, 1975

(c) Vector Control

- (1) It is not dealt with in the impact statement. Though there are many potential dangers involved, if not solved, such as fly breeding in animal droppings, mosquito breeding in ponds, rodent population increase, etc., what are the insurances against vector problems, and what is the impact if those develop?

(d) Design Problems

- (1) Is the water supply adequate?
- (2) No daylighting of any wastewater can be permitted.
- (3) Attached notes shall be included in the plans or specifications.
- (4) Wastewater handling and disposal system has to be designed.
- (5) Check building structure connection details for wind uplift and seismic forces.
- (6) Check pole foundations.
- (7) Check sliding on retaining walls.


JAMES S. KUMAGAI, Ph.D.

Attachment

April 15, 1975

(c) Vector Control

- (1) It is not dealt with in the impact statement. Though there are many potential dangers involved, if not solved, such as fly breeding in animal droppings, mosquito breeding in ponds, rodent population increase, etc., what are the insurances against vector problems, and what is the impact if those develop?

(d) Design Problems

- (1) Is the water supply adequate?
- (2) No daylighting of any wastewater can be permitted.
- (3) Attached notes shall be included in the plans or specifications.
- (4) Wastewater handling and disposal system has to be designed.
- (5) Check building structure connection details for wind uplift and seismic forces.
- (6) Check pole foundations.
- (7) Check sliding on retaining walls.


JAMES S. KUMAGAI, Ph.D.

Attachment



DEPARTMENT OF PARKS & RECREATION
COUNTY OF HAWAII

Herbert Matayoshi, Mayor
Milton Hakoda, Director

May 8, 1975

Dr. James S. Kumagai
Deputy Director for Environmental Health
State Department of Health
P. O. Box 3378
Honolulu, Hawaii 96801

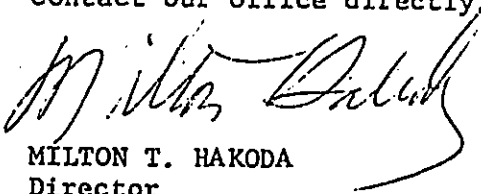
RE: Draft EIS for Panaewa Zoological Garden

We appreciate your indepth review of our Draft EIS for the Panaewa Zoological Garden. With respect to potential sanitation and pollution problems outlined in your letter of April 15, 1975, additional data on substrate permeability and projected waste water load were assembled. This material is presented in Table 4 of the final EIS (copy enclosed). A meeting with the Hawaii District Environmental Engineer (with Honolulu Environmental Health officials also attending) was held on April 30, 1975. An upgraded and revised waste disposal system was presented and approved, in principle, by the District Engineer. This system incorporated a combination of cesspools and drywells (for daylighted pond water) with such facilities diagrammed in Figure I and discussed on page 10 of the final EIS.

At the present Onekahakaha Children's Zoo, we have an effective vector and odor control problem (currently monitored by the Department of Health) which will be continued at the new zoo (see page 12 of the final EIS).

With respect to design problems enumerated in your letter, these have been discussed with your District Engineer and modified as required.

Should you have additional questions or comments, please feel free to contact our office directly.



MILTON T. HAKODA
Director

encs.



DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
BLDG. 230, FT. SHAFTER
APO SAN FRANCISCO 96558

PODED-P

18 April 1975

Dr. Richard E. Marland, Director
Office of Environmental Quality Control
State of Hawaii
550 Halekauwila Street
Honolulu, Hawaii 96813

Dear Dr. Marland:


We have reviewed the draft environmental statement for Panaewa Zoological Garden and have the following comments to offer.

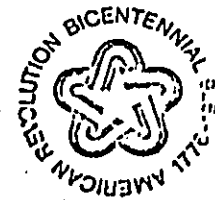
a. According to Flood Hazard Information, island of Hawaii, Report R37, September 1970, prepared by the Honolulu District, U.S. Army Corps of Engineers, the project region is subject to sheet flow damages. We note, however, that the statement indicates that overland runoff is absent, even during periods of intense and prolonged rainfall.

b. The Introduction section, page 1, states that a total of 172 acres of State land at Panaewa have been designated for the development of an integrated recreational complex, including a racetrack, rodeo arena, zoological-botanical garden, and other recreational facilities. The completed racetrack and rodeo complex occupies 50 acres, and the zoo is expected to occupy approximately 30 acres of this area. A brief discussion of the planned use for the remaining acreage ("other recreational facilities") should be included to indicate the total extent of development in the Conservation District area and the potential cumulative effects of total development.

Thank you for the opportunity to review the draft statement.

Sincerely yours,

for 
KISUK CHEUNG
Chief, Engineering Division





DEPARTMENT OF PARKS & RECREATION

COUNTY OF HAWAII

Herbert Matayoshi, Mayor

Milton Hakoda, Director

May 8, 1975

Mr. Kisuk Cheung, Chief
Engineering Division
U.S. Army Engineer District, Honolulu
Bldg. 230, Fort Shafter
APO San Francisco 96558

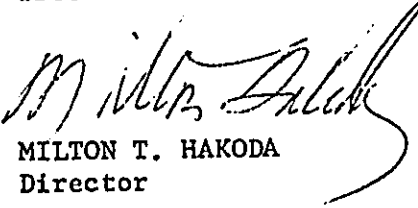
RE: Draft EIS for Panaewa Zoological Garden

We appreciate your comments on our Draft EIS for the Panaewa Zoological Garden. Enclosed is a copy of our final EIS; incorporating revisions suggested in your letter of April 18, 1975, along with those of other reviewers.

"Other recreational facilities" proposed for the 172 acre site include, primarily, the upgrading of rodeo racetrack facilities (covered grandstand, polo field, paddocks, etc.), the development of bridal paths in much of the remaining area, and establishment of a nursery and botanical garden.

With respect to the potential for sheet flow erosion or flood damage, the subject area is characterized by substrate of thin Papai Series soil overlaying a'ala lava. Soil permeability is very high at 6-20 in/hr. (SSC-Soil Survey Island of Hawaii, 1973). The extremely porous nature of the substrate precludes sheet flow in this specific area. None has been observed at the site even during periods of intense and prolonged rainfall.

Should you have additional comments or questions, please feel free to contact us directly.


MILTON T. HAKODA
Director

encs.

GEORGE R. ARIYOSHI
GOVERNOR



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

E. ALVEY WRIGHT
DIRECTOR
DEPUTY DIRECTORS
DOUGLAS S. SAKAMOTO
WALLACE AOKI

IN REPLY REFER TO:

April 21, 1975

ATP 8.3054

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

Dear Dr. Marland:

Subject: Draft EIS, Panaewa Zoological Garden
Panaewa, South Hilo, Hawaii

In reference to the subject environmental statement, we have no
comments to offer as it relates to and affects our transportation
system.

Sincerely,

E. Alvey Wright
E. ALVEY WRIGHT
Director



University of Hawaii at Manoa

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

Office of the Director

April 22, 1975

MEMORANDUM

TO: Richard E. Marland
FROM: Jerry M. Johnson
RE: Review of DEIS for Panaewa Zoological Garden

The Environmental Center review of the above cited DEIS has been prepared by the following members of the University faculty and staff: Charles Lamoureux, Botany Department, Jerry Johnson, Jacquelin N. Miller and Richard Scudder, Environmental Center.

The Department of Parks and Recreation, County of Hawaii, should be commended for their concise yet thorough preparation of this DEIS. In general the DEIS quite adequately describes the environmental impact of the proposed project. We offer a few minor comments on the text and some suggested corrections in the Floristic and Vertebrate checklists.

Pg. 3

The modification of the Conservation District Use Application to permit a public refreshment concession in the second phase of zoo construction would appear to be an appropriate and valid activity.

From the long-term view, will the proposed 30 acre site be entirely adequate? What is the potential for expansion onto adjacent properties should the need arise in the future?

Pg. 4

Line 14 should read "potable" not "portable."

Pg. 6

We particularly appreciate the straightforward and concise treatment of the "Fauna" section.

Pg. 7

A noise reducing buffer zone of dense vegetation should be considered for the zoo grounds adjacent to the race track and rodeo arena.

Pgs. 9, 10

The potential ground water contamination problem and the methods suggested to assure a minimal risk are appropriately recognized and discussed.

Appendix

We note in figure 1 that numerous rain shelters will be provided. Will these be sufficiently large to provide shelter for potential school-class zoo tour groups?

The following corrections should be made in tables 1 and 2:

Table 1: Floristic checklist

- 5. Ageratum conyzoides
- 11. X (not I)
- 16. X (not I)
- 18. X (not I) Aleurites moluccana
- 19. Macaranga
- 20. I (not E)
- 29. X (not I)
- 50. Freycinetia
- 63. X (not I)

Table 2, Checklist of Vertebrates, the Polynesian rat should be indicated as X (not I).

Table 3 gives a checklist of zoo animals to be obtained in phase I. Which of these are endangered species? Will they be obtained from other Zoos or from wild stocks?

We appreciate the opportunity to review this DEIS.


Jerry W. Johnson
Acting Director



DEPARTMENT OF PARKS & RECREATION

COUNTY OF HAWAII

Herbert Matayoshi, Mayor

Milton Hakoda, Director

May 8, 1975

Mr. Jerry M. Johnson
University of Hawaii at Manoa
Environmental Center
Mail Bldg. 10
2540 Maile Way
Honolulu, Hawaii 96822

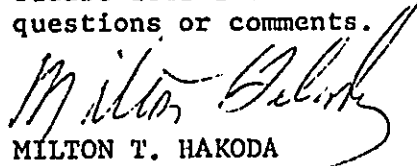
RE: Draft EIS for Panaewa Zoological Garden

We appreciate your thorough review of our Draft EIS for the Panaewa Zoological Garden. Your several corrections have been incorporated into our final EIS, a copy of which is here included.

Regarding specific comments in your letter of April 22, 1975:

1. There is potential for expansion of the zoo from its present 30 acre size into adjacent portions of the 172 acre Panaewa site.
2. A noise reducing buffer of vegetation will be maintained between the zoo and adjacent race track and rodeo arena.
3. Proposed rainshelters will be adequate for school class tour groups. Such guided tour groups will be kept at relatively small size (15-20) to increase interaction and effectiveness.
4. Endangered species designations have been included in Table 3. Acquisition of same will be subject to USDI permit and, in most cases, will be acquired as surplus stock from successful captive breeding programs at other zoos.
5. Note also the addition of Table 4 and relevant text materials dealing with waste water disposal.

Please feel free to contact us directly should you have additional questions or comments.


MILTON T. HAKODA
Director



DEPARTMENT OF THE ARMY
HEADQUARTERS UNITED STATES ARMY SUPPORT COMMAND, HAWAII
APO SAN FRANCISCO 96550

22 APR 1975

AFZV-SG-EC

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

Dear Dr. Marland:

The following Draft Environmental Impact Statements were reviewed by our office:

1. Wailuku-Alemaio Watershed Project, Hawaii County, Hawaii.
2. Ewa Beach Sewer System.
3. Existing Operation of the UH Observatory and the Construction and Operation of the New IRTF and Ukirt Observatories, Mauna Kea Science Reserve, County of Hawaii, Hawaii.
- ✓ 4. Panaewa Zoological Garden, Panaewa, South Hilo, Hawaii.
- ✗ 5. Lilipuna Road-Ka-Hanahou Circle Relief Drain.

We have no comments to offer at this time.

We thank you for the opportunity to review these statements.

Sincerely,

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



COUNTY OF
HAWAII

PLANNING DEPARTMENT

25 AUPUNI STREET • HILO, HAWAII 96720

HERBERT T. MATAYOSHI
Mayor
RAYMOND H. SUEFUJI
Director

April 23, 1975

Dr. Richard E. Marland
Director, Office of Environmental Quality Control
550 Halekauwila Street
Honolulu, Hawaii 96813

Re: Draft Environmental Impact Statement
Panaewa Zoological Garden
Panaewa, South Hilo, Hawaii
TMK: 2-4-4:1

Thank you for the opportunity to review the above. Our concerns have already been expressed and met prior to this documents submittal for statewide review. We have no further comments to offer.

A handwritten signature in cursive script, appearing to read "Raymond Suefuji".

RAYMOND SUEFUJI
Director

RN:lqv

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

440 Alexander Young Building, Honolulu, HI 96813

April 25, 1975

Dr. Richard E. Marland
Office of Environmental
Quality Control
550 Halekauwila St., Rm. 301
Honolulu, HI 96813

Dear Dr. Marland:

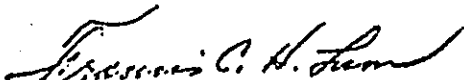
Subject: Environmental Impact Statement (Draft) for Panaewa
Zoological Garden, Panaewa, South Hilo, Hawaii

We have reviewed the above-mentioned draft environmental statement
in this office.

We have no comments to offer.

Thank you for the opportunity to review this statement.

Sincerely,


Francis C. H. Lum
State Conservationist

