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STATE OF HAWAII

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DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

November 20, 2001

Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Subject: Environmental Assessment, Paukukalo Preschool, TMK (2) 3-3-5: 86(por) and 87 (por), Paukukalo, Maui

Dear Ms. Salmonson:

The Department of Hawaiian Home Lands has reviewed the Environmental Assessment for the subject project and agrees with a Finding of No Significant Impact (FONSI) determination. Please publish a FONSI for this project in the December 8, 2001 OEQC Environmental Notice.

The completed OEQC Publication Form and four copies of the final Environmental Assessment are being sent with the original of this letter from Munekiyo & Hiraga, Inc.

Should you have any questions, please call Carolyn Darr, Land Agent, Land Management Division at 587-6430.

Aloha,

Raynard C. Soon, Chairman
Hawaiian Homes Commission

c: Kamehameha Schools
Munekiyo & Hirage, Inc.

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Final Environmental Assessment

PAUKUKALO PRESCHOOL TWO-CLASSROOM BUILDING

Prepared for:

Kamehameha Schools

November 2001

MUNEKIYO & HIRAGA, INC.

Final
Environmental Assessment

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Chapter I

Project Overview

I. PROJECT OVERVIEW

A. PROPERTY LOCATION, EXISTING USE, AND LAND OWNERSHIP

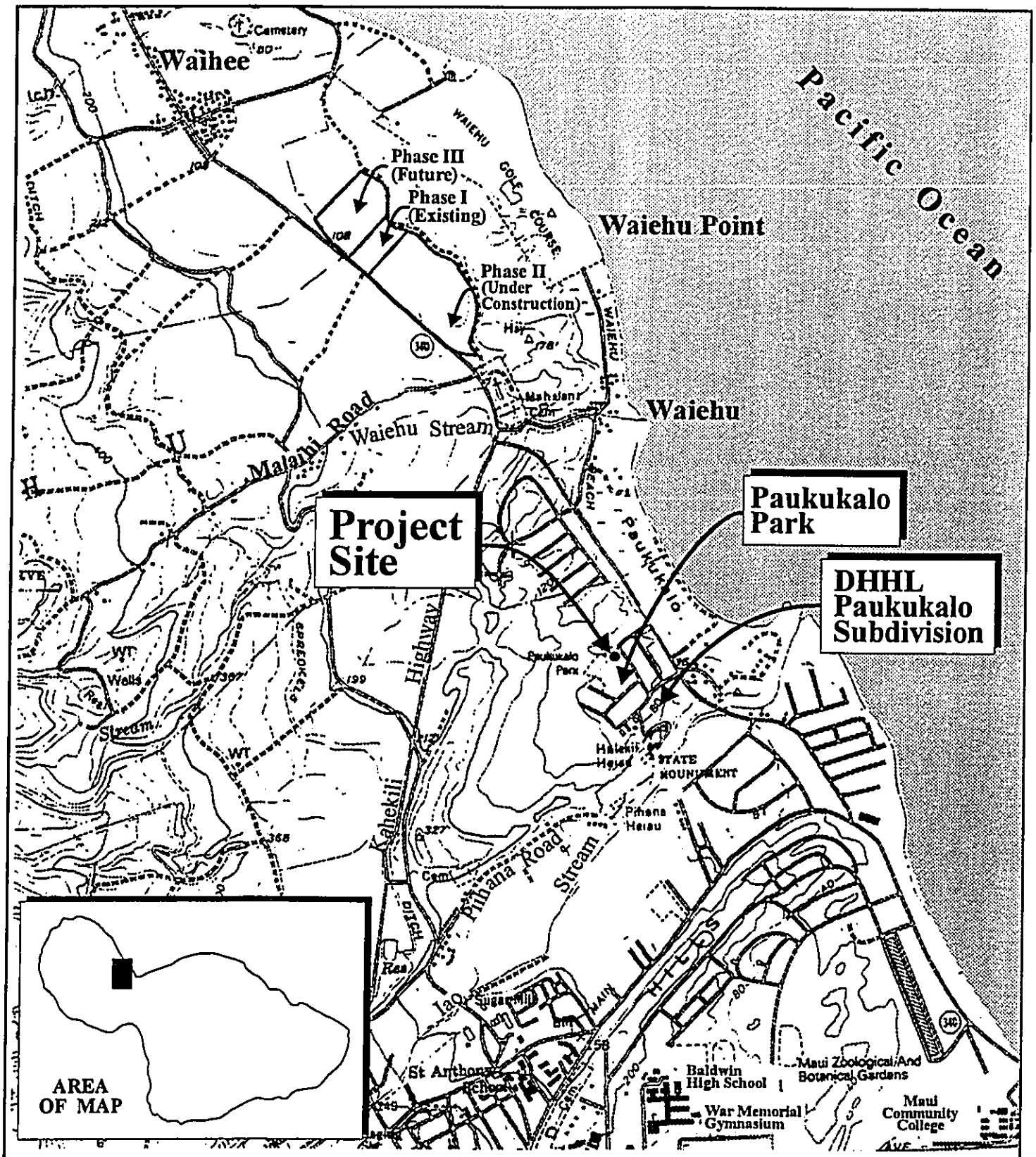
The applicant for the project is Kamehameha Schools and the State of Hawaii, Department of Hawaiian Home Lands (DHHL). Kamehameha Schools is currently developing a new preschool and related improvements in Paukukalo, Maui, Hawaii. The proposed project is located within a portion of the approximately 6.37-acre Paukukalo Park and Community Center (TMK 3-3-5:86, 87). See Figure 1.

The park presently contains a ballfield, playground equipment, open air gymnasium, community center, a restroom facility, and parking stalls. The park and community center serve the surrounding DHHL Paukukalo single-family residential homestead development.

Kamehameha Schools presently operates a preschool at the Department of Education's Waihee Elementary School. The current operation consists of 20 four year-olds, a teacher and an aide who occupy one classroom. Since the classroom will be utilized by Waihee School, a new preschool facility is needed.

The proposed project is intended to serve 3 to 4 year old preschoolers of native Hawaiian ancestry. The first enrollment priority is intended to be children from the DHHL Paukukalo development. Second priority would be children from DHHL's Waiehu Kou development. Third priority will be children from the Waihee Elementary School District. Any remaining openings could be filled by children of native Hawaiian ancestry living elsewhere in Maui.

There are approximately 183 homes within the Paukukalo DHHL community. Within Waiehu Kou Phase I, there are 40 Hawaiian



Source: U.S. Geological Survey

Figure 1

Paukukalo Preschool Two-Classroom Building

Regional Location Map

0 500 1000 2000 Feet

Prepared for: Kamehameha Schools

MUNEKIYO & HIRAGA, INC.

homestead single-family residential lots developed in 1993. Two parcels, one (1) north and one (1) south of the subdivision were purchased by the DHHL from Wailuku Agribusiness Company, Inc. in 1997. The southern parcel is identified as Phase II and the northern parcel is identified as Phase III. Approximately 110 single-family residential lots are under construction within Phase II. Phase III is contemplated for future development of 80 single-family lots.

The project site is located near the northern corner of Paukukalo Park. The site presently contains the 25 stall paved parking lot and a former DHHL site office. Land designated as TMK 3-3-5:86, 87 is owned by DHHL.

B. ***PROPOSED IMPROVEMENTS***

Initially, the proposed preschool facility was designed for an enrollment of 80 students, for which a total of four (4) classrooms in two (2) separate structures were proposed. The proposed preschool facility also included a separate multi-purpose building with a kitchen, as well as a children's play area within the central portion of the preschool facility. The entire facility is to be secured by fencing.

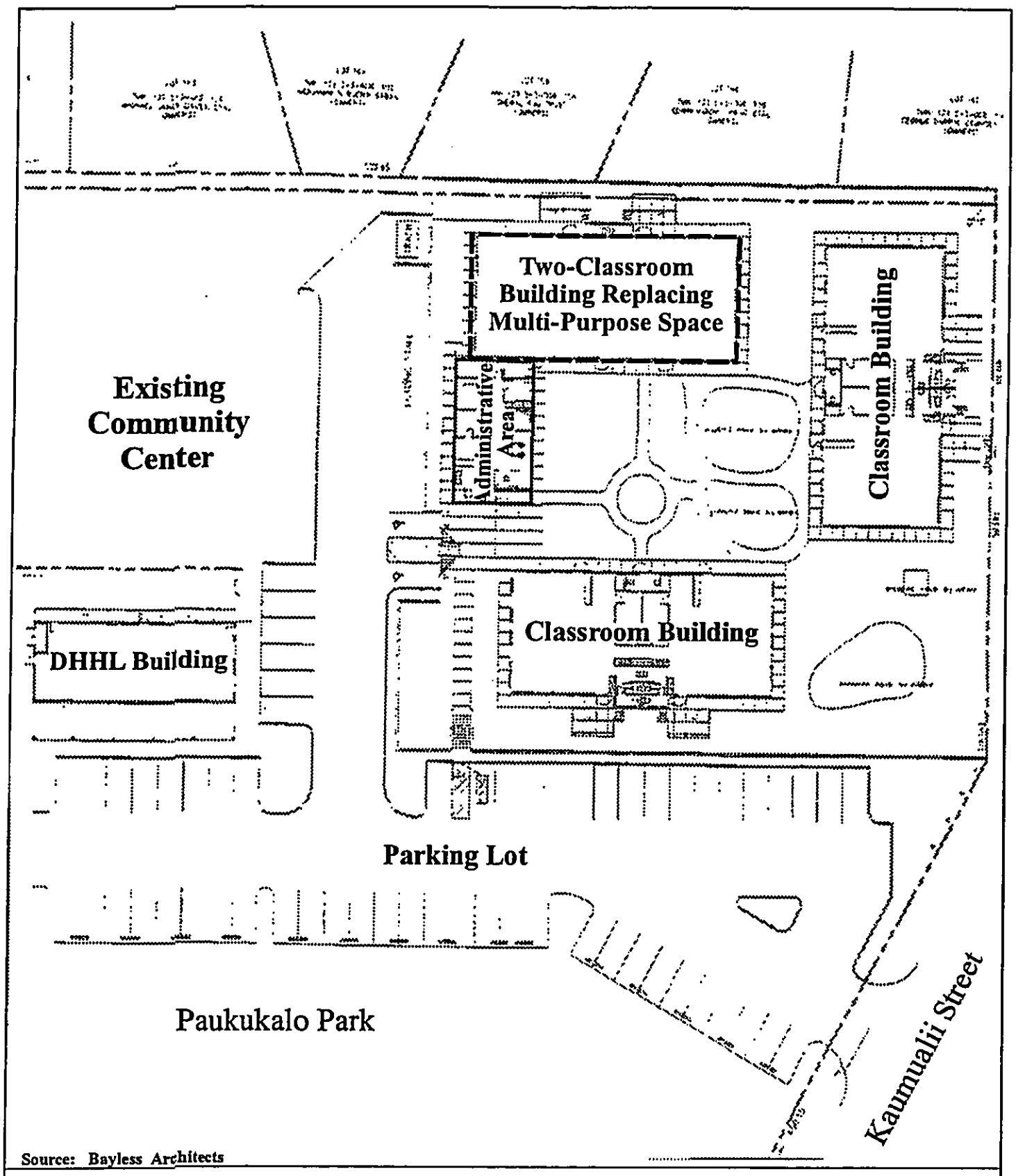
Following completion of initial programming for the preschool, student and faculty demand requirement were analyzed. Based on this most recent review, it was determined that additional classroom space was of higher priority than multi-purpose space, as provided in the multi-purpose building. Accordingly, Kamehameha Schools has determined that the redesign/reconfiguration of the multi-purpose space to provide two (2) additional classrooms instead of the multi-purpose building space is warranted.

The additional classrooms will accommodate twenty (20) students per classroom, thereby increasing the enrollment potential from 80 students to 120 students. No other design modifications are proposed for the other two-classroom buildings and the administration area. See Figure 2.

The former DHHL office and the 25 stall parking lot are being replaced by the new facility. A new DHHL on-site office of approximately 1,200 square feet is being located adjacent to the community center. Along with the eleven (11) remaining parking stalls, sixty (60) new paved parking stalls are being provided to serve the preschool, DHHL office, community center and park. A new driveway connection links the parking lot to Kaumualii Street.

All structures within the development are proposed to be one-story not exceeding 25 feet in height.

Since State lands are being utilized for the proposed action, an Environmental Assessment has been prepared as required by Chapter 343, Hawaii Revised Statutes. A Finding of No Significant Impact (FONSI) was published for the original plan (with the multi-purpose building) in the April 8, 2001 edition of the Office of Environmental Quality Control's Environmental Notice. Since the proposed modifications were not addressed in the initial Draft Environmental Assessment and FONSI, a new EA has been prepared in accordance with Chapter 343, Hawaii Revised Statutes. The scope of this new EA will be limited to the design modifications of the multi-purpose building. The two-classroom building (replacing the multi-purpose space) will be constructed with the other preschool improvements. The estimated cost of the two-classroom replacement building is $700,000.00.



Source: Bayless Architects

Figure 2

Paukukalo Preschool Two-Classroom Building

Current Site Plan with Three Classroom Buildings

NOT TO SCALE

Prepared for: Kamehameha Schools

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Chapter II

Description of Existing Environment

II. DESCRIPTION OF EXISTING ENVIRONMENT

A. PHYSICAL SETTING

1. Surrounding Land Use

The project site is located within the existing Paukukalo Park, a neighborhood park which primarily services the adjacent DHHL Paukukalo Subdivision. Also located within the parcel is the Paukukalo Community Center which includes an open air gymnasium.

The subject property is located in the Wailuku-Kahului region. To the north and west are the Waiehu Terrace and Waiehu Heights residential developments. To the south of the project site are the Halekii and Pihana Heiau. Further south are Iao Stream, Wailuku Industrial Park and the Iao Parkside townhome development. To the east of the project site across Waiehu Beach Road are single-family residential dwellings and the Pacific Ocean.

2. Climate

Like most areas of Hawaii, Maui's climate is relatively uniform year round. Characteristic of Hawaii's climate, the project site experiences mild and uniform temperature year round, moderate humidity and a relatively consistent northeasterly trade wind. Variation in climate on the island is largely left to local terrain.

Average temperatures at the project site (based on temperatures recorded at Kahului Airport) range from lows in the 60's to highs in the 80's. August is historically the warmest month, while January and February are the coolest. Rainfall at the project site averages approximately 20 to 30 inches per year. Winds in the region are predominantly out of the north-northeast and northeast.

3. ***Topography and Soils***

The project site ranges from 48 to 60 feet above sea level and slopes approximately 5 percent lower from the west to the east.

Underlying the proposed site are soils of the Pulehu-Ewa-Jaucas association. See Figure 3. This soil association is characteristically deep and well-drained and located on alluvial fans and basins.

The specific soil type at the project site is Jaucas sand, 0 to 15 percent slopes (JaC). See Figure 4. In a representative profile, the soil is single grain, pale brown to very pale brown, sandy, and more than 60 inches deep. Permeability is rapid, and runoff is very slow to slow. The hazard of water erosion is slight, but wind erosion is a severe hazard where vegetation has been removed.

4. ***Flood Hazard***

The proposed project is designated by the Flood Insurance Rate Map as Zone C, an area of minimal flooding. See Figure 5. The site is also located beyond coastal inundation areas.

5. ***Flora and Fauna***

The project is within the existing Paukukalo Park. The park is grassed and maintained on a regular basis.

6. ***Historic and Archaeological Sites***

The project site has been grubbed, graded, and landscaped in the previous development of Paukukalo Park. Thus, there are no surface archaeological features present at the site.

LEGEND

- ① Pulehu-Ewa-Jaucas association
- ② Waiakoa-Keahua-Molokai association
- ③ Honolua-Olelo association
- ④ Rock land-Rough mountainous land association
- ⑥ Puu Pa-Kula-Pane association
- ⑥ Hydrandepts-Tropaquods association
- ⑦ Hana-Makaalae-Kailua association
- ⑧ Pauwela-Haiku association
- ⑨ Laumaia-Kaipoipoi-Olinda association
- ⑩ Keawakapu-Makena association
- ⑪ Kamaole-Oanapuka association

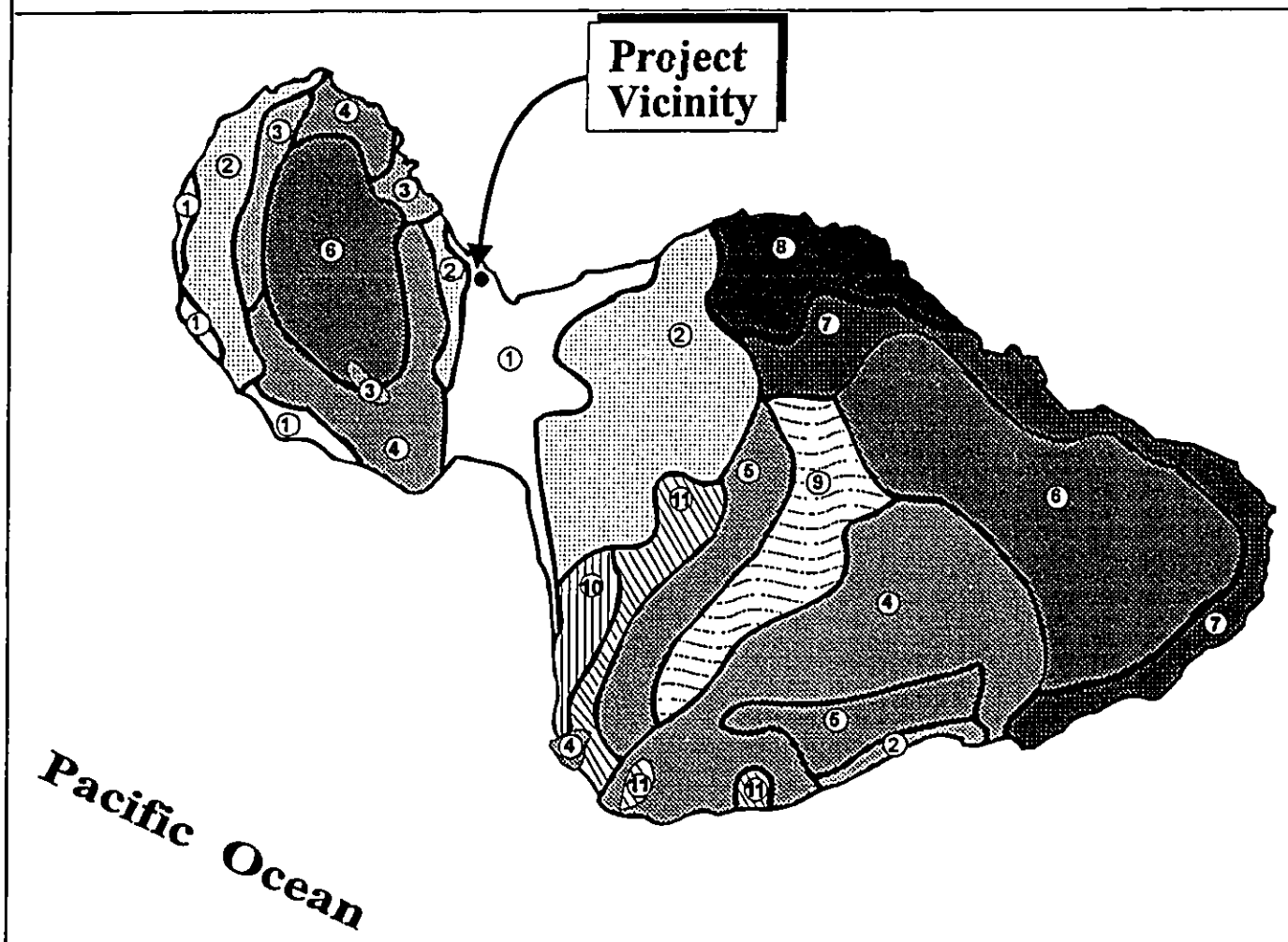

Figure 3

Paukukalo Preschool Two-Classroom Building

Soil Association Map

NOT TO SCALE

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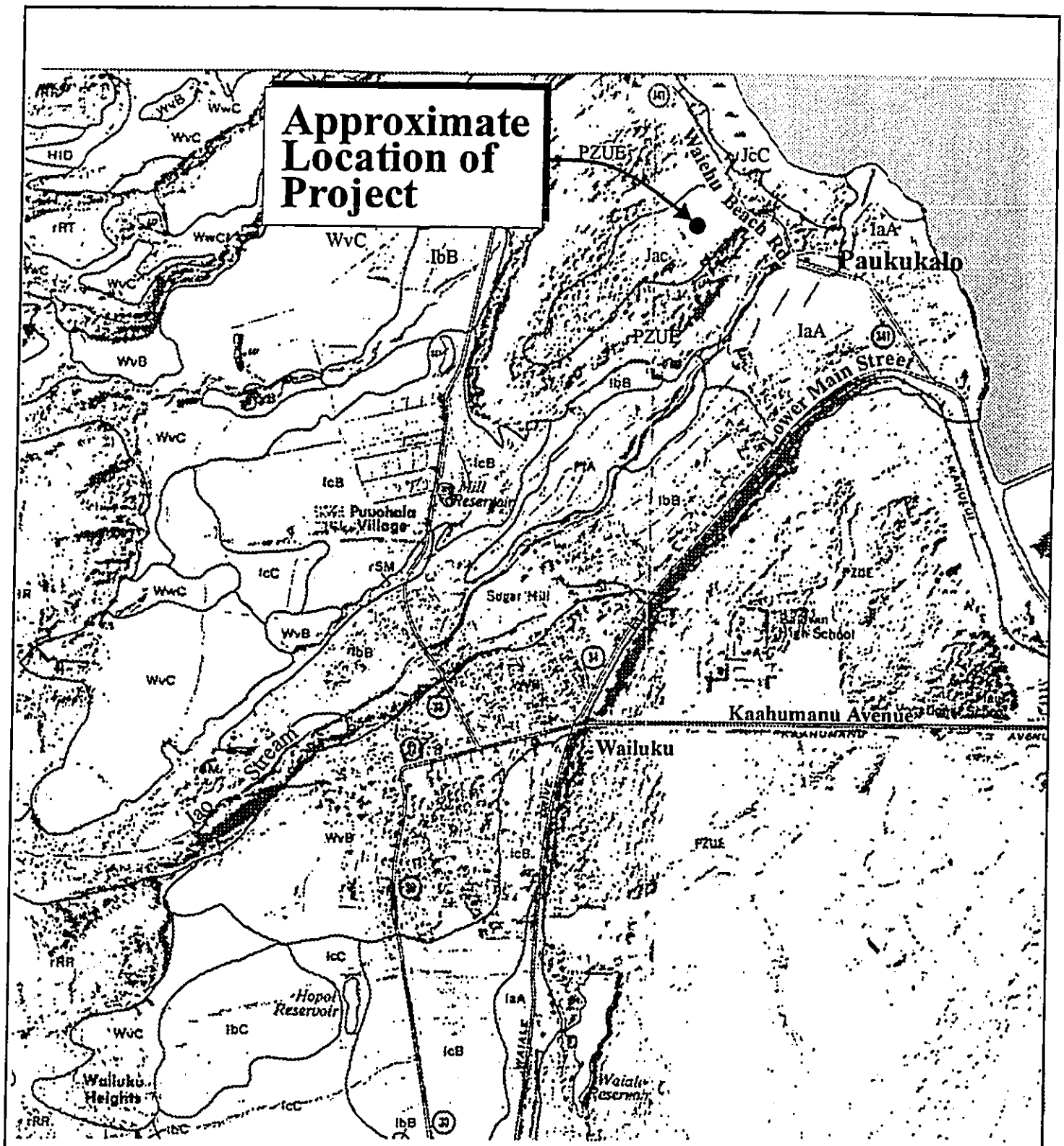


Source: Soil Conservation Service

Figure 4

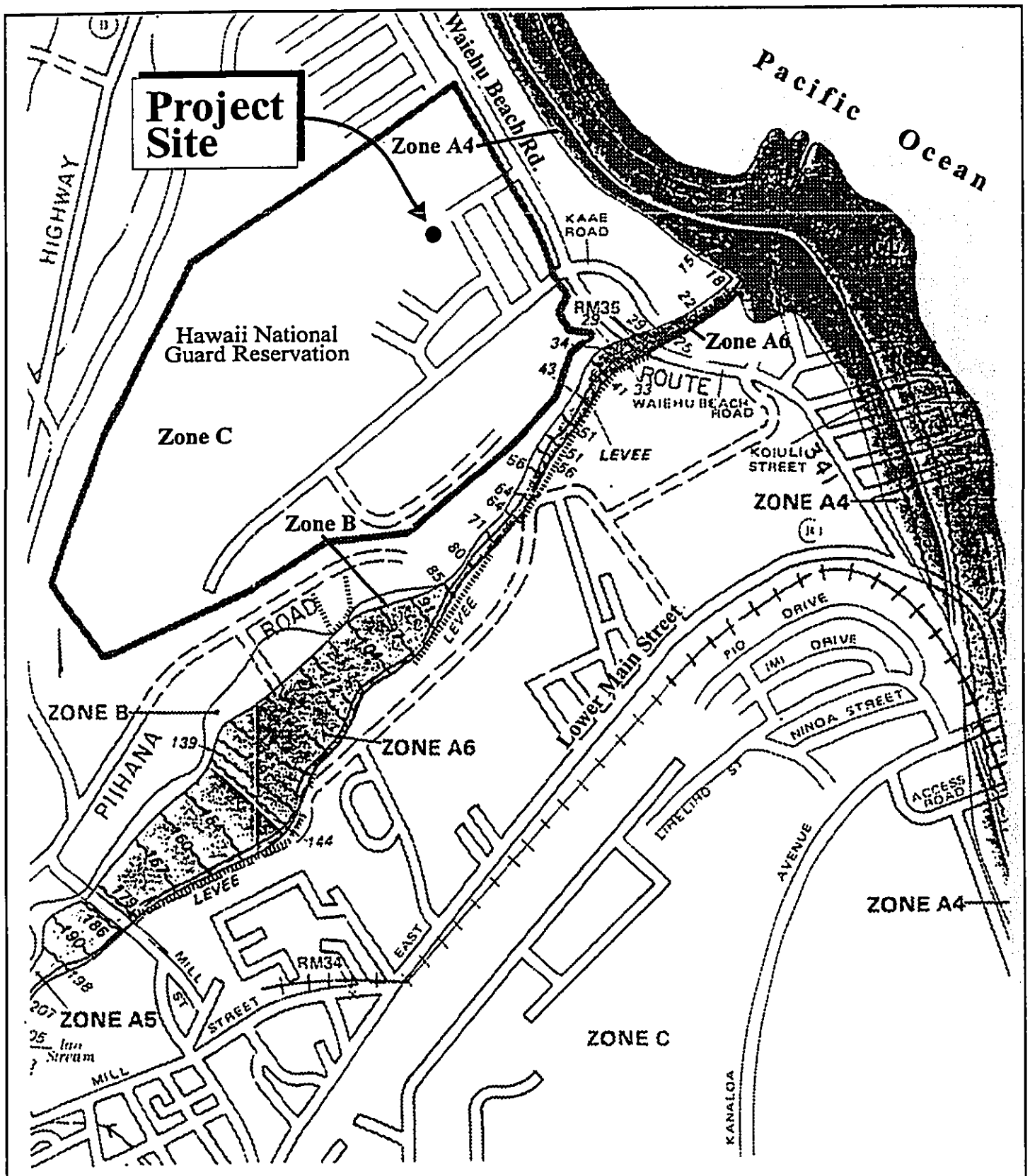
Paukukalo Preschool Two-Classroom Building

Soil Classification Map

0 500 1000 2000 Feet

Prepared for: Kamehameha Schools

MUNEKIYO & HIRAGA, INC.



Source: Federal Emergency Management Agency

Figure 5

Paukukalo Preschool Two-Classroom Building

Flood Insurance Rate Map

0 500 Feet
250 1000

MUNEKIYO & HIRAGA, INC.

Prepared for: Kamehameha Schools

7. *Air Quality*

There are no point sources of airborne emissions within close proximity of the project site. Although minimal, airborne pollutants are largely attributable to vehicular exhaust from traffic along the region's roadways. However, these sources are intermittent and prevailing winds quickly disperse the particulates generated by these temporary sources.

8. *Noise*

Ambient noise conditions are generally attributable to vehicular noise levels in proximity of the project site. There may be intermittent noise generated from activities at the gymnasium, community center and single-family residences.

9. *Scenic and Open Space Resources*

In addition to Mount Haleakala to the east, Iao Valley and the West Maui Mountains define the scenic resources to the west of the project site.

B. *SOCIO-ECONOMIC ENVIRONMENT*

1. *Population*

The population of the County of Maui exhibited relatively strong growth between the years of 1980 to 1990. The 1990 population of 100,504 reflects a 41.8 percent increase over the 1980 population of 70,847. The year 2000 population is estimated at 128,094. The resident population for the year 2010 is projected to be 145,872 (Community Resources, Inc., 1994).

The Wailuku-Kahului region reflects similar growth characteristics. The estimated 1990 population of Wailuku-Kahului was 32,816.

The region's population shows a 23.3 percent increase to 40,452 in the year 2000. By the year 2010, population is anticipated to increase to 48,132 (Community Resources, Inc., 1994).

2. *Economy*

Paukukalo is located within the Wailuku region which is the island's center of governmental activities, as well as a focal point for professional and business services. Combined with neighboring Kahului, the region's economic character encompasses a broad range of commercial, service, and governmental activities. In addition, the region is surrounded by significant agricultural acreages which include sugar cane fields, pineapple fields, and macadamia nut orchards. The vast expanse of agricultural land, cultivated by Hawaiian Commercial & Sugar (HC&S), is considered a key component of the local economy.

C. *PUBLIC SERVICES*

1. *Police and Fire Protection*

Police protection for the Wailuku-Kahului region is provided by the County Police Department headquartered at the Wailuku Station on Mahalani Street. The region is served by the Department's Central Maui Patrol.

Fire prevention, suppression, and protection services for the Wailuku-Kahului region is provided by the County Department of Fire Control's Wailuku Station, located in Wailuku Town, as well as the Kahului Station located on Dairy Road.

2. *Health Care*

Maui Memorial Medical Center, the only major medical facility on

the island, services the Wailuku-Kahului region. Acute, general and emergency care services are provided by the 194-bed facility. In addition, numerous privately operated medical/dental clinics and offices are located in the area to serve the region's residents.

3. ***Solid Waste***

Single-family residential solid waste collection service is provided by the County of Maui on a once-a-week basis. Residential solid waste collected by County crews are disposed at the County's 55-acre Central Maui Landfill, located four (4) miles southeast of the Kahului Airport. In addition to County-collected refuse, the Central Maui Landfill accepts commercial waste from private collection companies.

4. ***Recreational Resources***

The Wailuku-Kahului region encompasses a full range of recreational opportunities, including shoreline and boating activities at the Kahului Harbor and adjoining beach parks, and individual and organized athletic activities offered at numerous County parks. The project site is located within Paukukalo Park. It is also in close proximity to Waiehu Beach Park, Waihee Beach Park, Waiehu Golf Course, Iao Valley State Park, the Wailuku Community Center, Wells Park, and Papohaku Park.

5. ***Schools***

The Wailuku-Kahului region is served by the State Department of Education's public school system as well as several privately operated schools accommodating elementary, intermediate and high school students. Department of Education facilities in the Wailuku-Kahului area include Lihikai and Kahului Schools (Grades

K to 5), Maui Waena Intermediate School (Grades 6 to 8), and Maui High School (Grades 9 to 12). Schools in the Wailuku area include Wailuku and Waihee Elementary Schools (Grades K to 5), Iao Intermediate School (Grades 6 to 8), and Baldwin High School (Grades 9 to 12). The Maui Community College, a branch of the University of Hawaii, serves as the island's only community college.

D. INFRASTRUCTURE

1. Roadways

Waiehu Beach Road is a two-lane State roadway which links the Waihee and Waiehu areas with the Wailuku industrial area. In the vicinity of the project, Waiehu Beach Road has two (2) 12-foot travel lanes, a center 10-foot, two-way turn lane and paved shoulders.

Kuhio Place is the primary collector road within the Paukukalo Subdivision. At the unsignalized cross-intersection with Waiehu Beach Road and Kaae Road, separate left-turn lanes are provided on Waiehu Beach Road. The Kuhio Place approach to the Waiehu Beach Road has sufficient width to allow two (2) separate queues for the right-turn movements and the left-turn/through movements. The Kaae Road approach, which is off-set from the Kuhio Place approach, also has sufficient width to allow right-turn movements to pass by waiting, left-turn/through movements.

Kealii Drive is a local two-lane road which also serves as a secondary access to the Paukukalo Subdivision. At the unsignalized T-intersection of Waiehu Beach Road and Kealii Drive, a separate turn lane is designated for the northbound left turns and a two-way center turn lane is striped on the north side of

the intersection.

Kaumualii Street is a two-lane local road which provides access to Paukukalo Park and residential uses. Kaumualii Street links to Waiehu Beach Road via Kuhio Place and Kealii Drive.

Paukukalo Park has two (2) designated bus stops, one on Kaumualii Street and the other on Kawananakoa Street. School buses for Waihee (Elementary) School, Iao (Middle) School and Baldwin High School, as well as Maui Economic Opportunity (MEO) buses utilize the bus stops.

2. ***Water System***

As of January 1, 2000, the rolling average groundwater withdrawals from the Iao Aquifer were 18.501 million gallons per day (mgd). These withdrawals are within the limits of the regulatory 20 mgd sustainable yield of this aquifer.

In addition, two (2) wells at North Waihee, pumping at a combined rate of 1.5 mgd, were brought on-line by the County of Maui Department of Water Supply, in July 1997. These wells draw water from the heretofore undeveloped North Waihee Aquifer and pumps it into the Central Maui system at Waihee Village.

In addition, two (2) new wells in the Waihee Aquifer, each with a pumping capacity of approximately 1.0 mgd, will provide additional sources to supplement water provided by the Iao Aquifer.

3. ***Wastewater***

The Paukukalo area is served by the County wastewater collection

system. An 8-inch gravity interceptor is located on nearby Kuhio Place which extends to Waiehu Beach Road. The main collection route runs along a "spine" following the coast to the Kahului Wastewater Treatment Facility.

The Kahului Wastewater Treatment Facility was constructed in 1973 to serve as a regional wastewater treatment plant for Kahului and nearby areas, including Wailuku and Spreckelsville. The plant provides secondary treatment of sewage and features an activated sludge biological treatment process, secondary clarification and filtration. The final effluent is disposed of by four (4) gravity injection wells. The plant has a rated capacity of 7.9 million gallons per day.

4. ***Drainage***

Runoff from the project site presently sheet flows into Paukukalo Park. The park is a low-lying area with a grated catch basin located at the low point at the northwestern corner of the park. Runoff is intercepted from this area and conveyed across Waiehu Beach Road into the low area near the ocean. It is estimated that the existing 50-year storm runoff from the project site is 6.3 cubic feet per second (cfs.).

5. ***Electrical and Telephone Services***

Electrical and telephone services are provided by Maui Electric Company and Verizon Hawaii, respectively.

Chapter III

Potential Impacts and Mitigation Measures

III. POTENTIAL IMPACTS AND MITIGATION MEASURES

A. IMPACTS TO THE PHYSICAL ENVIRONMENT

1. Surrounding Land Uses

The project site is located within the Paukukalo Hawaiian Home Lands residential development. Abutting the development to the north and west are the residential developments of Waiehu Terrace and Waiehu Heights. Further north near the coast is the Department of Hawaiian Home Lands Waiehu Kou residential development. To the south of the development beyond Iao Stream are the Wailuku and Kahului urban areas. East of Waiehu Beach Road are scattered single-family residences and the Pacific Ocean.

The development of a two-classroom building in lieu of a multi-purpose facility is consistent and complementary with adjacent and surrounding land uses and is not anticipated to create any adverse impacts.

2. Topography and Landform

The proposed project is not anticipated to result in significant earthmoving activities. To the extent practicable, finished contours will follow existing grades to minimize earthwork costs and maintain drainage patterns.

With regard to neighboring subdivisions within the Waiehu Planned Development, the nearest residences to the project site are located at an approximately 8-feet higher elevation than the classroom with the finished floor at 62.5 feet. The buffer areas between the classrooms and the Waiehu Planned Development will be landscaped with Common Bermuda Grass.

3. ***Flora and Fauna***

There are no known significant habitats or rare, endangered, or threatened species of flora or fauna located on the project site. In addition, the project site does not contain any known wetland areas. Thus, the project should not result in any adverse impact to these components of the natural environment.

4. ***Archaeological Resources and Cultural Impact Considerations***

The entire preschool site has already been grubbed, graded and grassed with the development of Paukukalo Park and community center. Previous "no effect" letters were issued by the State *Historic Preservation Division for the Paukukalo Community Center* and playcourt. With regard to the subject project, the State Historic Preservation Division noted that it is unlikely that significant historic sites are present and did not recommend that an archaeological inventory survey be conducted. See Appendix A. However, in the event historic or archaeological materials are encountered during construction of the project, work will be halted in the area of the find and the SHPD will be notified to determine appropriate mitigation measures which should be implemented.

The proposed action involves the replacement of a preschool multi-purpose building with a two-classroom building in the same location. In this context, the action is not anticipated to have adverse effects upon cultural practices and beliefs.

5. ***Air Quality***

Air quality impacts attributed to the project will include dust generated by short-term, construction-related activities. Site work such as filling and grading and utilities and parking lot construction,

for example, will generate airborne particulates. Dust control measures, such as regular watering and sprinkling, will be implemented as needed to minimize wind-blown emissions.

The project will not generate a significant amount of traffic since an estimated 20 to 30 children are anticipated to come from families residing in the Paukukalo DHHL development. Thus, the preschool facility is within convenient walking distance for many of the children and parents. Project-related emissions are not expected to adversely impact local and regional ambient air quality conditions.

6. ***Noise***

As with air quality, ambient noise conditions will be impacted by construction activities. Construction equipment and machinery are anticipated to be the dominant source of noise during the development of the project. To mitigate the effects of construction noise upon surrounding uses, construction activities will be limited to daylight working hours.

On a long-term basis, the proposed two-classroom building will not generate adverse noise conditions.

7. ***Visual Resources***

The project will be fully landscaped to create a site visually and aesthetically integrated with Paukukalo Park and the surrounding residential neighborhood. As with other preschool facilities, the new two-classroom building will be one story, and consistent with the low-rise nature of the neighborhood.

B. *IMPACTS TO COMMUNITY SETTING*

1. *Population and Local Economy*

On a short-term basis, the project will support construction and construction-related employment. Over the long term, the project will provide limited support to the service sector for project operations and maintenance. Direct on-site employment generated by the project will likely be limited to the day care facility staff. With the addition of the two classrooms, total staffing requirements for the preschool would be six (6) teachers, six (6) aides, two (2) administrative staff, as well as three (3) staff at the DHHL site office.

2. *Police, Fire and Medical Services*

Police, fire and medical services are not expected to be adversely impacted by the proposed project. The project will not extend existing service area limits for emergency services.

3. *Recreational and Social Services*

The proposed project will serve preschool age children of Hawaiian descent primarily in the Paukukalo, Waiehu and Waihee areas. Tuition is expected to be approximately $555 per year. In addition to being an affordable preschool alternative, the facility provides three (3) to four (4) year-olds invaluable skills in academic education as well as socialization.

4. *Solid Waste*

The proposed action will be a part of a new preschool facility for an operation currently conducted at the Waihee Elementary School. In the long term, the new preschool facility will not have an adverse impact upon the County's solid waste disposal facilities. Regularly

scheduled refuse collection will be provided by a private vendor.

C. IMPACTS TO INFRASTRUCTURE

1. Roadways

A revised traffic impact analysis report was prepared for the project. See Appendix B. Manual traffic count data were collected and field observations were conducted on October 3 to 4, 2000. The morning peak hour of traffic occurred between 6:45 to 7:45 a.m. This time period coincides with the starting time of 7:30 a.m. of the proposed preschool. The early afternoon hour of 2:00 to 3:00 p.m. was selected for analysis as the proposed project traffic would be expected to peak at the preschool's ending time at 2:00 p.m.

The technical analysis of traffic conditions has been conducted for unsignalized intersections. Level of Service (LOS) is a qualitative measure used to describe the condition of traffic flow, ranging from free flow conditions at LOS A to congested conditions at LOS F.

The construction of the preschool and the DHHL office building is expected to be completed and occupied by November 2001. Thus, the traffic study calculated future traffic volumes with the project-generated traffic in the year 2001.

The traffic study includes findings and recommendations to accommodate existing traffic volumes and future traffic volumes with the project-generated traffic. The results of the unsignalized intersection analysis are summarized in Table 1.

Table 1

UNSIGNALIZED INTERSECTION ANALYSIS RESULTS

Intersection	Existing Conditions				Future Conditions Without Project				Future Conditions With Project			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Seconds	LOS	Seconds	LOS	Seconds	LOS	Seconds	LOS	Seconds	LOS	Seconds	LOS
Waiehu Beach Road, Kuhio Place and Kaae Road												
Northbound Left Turn	6.3	B	3.9	A	6.7	B	4.0	A	6.9	B	4.2	A
Southbound Left Turn	3.0	A	3.7	A	3.1	A	3.9	A	3.1	A	3.9	A
Kuhio Place												
Left Turn/ Through Movement	20.3	D	15.5	C	22.5	D	16.8	C	24.3	D	18.1	C
Right Turn Movement	10.2	C	4.9	A	11.0	C	5.1	B	11.8	C	5.2	B
Kaae Road												
Left Turn/ Through Movement	36.6	E	18.3	C	42.4	E	20.1	D	48	F	21.7	D
Right Turn Movement	3.8	A	4.8	A	3.9	A	4.9	A	3.9	A	4.9	A
Overall Intersection	**1.9**	**A**	**0.9**	**A**	**2.0**	**A**	**0.9**	**A**	**2.2**	**A**	**0.9**	**A**
Waiehu Beach Road and Kealii Place												
Northbound Left Turn	5.5	B	3.5	A	5.8	B	3.6	A	6.1	B	3.7	A
Kealii Place Approach	12.3	C	9.7	B	13.5	C	10.4	C	16.8	C	13.0	C
Overall Intersection	**0.3**	**A**	**0.2**	**A**	**0.3**	**A**	**0.2**	**A**	**0.7**	**A**	**0.8**	**A**

a. ***Existing Conditions***

The overall traffic conditions at the intersections of Waiehu Beach Road/Kuhio Place/Kaae Road are at LOS A. During the morning peak hour of traffic, the Waiehu Beach Road northbound left-turn movement is at LOS B. The Kuhio Place left-turn/through movement is at LOS D and the right-turn movement is at LOS C. The Kaae Road left-turn/through movement incurs the longest delay during the morning peak hour of traffic as it operates at LOS E. During the early afternoon peak hour of traffic, the Kuhio Place left-turn/through movement and the Kaae Road left-turn/through movement are at LOS C; the remaining movements at this intersection are at LOS A.

The overall traffic operations at the intersection of Waiehu Beach Road and Kealii Drive are at LOS A. During the morning peak hour of traffic, the Waiehu Beach Road northbound left-turn movement is at LOS B and the Kealii Drive approach is at LOS C. During the early afternoon peak hour of traffic, the northbound left-turn movement is at LOS A, while the Kealii Drive approach operates at LOS B.

Observations of the morning peak hour of traffic noted that queuing occurred in the southbound direction of Waiehu Beach Road. The southbound queue extended from the Waiehu Beach Road/Eha Street intersection to approximately midway between Makaala Drive and the Wailupe Drive/Lower Waiehu Beach Road intersections. The southbound traffic flow was sluggish as it passed through the Kealii Drive and Kuhio Place/Kaae Road intersection. The intersection of Waiehu Beach Road and Eha Street is the first signalized intersection in the southbound direction and the traffic signal serves to meter traffic flow from Waiehu Beach Road into the lower Wailuku area.

In general, the Waiehu Beach Road two-way left-turn lane and left-turn bays are effective in serving as a refuge area for turning traffic which would otherwise delay through traffic. However, a couple of school buses were observed to stop in the northbound travel lane to pick up school children and block the flow of northbound traffic.

b. ***Future Base Year 2001 Traffic Conditions Without Project***

The LOS conditions during the morning peak hour of traffic at the two (2) study intersections would remain the same as the existing conditions. During the early afternoon peak hour of traffic at the intersection of Waiehu Beach Road, Kuhio Place and Kaae Road, the Kuhio Place right-turn movement would drop from LOS A to LOS B and the Kaae Road left-turn/through movement would decrease from LOS C to LOS D. At the intersection of Waiehu Beach Road and Kealii Drive, the Kealii Drive approach would drop from LOS B to LOS C.

c. ***Future Year 2001 Traffic Conditions With Project-Generated Traffic***

Longer delays are expected with the project traffic and, generally, the future LOS conditions with the project are expected to remain the same as the future LOS without the project. The Kaae Road left-turn/through movement is the exception as it is expected to decrease from LOS E to LOS F during the morning peak hour of traffic; however, traffic volumes on this approach are low (20 vehicles per hour) and account for only 1.3% of the vehicles entering the intersection in the morning peak hour of traffic. Review of the traffic signal warrants indicate that a traffic signal will not be warranted at the Waiehu Beach Road/Kuhio Place/Kaae Road intersection. It is not uncommon for vehicles travelling on a low-volume side street to experience long delays,

especially when they try to enter or cross a major regional facility such as Waiehu Beach Road.

Recommendations: There are no roadway improvements recommended at the study intersections for the project traffic. The analytical comparison of the future traffic conditions indicates there would be slightly longer delays with the project but, in general, the future LOS conditions with or without the project would be similar. There is existing queuing along Waiehu Beach Road in the southbound direction during the morning peak period due to the traffic signal at the Waiehu Beach Road/Eha Street intersection which may help the left-turn/through movements exit from Kaae Road.

With regard to the traffic operations at Waiehu Beach Road and Kuhio Place/Kaae Road intersection, it is recommended that parents and staff be encouraged to use Kealii Drive for access to the preschool from Waiehu Beach Road. This would present a more direct route to the preschool site from Waiehu Beach Road and would lessen the demand at the Kuhio Place/Kaae Road intersection. See Appendix B-1.

2. ***Water***

Eight-inch waterlines extend along Kaumualii Street and Kealii Drive in close proximity to the project site. The replacement of the multi-purpose building with the two-classroom building is not anticipated to have a significant impact upon the water source, storage and transmission system.

3. ***Wastewater***

An eight-inch sewerline extends near the project site on Kealii Drive. This incremental addition of effluent from the additional student enrollment will not adversely affect existing collection, transmission and treatment capacities.

As required, a project sewer impact study will be prepared in coordination with the Department of Public Works and Waste Management.

4. ***Drainage***

The replacement of the multi-purpose space with the two-classroom building will not affect the overall site drainage plan.

The following measures will be taken to control erosion during the site development period (estimated 6 months):

1. Minimize time of construction.
2. Retain existing ground cover until latest date to complete construction.
3. Early construction of drainage control features.
4. Use temporary area sprinklers in non-active construction areas when ground cover is removed.
5. Station water truck on site during construction period to provide for immediate sprinkling, as needed, in active construction zones (weekends and holidays included).
6. Use temporary berms and cut-off ditches, where needed, for control of erosion.
7. Graded areas shall be thoroughly watered after construction activity has ceased for the day and on weekends.
8. All cut and fill slopes shall be sodded or planted immediately after grading work has been completed.

The drainage report prepared for the initial EA for the preschool is incorporated in Appendix C of this report.

5. *Electrical and Telephone Systems*

Electrical power requirements associated with the proposed project will be supplied by Maui Electric Company, Ltd. Additional telephone system requirements generated by the project will be met by Verizon Hawaii.

D. *CULTURAL IMPACT ASSESSMENT*

1. *Cultural Context*

The proposed preschool is located in the Paukukalo area of Wailuku. Significant cultural features in the project vicinity include the Haleki'i Heiau and the Piihana Heiau. Located approximately one-half mile to the south of the project site, the heiau is of the luakini class and is associated with high chiefs (Kennedy, 1983). In addition to the heiau, the project site is located approximately one mile north of the Mahalani Cemetery. The cemetery is associated with Waiehu Village and is actively maintained. Other identified sites in the Waiehu vicinity include Site No. 2836 and Site No. 2983, both being burials (Hammett, 2001; Sinoto, 2001).

Small clusters of Land Commission Awards are found in the Waiehu and Wailuku areas, in the vicinity of the project site. These awards include po'alima (lands worked for chiefs) lo'i, and kula lands.

The State Historic Preservation Division (SHPD) conducted a site inspection of the subject tax map parcel in 1996. The SHPD noted that the soil deposit in the area appear to be a mix of naturally occurring sand matrix with soil fill material. (Soils underlying the project site belong to the Jaucus sand series, 0 to 15 percent slope.) Evidence of disturbance was noted at the property, and on

that basis, the SHPD determined that it is unlikely that significant historic sites would be present.

The project site is located mauka of Waiehu Beach Road, within an existing residential subdivision. In terms of this geographic context, as well as recent land use and historical context, there is no direct or indirect impacts to cultural practices related to ocean activities such as fishing or sea gathering.

In terms of present day character, the DHHL's Paukukalo Subdivision is a quiet residential area consisting of 183 single-family residences. The 6.37 Paukukalo Park and Community Center site lies at the north edge of the subdivision.

The project site was previously developed for the DHHL's office and parking area.

2. *Interview Summaries*

A total of four (4) interviews were conducted with local residents familiar with the project site and surrounding environs. The purpose of the interview was to gather information and local perspective regarding the subject property and potential cultural resource values.

a. *Kyle Nakanelua*

Mr. Nakanelua is a firefighter with the State of Hawaii, Department of Transportation-Airports Division.

Mr. Nakanelua does not feel that the development of the preschool would affect cultural practices of his group (Hale

Mua). Hale Mua, an all male group, engages in religious practices (old Hawaiian) and old Hawaiian traditional rites and rituals which are a part of the group's "basic every day living". The group currently utilizes the open areas and playfields, when no one is around, for their cultural practices. Hale Mua also frequently uses the Haleki'i Heiau for its cultural practices.

Although not a resident of the DHHL subdivision, there are members of Hale Mua who reside in the subdivision.

b. ***Hokulani Holt-Padilla***

Ms. Holt-Padilla is the Cultural Programs Director at the Maui Arts and Cultural Center. Four generations of Ms. Holt-Padilla's family have resided in the vicinity of the project area. Ms. Holt-Padilla is a resident of the DHHL Paukukalo Subdivision.

Ms. Holt-Padilla stated that the pre-historic name of the DHHL Paukukalo Subdivision area is "Kauahea", which may mean battle or war cry. Historically, the area was the training ground for the warriors of Kahekili preparing for battle. The area is also known as a cool, misty area which may also relate to the name Kauahea (The Misty Rain). The area was heavily populated because of the abundance of water and taro patches lining both sides of the river (Iao Stream).

The Haleki'i Heiau has historical significance, for it was the political center for people who lived in the Wailuku area, and

was the spiritual center for the political society. The heiau was a vantage point for Wailuku. From the top of the heiau, one is able to see the coastline, providing a 360 degree vantage point for Wailuku, or Na Wai' Ehā, named for the four (4) valleys (Waihee, Waiehu, Wailuku, and Waikapu). Spiritually, the heiau provided for the people a focal point for worship, a connection with the gods, and the place for the alii. The alii and kahuna went to the heiau for their religious ceremonies for the welfare of the people.

It is said that Kahekili had three (3) main heiau in the Wailuku district. One was located under what is now the Kaahumanu Church, the second was in Puuohala, and the third is Haleki'i.

With regard to the preschool project, Ms. Holt-Padilla noted that it is in close proximity to the Haleki'i Heiau, and the heiau is still very important to cultural practitioners. However, she did not believe that the cultural practitioners would be directly affected by the preschool. Conversely, the heiau provides a visual and cultural link to the past and present and should have a positive effect on the preschool.

Ms. Holt-Padilla noted that she was pleased with the development of the preschool. She noted Punana Leo was interested in having its preschool at the project site, but was not allowed to.

Kaehu Bay (as discussed in the next interview) was a canoe landing area for fishing and also for battle. The Iao Stream

Flood Control Project changed the bay, as too much fresh water entered the ocean. The bay was also changed because of sugar plantations' bagasse that went directly into the ocean. This caused the "limu" to die. However, it appears that the "limu" may be starting up again.

Currently, for the project area, there is no "connection" to fishermen, limu, and sea gatherers, etc. However, there is spiritual importance because of the "healing" waters that flowed through the area.

c. ***Thelma "Kahili" Long Cummings***

Mrs. Cummings was born in 1918 as the sixth child of Henry and Ida Long, in Kahului, Maui. Mrs. Cummings moved to the project area in the early 1930's. She lived in the area which is now known as the corner of Hea and Kūhiō Place When Mrs. Cummings' family moved here, there were no other houses, just their house and the prison/jail house. Mrs. Cummings' father, Henry Long, was the jail/prison warden, who was appointed by Prince Jonah Kūhiō Kalaniana'ole, when the Prince was a delegate to Congress.

As a young girl, Mrs. Cummings walked to school by way of the Haleki'i Heiau, to Piihana, to Happy Valley, along Market Street, to reach Iao School.

No other homes were built until DHHL developed the Paukukalo Subdivision in the mid-1960's.

The Paukukalo Preschool area was previously used as a

rifle range/target range during World War II. During the war, the Wailuku jail/prison which was located in the project area, was used a internment camp for the Japanese. The internment camp was an "honor camp" and used to house primarily male Japanese merchants. Mrs. Cummings remembers several businessmen who were interned at the "prison". She remembers seeing their wives and families visiting the barracks where the men were interned.

Mrs. Cummings noted that "the most important thing about this place is the heiau. It is like a guardian." Mrs. Cummings recalled that the heiau area had the "auhuhu" plant which was gathered and used for fishing. The "auhuhu" was picked, pounded, and placed in a bag. The fishermen would place the bag of "auhuhu" in the water and would "stun" the fish, making the catch easier. Mrs. Cummings' father fished along the coast at Kaehu Bay, also known as Long's Beach. She noted that the beach was named after her father.

Prior to development in the area, the entire area was sand dunes. The prisoners flattened out the area. The prisoners also built the road to Kahakuloa and cleared the Waiehu golf course area.

d. ***<u>Kalani Tassill</u>***

Mr. Kalani Tassill is a seven year resident of the Department of Hawaiian Home Lands' (DHHL) Paukukalo Subdivision. Mr. Tassill is currently the President of the Paukukalo Hawaiian Homestead Community Association (PHHCA).

The PHHCA has a 25-year lease for the DHHL community center at the project site. The PHHCA successfully lobbied the State Legislature in appropriating funds for the community center building. Although the 25-year lease for the community center terminates in 2024, the DHHL is in the process of revising the lease terms and conditions.

Mr. Tassill noted that the surrounding park area which includes a ballfield, playground equipment, and restroom facility is maintained by the County of Maui's Department of Parks and Recreation.

Current uses of the park and community center include two (2) halaus, a church group, and youth baseball practices. The County's Summer PALS program and Alu Like's After-School program were previous users. The PHHCA is hopeful that other organizations, such as the Kupuna program and Boys and Girls Club, may be able to utilize the facility.

e. ***Ben Kaleiopu***

Mr. Ben Kaleiopu was born and raised in Lahaina and has resided in the Department of Hawaiian Home Lands' (DHHL) Paukukalo Subdivision since 1985. He is the current Vice-President of the Paukukalo Homestead Community Association (PHHCA), and has served as an officer of the Association since 1987.

Mr. Kaleiopu noted prior users of the park and community center area included the Alu Like Keola Pono Nona Kupuna

Program, the Ahupua'a State Council of Hawaiian Homestead Association and the Full Gospel Church under the leadership of Reverend Clarence Kamai. The PHHCA would like to see the community center renovated to allow for space for a youth center, cultural center and kupuna gardens, restrooms and office space.

With regard to the preschool development, Mr. Kaleiopu has concerns with the ingress and egress to the school site. He noted that the siting of the buildings and the preschool facility could have been better designed to accommodate the number of vehicles that will be going to and leaving the preschool site.

Mr. Kaleiopu noted a concern with the DHHL's review of the current lease for the community center.

With regard to the Paukukalo Subdivision area, Mr. Kaleiopu noted that "Paukukalo" is not the proper name for the area. "Paukukalo" is a bench marker and the proper name for the area is Waiehu, as part of the Wailuku ahupua'a. Mr. Kaleiopu stated that as a young boy he walked from Lahaina, through Iao Valley, to Waiehu and fished and dived at Waiehu Bay. The journey sometimes took an entire day.

3. ***Cultural Assessment***

Based on the subject property's land use history, there is no evidence that the preschool site was utilized for traditional cultural practices in the recent past. Interviews with local residents familiar with the project site and surrounding environs confirm that from a present-day standpoint, the site is not utilized for cultural practices such as gathering, access, and religious traditions. With regard to the proposed preschool action, therefore, there are no adverse impacts to cultural resources anticipated. This determination notwithstanding, is recognized that from a larger regional context, this area holds important cultural and historical value.

Chapter IV

Relationship to Land Use Plans, Policies and Controls

IV. RELATIONSHIP TO LAND USE PLANS, POLICIES AND CONTROLS

A. STATE LAND USE DISTRICTS

Chapter 205, Hawaii Revised Statutes, relating to the Land Use Commission, establishes the four (4) major land use districts in which all lands in the State are placed. These districts are classified "Urban", "Rural", "Agricultural", and "Conservation". The project site is within the "Urban" District. See Figure 6.

Although the Department of Hawaiian Home Lands is exempt from the State Land Use Law, the proposed action involves a new two-classroom building for a preschool which is compatible with the "Urban" classification.

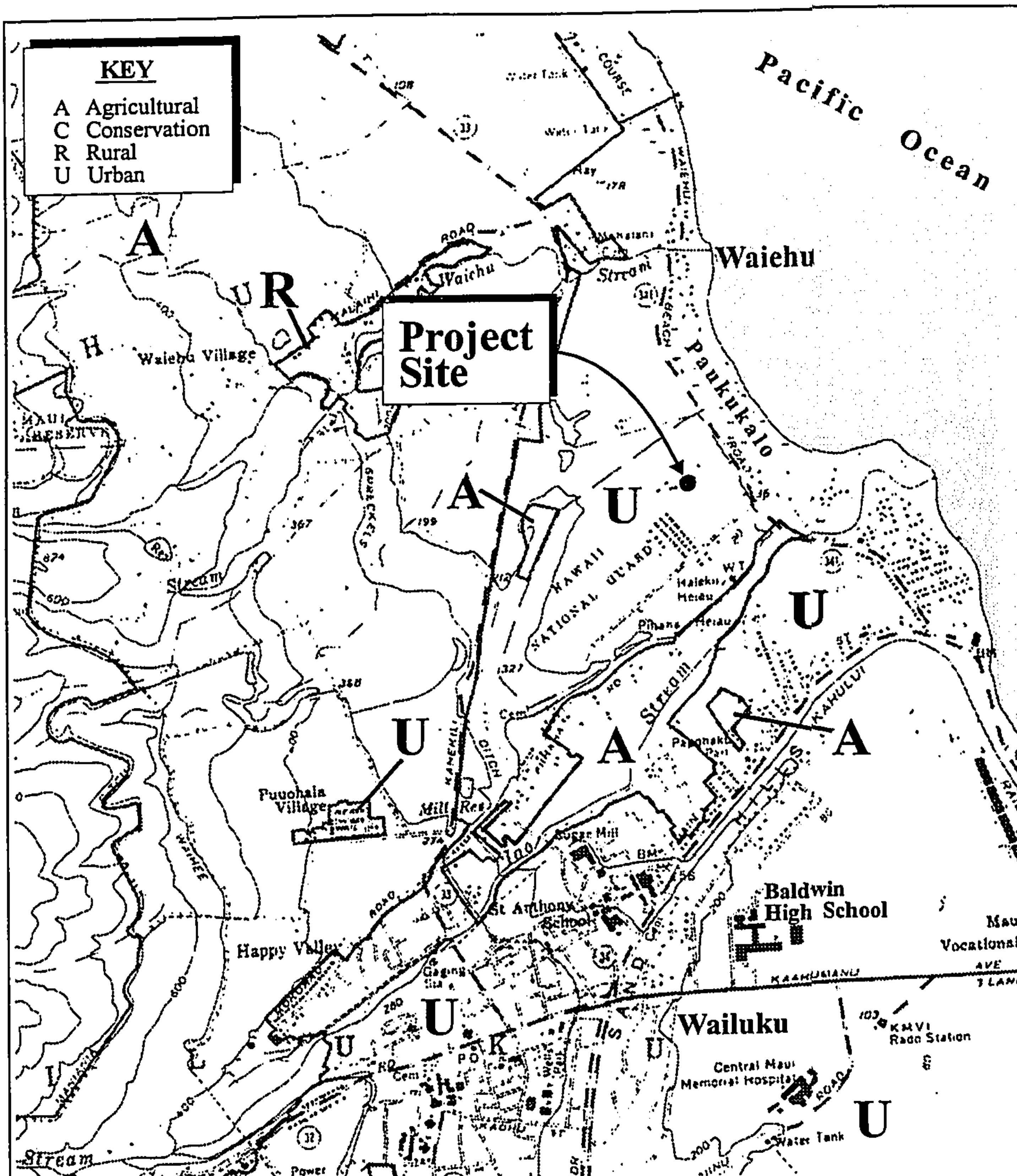
B. MAUI COUNTY GENERAL PLAN

The Maui County General Plan (1990 Update) sets forth broad objectives and policies to help guide the long range development of the County. As stated in the Maui County Charter, "The purpose of the General Plan is to recognize and state the major problems and opportunities concerning the needs and the development of the County and the social, economic and environmental effects of such development and set forth the desired sequence, patterns and characteristics of future development."

The proposed action is in keeping with the following General Plan objectives and policies.

Objective: To provide Maui residents with continually improving quality educational opportunities which can help them better understand themselves and their surroundings and help them realize their ambitions.

Policy: Seek continual improvement in the quality of education at all levels for all residents.



Source: State Land Use Commission

Figure 6

Paukukalo Preschool
Two-Classroom Building
State Land Use Designations

Prepared for: Kamehameha Schools

MUNEKIYO & HIRAGA, INC.

C. *WAILUKU-KAHULUI COMMUNITY PLAN*

The subject parcel is located in the Wailuku-Kahului Community Plan region which is one of nine (9) Community Plan regions established in the County of Maui. Planning for each region is guided by the respective Community Plans, which are designed to implement the Maui County General Plan. Each Community Plan contains recommendations and standards which guide the sequencing, patterns and characteristics of future development in the region.

The proposed project site is designated as "Park" by the Wailuku-Kahului Community Plan. See Figure 7. Development on DHHL property is exempt from community plan provisions but the project does support the plan.

The two-classroom building supports the education aspects of the community plan by providing a preschool facility for native Hawaiian beneficiaries. This expands educational opportunities within the County.

The proposed action also provides a significant amenity for the Paukukalo neighborhood. This aids in preserving the long-term viability of the community.

D. *ZONING*

The subject property's underlying zoning is R-2 Residential District. A preschool is considered a County Special Use within the R-2 District. Although a County Special Use Permit would normally be applicable where there are more than 12 children on lot sizes of 10,000 square feet or more, DHHL is not subject to County zoning rules and regulations.

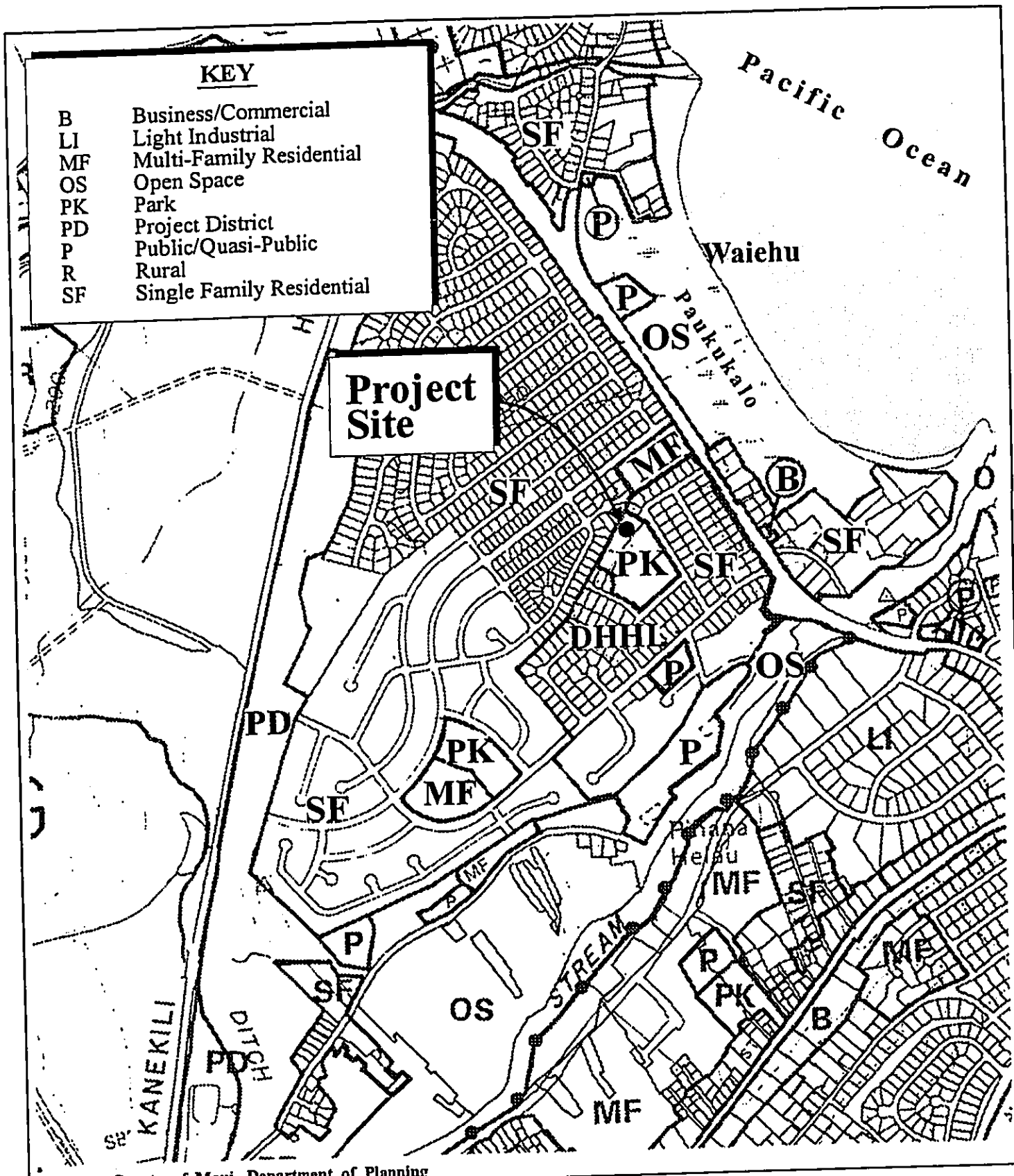


Figure 7

Paukukalo Preschool Two-Classroom Building

Wailuku-Kahului Community Plan

0 250 500 1000 Feet

MUNEKIYO & HIRAGA, INC.

Prepared for: Kamehameha Schools

E. COASTAL ZONE MANAGEMENT OBJECTIVES AND POLICIES

Pursuant to Chapter 205A, Hawaii Revised Statutes, all lands within the State are considered within the coastal zone. This section addresses the project's relationship to applicable coastal zone management considerations as set forth in Chapter 205A. It is noted that the project site is outside of the County Special Management Area.

Recreational Resources

Objective: Provide coastal recreational opportunities accessible to the public.

Policies:

a. Improve coordination and funding of coastal recreational planning and management; and

b. Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:

(i) Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;

(ii) Requiring replacement of coastal resources having significant recreational value, including but not limited to surfing sites, fishponds, and sand beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the state for recreation when replacement is not feasible or desirable;

(iii) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;

(iv) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;

(v) Ensuring public recreational use of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety

standards and conservation of natural resources;

(vi) Adopting water quality standards and regulating point and non-point sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;

(vii) Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and

(viii) Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, county planning commissions; and crediting such dedication against the requirements of Section 46-6, HRS.

Response: The proposed project is not located on the shoreline and is not anticipated to affect existing coastal or inland recreational resources.

Historic Resources

Objective: Protect, preserve and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

Policies:

a. Identify and analyze significant archeological resources;

b. Maximize information retention through preservation of remains and artifacts or salvage operations; and

c. Support state goals for protection, restoration, interpretation, and display of historic resources.

Response: The project site has been previously disturbed in connection with the development of the park. However, should any cultural materials be uncovered during construction, the applicant intends to notify and work

closely with the State Historic Preservation Division on implementing applicable mitigation measures.

Scenic and Open Space Resources

Objectives: Protect, preserve and, where desirable, restore or improve the quality of coastal scenic and open space resources.

Policies:

a. Identify valued scenic resources in the coastal zone management area;

b. Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;

c. Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and

d. Encourage those developments which are not coastal dependent to locate in inland areas.

Response: The two-classroom building will not adversely impact scenic or open space resources. The proposed project will not involve significant alteration to the existing topographic character of the site and will not significantly affect public views from the shoreline.

Coastal Ecosystems

Objective: Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.

Policies:

a. Improve the technical basis for natural resource management;

b. Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;

c. Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and

d. Promote water quantity and quality planning and management practices which reflect the tolerance of fresh water and marine ecosystems and prohibit land and water uses which violate state water quality standards.

Response: The proposed improvements are not expected to adversely impact coastal ecosystems. The project will comply with applicable County drainage provisions. Erosion control measures will be implemented during construction to ensure that coastal ecosystems are not impacted.

Economic Uses

Objective: Provide public or private facilities and improvements important to the State's economy in suitable locations.

Policies:

a. Concentrate coastal dependent development in appropriate areas;

b. Ensure that coastal dependent development such as harbors and ports, and coastal related development such as visitor facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and

c. Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:

(i) Use of presently designated locations is not feasible;

(ii) Adverse environmental effects are minimized; and

(iii) The development is important to the State's economy.

Response: The project would have a beneficial short-term impact on the economy during construction. In the long term, the project provides employment relating to the operation of the pre-school. The proposed action is not inconsistent with the objectives and policies for economic use.

Coastal Hazards

Objective: Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence and pollution.

Policies

a. Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards;

b. Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint pollution hazards;

c. Ensure that developments comply with requirements of the Federal Flood Insurance Program;

d. Prevent coastal flooding from inland projects; and

e. Develop a coastal point and nonpoint source pollution control program.

Response: Erosion control measures will be incorporated during the construction period to minimize soil loss and erosion hazards. No significant adverse drainage impacts to downstream properties will result from the proposed project.

Managing Development

Objective: Improve the development review process, communication, and public participation in the management of coastal resources and hazards.

Policies:

a. Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;

b. Facilitate timely processing of applications for development permits and resolve overlapping of conflicting permit requirements; and

c. Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life-cycle and in terms understandable to the public to facilitate public participation in the planning and review process.

Response:

Early consultation and public review are required as part of the Environmental Assessment process. Applicable State and County requirements will be adhered to in the design and construction of the proposed project.

Public participation

Objective: Stimulate public awareness, education, and participation in coastal management.

Policies:

a. Maintain a public advisory body to identify coastal management problems and to provide policy advice and assistance to the coastal zone management program;

b. Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public

workshops for persons and organizations concerned with coastal-related issues, developments, and government activities; and

c. Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.

Response: Comments are being solicited as part of the Environmental Assessment process. The proposed project is not contrary to the objective of public awareness, education and participation.

Beach protection

Objective: Protect beaches for public use and recreation.

Policies:

a. Locate new structures inland from the shoreline setback to conserve open space and to minimize loss of improvements due to erosion;

b. Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities; and

c. Minimize the construction of public erosion-protection structures seaward of the shoreline.

Response: The project site is not located adjacent to any beach or shoreline. Thus, there should be no adverse impact to this component of the environment.

Marine Resources

Objective: Implement the State's ocean resources management plan.

Policies:

a. Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;

b. Assure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;

c. Coordinate the management of marine and coastal resources and activities management to improve effectiveness and efficiency;

d. Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;

e. Promote research, study, and understanding of ocean processes, marine life, and other ocean resources in order to acquire and inventory information necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and

f. Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

Response: The proposed project is not anticipated to have adverse effects upon marine and coastal resources in the vicinity.

Chapter V

Summary of Adverse Environmental Effects Which Cannot Be Avoided

V. SUMMARY OF ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

The proposed two-classroom building will result in unavoidable construction-related impacts as described in Chapter III, Potential Impacts and Mitigation Measures.

Potential effects include noise generated impacts occurring from site preparation and construction activities. In addition, there may be temporary air quality impacts associated with dust generated from construction activities, and exhaust emissions discharged by construction equipment.

The proposed project is not anticipated to create any significant, long-term adverse environmental effects.

Chapter VI

Alternatives Analysis

VI. ALTERNATIVES ANALYSIS

The proposed two-classroom building is an alternative to the initially proposed multi-purpose building. While the multi-purpose building would have been a desired component of the preschool, the educational objectives for preschool-aged children were deemed to be of higher priority by Kamehameha Schools. In this context, implementation of the additional two-classroom building is being pursued.

Chapter VII

Irreversible and Irretrievable Commitment of Resources

VII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The proposed project would involve the commitment of fuel, land, labor and material resources. Portions of the existing Paukukalo Park would be occupied by the project. Although green space and parking would be utilized, the project would provide amenities for the community in the form of a preschool, DHHL site office and replacement parking.

Chapter VIII

Findings and Conclusions

VIII. FINDINGS AND CONCLUSIONS

The proposed project involves the construction of a two-classroom building in lieu of a multi-purpose building at Kamehameha School's Paukukalo Preschool. Every phase of the proposed action, expected consequences, both primary and secondary, and the cumulative as well as the short-term and the long-term effects of the action have been evaluated in accordance with the Significance Criteria of Section 11-200-12 of the Hawaii Administrative Rules. Based on the analysis, the proposed project will not result in any significant impacts. Discussion of project conformance to the criteria is noted as follows:

1. ***No Irrevocable Commitment to Loss of Destruction of any Natural or Cultural Resources Would Occur as a Result of the Proposed Project***

   The project site has already been altered through development of the Paukukalo Park and is within an area of urban development. There are no known rare, endangered or threatened species of flora, fauna, or avifauna within the project site.

   From an archaeological standpoint, the ground surface has already been altered by previous activities. However, if archaeological or cultural materials are found during construction, work in the vicinity will cease and the State Historic Preservation Division will be notified to ensure compliance with Chapter 6E, HRS.

2. ***The Proposed Project Would Not Curtail the Range of Beneficial Uses of the Environment***

   The project site is located within a landscaped open space and parking area. The commitment of land resources would not curtail the range of beneficial uses of the environment.

3. ***The Proposed Action Does Not Conflict With the State's Long-Term Environmental Policies or Goals or Guidelines as Expressed in Chapter 344, Hawaii Revised Statutes***

The State Environmental Policy and Guidelines are set forth in Chapter 344, Hawaii Revised Statutes. The proposed action is in consonance with the following guidelines:

Environmental Policy:

Enhance the quality of life by:

Establishing communities which provide a sense of identity, wise use of land, efficient transportation, and aesthetic and social satisfaction in harmony with the natural environment which is uniquely Hawaiian.

Guideline:

Foster lifestyles compatible with the environment; preserve the variety of lifestyles traditional to Hawaii through the design and maintenance of neighborhoods which reflect the culture and mores of the community.

4. ***The Economic or Social Welfare of the Community or State Would Not Be Substantially Affected***

The proposed project provides a direct economic benefit during the construction phase of the project. In the long term, there would be support to the service sector. The project will have a beneficial effect upon the social welfare of the community.

5. ***The Proposed Action Does Not Affect Public Health***

No negative impacts to the public's health and welfare are anticipated as a result of the proposed action.

6. ***No Substantial Secondary Impacts Such as Population Changes or Effects on Public Facilities Are Anticipated***

The proposed project is not anticipated to have an effect upon the island's population base and should not place significant new demands on the island's public services.

7. ***No Substantial Degradation of Environmental Quality is Anticipated***

As the proposed project is implemented, appropriate environmental mitigation measures will be used to ensure that adverse environmental effects are mitigated. No substantial degradation of environmental quality resulting from the proposed project is anticipated.

8. ***The Proposed Action Does Not Involve a Commitment to Larger Actions Nor Would Cumulative Impacts Result in Considerable Effects Upon the Environment***

The proposed two-classroom building is part of the Kamehameha School's Paukukalo Preschool. Beyond the preschool, there are no larger actions which are linked to the proposed project. The proposed project is not anticipated to create any significant long-term environmental effects.

9. ***No Rare, Threatened or Endangered Species or Their Habitats Would Be Adversely Affected by the Proposed Project***

There are no known significant habitats or rare, endangered or threatened species of flora and fauna at the project site. The removal of existing flora and displacement of fauna or avifauna from the area due to construction activities are not considered a negative impact upon these environmental features.

10. ***Air Quality, Water Quality or Ambient Noise Levels Would Not Be Detrimentally Affected by the Proposed Project***

Appropriate environmental mitigation measures will be used during construction to ensure that adverse environmental effects on air quality and noise are minimized. The project should have no adverse effect upon water quality.

In the long term, the proposed project is not anticipated to have a significant impact on air quality, water quality or noise parameters.

11. ***The Proposed Project Would Not Affect Environmentally Sensitive Areas Such as Flood Plains, Tsunami Zones, Erosion-prone Areas, Geologically Hazardous Lands, Estuaries, Fresh Waters, or Coastal Waters***

The subject property is not located within or would not affect environmentally sensitive areas. The site is located in an area of minimal flooding and not subject to tsunami inundation. The underlying soils are not erosion-prone. There are no geologically hazardous lands, estuaries or coastal areas within or adjacent to the subject property.

12. ***The Proposed Action Would Not Substantially Affect Scenic Vistas and Viewplanes Identified in County or State Plans or Studies***

The proposed classroom building will be one-story in height and compatible with building heights of surrounding structures. The grounds will also be fully landscaped. The proposed project will be complementary to the surrounding neighborhood and its scenic character.

13. ***The Proposed Action Would Not Require Substantial Energy Consumption***

The construction of the two-classroom building will involve the short-term commitment of fuel for equipment, vehicles and machinery during

construction activities. However, this use is not anticipated to result in substantial consumption of energy resources. In the long term, the project will create an additional demand for electricity. However, this demand is not substantive or excessive within the context of the region's overall energy consumption.

Based on the foregoing findings, it is concluded that the proposed action will not result in any significant impacts.

Chapter IX

Agencies and Organizations Consulted Prior to the Preparation of the Draft Environmental Assessment

IX. AGENCIES AND ORGANIZATIONS CONSULTED PRIOR TO THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT

The following agencies and organizations were consulted prior to the preparation of the Draft Environmental Assessment. Letters received are included in this section.

1. David Blane, Director
State of Hawaii
Office of Planning
Department of Business, Economic, Development and Tourism
P.O. Box 2359
Honolulu, HI 96804

2. Herbert Matsubayashi
State of Hawaii
District Environmental Health Program Chief
Department of Health
54 High Street
Wailuku, HI 96793

3. Gilbert Coloma-Agaran, Director
State of Hawaii
Department of Land and Natural Resources
P. O. Box 621
Honolulu, HI 96809

4. Robert Siarot, Maui District Engineer
State of Hawaii
Department of Transportation
Highways Division
650 Palapala Drive
Kahului, HI 96732

5. Clayton Ishikawa, Chief
County of Maui
Department of Fire Control
200 Dairy Road
Kahului, HI 96732

6. Alice Lee, Director
County of Maui
Department of Housing and Human Concerns
200 S. High Street
Wailuku, HI 96793

7. Floyd Miyazono, Director
County of Maui
Department of Parks and Recreation
1580-C Kaahumanu Avenue
Wailuku, HI 96793

8. John Min, Director
County of Maui
Department of Planning
250 South High Street
Wailuku, HI 96793

9. Thomas Phillips, Chief
County of Maui
Police Department
55 Mahalani Street
Wailuku, HI 96793

10. David Goode, Director
County of Maui
Department of Public Works and Waste Management
200 South High Street
Wailuku, HI 96793

11. David Craddick, Director
County of Maui
Department of Water Supply
200 South High Street
Wailuku, HI 96793

12. Greg Kauhi
Maui Electric Company, Ltd.
P. O. Box 398
Kahului, HI 96732

13. Kalani Tassill, President
Paukukalo Community Association
P.O. Box 2424
Wailuku, HI 96793

It is noted that meetings between Kamehameha Schools and the Paukukalo Community Association were held on November 30, 1999 and December 7, 1999 to discuss project parameters. A meeting was held on February 27, 2001 to discuss the revised project parameters.

MAY 0 7 2001

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

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

May 4, 2001

LD-NAV
Ref.: PAUKUKALOPS.RCM
LOG1454

Gwen Ohashi Hiraga, Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Hiraga:

SUBJECT: Revised Design to Multi-Purpose Building at Paukukalo Preschool (Kamehameha School) located at Paukukalo, Island of Maui, Hawaii TMK: 2nd/ 3-3-85: portion of 087

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

The Department has no comment to offer. Should you have any questions, please feel free to contact Nicholas Vaccaro of the Land Division's Support Services Branch at 808-587-0438.

Very truly yours,

DEAN Y. UCHIDA
Administrator

C: Maui District Land Office

BENJAMIN J. CAYETANO
GOVERNOR

APR 27 2001

BRIAN K. MINAAI
DIRECTOR

DEPUTY DIRECTORS
GLENN M. OKIMOTO
JADINE Y. URASAKI

IN REPLY REFER TO:

HWY-M 2.128-01

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
MAUI DISTRICT
650 PALAPALA DRIVE
KAHULUI, HAWAII 96732

April 25, 2001

MEMORANDUM

TO: Gwen Ohashi Hiraga, Project Manager
Munekiyo & Hiraga, Inc.

FROM: Robert O. Siarot, District Engineer
State Highways

SUBJECT: PAUKUKALO PRESCHOOL
I.D. NO. ME-99-68

Based on our review of the project summary, a Traffic Impact Analysis Report is required to determine the project's impact on our facilities. More specifically, traffic signal warrants need to be analyzed at the Waiehu Beach Road/Kuhio Place intersection.

If you have any questions, please call me at [illegible]-3535.

PMC:dmf

DEPARTMENT OF
HOUSING AND HUMAN CONCERNS
COUNTY OF MAUI

MAY 0 3 2001

JAMES "KIMO" APANA
Mayor
ALICE L. LEE
Director
PRISCILLA P. MIKEL
Deputy Director

200 SOUTH HIGH STREET • WAILUKU, HAWAII 96793 • PHONE (808) 270-7805 • FAX (808) 270-7165

May 1, 2001

Gwen Ohashi Hiraga, Project Manager
Munekiyo Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

SUBJECT: Revised Design to Multi-Purpose Building at Paukukalo Preschool

Dear Ms Hiraga,

I commend Kamehameha Schools for its foresight in addressing the critical early education needs of Native Hawaiian families in Maui County. The need for affordable and quality early childhood education is great, especially among Native Hawaiian families.

In addition to the Paukukalo site, this Department encourages Kamehameha Schools to consider providing early childhood education programs in other areas of Maui with high concentrations of Native Hawaiian children; for example, the Keokea area in Kula. There is a projected need for early childhood education programs in the immediate future as families begin to settle on this Hawaiian homestead. Additionally, transportation is often a barrier for Native Hawaiian families so having a preschool in close proximity to communities with large concentrations of Native Hawaiians would increase accessibility as well.

Again, I commend Kamehameha Schools for investing in the future of the Native Hawaiian community on Maui through its expansion of educational services, especially early education.

Sincerely,

Alice L. Lee
Director

APR 2 / 2001

DEPARTMENT OF
HOUSING AND HUMAN CONCERNS
COUNTY OF MAUI

JAMES "KIMO" APANA
Mayor
ALICE L. LEE
Director
PRISCILLA P. MIKELL
Deputy Director

200 SOUTH HIGH STREET • WAILUKU, HAWAII 96793 • PHONE (808) 270-7805 • FAX (808) 270-7165

April 23, 2001

Ms. Gwen Ohashi Hiraga
Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, suite 104
Wailuku, Hawaii 96793

Dear Ms. Ohashi Hiraga:

Subject: REVISED DESIGN TO MULTI-PURPOSE BUILDING AT PAUKUKALO PRESCHOOL

We have reviewed the project summary and have no comments to offer.

Thank you for the opportunity to comment.

Very truly yours,

ALICE L. LEE
Director

ETO:hs

c: Housing Administrator

DEPARTMENT OF
PARKS AND RECREATION
COUNTY OF MAUI

1580-C KAAHUMANU AVENUE WAILUKU, HAWAII 96793

JAMES "KIMO" APANA
Mayor

FLOYD S. MIYAZONO
Director

ELIZABETH D. MENOR
Deputy Director

(808) 270-7230
FAX (808) 270-7934

APR 27 2001

April 24, 2001

Gwen Ohashi Hiraga
Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Hiraga:

SUBJECT: REVISED DESIGN TO MULTI-PURPOSE BUILDING AT PAUKUKALO PRESCHOOL

We have reviewed the general overview of the subject project and have no comments or objections to the proposed revisions.

Thank you for the opportunity to review and comment. Should you have any questions, please feel free to call me or Mr. Patrick Matsui, Chief of Planning and Development, at 270-7387.

Sincerely,

FLOYD S. MIYAZONO
Director

c: Patrick Matsui, Chief of Planning and Development

Mayor

JOHN E. MIN
Director

CLAYTON I. YOSHIDA
Deputy Director

COUNTY OF MAUI
DEPARTMENT OF PLANNING

April 27, 2001

Ms. Gwen Ohashi Hiraga
Munekiyo & Hiraga, Inc.
305 South High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Hiraga:

RE: Draft Environmental Assessment for Paukukalo Preschool, Revised

The Maui Planning Department has reviewed the above-referenced project and understands that the redesigned preschool will have a maximum enrollment of 120 students. The development will have six classrooms located in two structures. In addition, a 1,200 sq. ft. office building is proposed to be constructed adjacent to the community center. The originally proposed multi-purpose building has been modified into the additional classrooms.

Our December 19, 2000 letter regarding traffic is still appropriate and should be included in the draft EA. However, any impacts associated with the project should be based upon the current proposal of 120 students, an increase of 40 students.

Thank you for the opportunity to comment on the proposed project. If additional clarification is required, please contact Ms. Colleen Suyama, Staff Planner, of this office at 270-7735.

Very truly yours,

JOHN E. MIN
Planning Director

JEM:CMS:cmb
c: Clayton Yoshida, AICP, Deputy Planning Director
Colleen Suyama, Staff Planner
Project File
General File
S:\ALL\COLLEEN\Paukukalo Preschool\revisedEa.wpd

Maui Electric Company, Ltd. • 210 West Kamehameha Avenue • PO Box 398 • Kahului, Maui, HI 96733-6898 • (808) 871-8461

MAY 2 4 2001

May 22, 2001

Ms. Gwen Ohashi Hiraga
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

Subject: Revised Design to Multi-Purpose Building at Paukukalo Preschool

Dear Ms. Hiraga,

We appreciate the opportunity to comment on this project and apologize for the late response to your letter dated April 18, 2001. We have no objections to their request for the subject project.

Maui Electric Company will provide electrical power to the proposed project upon request by the customer. However, we suspect that our review of the subject project's power requirements must be obtained to complete this project. We would like to take this opportunity to mention that a design submittal and project timeframe from the project's consultant would be greatly appreciated to provide our electrical requirements.

Should you have any further questions, please contact me at (808) 871-2366.

Sincerely,

Gregorysenn Kauhi
Distribution Engineering Supervisor

Chapter X

Letters Received During the Draft Environmental Assessment Public Comment Period and Responses to Substantive Comments

X. LETTERS RECEIVED DURING THE DRAFT ENVIRONMENTAL ASSESSMENT PUBLIC COMMENT PERIOD AND RESPONSES TO SUBSTANTIVE COMMENTS

Pursuant to the requirements of the environmental review process, letters recieved during the Draft Environmental Assessment public comment period, as well as responses to substantive comments, are included in this section.

BENJAMIN J. CAYETANO
GOVERNOR

BRUCE S. ANDERSON, Ph.D., M.P.H.
DIRECTOR OF HEALTH

LORRIN W. PANG, M.D., M.P.H
MAUI DISTRICT HEALTH OFFICER

STATE OF HAWAII
DEPARTMENT OF HEALTH
MAUI DISTRICT HEALTH OFFICE
ENVIRONMENTAL PROTECTION AND HEALTH SERVICES
54 HIGH STREET, ROOM 300
WAILUKU, MAUI, HAWAII 96793

July 10, 2001

Gwen Ohashi Hiraga
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawai'i 96793

Dear Ms. Ohashi Hiraga:

Subject: **Paukukalo Preschool, Two-Classroom Building**
TMK: (2) 3-3-5: por. 86 and por. 87

Thank you for the opportunity to comment on the Draft Environmental Assessment for the additional two classrooms for the Paukukalo Preschool project. The following comments are offered:

The noise created during the construction phase of the project may exceed the maximum allowable levels as set forth in Hawaii Administrative Rules, Chapter 11-46 "Community Noise Control". A noise permit may be required and should be obtained before the commencement of work.

Should you have any questions, please call me at 98-

Sincerely,

Herbert S. Matsubayashi
District Environmental Health Program Chief

MUNEKIYO & HIRAGA, INC.

September 28, 2001

Mr. Hebert S. Matsubayashi
District Environmental Health Program Chief
Department of Health, Maui District Office
54 High Street, Room 300
Wailuku, Hawaii 96793

SUBJECT: *Paukukalo Preschool, Two-Classroom Building*
TMK 3-3-5: por. 86 and por. 87

Dear Mr. Matsubayashi:

Thank you for your letter of July 10, 2001, providing comments on the Draft Environmental Assessment for the referenced project.

On behalf of the applicant, Kamehameha Schools, we acknowledge your comments regarding noise created during the construction phase and will obtain the necessary permits for the project.

Thank you again for providing us with your comments.

Very truly yours,

Gwen Ohashi Hiraga

Gwen Ohashi Hiraga
Project Manager

GOH:cc
cc: Allison Yue, Kamehameha Schools
Carolyn Darr, Department of Hawaiian Home Lands
k:\be\addicias\doh.ltr

planning environment
305 High Street, Suite 104 · Wailuku, Hawaii 96793 · ph: (808)244-2015 · fax: (808)244-8729 · planning@mhinconline.com

DEPARTMENT OF
HOUSING AND HUMAN CONCERNS
COUNTY OF MAUI

JAMES "KIMO" APANA
Mayor
ALICE L. LEE
Director
PRISCILLA P. MIKELL
Deputy Director

200 SOUTH HIGH STREET • WAILUKU, HAWAII 96793 • PHONE (808) 270-7805 • FAX (808) 270-7165

July 10, 2001

Ms. Gwen Ohashi Hiraga
Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Hiraga:

SUBJECT: PAUKUKALO PRESCHOOL
TWO-CLASSROOM BUILDING

We have reviewed the draft Environmental Assessment for the subject project and have no additional comments to offer.

Thank you for the opportunity to comment.

Very truly yours,

ALICE L. LEE
Director

ETO:hs

c: Housing Administrator

JUL 17 2001

JAMES "KIMO" APANA
MAYOR

OUR REFERENCE
ty
YOUR REFERENCE

POLICE DEPARTMENT
COUNTY OF MAUI

55 MAHALANI STREET
WAILUKU, HAWAII 96793
(808) 244-6400
FAX (808) 244-6411

THOMAS M. PHILLIPS
CHIEF OF POLICE

KEKUHAUPIO R. AKANA
DEPUTY CHIEF OF POLICE

July 13, 2001

Ms. Gwen Ohashi Hiraga
Project Manager
Munekiyo, Arakawa & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

Dear Ms. Ohashi Hiraga:

SUBJECT: Paukukalo Preschool-Additional Classrooms

Thank you for your letter of July 3, 2001, requesting comments on the above subject.

The assessment was reviewed and we have no additional comments or recommendations at this time. Thank you for giving us the opportunity to comment on this project. We are returning the Draft Environmental Assessment which was submitted for our review.

Very truly yours,

Assistant Chief Robert Tam Ho
for: Thomas M. Phillips
Chief of Police

Enclosure

c: John E. Min, Planning Department

BENJAMIN J. CAYETANO
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
MAUI DISTRICT
650 PALAPALA DRIVE
KAHULUI, HAWAII 96732

BRIAN K. MINAAI
DIRECTOR

DEPUTY DIRECTORS
GLENN M. OKIMOTO
JADINE Y. URASAKI

IN REPLY REFER TO:
HWY-M2.205-01

July 14, 2001

MEMORANDUM

TO: **Gwen Ohashi Hiraga**
Munekiyo & Hiraga, Inc.

FROM: **Paul M. Chung**
State Highways

SUBJECT: **Paukukalo Preschool - Additional Classrooms**
ME 99-68

Thank you for giving us the opportunity to review the Draft Environmental Assessment for the subject project. Based upon our review, the proposed development should not have a significant impact upon our facilities, therefore, we have no objections to the project.

If there are any questions or concerns, please call me at 873-3535.

/pmc

Maui Electric Company, Ltd. • 210 West Kamehameha Avenue • PO Box 398 • Kahului, Maui, HI 96733-6898 • (808) 871-8461

JUL 2 4 2001

July 20, 2001

Ms. Gwen Ohashi Hiraga
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

Subject: Paukukalo Preschool-Additional Classrooms

Dear Ms. Hiraga,

We appreciate the opportunity to comment on this project in response to your letter dated July 3, 2001. We have no objections to this request in regards to your draft environmental assessment for the subject project.

Our correspondence dated May 22, 2001 to you is still appropriate and should be included in the draft EA.

Should you require additional clarification, please contact me at (808) 871-2366.

Sincerely,

Gregorysenn Kauhi
Distribution Engineering Supervisor

JAMES "KIMO" APANA
Mayor

JOHN E. MIN
Director

CLAYTON I. YOSHIDA
Deputy Director

JUL 3 1 2001

COUNTY OF MAUI
DEPARTMENT OF PLANNING

July 27, 2001

Ms. Gwen Hiraga
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Hiraga:

RE: Draft Environmental Assessment (EA) for the Proposed Kamehameha Schools/Department of Hawaiian Home Lands Paukukalo Preschool to Change the Original Proposal to Construct a Multi-Purpose Building and Replace with Two Classrooms and to Increase the Enrollment from 80 Students to 120 Students at Tax Map Key: 3-3-005:Portion 86 and Portion 87, Paukukalo, Maui, Hawaii

The Maui Planning Department (Department) received your letter of July 5, 2001, requesting review and comments on the above subject. Kamehameha Schools is now proposing to construct three new structures with six (6) preschool classrooms with twenty (20) children in each classroom. A children's play area is planned within the central portion of the preschool facility with the entire facility being secured by fencing.

The Planning Department has the following comments:

1. Page 1, I, "Project Overview," relating to existing use and proposed improvements should be expanded to identify the existing structures and uses on the property. A brief background on the first Draft EA submittal and what was proposed should be included. In addition, since the kitchen facility is removed, where and how will children be fed their snacks and lunch? Will the Community Center facility be used in place of the multi-purpose space activities? How will that affect the community's ongoing and current availability of the Community Center and use by the County's Department of Parks and Recreation?

2. Page 16, III, A.1, first line states that the project site is located in the middle of the Paukukalo Hawaiian Home Lands residential development. The project is located at the far north end of the Hawaiian Home Lands property - not in the middle of Paukukalo Hawaiian Home Lands residential development since the abutting north side is the residential developments of Waiehu Terrace.

3. Page 16, A.2, relating to topography and landform should note the difference in elevation of the existing Waiehu Residential Subdivision and the proposed development. Page 18, 6, relating to noise should also discuss the noise impact on the residential subdivision located above the proposed preschool site. Since noise levels generally travel up, would there be any landscaping such as large trees or tall hedges such as wili wili or panax be planted on the northern boundary to reduce noise levels?

4. The Traffic Impact Analysis Report (TIAR), as well as discussions on Pages 13-14 and 19-24, indicates that with the project, the level of service (LOS) at Kaae Road left-turn/through movement at Kaae Road and Waiehu Beach Road will change from a LOS of E to F during the a.m. peak and from LOS of C to D during the p.m. peak. There was no discussion in the TIAR or the draft EA on the number of accidents, particularly fatalities, that have occurred on Waiehu Beach Road at the Kuhio Road and Kaae Road area. There is also a line-of-sight problem turning left from Kaae Road and Kuhio Place onto Waiehu Beach Road because of the topography of the Waiehu Beach Road. To reduce the impact of traffic on Kuhio Place and Kaae Road, the parents and staff of the preschool could be encouraged to use Kealii Drive for egress and ingress to Waiehu Beach Road.

Should you have any questions, please call Ms. Julie Higa, Staff Planner, of this office at 270-7814.

Very truly yours,

JOHN E. MIN
Planning Director

JEM:JH:smb
c: Clayton Yoshida, AICP, Deputy Planning Director
Julie Higa, Staff Planner
Project File
General File
S:\ALL\JULIE\ENVIRONM\PaukulaloPreschool.DHHL\DraftEAgwenHiraga.ltr.wpd

MUNEKIYO HIRAGA, INC.

November 5, 2001

John E. Min, Director
Department of Planning
2200 Main Street, #335
Wailuku, Hawaii 96793

SUBJECT: Paukukalo Preschool, Two-Classroom Building
TMK 3-3-5:por. 86 and por. 87

Dear Mr. Min:

Thank you for your letter of July 27, 2001, commenting on the Draft Environmental Assessment (EA) for the subject project. On behalf of the applicant, Kamehameha Schools, we note the following:

1. ***Project Overview***

The Final EA will include information on the existing structures and uses, as well as background information on the first EA submittal and what was proposed.

Removal of the kitchen facility would not affect snacks and lunches for the children. The preschool will provide pre-packaged snacks, for which there is no preparation, and will be served in the classrooms. With regard to lunch, the children will bring their own lunches, and again, will have lunch in the classrooms.

There are no plans to use the community center in place of the multi-purpose space activities. The intent for the multi-purpose building was for assemblies. Without the facility, assemblies will be held outdoors. The program at the preschool will be similar to the Central Maui Preschool facility, for which there is no multi-purpose building. As noted in the Environmental Assessment document, a determination was made that additional classroom space was of higher priority than multi-purpose space, thereby accommodating more children at the preschool.

The Community Center is a facility of the Department of Hawaiian Home Lands (DHHL) and not the County of Maui, Department of Parks and Recreation. According to DHHL, the "ongoing and current availability" of the Community Center is not expected to change.

305 High Street, Suite 104 Wailuku, Hawaii 96793 ph: (808)244-2015 fax: (808)244-8729 planning@mhinconline.com

2. ***Location of Project Site***

The description of the project's location will be clarified in the Final EA document. The project site is not at the far north end of the Hawaiian Home Lands property as there is one (1) street of DHHL homes, immediately north of the project site.

3. ***Topography/Landform and Noise***

The project's engineer estimates that residences of the "Waiehu Residential Subdivision", particularly Lots 165, 166, and 167, which are adjacent to the preschool project area, are at least eight (8) feet higher than the classroom with the finished floor at 62.50 feet.

A six (6) feet high chain link fence will be constructed around the perimeter of the preschool. Further, the preschool will be landscaped as shown on the attached planting plan.

According to the DHHL, there are no plans for additional landscaping of the northern boundary of the property.

4. ***Traffic Impact Analysis Report***

In response to your department's comments, enclosed is a letter from the project's traffic engineer.

We appreciate your comments on the project.

Very truly yours,

Gwen Ohashi Hiraga
Project Manager

GOH:cc
Enclosures
cc: Allison Yue, Kamehameha Schools
Carolyn Darr, Department of Hawaiian Home Lands
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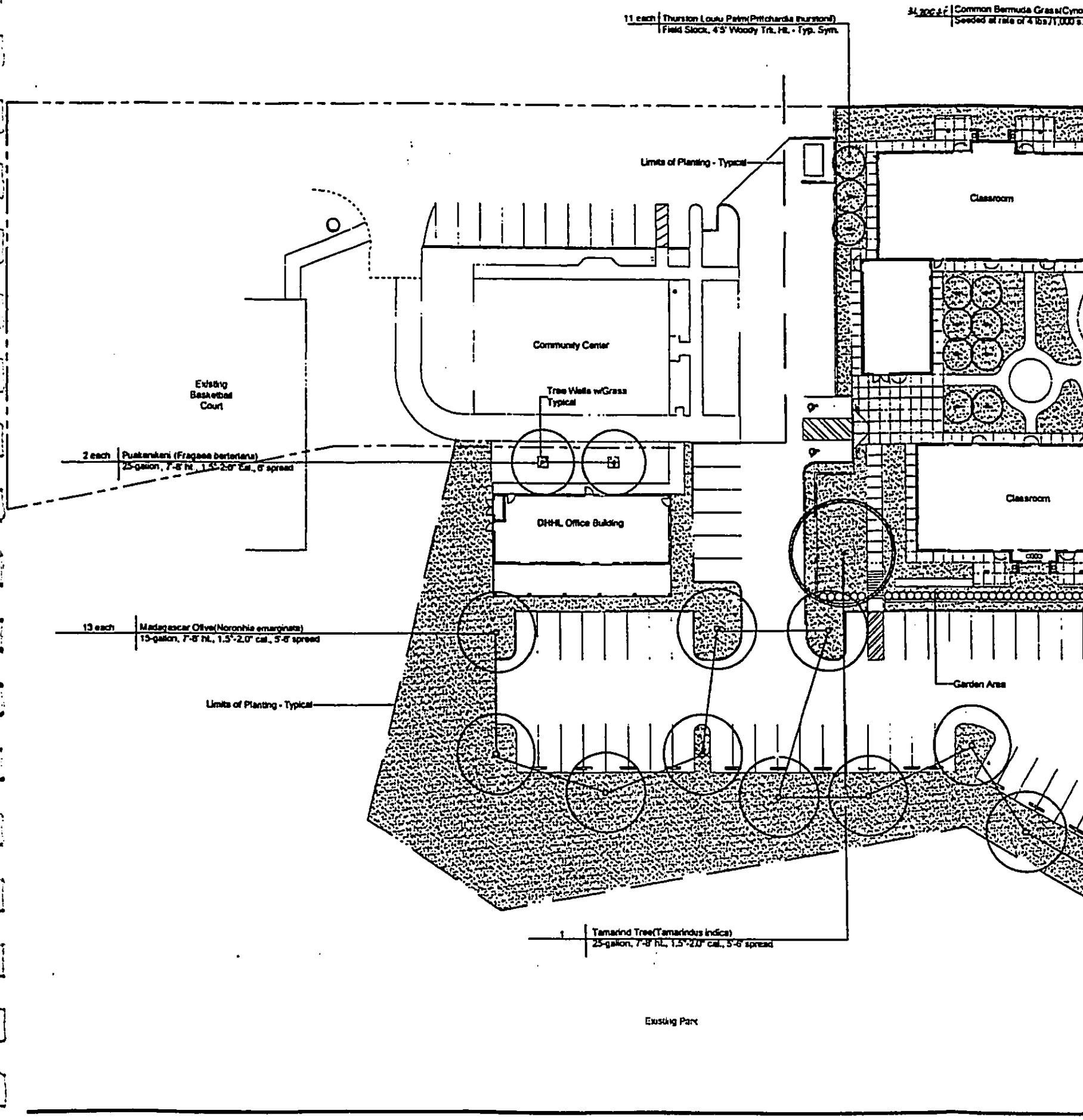

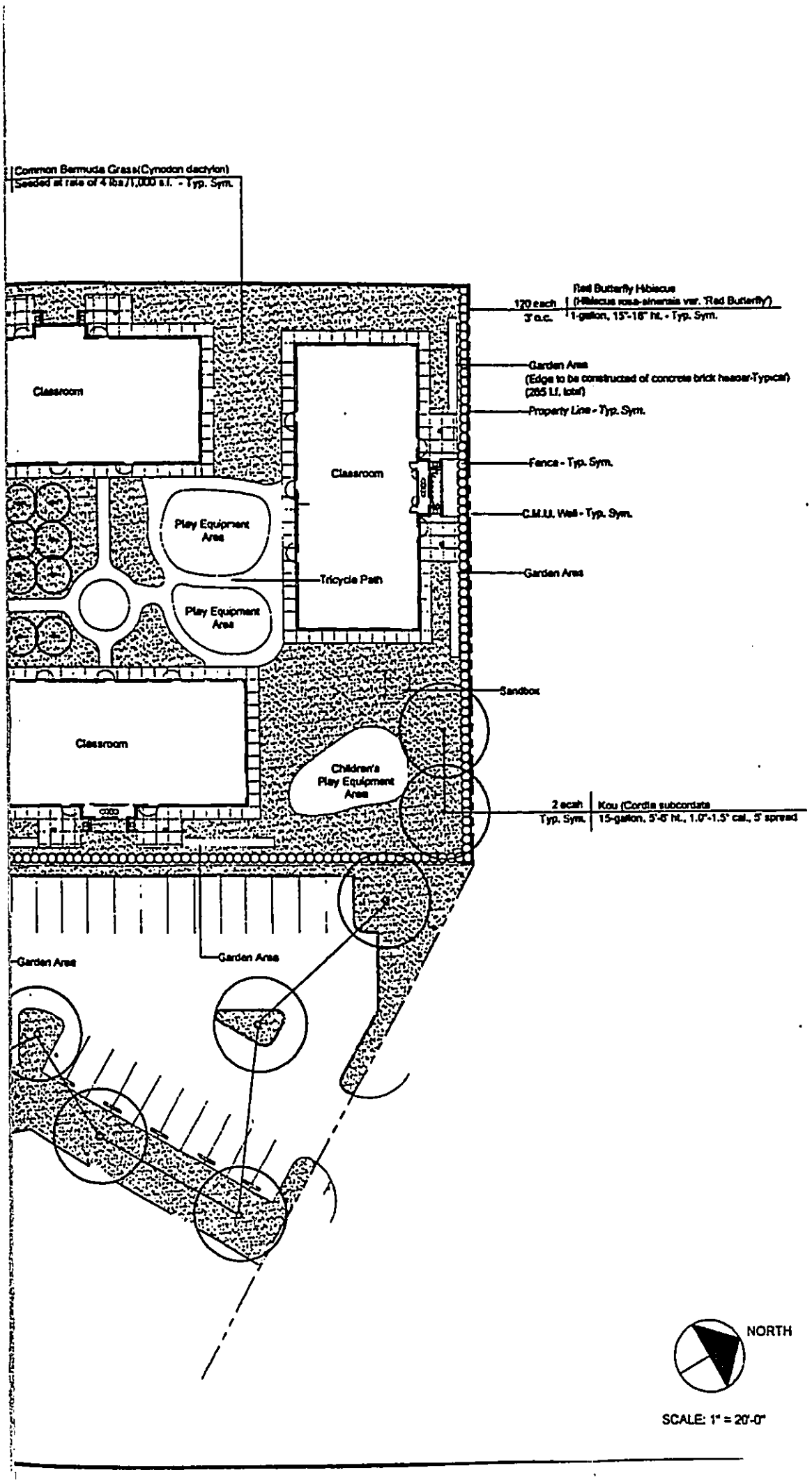

RUSSEL Y. GUSHI
LANDSCAPE
ARCHITECT

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RUSSEL Y. GUSHI LICENSED PROFESSIONAL LANDSCAPE ARCHITECT No. 0032 HAWAII, U.S.A.

This work was prepared by me or under my supervision.

KSBE-PAUKUKALO PRE-SCHOOL

TMK: (2)3-3-005: 088 & 087
PAUKUKALO, MAUI, HAWAII

PLANTING PLAN

Project No:
Drawn by: Manla Etc./RYG
Designed by: RYG
Checked by: RYG
Date: 03/23/01
Revisions:

Sheet :

L-3

3 of 4 Sheets

AUSTIN, TSUTSUMI & ASSOCIATES, INC. CIVIL ENGINEERS • SURVEYORS
CONTINUING THE ENGINEERING PRACTICE FOUNDED BY H. A. R. AUSTIN IN 1934

TED S KAWAHIGASHI PE . FACEC
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TERRANCE S ARASHIRO PE
MERNA S KIBE

#O-00-088

November 2, 2001

Munekiyo & Hiraga, Inc.
305 South High Street, Suite 104
Wailuku, Hawaii 96793

Attention: Ms. Gwen Hiraga:

Gentlemen and Ladies:

Subject: Paukukalo Preschool Traffic Report

This letter is in response to the County of Maui Planning Department's letter, dated July 27, 2001 in regards to the Draft Environmental Assessment (EA) for the Paukukalo Preschool addition of two additional classrooms and increase in student enrollment from 80 to 120 students.

In particular, we are responding to Comment No. 4 in regards to the traffic operations at Waiehu Beach Road and Kuhio Place/Kaae Road intersection. We concur with the recommendation that parents and staff be encouraged to use Kealii Drive for access to the preschool from Waiehu Beach Road. This would certainly present a more direct route to the school site from Waiehu Beach Road, and would lessen the traffic demand at the Kuhio Place/Kaae Road intersection.

A Traffic Impact Analysis Report (TIAR) normally does not discuss crashes (accidents) in the traffic study area, because the new development should not be expected to correct the existing problem(s) responsible for the crashes. And, therefore, this TIAR did not include a discussion on crashes on Waiehu Beach Road and at this intersection in particular. Further, the intersection sight distance is also an existing condition, and if it is deficient, the developer should not be tasked with its improvement.

Left-turning traffic from Kaae Road is projected to experience LOS "F" conditions in the Year 2001 under natural growth conditions, and without traffic generated by the subject project. See Figure 7 on Page 18 of the TIAR.

We trust that the above satisfactorily addresses the points raised in Comment No. 4.

Very truly yours,

AUSTIN, TSUTSUMI & ASSOCIATES, INC.

By Ted S. Kawahigashi
TED S. KAWAHIGASHI, P.E./FACEC
Principal Transportation Engineer

TSK:svol

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DEPARTMENT OF
PARKS AND RECREATION
COUNTY OF MAUI

1580-C KAAHUMANU AVENUE WAILUKU, HAWAII 96793

Mayor

FLOYD S. MIYAZONO
Director

ELIZABETH D. MENOR
Deputy Director

(808) 270-7230
FAX (808) 270-7934

August 3, 2001

Gwen Ohashi Hiraga
Project Manager
Munekiyo & Hiraga
305 High Street, Suite 104
Wailuku, Hawaii 96793

SUBJECT: Paukukalo Preschool - Additional Classrooms

Dear Ms. Hiraga:

We have reviewed the Draft Environmental Assessment for the subject project and find that we have no comments.

Thank you for allowing us to review and comment. Should you have any questions, please feel free to call me or Mr. Patrick Matsui, Chief of Parks Planning & Development, at 270-7387.

Sincerely,

Patrick T. Matsui

FLOYD S. MIYAZONO
Director

c: Patrick Matsui, Chief of Planning and Development

AUG 0 6 2001

DEPARTMENT OF WATER SUPPLY
COUNTY OF MAUI
P.O. BOX 1109
WAILUKU, MAUI, HAWAII 96793-7109
Telephone (808) 270-7816 • Fax (808) 270-7833

August 6, 2001

Gwen Ohashi Hiraga
Minekiyo and Hiraga Inc.
305 High Street Ste 104
Wailuku HI 96793

RE: Draft EA - Paukukalo Pre-School-Additional Classrooms
TMK: 3-3-05:86, 87

Dear Ms Hiraga:

Thank you for the opportunity to review the above-mentioned draft EA. The Department of Water Supply has the following comments:

The project involves the redesigning/reconfiguration of the multi-purpose facility into a 2-classroom building. Based on empirical data, water demand for pre-schools average approximately 814 gallons per day (gpd). However, average consumption for this facility is about 1,579 gpd.

This project are is being served by the Central Maui System. The major source of water for this system is the Iao Aquifer. Rolling annual average groundwater withdrawals from the Iao aquifer as of July 1, 2001 were 17.351 MGD. The regulatory sustainable yield of this aquifer is 20 MGD. If rolling annual average withdrawals exceed 20 MGD, the State Commission on Water Resource Management will designate Iao Aquifer. DWS is implementing a plan to bring new source on-line and to mitigate withdrawals. Two wells in North Waihee were brought on-line in July, 1997 and another two adjacent wells were brought on-line during the year 2000. The Department is continuing to implement the plan to bring new sources on-line and to mitigate withdrawals. No guarantee of water is granted or implied as a result of these comments.

The pre-school is being served by an 8" waterline and a fire hydrant situated on the property. Actual consumption for the project will be examined based on fixture unit counts during the building permit process. The applicant will be required to provide fire and domestic services according to standards including backflow prevention. Fire demand for structures is determined by fire flow calculations performed by a licensed engineer. The approved fire flow calculation method for use is the "Guide for Determination of Required Fire Flow" - Insurance Service Office, 1974. We encourage the applicant to contact our Engineering Division at 270-7835 to discuss the required system improvements.

The project is located in the Maui County Planting Plan - Plant Zones 3 and 5. In the event of any future landscape renovations, we encourage the applicant to utilize appropriate native and non invasive species and avoid the use of potentially invasive plants. Native plants adapted to the natural rainfall of the area conserve water and protect the watershed from degradation due to invasive alien species. Attached is a list of appropriate plants for the zones as well as potentially invasive plants to avoid.

Where possible, brackish and/or reclaimed water should be used for non-potable uses. We encourage the applicant to consider the following conservation measures:

Eliminate Single-Pass Cooling: Single-pass, water-cooled systems should be eliminated per Maui County Code Subsection 14.21.20. Although prohibited by code, single-pass water cooling is still manufactured into some models of air conditioners, freezers, and commercial refrigerators.

Utilize Low-Flow Fixtures and Devices: Maui County Code Subsection 16.20A.680 requires the use of low-flow water fixtures and devices in faucets, showerheads, urinals, water closets and hose bibs. Water conserving washing machines, ice-makers and other units are also available.

Maintain Fixtures to Prevent Leaks: A simple, regular program of repair and maintenance can prevent the loss of hundreds or even thousands of gallons a day. Refer to the attached handout, "The Costly Drip". The applicant should establish a regular maintenance program.

Prevent Over-Watering By Automated Systems: Provide rain-sensors on all automated irrigation controllers. Check and reset controllers at least once a month to reflect the monthly changes in evapotranspiration rates at the site.. As an alternative, provide the more automated, soil-moisture sensors on controllers.

The project overlies the Iao Aquifer. DWS strives to protect the integrity of surface water and and groundwater resources by encouraging applicants to adopt Best Management Practices (BMPs) relevant to potentially polluting activities. We have attached a few BMPs for your reference. Additional information can be obtained from the State Department of Health.

Should you have any questions, please contact our Water Resources and Planning Division at 270-7199.

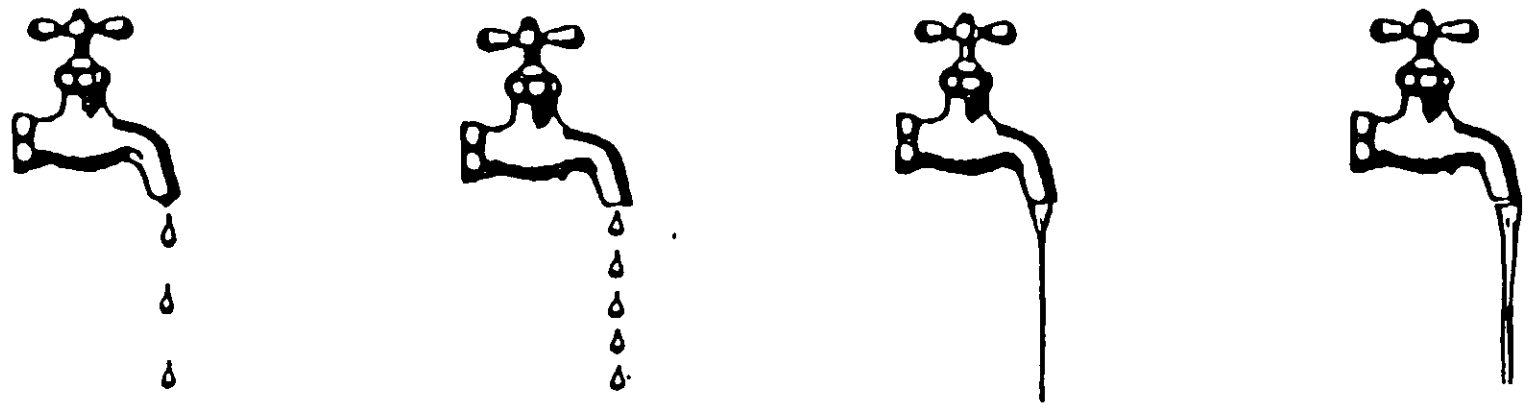
Sincerely,

David Craddick
Director

eam

c: engineering division
applicant ,with attachments:
"The Costly Drip"
Maui County Plating Plan-Plant Zones 3 & 5- "Saving Water in the Yard: What & How to Plant in Your Area"
BMPs for Erosion Prevention and Sediment Control during Construction from the Residential and Commercial Control Programs, WERP 1998
Water Conservation for Schools and Public Buildings

"THE COSTLY DRIP"



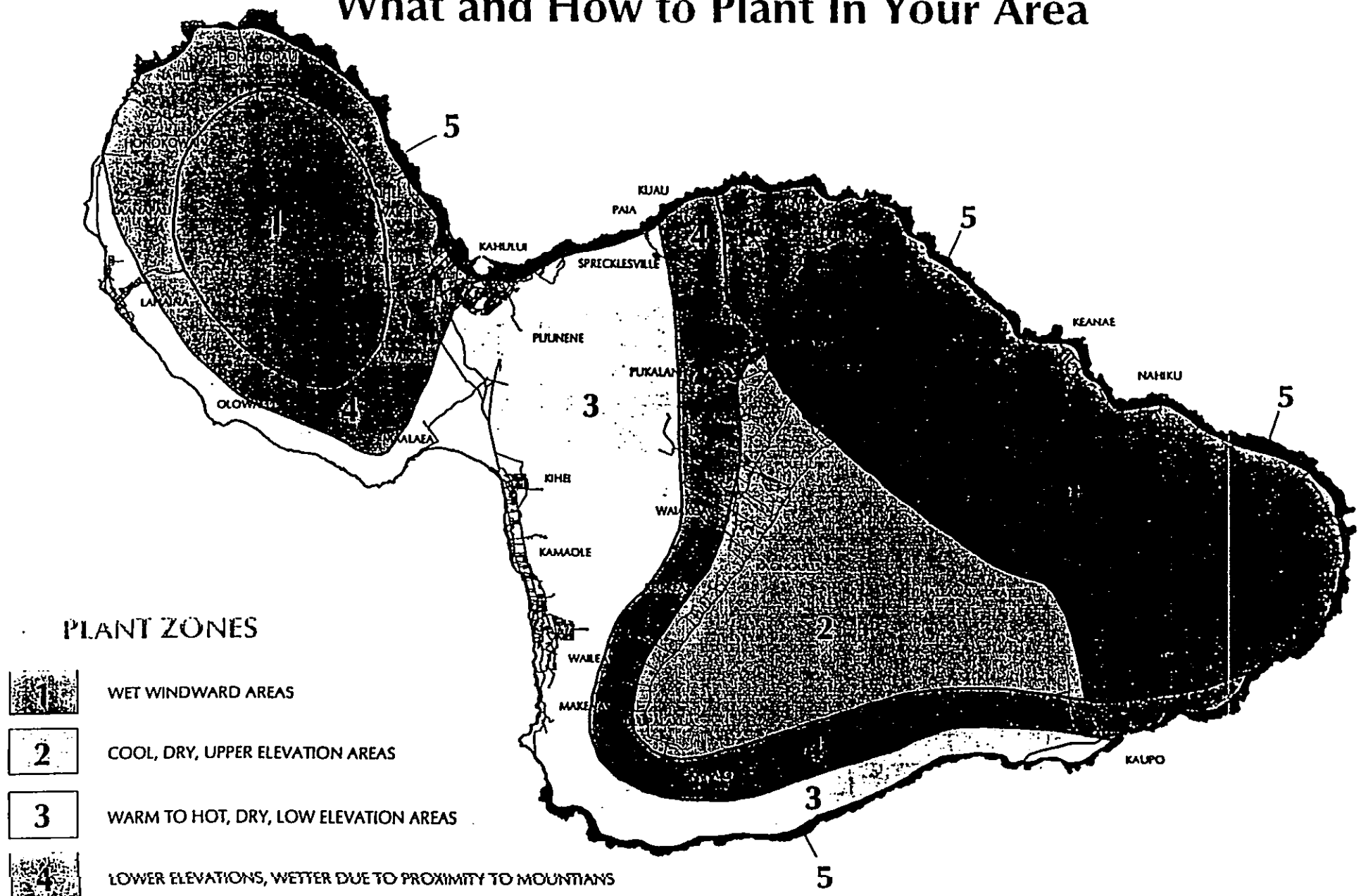
Slowly Dripping Spigot Wastes 15 Gallons a day.

1/32" Leak Wastes 25 Gallons a day.

1/16" Stream Wastes 100 Gallons a Day.

1/8" Stream Wastes 400 Gallons a day.

Saving Water in The Yard
What and How to Plant In Your Area



PLANT ZONES

1. WET WINDWARD AREAS
2. COOL, DRY, UPPER ELEVATION AREAS
3. WARM TO HOT, DRY, LOW ELEVATION AREAS
4. LOWER ELEVATIONS, WETTER DUE TO PROXIMITY TO MOUNTIANS
5. SALT SPRAY ZONES IN WINDWARD COASTAL AREAS

Map Adapted from:
Maui County Planting Plan

From the Maui County Department of Water Supply

Zone-specific Native and Polynesian plants for Maui County

Zone 4

TYPE: F Fern G Grass Gr Ground Cover Sh Shrub P Palm S Sedge Tr Tree V Vine

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
F	Psilotum nudum	moa, moa kula	1'	1'	sea to 3,000'	Dry to Wet
F	Sadleria cyatheoides	'ama'u, ama'uma'u				
G	Colubrina asiatica	'anapanapa	3'	10'	sea to 1,000'	Dry to Wet
G	Eragrostis monticola	kalamalo	1'	2'	sea to 3,000'	Dry to Medium
G	Eragrostis variabilis	'emo-loa	1'	2'	sea to 3,000'	Dry to Medium
G	Fimbristylis cymosa ssp. spathacea	mau'u'aki'aki fimbristylis	0.5'	1'	sea to 1,000'	Dry to Medium
Gr	Chamaesyce celastroides var. laehiensis	'akoko	2'	3'	sea to 1,000'	Dry to Medium
Gr	Ipomoea tuboides	Hawaiian moon flower, 'uala	1'	10'	sea to 3,000'	Dry to Medium
Gr	Jacquemontia ovalifolia ssp. sandwicensis	pa'u o hi'iaka	0.5'	6'	sea to 1,000'	Dry to Medium
Gr	Lipochaeta integrifolia	nehe	1'	5'	sea to 1,00'	Dry to Medium
Gr	Peperomia leptostachya	'ala'ala-wai-nui	1'	1'	sea to 3,000'	Dry to Medium
Gr	Plumbago zeylanica	'ilie'e	1'			
Gr	Sida fallax	'ilima	0.5'	3'	sea to 1,000'	Dry to Medium
Gr	Tephrosia purpurea var. purpurea	'auhuhu	2'	2'	sea to 1,000'	Dry to Medium
Gr - Sh	Hibiscus calyphyllus	ma'o hau hele, Rock's hibiscus	3'	2'	sea to 3,000'	Dry to Medium
Gr - Sh	Lipochaeta rockii	nehe	2'	2'	sea to 3,000'	Dry to Medium
Gr - Sh	Lipochaeta succulenta	nehe	2'	5'	sea to 1,000'	Dry to Wet
P	Cocos nucifera	coconut, niu	100'	30'	sea to 1,000'	Dry to Wet
P	Pritchardia arecina	lo'ulu, hawane	40'	10'	1,000' to 3,000'	Dry to Wet
P	Pritchardia forbesiana	lo'ulu	15'			
P	Pritchardia hillebrandii	lo'ulu, fan palm	25'	15'	sea to 1,000'	Dry to Wet
S	Mariscus javanicus	marsh cypress, 'ahu'awa	0.5'	0.5'	sea to 1,000'	Dry to Medium
Sh	Argemone glauca var. decipiens	pua kala	3'	2'	sea to 3,000'	Dry to Medium
Sh	Artemisia australis	'ahinahina	2'	3'	sea to 3,000'	Dry to Medium

Zone-specific Native and Polynesian plants for Maui County

Zone 4

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
Tr	Nestegis sandwicensis	olopua	15'	15'	1,000' to 3,000'	Dry to Medium
Tr	Pandanus tectorius	hala, puhala (HALELIST)	35'	25'	sea to 1,000'	Dry to Wet
Tr	Pleomele auwahiensis	halapepe	20'			
Tr	Rauvolfia sandwicensis	hao	20'	15'	sea to 3,000'	Dry to Medium
Tr	Santalum ellipticum	coastal sandalwood, 'ili-ahi	8'	8'	sea to 3,000'	Dry to Medium
Tr	Sophora chrysophylla	mamane	15'	15'	1,000' to 3,000'	Medium
Tr	Thespesia populnea	milo	30'	30'	sea to 3,000'	Dry to Wet
V	Alyxia oliviformis	maile	Vine		sea to 6,000'	Medium to Wet

Zone-specific Native and Polynesian plants for Maui County

Zone 5

TYPE: F Fern G Grass Gr Ground Cover Sh Shrub P Palm S Sedge Tr Tree V Vine

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
G	Colubrina asiatica	'anapanapa	3'	10'	sea to 1,000'	Dry to Wet
G	Eragrostis variabilis	'emo-loa	1'	2'	sea to 3,000'	Dry to Medium
G	Fimbristylis cymosa ssp. spathacea	mau'u'aki'aki fimbristylis	0.5'	1'	sea to 1,000'	Dry to Medium
Gr	Boerhavia repens	alena	0.5'	4'	sea to 1,000'	Dry to Medium
Gr	Chamaesyce celastroides var. laehiensis	'akoko	2'	3'	sea to 1,000'	Dry to Medium
Gr	Cressa truxillensis	cressa	0.5'	1'	sea to 1,000'	Dry to Medium
Gr	Heliotropium anomalum var. argenteum	hinahina ku kahakai	1'	2'	sea to 1,000'	Dry to Medium
Gr	Jacquemontia ovalifolia ssp. sandwicensis	pa'u o hi'iaka	0.5'	6'	sea to 1,000'	Dry to Medium
Gr	Lipochaeta integrifolia	nehe	1'	5'	sea to 1,00'	Dry to Medium
Gr	Sesuvium portulacastrum	'akulikuli, sea-purslane	0.5'	2'	sea to 1,000'	Dry to Wet
Gr	Sida fallax	'ilima	0.5'	3'	sea to 1,000'	Dry to Medium
Gr	Tephrosia purpurea var. purpurea	'auhuhu	2'	2'	sea to 1,000'	Dry to Medium
Gr - Sh	Hibiscus calyphyllus	ma'o hau hele, Rock's hibiscus	3'	2'	sea to 3,000'	Dry to Medium
Gr - Sh	Lycium sandwicense	'ohelo-kai, 'ae'ae	2'	2'	sea to 1,000'	Dry to Medium
P	Cocos nucifera	coconut, niu	100'	30'	sea to 1,000'	Dry to Wet
P	Pritchardia hillebrandii	lo'ulu, fan palm	25'	15'	sea to 1,000'	Dry to Wet
S	Mariscus javanicus	marsh cypress, 'ahu'awa	0.5'	0.5'	sea to 1,000'	Dry to Medium
Sh	Argemone glauca var. decipiens	pua kala	3'	2'	sea to 3,000'	Dry to Medium
Sh	Artemisia australis	'ahinahina	2'	3'	sea to 3,000'	Dry to Medium
Sh	Bidens hillebrandiana ssp. hillebrandiana	ko'oko'olau	1'	2'	sea to 1,000'	Dry to Wet
Sh	Bidens mauiensis	ko'oko'olau	1'	3'	sea to 1,000'	Dry to Medium
Sh	Chenopodium oahuense	'aheahea, 'aweoweo	6'		sea to higher	Dry to Medium
Sh	Dianella sandwicensis	'uki	2'	2'	1,000' to higher	Dry to Medium
Sh	Gossypium tomentosum	mao, Hawaiian cotton	5'	8'	sea to 1,000'	Dry to Medium

Zone-specific Native and Polynesian plants for Maui County

Zone 5

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
Sh	Hedyotis spp.	au, pilo	3'	2'	1,000' to 3,000'	Dry to Wet
Sh	Lipochaeta lavarum	nehe	3'	3'	sea to 3,000'	Dry to Medium
Sh	Osteomeles anthyllidifolia	'ulei, eluehe	4'	6'	sea to 3,000'	Dry to Medium
Sh	Scaevola sericea	naupaka, naupaka-kahakai	6'	8'	sea to 1,000'	Dry to Medium
Sh	Senna gaudichaudii	kolomana	5'	5'	sea to 3,000'	Dry to Medium
Sh	Solanum nelsonii	'akia, beach solanum	3'	3'	sea to 1,00'	Dry to Medium
Sh	Vitex rotundifolia	pohinahina	3'	4'	sea to 1,000'	Dry to Medium
Sh	Wikstroemia uva-ursi kaualensis kaualensis	'akia, Molokai osmanthus				
Sh - Tr	Myoporum sandwicense	naio, false sandalwood	10'	10'	sea to higher	Dry to Medium
Sh-Tr	Dodonaea viscosa	'a'ali'i	6'	8'	sea to higher	Dry to Medium
Tr	Aleurites moluccana	candlenut, kukui	50'	50'	sea to 3,000'	Medium to Wet
Tr	Calophyllum inophyllum	kamani, alexandrian laurel	60'	40'	sea to 3,000'	Medium to Wet
Tr	Cordia subcordata	kou	30'	25'	sea to 1,000'	Dry to Wet
Tr	Hibiscus furcellatus	'akiohala, hau-hele	8'			
Tr	Morinda citrifolia	indian mulberry, noni	20'	15'	sea to 1,000'	Dry to Wet
Tr	Pandanus tectorius	hala, puhala (HALELIST)	35'	25'	sea to 1,000'	Dry to Wet
Tr	Thespesia populnea	milo	30'	30'	sea to 3,000'	Dry to Wet
V	Ipomoea pes-caprae	beach morning glory, pohuehue	1			

DO NOT PLANT THESE PLANTS !!!

Common name	Scientific name	Plant family
black wattle	Acacia mearnsii	Mimosaceae
blackberry	Rubus argutus	Rosaceae
blue gum	Eucalyptus globulus	Myrtaceae
bocconia	Bocconia frutescens	Papaveraceae
broad-leaved cordia	Cordia glabra	Boraginaceae
broomsedge, yellow bluestem	Andropogon virginicus	Poaceae
buffelgrass	Cenchrus ciliaris	Poaceae
butterfly bush, smoke bush	Buddleja madagascariensis	Buddlejaceae
cats claw, Mysore thorn, wait-a-bit	Caesalpinia decapetala	Caesalpiniaceae
common ironwood	Casuarina equisetifolia	Casuarinaceae
common velvet grass, Yorkshire fog	Holcus lanatus	Poaceae
fiddlewood	Citharexylum spinosum	Verbenaceae
fire tree, faya tree	Myrica faya	Myricaceae
glorybower	Clerodendrum laponicum	Verbenaceae
hairy cat's ear, gosmore	Hypochoeris radicata	Asteraceae
haole koa	Leucaena leucocephala	Fabaceae
ivy gourd, scarlet-fruited gourd	Coccinia grandis	Cucurbitaceae
juniper berry	Citharexylum caudatum	Verbenaceae
kahili flower	Grevillea banksii	Proteaceae
klu, popinac	Acacia farnesiana	Mimosaceae
logwood, bloodwood tree	Haematoxylon campechianum	Caesalpiniaceae
loquat	Eriobotrya japonica	Rosaceae
meadow ricegrass	Ehrharta stipoides	Poaceae
melaleuca	Melaleuca quinquenervia	Myrtaceae
miconia, velvet leaf	Miconia calvescens	Melastomataceae
narrow-leaved carpetgrass	Axonopus fissifolius	Poaceae
oleaster	Elaeagnus umbellata	Elaeagnaceae
oriental mangrove	Bruguiera gymnorrhiza	Rhizophoraceae
padang cassia	Cinnamomum burmanii	Lauraceae
palmgrass	Setaria palmifolia	Poaceae
pearl flower	Heterocentron subtriplinervium	Melastomataceae
quinine tree	Cinchona pubesens	Rubiaceae
satin leaf, caimitillo	Chrysophyllum oliviforme	Sapotaceae
silkwood, Queensland maple	Flindersia brayleyana	Rutaceae
silky oak, silver oak	Grevillea robusta	Proteaceae
strawberry guava	Psidium cattleianum	Myrtaceae
swamp oak, saltmarsh, longleaf ironwood	Casuarina glauca	Casuarinaceae
sweet vernalgrass	Anthoxanthum odoratum	Poaceae
tree of heaven	Ailanthus altissima	Simaroubaceae
trumpet tree, guarumo	Cecropia obtusifolia	Cecropiaceae
white ginger	Hedychium coronarium	Zingiberaceae
white moho	Heliocarpus popayanensis	Tiliaceae
yellow ginger	Hedychium flavescens	Zingiberaceae

DO NOT PLANT THESE PLANTS !!!

Common name	Scientific name	Plant family
	Jasminum fluminense	Oleaceae
	Arthrostema ciliatum	Melastomataceae
	Dissotis rotundifolia	Melastomataceae
	Erigeron karvinskianus	Asteraceae
	Eucalyptus robusta	Myrtaceae
	Hedychium gardnerianum	Zingiberaceae
	Juncus planifolius	Juncaceae
	Lophostemon confertus	Myrtaceae
	Medinilla cumingii	Melastomataceae
	Medinilla magnifica	Melastomataceae
	Medinilla venosa	Melastomataceae
	Melastoma candidum	Melastomataceae
	Melinis minutiflora	Poaceae
	Olea europaea	
	Oxyspora paniculata	Melastomataceae
	Panicum maximum	Poaceae
	Paspalum urvillei	Poaceae
	Passiflora edulis	Passifloraceae
	Phormium tenax	Agavaceae
	Pinus taeda	Pinaceae
	Prosopis pallida	Fabaceae
	Pterolepis glomerata	Melastomataceae
	Rhodomyrtus tomentosa	Myrtaceae
	Schefflera actinophylla	Araliaceae
	Syzygium jambos	Myrtaceae
Australian blackwood	Acacia melanoxylon	Mimosaceae
Australian tree fern	Cyathea cooperi	Cyatheaceae
Australian tree fern	Sphaeropteris cooperi	Cyatheaceae
Beggar's tick, Spanish needle	Bidens pilosa	Asteraceae
California grass	Brachiaria mutica	Poaceae
Chinese banyon, Maylayan banyon	Ficus mirocarpa	Moraceae
Chinese violet	Asystasia gangetica	Acanthaceae
Christmasberry, Brazilian pepper	Schinus terebinthifolius	Anacardiaceae
Formosan koa	Acacia confusa	Mimosaceae
German ivy	Senecio mikanioides	Asteraceae
Japanese honeysuckle	Lonicera japonica	Caprifoliaceae
Koster's curse	Clidemia hirta	Melastomataceae
Lantana	Lantana camara	Verbenaceae
Mauritius hemp	Furcraea foetida	Agavaceae
Mexican ash, tropical ash	Fraxinus uhdei	Oleaceae
Mexican tulip poppy	Hunnemannia fumariifolia	Papaveraceae
Mules foot, Madagascar tree fern	Angiopteris evecta	Marattiaceae
New Zealand laurel, karakaranut	Corynocarpus laevigatus	Corynocarpaceae
New Zealand tea	Leptospermum scoparium	Myrtaceae
Pampas grass	Cortaderia jubata	Poaceae
Panama rubber tree, Mexican rubber tree	Castilloa elastica	Moraceae
Shoebutton ardisia	Ardisia elliptica	Myrsinaceae
banana poka	Passiflora mollissima	Passifloraceae

Selection

As a general rule, it is best to select the largest and healthiest specimens. However, be sure to note that they are not pot-bound. Smaller, younger plants may result in a low rate of plant survival.[1] When selecting native species, consider the site they are to be planted in, and the space that you have to plant. For example: Mountain species such as koa and maile will not grow well in hot coastal areas exposed to strong ocean breezes. Lowland and coastal species such as wiliwili and Kou require abundant sunshine and porus soil. They will not grow well with frequent cloud cover, high rainfall and heavy soil.

Consider too, the size that the species will grow to be. It is not wise to plant trees that will grow too large.[2] Overplanting tends to be a big problem in the landscape due to the underestimation of a species' height, width or spread.

A large, dense canopied tree such as the kukui is a good shade tree for a lawn. However, it's canopy size and density of shade will limit what can be planted in the surrounding area. Shade cast by a koa and ohia lehua is relatively light and will not inhibit growth beneath it.

Keep seasons in mind when you are selecting your plants. Not all plants look good year round, some plants such as ilima will look scraggly after they have flowered and formed seeds. Avoid planting large areas with only one native plant. Mixing plants which naturally grow together will ensure the garden will look good all year round.[3] Looking at natural habitats helps to show how plants grow naturally in the landscape.

When planting an area with a mixed-ecosystem, keep in mind the size and ecological requirements of each plant. Start with the hardiest and most easily grown species, but allow space for fragile ones in subsequent plantings.

Acquiring natives

Plants in their wild habitat must be protected and maintained. It is best and easiest to get your plants from nurseries (see list), or friend's gardens. Obtain proper permits from landowners and make sure you follow a few common sense rules:

- collect sparingly from each plant or area.
- some plants are on the state or Federal Endangered Species list. Make sure you get permits (see app. A,B)

---

[1] K. Nagata, P.6

[2] K. Nagata, P.9

[3] Nagata, P.9

Soil

Once you have selected your site and the plants you wish to establish there, you must look at the soil conditions on the site. Proper soil is necessary for the successful growth of most native plants, which preform poorly in hard pan, clay or adobe soils. If natives are to be planted in these types of soil, it would be wise to dig planting holes several times the size of the rootball and backfill with 50-75% compost.[4] A large planting hole ensures the development of a strong root system. The plant will have a headstart before the roots penetrate the surrounding poor soil.[5]

It is recommended that native plants not be planted in ground that is more dense than potting soil. If there is no alternative, dig a hole in a mound of soil mixed with volcanic cinder which encourages maximum root development. Fill the hole with water, if the water tends to puddle or drain too slowly, dig a deeper hole until the water does not puddle longer than 1 or 2 minutes.[6] Well-drained soil is one of the most important things when planting natives as you will see in the next section.

Irrigation

Most natives do very poorly in waterlogged conditions. Do not water if the soil is damp. Water when the soil is dry and the plants are wilting. Once established, a good soaking twice a week should suffice. Deep soaking encourages the development of stronger, and deeper root systems. This is better than frequent and shallow watering which encourage weaker, more shallow root systems.

The following is a watering schedule from Kenneth Nagata's Booklet, *How To Plant A Native Hawaiian Garden*:

WATER REQUIREMENT	WATERING FREQUENCY
Heavy	3x / week
Moderate	2x / week
Light	1x / week

Red clay soils hold more water for a longer period of time than sandy soils do. If your area is very sunny or near a beach, things will dry out faster. Even in the area of one garden, there are parts that will need more or less water. Soils can vary and amount of shade and wind differ. After plants are established (a month or two for most plants, up to a year for some trees), you can back off watering.

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[4] Nagata, p. 6

[5] Nagata, p. 8

[6] Nagata, p. 8

Automatic sprinkler systems are expensive to install and must be checked and adjusted regularly. Above-ground systems allow you to monitor how much water is being put out, but you lose a lot due to malfunctioning of sprinkler heads and wind. The most efficient way to save water and make sure your plants get enough water, is to hand-water. This way you are getting our precious water to the right places in the right amounts.[7]

Fertilizer

An all-purpose fertilizer 10-10-10 is adequate for most species. They should be applied at planting time, 3 months later, and 6 months thereafter. Use half the dosage recommended for ornamentals and pay special attention to native ferns which are sensitive to strong fertilizers. Use of organic composts and aged animal manures is suggested instead of chemical fertilizers. In addition, use of cinders for providing trace minerals is strongly recommended.[8]

Natives are plants which were here hundreds of years before the polynesians inhabited the Hawaiian Islands. They were brought here by birds, or survived the harsh ocean conditions to float here. They are well-adapted to Hawaii's varying soil and environmental conditions. This is why they make prime specimens for a xeriscape garden. However, natives will not thrive on their own, especially under harsh conditions. On the other hand, like any other plant, if you over-water and over-fertilize them, they will die. Follow the instructions given to you by the nursery you buy the plant from, or from this booklet. Better yet, buy a book (suggested readings can be found in the bibliography in the back of this pamphlet), read it, and learn more about native plants. I guarantee that you will be pleased with the results.

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[7] Bornhorst, p. 19-20

[8] Nagata, p. 6

Propagation

There are many ways to propagate and plant-out native Hawaiian species. One of the most thourough and helpful book is Heidi Bornhorst's book, *Growing Native Hawaiian Plants.* The easiest, and best way to obtain natives for the novice gardener is to get them from a reputable nursery (see appendix c). That way all you will have to do is know how to transplant (if necessary) and plant-out when you are ready. These are the two methods I have listed here.

Transplanting

1. Use pots that are one size bigger than the potted plant is in
2. Get your potting medium ready

Good potting medium is a ½, ½ mixture of peat moss and perlite. If the plant is from a dry or coastal area, add chunks of cinder or extra perlite. If it is a wet forest species, add more peat moss or compost. Be aware that peat moss is very acidic and certain plants react severely to acidity.

If the plant is to eventually be planted into the ground, make a mix of equal parts peat moss, perlite, and soil from the area in which the plant is to be planted. Slow-release fertilizer can be mixed into the potting medium.

3. Once pots, potting medium, fertilizer and water are ready, you can begin re-potting. Keep the plant stem at the same depth it was in the original pot. Avoid putting the plant in too large a pot, as the plant may not be able to soak up all the water in the soil and the roots may drown and rot.

Mix potting medium and add slow-release fertilizer at this time. Pre-wet the medium to keep dust down and lessen shock to the plant. Put medium in bottom of pot. Measure for the correct depth in the new pot. Make sure there is from ½ to 2 inches from the top of the pot so the plant can get adequate water. Try to stand the plant upright and center the stem in the middle of the pot.

Water the plant thoroughly after transplanting. A vitamin B-1 transplanting solution can help to lessen the transplant shock. Keep the plant in the same type of environment as it was before, sun or shade. If roots were broken, trimm off some of the leaves to compensate for the loss.[9]

Planting out

1. Plant most native Hawaiian plants in a sunny location in soil that is well-drained.
2. Make the planting hole twice as wide as the root ball or present pot, and just as deep.

If the soil is clay-like, and drains slowly, mix in some coarse red or bland cinder, coarse perlite or

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[9] Bornhorst, p.20-21

coarse compost. Place some slow-release fertilizer at the bottom of the hole.

3. Carefully remove the plant from the container and place it in the hole.

The top of the soil should be at the same level as the top of the hole, if it is too high or too low, adjust the soil level so that the plant is at the right depth.

4. Water thoroughly after you transplant.

Mulch

Most natives cannot compete with weeds, and therefore must be weeded around constantly in order to thrive. Mulch is a practical alternative, which discourages and prevents weeds from growing.

Hawaii's hot, humid climate leads to the breaking down of organic mulches. Thick organic mulches such as wood chips and leaves, may also be hiding places for pests.

Stone mulches are attractive, permanent and can help to improve soil quality. Red or black cinder, blue rock chips, smooth river rocks and coral chips are some natural choices.[10] Macadamia nut hulls are also easy to find and can make a nice mulch.[11]

Never pile up mulch right next to the stem or trunk of a plant, keep it a few inches away.

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[10] Bornhorst, p. 24

[11] Nagata, p. 7

ZONES

The Maui County Planting Plan has compiled a system of 5 zones of plant growth for Maui County. The descriptions of zones and maps for these zones are as follows:

Zone 1:

Wet areas on the windward side of the island. More than 40 inches of rain per year. Higher than 3,000 feet.

Zone 2:

Cool, dry areas in higher elevations (above 1,000 feet). 20 to 40 inches of rain per year.

Zone 3:

Low, drier areas, warm to hot. Less than 20 inches of rain per year. Sea level to 1,000 feet.

Zone 4:

Lower elevations which are wetter due to proximity of mountains. 1,000 to 3,000 feet.

Zone 5:

Salt spray zones in coastal areas on the windward side.

These zones are to be used as a general guide to planting for Maui County. In addition to looking at the maps, read the descriptions of the zones and decide which zone best fits your area. Plants can be listed in more than one zone and can be planted in a variety of conditions. For best results, take notes on the rainfall, wind, sun and salt conditions of your site. Use the zones as a general guide for selection and read about the plants to decide which best fits your needs as far as care and or function.

PLACES TO SEE NATIVES ON:

The following places propagate native Hawaiian plants from seeds and/or cuttings. Their purpose is to protect and preserve these native plants. Please contact them before going to view the sites, they can provide valuable information and referral to other sources.

Maui:

1. Hoolawa Farms, P.O. Box 731, Haiku, Hawaii, 96708	572-4835
2. The Hawaiian Collection, 1127 Manu St., Kula, Hawaii, 96790	878-1701
3. Kula Botanical Gardens, RR 4, Box 228, Kula, Hawaii, 96790	878-1715
4. Maui Botanical Gardens, Kanaloa Avenue across from stadium	243-7337
5. Kula Forest Reserve, access road at the end of Waipouli Rd. Call the Maui District Forester	984-8100
6. Wailea Point, Private Condominium residence, 4000 Wailea Alanui, public access points at Four Seasons Resort or Polo Beach	875-9557
7. Kahanu Gardens, National Tropical Botanical Garden, Alau Pl, Hana, Hawaii, 96713	248-8912
9. Kahului Library Courtyard, 20 School Street, Kahului, Hawaii	873-3097

PLACES TO BUY NATIVES ON:

Maui:

1. Hoolawa Farms, P.O. Box 731, Haiku, Hawaii, 96708 — 572-4835
   The largest and best collection of natives in the state
   They will deliver, but it's worth the drive to go and see!
   Will propagate upon request

2. Kula True Value Nursery — 878-2557
   Many natives in stock
   Get most of their plants from Hoolawa farms
   They take special requests

3. Kihei Garden and Landscape — 244-3804

4. Maui Garden and Hardware — 877-0447
   Will bring in special orders

5. Kihana Nursery, Kihei — 879-1165

6. Pukalani Plant Company, Jimmy Jones — 572-8950
   Commercial wholesale only

7. The Hawaiian Collection
   Specialize in Sandalwood propagation — 878-1701
   Will propagate special requests

LAND_USE: Construction

SOURCE: Painting, solvent and adhesive application; roadwork, landscaping; heavy equipment operation, concrete

EFFECTS: Erosion and runoff prevention

REFERENCE: Residential & Commercial Source Control Programs..WERF 1998

PICTURE:

PRACTICE: Erosion Prevention and Sediment Control

Minimize the area disturbed and the time of disturbance. This is accomplished through effective site planning and design. The smallest area of land should be exposed for the shortest period of time practical during construction. Mass grading (e.g., topsoil removal) should be performed only when construction activities are imminent and should not be performed on areas that will not be constructed during the current season. In addition, development should follow the natural contours of the land whenever possible to create the least potential for erosion. Natural vegetation, such as woodlands, should be preserved whenever possible. This is particularly important for areas immediately adjacent to natural waterbodies and wetlands.

Stabilize disturbed soils as soon as possible. To minimize erosion, soils should be stabilized within 7days following the end of active disturbance (grading, construction, etc). Erosion controls should be implemented and maintained during the entire construction project on all areas not undergoing active disturbance. This includes areas with stockpiled soil arid landscape materials. Stabilization is accomplished by protecting exposed soil from the impact of rainfall and from water running off the surface of the land. It is best achieved by re-establishing vegetation through seeding or sodding. Temporary measures also include using mulch or erosion blankets.

Trap and filter eroded sediments before they leave the site. The objective of sediment control is to prevent eroded soil particles from leaving the construction site. The most effective sediment controls reduce runoff velocity and trap runoff allowing sediment to settle out. Eroded sediments are trapped by capturing runoff in a sediment basin and providing sufficient detention time for settling of sediment particles. Eroded sediments can also be filtered by forcing runoff waters to drain slowly through silt fences, straw bale barriers, or vegetated filter strips. Areas that require special attention are storm sewer inlets, culverts, and entrance roads. Storm sewer inlets and culverts should be protected with traps of filters. Roads and parking areas should be stabilized with gravel or the equivalent. In addition, a temporary stone pad with a filter fabric underliner should be installed near the site exit. This device removes dirt and mud and prevents construction vehicle tires from tracking soil onto nearby streets.

Control runoff onto and through construction sites: It is important that runoff from adjacent properties be controlled to prevent water from running across eroded areas. Off-site flow is typically addressed by diverting flow around or through disturbed areas using a stabilized channel and a stabilized outlet. In addition, provisions should be made for increased runoff caused by construction activities.

Routinely inspect construction sites and maintain control measures. Inspections will assess the adequacy of installed erosion and sediment control measures and verify that sediment is not causing onsite or off-site impacts. Maintenance is necessary to assure the continued effectiveness of erosion and sediment control measures.

water conservation for Schools and Public Buildings

General Suggestions

- Increase employee, faculty and student awareness of water conservation. Brochures explaining how to conserve water at home are available from the Board of Water Supply.
- Read water meter daily to monitor the success of water conservation efforts.
- Conduct contests for employees, students and faculty (e.g., posters, slogans or conservation ideas); locate suggestion boxes in prominent areas.
- Install signs that encourage water conservation in restrooms-leaflets suitable for display or distribution are available from the Board of Water Supply.
- When cleaning with water is necessary, use budgeted amounts.

Physical Plant - Building Maintenance

- Minimize the water used in cooling equipment, such as air compressors, in accordance with the manufacturer's recommendations.
- Reduce the load on air conditioning units by shutting air conditioning off when and where it is not needed.
- Maintain insulation on hot water pipes.
- Check water supply system for leaks, and turn off any unnecessary flows.
- Repair dripping faucets, showers, and continuously running toilets.
- Avoid excessive boiler and air conditioner blowdown. Monitor total dissolved solids levels, and blowdown only when needed.
- Reduce the water used in toilet flushing by either adjusting the vacuum flush mechanism or installing toilet tank displacement devices (dams, bottles, or bags).
- Instruct clean-up crews to use less water for mopping.
- Change window cleaning schedule from periodic to an on-call, as required bases.
- Install flow reducers and faucet aerators in all plumbing fixtures.
- As appliances or fixtures wear out, replace with water-saving models.

Cafeteria and Food Service

- Turn off the continuous flow used to clean the drain trays of the coffee/milk/soda beverage island; clean the trays only as needed.
- Turn dishwashers off when dishes are not being processed. Wash full loads only. Replace spray heads to reduce water flow.
- Recycle rinse water from the dishwasher or recirculate it to the garbage disposer.
- Presoak utensils and dishes in ponded water instead of using a running water rinse.
- Avoid thawing foods under running water by using other available alternatives, including microwave ovens.
- Wash vegetables in ponded water, do not let water run in prep sink.
- Minimize use of ice machines and adjust them to dispense less ice.
- Use water from the steam table in place of fresh water to wash down the cook's area.

Pool

- Lower pool water to reduce amount of water splashed out.
- Reduce amount of water used to backflush pool filters
- Use a pool cover to reduce evaporation when pool is not being used.

Laundry

- Water conservation ideas for Laundries can be obtained from the Board of Water Supply.

Exterior Areas

- Wash autos, buses and trucks less often.
- Discontinue using water to clean sidewalks, driveways, loading docks, and parking lots. Consider using brooms or motorized sweepers.
- Avoid landscape fertilizing and pruning that stimulate excessive growth.
- Remove unhealthy plants so that remaining plants can benefit from the water saved.
- In many cases, older, established plants require only infrequent irrigation. Look for indications of water need such as wilt, change of color, or dry soils.
- Limit landscaping additions and alterations. In the future, design landscapes which require less water. Incorporate xeriscape (water management) techniques into the design.
- Install soil moisture overrides or timers on sprinkler systems. Time waterings, when possible, to occur in the morning when wind and evaporation are lowest. Irrigation equipment should apply water uniformly.
- Investigate the advantages of installing drip irrigation systems.
- Mulch around plants to reduce evaporation and discourage weeds.
- Remove thatch and aerate turf to encourage the movement of water to the root zone.
- Begin a flexible watering schedule, watering only when needed and not on windy or rainy days.
- Avoid runoff, and make sure sprinklers cover just the lawn or garden, not sidewalks, driveways or gutters.

MUNEKIYO & HIRAGA, INC.

September 28, 2001

Mr. David Craddick, Director
County of Maui
Department of Water Supply
200 South High Street
Wailuku, Hawaii 96793

SUBJECT: Paukukalo Preschool, Two-Classroom Building
TMK 3-3-5: por. 86 and por. 87

Dear Mr. Craddick:

Thank you for your letter of August 6, 2001, providing comments on the Draft Environmental Assessment for the referenced project.

On behalf of the applicant, Kamehameha Schools, we acknowledge your comments and note that coordination will continue with your Department regarding required system improvements. In addition, your comments regarding use of native and non-invasive plant species will be considered in future landscape renovations.

Again, we thank you for your comments.

Very truly yours,

Gwen Ohashi Hiraga
Project Manager

GOH:cc
cc: Allison Yue, Kamehameha Schools
Carolyn Darr, Department of Hawaiian Home Lands
kabe\addlclas\dws.ltr

environment

305 High Street, Suite 104 · Wailuku, Hawaii 96793 · ph: (808)244-2015 · fax: (808)244-8729 · planning@mhinconline.com

BENJAMIN J. CAYETANO
GOVERNOR

AUG 0 8 2001

GENEVIEVE SALMONSON
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186

August 6, 2001

The Honourable Raymond Soon, Chairperson
Ms. Carolyn Darr
Department of Hawaiian Home Lands
P.O. Box 1879
Honolulu, Hawai'i 96805

Kamehameha Schools Bishop Estate
567 South King Street, Suite 100
Honolulu, Hawai'i 96813

Ms. Gwen Ohashi Hiraga
Munekiyo and Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawai'i 96793

Dear Kamehameha Schools, Mr. Soon, and Mesdames Darr and Hiraga:

Having reviewed the draft environmental assessment for the proposed Paukukalo Preschool and Two-Classroom Building, we offer the following comments for your consideration.

1. CULTURAL IMPACTS. Section II.A.6 is entitled "Historic and Archaeological Sites" and Section III.A.4 is entitled "Archaeological Resources and Cultural Impact Considerations" but both sections (one dealing with the environmental setting, and the other dealing with the impacts and mitigative measures) discuss only historic and archaeological considerations, with a finding based on the historic/archaeological context that no impacts on cultural practices and beliefs are anticipated. These sections also need to include information on current cultural resources and practices in the region and impacts the propject may have on these resources or practices. This information may be obtained by consulting with with knowledgeable cultural practicioners in the Paukukalo region. Chapter 343, Hawai'i Revised Statutes now requires that these cultural impacts be assessed (see enclosed copy of Act 50, SLH 2000). A copy of the Environmental Council's guidelines for assessing cultural impacts is enclosed for your use. In addition to discussing historical and archaeological resources as well as impacts to these, resources, please also consult with cultural and religious practicioners in the region (fishermen, limu and other sea gatherers, canoe and surfing organizations) and discuss direct, indirect and cumulative effects of the project on cultural resources and practices.
2. GUIDELINES FOR SUSTAINABLE BUILDING DESIGN IN HAWAI'I: We ask that you consider implementing some of the techniques discussed in the enclosed guidelines for sustainable building design.
3. USE OF RECYCLED GLASS IN CONSTRUCTION PROJECTS. To promote the use of recycled materials in-state, we ask that you consider the use of materials with minimum recycled glass content.
4. INDIGENOUS AND POLYNESIAN INTRODUCED PLANTS FOR USE IN PUBLIC LANDSCAPING: We ask that you consider the use of native, indigenous and polynesian introduced plants in your landscaping, to convey a Hawaiian sense of place.

If there are any questions, please call Leslie Segundo of my staff at (808) 586-4185. Thank you for the opportunity to comment.

Sincerely,

GENEVIEVE SALMONSON
Director

State of Hawaii
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
Guidelines for Assessing Cultural Impacts

Adopted by the Environmental Council, State of Hawaii
November 19, 1997

I. INTRODUCTION

It is the policy of the State of Hawaii under Chapter 343, HRS, to alert decision makers, through the environmental assessment process, about significant environmental effects which may result from the implementation of certain actions. An environmental assessment of cultural impacts gathers information about cultural practices and cultural features that may be affected by actions subject to Chapter 343, and promotes responsible decision making.

Articles IX and XII of the State Constitution, other state laws, and the courts of the state require government agencies to promote and preserve cultural beliefs, practices, and resources of native Hawaiians and other ethnic groups. Chapter 343 also requires environmental assessment of cultural resources, in determining the significance of a proposed project.

The Environmental Council encourages preparers of environmental assessments and environmental impact statements to analyze the impact of a proposed action on cultural practices and features associated with the project area. The Council provides the following methodology and content protocol as guidance for any assessment of a project that may significantly affect cultural resources.

II. CULTURAL IMPACT ASSESSMENT METHODOLOGY

Cultural impacts differ from other types of impacts assessed in environmental assessments or environmental impact statements. A cultural impact assessment includes information relating to the practices and beliefs of a particular cultural or ethnic group or groups.

Such information may be obtained through scoping, community meetings, ethnographic interviews and oral histories. Information provided by knowledgeable informants, including traditional cultural practitioners, can be applied to the analysis of cultural impacts in conjunction with information concerning cultural practices and features obtained through consultation and from documentary research.

In scoping the cultural portion of an environmental assessment, the geographical extent of the inquiry should, in most instances, be greater than the area over which the proposed action will take place. This is to ensure that cultural practices which may not occur within the boundaries of the project area, but which may nonetheless be affected, are included in the assessment. Thus, for example, a proposed action that may not physically alter gathering practices, but may affect access

to gathering areas would be included in the assessment. An ahupua'a is usually the appropriate geographical unit to begin an assessment of cultural impacts of a proposed action, particularly if it includes all of the types of cultural practices associated with the project area. In some cases, cultural practices are likely to extend beyond the ahupua'a and the geographical extent of the study area should take into account those cultural practices.

The historical period studied in a cultural impact assessment should commence with the initial presence in the area of the particular group whose cultural practices and features are being assessed. The types of cultural practices and beliefs subject to assessment may include subsistence, commercial, residential, agricultural, access-related, recreational, and religious and spiritual customs.

The types of cultural resources subject to assessment may include traditional cultural properties or other types of historic sites, both man made and natural, including submerged cultural resources, which support such cultural practices and beliefs.

If the subject area is in a developed urban setting, cultural impacts must still be assessed. Many incorrectly assume that the presence of urban infrastructure effectively precludes consideration of current cultural factors. For example, persons are known to gather kauna"oa, "ilima, "uhaloa, noni or ki on the grassy slopes and ramps of the H-1 freeway and some state highways on the neighbor islands. Certain landmarks and physical features are used by Hawaiian navigators for sailing, and the lines of sight from landmarks to the coast by fisherman to locate certain fishing spots. Blocking these features by the construction of buildings or tanks may constitute an adverse cultural impact.

The Environmental Council recommends that preparers of assessments analyzing cultural impacts adopt the following protocol:

(1) identify and consult with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs found within the broad geographical area, e.g., district or ahupua`a;

(2) identify and consult with individuals and organizations with knowledge of the area potentially affected by the proposed action;

(3) receive information from or conduct ethnographic interviews and oral histories with persons having knowledge of the potentially affected area;

(4) conduct ethnographic, historical, anthropological, sociological, and other culturally related documentary research;

(5) identify and describe the cultural resources, practices and beliefs located within the potentially affected area; and

(6) assess the impact of the proposed action, alternatives to the proposed action, and mitigation measures, on the cultural resources, practices and beliefs identified.

Interviews and oral histories with knowledgeable individuals may be recorded, if consent is given, and field visits by preparers accompanied by informants are encouraged. Persons interviewed

should be afforded an opportunity to review the record of the interview, and consent to publish the record should be obtained whenever possible. For example, the precise location of human burials are likely to be withheld from a cultural impact assessment, but it is important that the document identify the impact a project would have on the burials. At times an informant may provide information only on the condition that it remain in confidence. The wishes of the informant should be respected.

Primary source materials reviewed and analyzed may include, as appropriate: Mahele, land court, census and tax records, including testimonies; vital statistics records; family histories and genealogies; previously published or recorded ethnographic interviews and oral histories; community studies, old maps and photographs; and other archival documents, including correspondence, newspaper or almanac articles, and visitor journals. Secondary source materials such as historical, sociological, and anthropological texts, manuscripts, and similar materials, published and unpublished, should also be consulted. Other materials which should be examined include prior land use proposals, decisions, and rulings which pertain to the study area.

III. CULTURAL IMPACT ASSESSMENT CONTENTS

In addition to the content requirements for environmental assessments and environmental impact statements, which are set out in HAR §§§§ 11-200-10 and 16 through 18, the portion of the assessment concerning cultural impacts should address, but not necessarily be limited to, the following matters:

1. A discussion of the methods applied and results of consultation with individuals and organizations identified by the preparer as being familiar with cultural practices and features associated with the project area, including any constraints or limitations which might have affected the quality of the information obtained.

2. A description of methods adopted by the preparer to identify, locate, and select the persons interviewed, including a discussion of the level of effort undertaken.

3. Ethnographic and oral history interview procedures, including the circumstances under which the interviews were conducted, and any constraints or limitations which might have affected the quality of the information obtained.

4. Biographical information concerning the individuals and organizations consulted, their particular expertise, and their historical and genealogical relationship to the project area, as well as information concerning the persons submitting information or interviewed, their particular knowledge and cultural expertise, if any, and their historical and genealogical relationship to the project area.

5. A discussion concerning historical and cultural source materials consulted, the institutions and repositories searched, and the level of effort undertaken. This discussion should include, if appropriate, the particular perspective of the authors, any opposing views, and any other relevant constraints, limitations or biases.

6. A discussion concerning the cultural resources, practices and beliefs identified, and, for resources and practices, their location within the broad geographical area in which the

proposed action is located, as well as their direct or indirect significance or connection to the project site.

7. A discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project.

8. An explanation of confidential information that has been withheld from public disclosure in the assessment.

9. A discussion concerning any conflicting information in regard to identified cultural resources, practices and beliefs.

10. An analysis of the potential effect of any proposed physical alteration on cultural resources, practices or beliefs; the potential of the proposed action to isolate cultural resources, practices or beliefs from their setting; and the potential of the proposed action *to introduce elements which may alter the setting in which cultural practices take place.*

11. A bibliography of references, and attached records of interviews which were allowed to be disclosed.

The inclusion of this information will help make environmental assessments and environmental impact statements complete and meet the requirements of Chapter 343, HRS. If you have any questions, please call 586-4185.

Guidelines for Sustainable Building Design in Hawai`i

A planner's checklist

(Adopted by the Environmental Council on October 13, 1999)

Introduction

Hawai`i law calls for efforts to conserve natural resources, promote efficient use of water and energy and encourage recycling of waste products. Planning a project from the very beginning to include sustainable design concepts can be a critical step toward meeting these goals.

The purpose of the state's environmental review law (HRS Ch. 343) is to encourage a full, accurate and complete analysis of proposed actions, promote public participation and support enlightened decision making by public officials. The Office of Environmental Quality Control offers the following guidelines for preparers of environmental reviews under the authority of HRS 343 to assist agencies and applicants in meeting these goals.

These guidelines do not constitute rules or law. They have been refined by staff and peer review to provide a checklist of items that will help the design team create projects that will have a minimal impact on Hawai`i's environment and make wise use of our natural resources. In a word, projects that are *sustainable*.

A sustainable building is built to minimize energy use, expense, waste, and impact on the environment. It seeks to improve the region's sustainability by meeting the needs of Hawai`i's residents and visitors today without compromising the needs of future generations. Compared to conventional projects, a resource-efficient building project will:

I. Use less energy for operation and maintenance
II. Contain less *embodied* energy (e.g. locally produced building products often contain less *embodied* energy than imported products because they require less energy-consuming transportation.)
III. Protect the environment by preserving/conserving water and other natural resources and by minimizing impact on the site and ecosystems
IV. Minimize health risks to those who construct, maintain, and occupy the building
V. Minimize construction waste
VI. Recycle and reuse generated construction wastes

VII. Use resource-efficient building materials (e.g. materials with recycled content and low embodied energy, and materials that are recyclable, renewable, environmentally benign, non-toxic, low VOC (Volatile Organic Compound) emitting, durable, and that give high life cycle value for the cost.)

VIII. Provide the highest quality product practical at competitive (affordable) first and life cycle costs.

In order to avoid excessive overlapping of items, the checklist is designed to be read in totality, not just as individual sections. This checklist tries to address a range of project types, large scale as well as small scale. Please use items that are appropriate to the type and scale of the project.

Although this list will help promote careful and sensitive planning, mere compliance with this checklist does not confirm *sustainability*. Compliance with and knowledge of current building codes by users of this checklist is also required.

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I. Pre Design

___1. Hold programming team meeting with client representative, Project Manager, planning consultant, architectural consultant, civil engineer, mechanical, electrical, plumbing (MEP) engineer, structural engineer, landscape architect, interior designer, sustainability consultant and other consultants as required by the project. Identify project and sustainability goals. Client representatives and consultants need to work together to ensure that project and environmental goals are met.

___2. Develop sustainable guideline goals to insert into outline specifications as part of the Schematic Design documents. Select goals from the following sections that are appropriate for the project.

___3. Use Cost-Benefit Method for economic analysis of the sustainability measures chosen. (Cost-Benefit Method is a method of evaluating project choices and investments by comparing the present and life cycle value of expected benefits to the present and life cycle value of expected costs.)

___4. Include "Commissioning" in the project budget and schedule. (Building "Commissioning" is the process of ensuring that systems are designed, installed, functionally tested, and capable of being operated and maintained in accordance with specifications that meet the owner's needs, and recognize the owner's financial and operational capacity. It improves the performance of the building systems, resulting in energy efficiency and conservation, improved air quality and lower operation costs. *Refer to Section IX.*)

II. Site Selection & Site Design

A. Site Selection

___1. Analyze and assess site characteristics such as vegetation, topography, geology, climate, natural access, solar orientation patterns, water and drainage, and existing utility and transportation infrastructure to determine the appropriate use of the site.

___2. Whenever possible, select a site in a neighborhood where the project can have a positive social, economic and/or environmental impact.

___3. Select a site with short connections to existing municipal infrastructure (sewer lines, water, waste water treatment plant, roads, gas, electricity, telephone, data communication lines and services). Select a site close to mass transportation, bicycle routes and pedestrian access.

B. Site Preparation and Design

___1. Prepare a thorough existing conditions topographic site plan depicting topography, natural and built features, vegetation, location of site utilities and include solar information,

rainfall data and direction of prevailing winds. Preserve existing resources and natural features to enhance the design and add aesthetic, economic and practical value. Design to minimize the environmental impact of the development on vegetation and topography.

___2. Site building(s) to take advantage of natural features and maximize their beneficial effects. Provide for solar access, daylighting and natural cooling. Design ways to integrate the building(s) with the site that maximizes and preserves positive site characteristics, enhances human comfort, safety and health, and achieves operational efficiencies.

___3. Locate building(s) to encourage bicycle and pedestrian access and pedestrian oriented uses. Provide bicycle and pedestrian paths, bicycle racks, etc. Racks should be visible and accessible to promote and encourage bicycle commuting.

___4. Retain existing topsoil and maintain soil health by clearing only the areas reserved for the construction of streets, driveways, parking areas, and building foundations. Replant exposed soil areas as soon as possible. Reuse excavated soils for fill and cut vegetation for mulch.

___5. Grade slopes to a ratio of less than 2 : 1 (run to rise). Balance cut and fill to eliminate hauling. Check grading frequently to prevent accidental over excavation.

___6. Minimize the disruption of site drainage patterns. Provide erosion and dust controls, positive site drainage, and siltation basins as required to protect the site during and after construction, especially, in the event of a major storm.

___7. Minimize the area required for the building footprint. Consolidate utility and infrastructure in common corridors to minimize site degradation, and cost, improve efficiency, and reduce impermeable surfaces.

___8. For termite protection, use non toxic alternatives to pesticides and herbicides, such as Borate treated lumber, Basaltic Termite Barrier, stainless steel termite barrier mesh, and termite resistant materials.

III. Building Design

___1. Consider adaptive re-use of existing structures instead of demolishing and/or constructing a new building. Consult the State Historic Preservation Officer for possible existing historic sites that may meet the project needs.

___2. Plan for high flexibility while designing building shell and interior spaces to accommodate changing needs of the occupants, and thereby extend the life span of the building.

___3. Design for re-use and/or disassembly. (For recyclable and reusable building products, see Section VII).

___4. Design space for recycling and waste diversion opportunities during occupancy.

___5. Provide facilities for bicycle and pedestrian commuters (showers, lockers, bike racks, etc.) in commercial areas and other suitable locations.

___6. Plan for a comfortable and healthy work environment. Include inviting outdoor spaces, wherever possible. *(Refer to Section VIII.)*

___7. Provide an Integrated Pest Management approach. The use of products such as Termi-mesh, Basaltic Termite Barrier and the Sentricon "bait" system can provide long term protection from termite damage and reduce environmental pollution.
___8. Design a building that is energy efficient and resource efficient. *(See Sections IV, V, VII.)* Determine building operation by-products such as heat gain and build up, waste/gray-water and energy consumption, and plan to minimize them or find alternate uses for them.
___9. For natural cooling, use
   a. Reflective or light colored roofing, radiant barrier and/or insulation, roof vents
   b. Light colored paving (concrete) and building surfaces
   c. Tree Planting to shade buildings and paved areas
   d. Building orientation and design that captures trade winds and/or provides for convective cooling of interior spaces when there is no wind.

IV. Energy Use

___1. Obtain a copy of the State of Hawai'i Model Energy Code (available through the Hawai'i State Energy Division, at Tel. 587-3811). Exceed its requirements. (Contact local utility companies for information on tax credits and utility-sponsored programs offering rebates and incentives to businesses for installing qualifying energy efficient technologies.)
___2. Use site sensitive orientation to :
   a. Minimize cooling loads through site shading and carefully planned east-west orientation.
   b. Incorporate natural ventilation by channeling trade winds.
   c. Maximize daylighting.
___3. Design south, east and west shading devices to minimize solar heat gain.
___4. Use spectrally selective tints or spectrally selective low-e glazing with a Solar Heat Gain Coefficient (SHGC) of 0.4 or less.
___5. Minimize effects of thermal bridging in walls, roofs and window systems.
___6. Maximize efficiencies for lighting, Heating, Ventilation, Air Conditioning (HVAC) systems and other equipment. Use insulation and/or radiant barriers, natural ventilation, ceiling fans and shading to avoid the use of air conditioning whenever appropriate.
___7. Eliminate hot water in restrooms when possible.
___8. Provide tenant sub-metering to encourage utility use accountability.
___9. Use renewable energy. Use solar water heaters and consider the use of photovoltaics and Building Integrated Photovoltaics (BIPV).
__10. Use available energy resources such as waste heat recovery, when feasible.

A. Lighting

___1. Design for at least 15% lower interior lighting power allowance than the Energy Code.
___2. Select lamps and ballasts with the highest efficiency, compatible with the desired level of illumination and color rendering specifications. Examples that combine improved color rendering with efficient energy use include compact flourescents and T8 flourescents that use tri-phosphor gases.
___3. Select lighting fixtures which maximize system efficacy and which have heat removal capabilities
___4. Reduce light absorption on surfaces by selecting colors and finishes that provide high reflectance values without glare.
___5. Use task lighting with low ambient light levels.
___6. Maximize daylighting through the use of vertical fenestration, light shelves, skylights, clerestories, building form and orientation as well as through translucent or transparent interior partitions. Coordinate daylighting with electrical lighting for maximum electrical efficiency.
___7. Incorporate daylighting controls and/or motion activated light controls in low or intermittent use areas.
___8. Avoid light spillage in exterior lighting by using directional fixtures.
___9. Minimize light overlap in exterior lighting schemes.
__10. Use lumen maintenance procedures and controls.

B. Mechanical Systems

___1. Design to comply with the Energy Code and to exceed its efficiency requirements.
___2. Use "Smart Building" monitor/control systems when appropriate.
___3. Utilize thermal storage for reduction of peak energy usage.
___4. Use Variable air volume systems to save fan power.
___5. Use variable speed drives on pumping systems and fans for cooling towers and air handlers.
___6. Use air-cooled refrigeration equipment or use cooling towers designed to reduce drift.
___7. Specify premium efficiency motors.
___8. Reduce the need for mechanical ventilation by reducing sources of indoor air pollution. Use high efficiency air filters and ultraviolet lamps in air handling units. Provide for regular maintenance of filtration systems. Use ASHRAE standards as minimum.
___9. Locate fresh air intakes away from polluted or overheated areas. Locate on roof where possible. Separate air intake from air exhausts by at least 40 ft.
__10. Use separate HVAC systems to serve areas that operate on widely differing schedules and/or design conditions.
__11. Use shut off or set back controls on HVAC system when areas are not occupied.
__12. Use condenser heat, waste heat or solar energy. (Contact local utility companies for information on the utility-sponsored Commercial and Industrial Energy Efficiency

Programs which offer incentives to businesses for installing qualifying energy efficient technologies.)

__13. Evaluate plug-in loads for energy efficiency and power saving features.

__14. Improve comfort and save energy by reducing the relative humidity by waste reheat, heat pipes or solar heat.

__15. Minimize heat gain from equipment and appliances by using:
   a. Environmental Protection Agency (EPA) Energy Star rated appliances.
   b. Hoods and exhaust fans to remove heat from concentrated sources.
   c. High performance water heating that exceeds the Energy Code requirements.

__16. Specify HVAC system "commissioning" period to reduce occupant exposure to Indoor Air Quality (IAQ) contaminants and to maximize system efficiency.

V. Water Use

A. Building Water

___1. Install water conserving, low flow fixtures as required by the Uniform Plumbing Code.

___2. If practical, eliminate hot water in restrooms.

___3. Use self closing faucets (infrared sensors or spring loaded faucets) for lavatories and sinks.

B. Landscaping and Irrigation

(See Section VI.)

VI. Landscape and Irrigation

___1. Incorporate water efficient landscaping (xeriscaping) using the following principles:
   a. Planning, Efficient irrigation: Create watering zones for different conditions. Separate vegetation types by watering requirements. Install moisture sensors to prevent operation of the irrigation system in the rain or if the soil has adequate moisture. Use appropriate sprinkler heads.
   b. Soil analysis/improvement: Use (locally made) soil amendments and compost for plant nourishment, improved water absorption and holding capacity.
   c. Appropriate plant selection: Use drought tolerant and/or slow growing hardy grasses, native and indigenous plants, shrubs, ground covers, trees, appropriate for local conditions, to minimize the need for irrigation.
   d. Practical turf areas: Turf only in areas where it provides functional benefits.

e. Mulches: Use mulches to minimize evaporation, reduce weed growth and retard erosion.

Contact the local Board of Water Supply for additional information on xeriscaping such as efficient irrigation, soil improvements, mulching, lists of low water-demand plants, tours of xeriscaped facilities, and xeriscape classes.

___2. Protect existing beneficial site features and save trees to prevent erosion. Establish and carefully mark tree protection areas well before construction.

___3. Limit staging areas and prevent unnecessary grading of the site to protect existing, especially native, vegetation.

___4. Use top soil from the graded areas, stockpiled on the site and protected with a silt fence to reduce the need for imported top soil.

___5. Irrigate with non-potable water or reclaimed water when feasible. Collect rainwater from the roof for irrigation.

___6. Sub-meter the irrigation system to reduce water consumption and consequently water and sewer fees. Contact the local county agency to obtain irrigation sub-metering requirements and procedures. Locate irrigation controls within sight of the irrigated areas to verify that the system is operating properly.

___7. Use pervious paving instead of concrete or asphalt paving. Use natural and man-made berms, hills and swales to control water runoff.

___8. Avoid the use of solvents that contain or leach out pollutants that can contaminate the water resources and runoff. Contact the State of Hawai`i Clean Water Branch at 586-4309 to determine whether a NPDES (National Pollutant Discharge Elimination System) permit is required.

___9. Use Integrated Pest Management (IPM) techniques. IPM involves a carefully managed use of biological and chemical pest control tactics. It emphasizes minimizing the use of pesticides and maximizing the use of natural process

__10. Use trees and bushes that are felled at the building site (i.e. mulch, fence posts). Leave grass trimmings on the lawn to reduce green waste and enhance the natural health of lawns.

__11. Use recycled content, decay and weather resistant landscape materials such as plastic lumber for planters, benches and decks.

VII. Building Materials & Solid Waste Management

A. Material Selection and Design

___1. Use durable products.

___2. Specify and use natural products or products with low embodied energy and/or high recycled content. Products with recycled content include steel, concrete with glass,

drywall, carpet, etc. Use ground recycled concrete, graded glass cullet or asphalt as base or fill material.

___3. Specify low toxic or non-toxic materials whenever possible, such as low VOC (Volatile Organic Compounds) paints, sealers and adhesives and low or formaldehyde-free materials. Do not use products with CFCs (Chloro-fluoro-carbons).

___4. Use locally produced products such as plastic lumber, insulation, hydro-mulch, glass tiles, compost.

___5. Use advanced framing systems that reduce waste, two stud corners, engineered structural products and prefabricated panel systems.

___6. Use materials which require limited or no application of finishing or surface preparation. (i.e. finished concrete floor surface, glass block and glazing materials, concrete block masonry, etc.).

___7. Use re-milled salvaged lumber where appropriate and as available. Avoid the use of old growth timber.

___8. Use sustainably harvested timber.

___9. Commit to a material selection program that emphasizes efficient and environmentally sensitive use of building materials, and that uses locally available building materials. (A list of Earth friendly products and materials is available through the Green House Hawai`i Project. Call Clean Hawai`i Center, Tel. 587-3802 for the list.)

B. Solid Waste Management, Recycling and Diversion Plan

___1. Prepare a job-site recycling plan and post it at the job-site office.

___2. Conduct pre-construction waste minimization and recycling training for employees and sub-contractors.

___3. Use a central area for all cutting.

___4. Establish a dedicated waste separation/diversion area. Include Waste/Compost/Recycling collection areas and systems for use during construction process and during the operational life cycle of the building.

___5. Separate and divert all unused or waste cardboard, ferrous scrap, construction materials and fixtures for recycling and/or forwarding to a salvage exchange facility. Information on "Minimizing C&D (construction and demolition) waste in Hawai`i" is available through Department of Health, Office of Solid Waste Management, Tel. 586-4240.

___6. Use all green waste, untreated wood and clean drywall on site as soil amendments or divert to offsite recycling facilities.

___7. Use concrete and asphalt rubble on-site or forward the material for offsite recycling.

___8. Carefully manage and control waste solvents, paints, sealants, and their used containers. Separate these materials from C&D (construction and demolition) waste and store and dispose them of them carefully.

___9. Donate unused paint, solvents, sealants to non-profit organizations or list on HIMEX (Hawai`i Materials Exchange). HIMEX is a free service operated by Maui Recycling

Group, that offers an alternative to landfill disposal of usable materials, and facilitates no-cost trades. See web site, www.himex.org.

__10. Use suppliers that re-use or recycle packaging material whenever possible.

VIII. Indoor Air Quality

___1. Design an HVAC system with adequate supply of outdoor air, good ventilation rates, even air distribution, sufficient exhaust ventilation and appropriate air cleaners.

___2. Develop and specify Indoor Air Quality (IAQ) requirements during design and contract document phases of the project. Monitor compliance in order to minimize or contain IAQ contaminant sources during construction, renovation and remodeling.

___3. Notify occupants of any type of construction, renovation and remodeling and the effects on IAQ.

___4. Inspect existing buildings to determine if asbestos and lead paint are present and arrange for removal or abatement as needed.

___5. Supply workers with, and ensure the use of VOC (Volatile Organic Compounds)-safe masks where required.

___6. Ensure that HVAC systems are installed, operated and maintained in a manner consistent with their design. Use UV lamps in Air Handling Units to eliminate mold and mildew growth. An improperly functioning HVAC system can harbor biological contaminants such as viruses, bacteria, molds, fungi and pollen, and can cause Sick Building Syndrome (SBS).

___7. Install separate exhaust fans in rooms where air polluting office equipment is used, and exhaust directly to the exterior of the building, at sufficient distance from the air intake vents.

___8. Place bird guards over air intakes to prevent pollution of shafts and HVAC ducts.

___9. Control indoor air pollution by selecting products and finishes that are low or non-toxic and low VOC emitting. Common sources of indoor chemical contaminants are adhesives, carpeting, upholstery, manufactured wood products, copy machines, pesticides and cleaning agents.

__10. Schedule finish application work to minimize absorption of VOCs into surrounding materials e.g. allow sufficient time for paint and clear finishes to dry before installing carpet and upholstered furniture. Increase ventilation rates during periods of increased pollution.

__11. Allow a flush-out period after construction, renovation, remodeling or pesticide application to minimize occupant exposure to chemicals and contaminants.

IX. Commissioning & Construction Project Closeout

___1. Appoint a Commissioning Authority to develop and implement a commissioning plan and a preventative maintenance plan. Project Manager's responsibilities must include coordination of commissioning activities during project closeout.
___2. Commissioning team should successfully demonstrate all systems and perform operator training before final acceptance.
___3. Provide flush-out period to remove air borne contaminants from the building and systems.
___4. Provide as-built drawings and documentation for all systems. Provide data on equipment maintenance and their control strategies as well as maintenance and cleaning instructions for finish materials.

X. Occupancy and Operation

A. General Objectives

___1. Develop a User's Manual for building occupants that emphasizes the need for Owner/Management commitment to efficient sustainable operations.
___2. Management's responsibilities must include ensuring that sustainability policies are carried out.

B. Energy

___1. Purchase EPA rated, Energy Star, energy-efficient office equipment, appliances, computers, and copiers. (Energy Star is a program sponsored by U.S. Dep. Of Energy. Use of these products will contribute to reduced energy costs for buildings and reduce air pollution.)
___2. Institute an employee education program about the efficient use of building systems and appliances, occupants impact on and responsibility for water use, energy use, waste generation, waste recycling programs, etc.
___3. Re-commission systems and update performance documentation periodically per recommendations of the Commissioning Authority, or whenever modifications are made to the systems.

C. Water

___1. Start the watering cycle in the early morning in order to minimize evaporation.
___2. Manage the chemical treatment of cooling tower water to reduce water consumption.

D. Air

___1. Provide incentives which encourage building occupants to use alternatives to and to reduce the use of single occupancy vehicles.

___2. Provide a location map of services within walking distance of the place of employment (child care, restaurants, gyms, shopping).
___3. Periodically monitor or check for indoor pollutants in building.
___4. Provide an IAQ plan for tenants, staff and management that establishes policies and documentation procedures for controlling and reporting indoor air pollution. This helps tenants and staff understand their responsibility to protect the air quality of the facility.

E. Materials and Products

___1. Purchase business products with recycled content such as paper, toners, etc.
___2. Purchase Furniture made with sustainably harvested wood, or with recycled and recycled content materials, which will not off gas VOC's.
___3. Remodeling and painting should comply with or improve on original sustainable design intent.
___4. Use low VOC, non-toxic, phosphate and chlorine free, biodegradable cleaning products.

F. Solid Waste

___1. Collect recyclable business waste such as paper, cardboard boxes, and soda cans.
___2. Avoid single use items such as paper or Styrofoam cups and plates, and plastic utensils.

XI. Resources

Financing: Energy Efficiency in Buildings. U.S. Department of Energy, DOE/EE-0152, May, 1998 (Call Tel.1-800-DOE-EREC or visit local office)

Building Commissioning: The Key to Quality Assurance. U.S. Department of Energy, DOE/EE-0153, May, 1998 (Call Tel.1-800-DOE-EREC or visit local office)

Guide to Resource-Efficient Building in Hawaii. University of Hawai`i at Manoa, School of Architecture and Energy, Resources and Technology Division, Department of Business, Economic Development and Tourism, October 1998. (Call Tel. 587-3804 for publication)

Hawaii Model Energy Code. Energy, Resources and Technology Division, Department of Business, Economic Development and Tourism, November 1997 (Call Tel. 587-3810 for publication)

Photovoltaics in the Built Environment: A Design Guide for Architects and Engineers. NREL Publications, DOE/GO #10097-436, September 1997 (Call Tel.1-800-DOE-EREC or visit local office)

Building Integrated Photovoltaics: A Case Study. NREL Publications #TP-472-7574, March 1995 (Call Tel.1-800-DOE-EREC or visit local office)

Solar Electric Applications: An overview of Today's Applications. NREL Publications, DOE/GO #10097-357, Revised February, 1997 (Call Tel.1-800-DOE-EREC or visit local office)

Green Lights: An Enlightened Approach to Energy Efficiency and Pollution Prevention. U.S. Environmental Protection Agency, Pacific Island Contact Office (Call Tel. 541-2710 for publication.)

Healthy Lawn, Healthy Environment. U.S. Environmental Protection Agency, Pacific Island Contact Office. (Call Tel. 541-2710 for this and related publications)

How to Plant a Native Hawaiian Garden. Office of Environmental Quality Control (OEQC), Department of Health, State of Hawai'i (Call Tel. 586-4185 for publication)

Buy Recycled in Hawai'i. Clean Hawai'i Center, Energy, Resources and Technology Division, Department of Business, Economic Development and Tourism, November 1997. (Call Tel. 587-3802 for publication)

Hawai'i Recycling Industry Guide and other recycling and reuse related fact sheets. Clean Hawai'i Center, Energy, Resources and Technology Division, Department of Business, Economic Development and Tourism, July 1999. (Call Tel. 587-3802 for publication)

Minimizing Construction and Demolition Waste. Office of Solid Waste Management, Department of Health and Clean Hawai'i Center, Energy, Resources and Technology Division, Department of Business, Economic Development and Tourism, February 1998. (Call Tel. 586-4240 for publication)

Contractor's Waste Management Guide and Construction and demolition Waste Management Facilities Directory. Clean Hawai'i Center, Energy, Resources and Technology Division, Department of Business, Economic Development and Tourism, 1999. (Call Tel. 587-3802 for publication)

Waste Management and Action: Construction Industry. Department of Health, Solid and Hazardous Waste Branch (Call Tel. 586-7496 for publication)

Business Guide For reducing Solid Waste. U.S. Environmental Protection Agency, Pacific Island Contact Office, Tel. 541-2710 (Call for publication.)

The Inside Story: A Guide to Indoor Air Quality. U.S. Environmental Protection Agency, Pacific Island Contact Office, Tel. 541-2710 (Call for this and related publications.) Additional information is available from the American Lung Association, Hawai'i, Tel. 537-5966

Selecting Healthier Flooring Materials. American Lung Association and Clean Hawai'i Center, February 1999. (Call Tel. 537-5966 x307)

Office Paper Recycling: An Implementation Manual. U.S. Environmental Protection Agency, Pacific Island Contact Office, Tel. 541-2710 (Call for publication.)

Acknowledgments

OEQC and the Environmental Council would like to thank Allison Beale, Gary Gill, Nick H. Huddleston, Gail Suzuki-Jones, Purnima McCutcheon, Virginia B. MacDonald, Steve Meder, Ramona Mullahey, Thomas P. Papandrew, Victor Olgay, Howard Tanaka, and Howard Wiig for their assistance with this project.

MUNEKIYO & HIRAGA, INC.

September 28, 2001

Genevieve Salmonson, Director
Office of Environmental Quality Control
235 S. Beretania Street, Suite 702
Honolulu, Hawaii 96813

SUBJECT: Paukukalo Preschool, Two-Classroom Building
TMK 3-3-5: por. 86 and por. 87

Dear Ms. Salmonson:

Thank you for your letter of August 6, 2001, commenting on the Draft Environmental Assessment (EA) for the subject project. On behalf of the applicant, the following are noted with regard to your comments:

1. ***Cultural Impacts***

The Final EA document will be revised to address to your comments. Accordingly, relevant sections will include information on current cultural resources and practices in the region as well as impacts the project may have on these resources or practices.

2. ***Guidelines for Sustainable Building Design in Hawaii***

Consideration will be given to implementing appropriate techniques as provided in your guidelines for sustainable building design.

3. ***Use of Recycled Glass in Construction Projects***

Consideration will be given to use of recycled materials in-state and purchasing materials with minimum recycled glass content in the design of the fire station.

4. ***Indigenous and Polynesian Introduced Plants for Use in Public Landscaping***

Consideration will be given for the use of native, indigenous and Polynesian introduced plants in the landscaping for the project.

planning environment

305 High Street, Suite 104 · Wailuku, Hawaii 96793 · ph: (808)244-2015 · fax: (808)244-8729 · planning@mhinconline.com

We thank you for your comments on the project.

Very truly yours,

Gwen Ohashi Hiraga

Gwen Ohashi Hiraga
Project Manager

GOH:cc
c: Allison Yue, Kamehameha Schools
Carolyn Darr, Department of Hawaiian Home Lands

JAMES "KIMO" APANA
Mayor

DAVID C. GOODE
Director

MILTON M. ARAKAWA, A.I.C.P.
Deputy Director

Telephone: (808) 270-7845
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COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS AND WASTE MANAGEMENT
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

RALPH NAGAMINE, L.S., P.E.
Land Use and Codes Administration

RON R. RISKA, P.E.
Wastewater Reclamation Division

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

BRIAN HASHIRO, P.E.
Highways Division

Solid Waste Division

AUG 1 4 2001

August 13, 2001

Ms. Gwen Ohashi Hiraga
MUNEKIYO & HIRAGA, INC.
305 High Street, Suite 104
Wailuku, Hawaii 96793

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT
PAUKUKALO PRESCHOOL-ADDITIONAL CLASSROOMS
TMK: (2) 3-3-005:POR 86 & 87

Dear Ms. Hiraga:

We have reviewed the subject application and have the following comments:

1. Submit plan for construction waste disposal at C & D landfill/recycling.

2. Although wastewater system capacity is currently available as of August 2, 2001, the developer should be informed that wastewater system capacity cannot be ensured at the time of building permit final approval or if the project completion is delayed.

3. Wastewater contribution calculations are required before building permit is issued.

4. Developer shall pay assessment fees for treatment plant expansion costs in accordance with ordinance setting forth such fees.

5. Developer is required to fund any necessary off-site improvements to collection system and wastewater pump stations.

6. Off-street parking, loading spaces and landscaping shall be provided per Maui County Code Chapter 19.36.

7. Public Law 101-336, Americans with Disabilities Act–Title III, require all places of public accommodation and commercial facilities be accessible to people with disabilities.

8. The subject project shall comply with the provisions of the grading ordinance by requiring the design and installation of erosion and dust control measures.

Should you have any questions, please call me at 270-7845.

Very truly yours,

for DAVID GOODE
Director of Public Works
and Waste Management

DG:da/ry
S:\LUCA\CZM\paukukalopreschool.wpd

MUNEKIYO & HIRAGA, INC.

September 28, 2001

David Goode, Director
Department of Public Works
and Waste Management
200 South High Street
Wailuku, Hawaii 96793

SUBJECT: Paukukalo Preschool, Two-Classroom Building
TMK 3-3-5: por. 86 and por. 87

Dear Mr. Goode:

Thank you for your letter of August 13, 2001, commenting on the Draft Environmental Assessment for the subject project. On behalf of the applicant, Kamehameha Schools, we note the following:

1. ***Construction Waste Disposal***

The project's contractor will submit a plan for construction waste disposal.

2. ***Wastewater System Capacity***

The applicant acknowledges that wastewater system capacity cannot be ensured at the time of final building permit approval or if the project completion is delayed.

3. ***Wastewater Contribution Calculations***

The applicant acknowledges that wastewater contribution calculations are required to be submitted.

4. ***Treatment Plant Expansion Assessment Fees***

The applicant acknowledges that treatment plant expansion assessment fees must be paid in accordance with the applicable ordinance setting forth such fees.

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305 High Street, Suite 104 · Wailuku, Hawaii 96793 · ph: (808)244-2015 · fax: (808)244-8729 · planning@mhinconline.com

5. ***Off-Site Improvements***

The applicant acknowledges that it is required to fund any necessary off-site improvements to collection system and wastewater pump stations.

6. ***Off-Street Parking, Loading Spaces and Landscaping***

The applicant acknowledges and will comply with Maui County Code Chapter 19.36.

7. ***Americans with Disabilities Act***

The applicant acknowledges and will comply with Public Law 101-336, Americans with Disabilities Act - Title III.

8. ***Erosion and Dust Control Measures***

The applicant acknowledges and will comply with the provisions of the Maui County Grading Ordinance.

We appreciate your comments on the project.

Very truly yours,

Gwen Ohashi Hiraga

Gwen Ohashi Hiraga
Project Manager

GOH:cc
cc: Allison Yue, Kamehameha Schools
Carolyn Darr, Department of Hawaiian Home Lands
kabe\addiclas\dpwwm.ltr

Chapter XI

List of Permits and Approvals

XI. LIST OF PERMITS AND APPROVALS

The following County permits and approvals will be required prior to the implementation of the project.

County of Maui

1. Construction Permits (e.g., building, electrical, plumbing, driveway).

References

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Appendices

Appendix A

Letters from SHPD Dated June 1, 1992, July 5, 1996 and August 4, 1999

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

DEPUTIES

JOHN P. KEPPELER, II
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AQUATIC RESOURCES
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CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION DIVISION
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

June 1, 1992

LOG NO: 5434
DOC NO: 2298A

Mr. Bert Ratte, Engineer
Department of Public Works
Division of Land Use and Code Administration
250 South Street
Wailuku, Maui, Hawaii 96793

Dear Mr. Ratte:

SUBJECT: Historic Preservation Review of the Building Permit Application for the Paukukalo Community Center
Paukukalo, Wailuku, Maui
TMK: 3-3-5: 87

Thank you for the opportunity to review the plans for the construction of a new building and parking lots at the existing Paukukalo Community Center.

A review of our records indicates the absence of known historic sites on this property. This parcel is on a sand dune which has gone through extensive modification when the Department of Hawaiian Home Lands constructed the homestead subdivision. It is not likely that significant historic sites are still present. Therefore, we believe that the proposed project will have "no effect" on significant historic sites.

If you have any questions, please contact Ms. Annie Griffin at 587-0013.

Sincerely,

DON HIBBARD, Administrator
State Historic Preservation Division

AG:jen

JUN - 2 1992

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

DEPUTY
GILBERT COLOMA-AGARAN

AQUACULTURE DEVELOPMENT PROGRAM
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HISTORIC PRESERVATION DIVISION
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

July 5, 1996

LOG NO: 17601
DOC NO: 9606KD31

Mr. Bert Ratte, Engineer
Department of Public Works
Land Use and Codes Administration
250 South High Street
Wailuku, Hawaii 96793

Dear Mr. Ratte:

SUBJECT: **Chapter 6E-42, Historic Preservation Review of Construction Plans for the Paukukalo Community Center Playcourt**
Paukukalo, Wailuku District, Island of Maui
TMK: 3-3-05: 87 (Appl. No. 96/0961)

Thank you for the opportunity to review the construction and grading plans for a basketball court, to be located south of the existing community center in Paukukalo. The proposed project area consists of a previously graded lot which has no standing structures or existing improvements. The lot is located within the area of the Waiehu sand dunes, and within the existing Hawaiian Homelands subdivision. The area was previously graded in connection with the subdivision development and construction of the community center.

Our records indicate that human skeletal remains and burials have been identified in a number of locations within the Hawaiian Homelands and adjacent Waiehu Terrace subdivision. These remains tend to occur along the eroding slopes of intact dunes, where previous construction cuts were made.

The proposed project site was inspected by Historic Preservation Division staff on June 26, 1996. The surface of the lot was fully visible at the time of the inspection. No evidence of historic sites was observed. The sand matrix is mixed with soil fill material, indicating that it has been previously disturbed. A backfilled excavation, which appears to be a recent *imu* pit is present near the center of the lot.

CORRECTION

THE PRECEDING DOCUMENT(S) HAS BEEN REPHOTOGRAPHED TO ASSURE LEGIBILITY
SEE FRAME(S)
IMMEDIATELY FOLLOWING

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

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HISTORIC PRESERVATION DIVISION
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

July 5, 1996

Mr. Bert Ratte, Engineer
Department of Public Works
Land Use and Codes Administration
250 South High Street
Wailuku, Hawaii 96793

LOG NO: 17601
DOC NO: 9606KD31

Dear Mr. Ratte:

SUBJECT: **Chapter 6E-42, Historic Preservation Review of Construction Plans for the Paukukalo Community Center Playcourt**
Paukukalo, Wailuku District, Island of Maui
TMK: 3-3-05: 87 (Appl. No. 96/0961)

Thank you for the opportunity to review the construction and grading plans for a basketball court, to be located south of the existing community center in Paukukalo. The proposed project area consists of a previously graded lot which has no standing structures or existing improvements. The lot is located within the area of the Waiehu sand dunes, and within the existing Hawaiian Homelands subdivision. The area was previously graded in connection with the subdivision development and construction of the community center.

Our records indicate that human skeletal remains and burials have been identified in a number of locations within the Hawaiian Homelands and adjacent Waiehu Terrace subdivision. These remains tend to occur along the eroding slopes of intact dunes, where previous construction cuts were made.

The proposed project site was inspected by Historic Preservation Division staff on June 26, 1996. The surface of the lot was fully visible at the time of the inspection. No evidence of historic sites was observed. The sand matrix is mixed with soil fill material, indicating that it has been previously disturbed. A backfilled excavation, which appears to be a recent *imu* pit is present near the center of the lot.

The topography surrounding the community center park area suggests that this area was cut during subdivision development. In addition, the sand within the project area has been previously disturbed to an unknown depth. The existing grade of the lot is at or very near the proposed finished grade of the playcourt, and very little cutting will be required.

Based on the location of the proposed project away from intact dune remnants, and based on the limited amount of excavation that will occur for this project, we believe that it will have "no effect" on historic sites.

If evidence of human skeletal remains is observed during construction, the contractor should follow the instructions as given on page C-3 of the construction plans.

Please contact Ms. Theresa K. Donham at 243-5169 if you have any questions.

Aloha,

DON HIBBARD, Administrator
State Historic Preservation Division

KD:jen

JL 5 1996

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

AUG 12 1999

TIMOTHY E. JOHNS, CHAIRPERSON
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HISTORIC PRESERVATION
LAND
STATE PARKS
WATER RESOURCE MANAGEMENT

August 4, 1999

Mr. Milton Arakawa
Munekiyo, Arakawa and Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

LOG NO: 23912 ✓
DOC NO: 9906CD13

Dear Mr. Arakawa,

SUBJECT: **Inquiry as to Whether an Archaeological Inventory Survey is Warranted for the Proposed New Paukualo Preschool and Offices**
Wai'ehu Ahupua'a, Wailuku District, Island of Maui TMK: 3-3-05:086 and 087

Thank you for your inquiry as to whether or not an archaeological inventory survey is warranted for the proposed new Paukukalo Preschool and offices. Our response is based on reports, maps and aerial photographs maintained at the State Historic Preservation Office.

Our records show that the subject parcels have not been subject to an archaeological inventory survey. Our records also indicate that human skeletal remains have been identified in a number of locations within the Hawaiian Homelands adjacent Wai'ehu Terrace subdivision. These remains tend to occur along the eroding slopes of intact dunes, where previous construction cuts were made.

A site inspection was conducted of parcel 87 in 1996 [SHPD DOC NO: 9606KD31], by Ms. Theresa Donham, previous Maui Island Archaeologist. At that time Ms. Donham stated no evidence of historic sites was observed; the deposit appeared to be a mix of the naturally occurring sand matrix with soil fill material; and evidence of recent disturbance was present. In addition, Ms. Donham stated that the topography surrounding the community center park area suggested that the area was altered during subdivision development and that the sand within parcel 87 has been previously disturbed to an undetermined depth (SHPD DOC NO: 9606KD31). According to our maps, parcel 86 appears to have been previously disturbed as a result of being graded and has been used in the recent past as a community park, making it unlikely that significant historic sites remain.

Given the above information, it is unlikely that significant historic sites are present within the proposed project area and an archaeological inventory survey is not recommended.

Please call Cathleen Dagher at 692-8023 if you have any questions.

Aloha,

Don Hibbard, Administrator
State Historic Preservation Division

CD:jen

c: Greg Bayless, Bayless Architects AIA

Appendix B

Traffic Impact Analysis Report

PAUKUKALO PRESCHOOL
TRAFFIC IMPACT ANALYSIS REPORT
Paukukalo, Maui, Hawaii

May 2001

Prepared for

Kamehameha Schools

Austin, Tsutsumi & Associates, Inc.
Civil Engineers • Surveyors
501 Sumner Street, Suite 521
Honolulu, Hawaii 96817-5031
Telephone: (808) 533-3646
Facsimile: (808) 526-1267
Honolulu • Wailuku, Hawaii

PAUKUKALO PRESCHOOL
TRAFFIC IMPACT ANALYSIS REPORT

Paukukalo, Maui, Hawaii

PREPARED FOR:

Kamehameha Schools

PREPARED BY:

Austin, Tsutsumi & Associates, Inc.
Civil Engineers • Surveyors
Honolulu • Wailuku, Hawaii

May 2001

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
CIVIL ENGINEERS • SURVEYORS

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AUSTIN, TSUTSUMI & ASSOCIATES, INC. CIVIL ENGINEERS • SURVEYORS
CONTINUING THE ENGINEERING PRACTICE FOUNDED BY H. A. R. AUSTIN IN 1934

TED S. KAWAHIGASHI, P.E., FACEC
KENNETH K. KUROKAWA, P.E.
DONOHUE M. FUJII, P.E.
STANLEY T. WATANABE
TERRANCE S. ARASHIRO, P.E.
MERNA S. KIBE

PAUKUKALO PRESCHOOL

TRAFFIC IMPACT ANALYSIS REPORT

I. INTRODUCTION

This report documents the findings of the traffic impact analysis study conducted by Austin, Tsutsumi & Associates, Inc. to evaluate the potential traffic impact resulting from the vehicular traffic generated by the proposed preschool and office building to be located at the Paukukalo Park in Wailuku, Maui.

A. Project Description

Kamehameha Schools (KS) proposes to construct a preschool for a maximum of 120 children. The preschool includes three classroom buildings and an administration area. Preschool hours will be from 7:30 a.m. to 2:00 p.m. In the morning children may be dropped off from 7:30 a.m. and in the afternoon, children may be picked up from 12:00 p.m. to 2:00 p.m. Preference will be given to children of Hawaiian ancestry living in Paukukalo Subdivision and in the nearby areas of Waiehu Kou and Waihee; children with Hawaiian ancestry living elsewhere would be able to fill the remaining openings. The preschool will employ two administrative staff, six teachers and six teaching assistants.

Additionally, the State of Hawaii Department of Hawaiian Home Lands (DHHL) plans to construct a new, 1,200-square-foot office building at Paukukalo Park. The existing DHHL office is located in Puuone Plaza in Wailuku; the current staff of two people will relocate to the new building and there is potential to add a third staff member. Office hours will be 7:30 a.m. to 4:30 p.m.

REPLY TO:
501 SUMNER STREET, SUITE 521 • HONOLULU, HAWAII 96817-5031
PHONE (808) 533-3646 • FAX (808) 526-1267 • EMAIL: atahnl@atahawaii.com

OFFICES IN:
HONOLULU, HAWAII
WAILUKU, MAUI, HAWAII

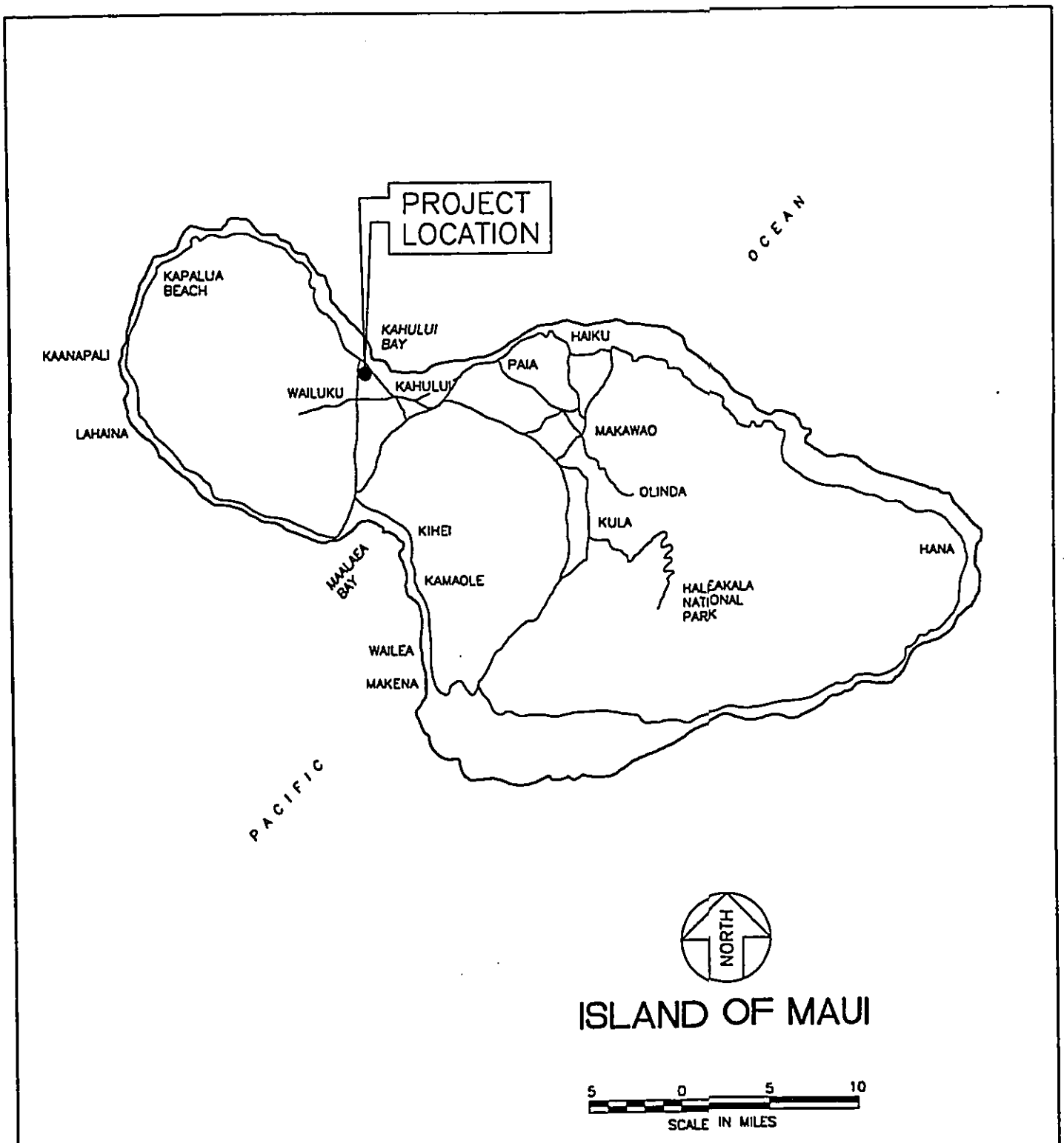
Construction of the KS preschool and the DHHL office building are expected to be completed and occupied by November 2001. Hence, the Year 2001 is utilized for future conditions when the project is expected to be fully operational.

The proposed project is located at Paukukalo, Maui as shown in Figure 1 and the vicinity map in Figure 2. The preliminary project site plan is provided in Figure 3. The tax map key reference is (2) 3-3-005: 086 and 087. The project access will be relocated approximately 135 feet south of the existing parking lot driveway at its connection to Kaumualii Street and Kealii Drive.

B. Study Methodology

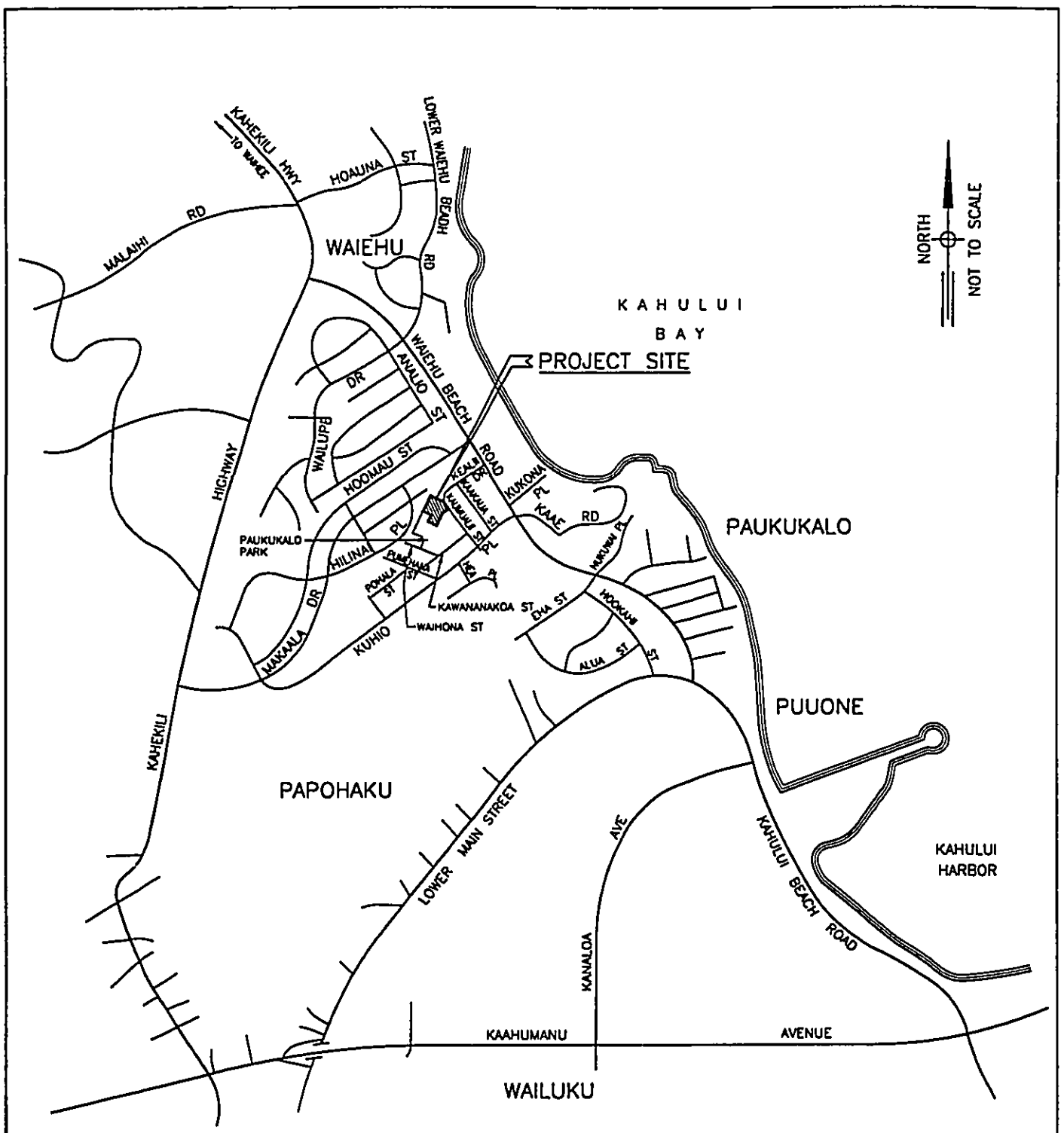
The purpose of this study is to identify, quantify and mitigate the potential traffic impacts at the intersections of Waiehu Beach Road/Kuhio Place/Kaae Road and Waiehu Beach Road/Kealii Drive by the vehicular trips generated by the preschool and office building. The roadway improvements which would be required to accommodate the future regional traffic growth, as well as the project-generated traffic, are identified, as needed.

Traffic counts were taken on Waiehu Beach Road at the intersections of Kuhio Place/Kaae Road and Kealii Drive to quantify existing traffic operations during the morning and afternoon peak periods of traffic. Field observations along Waiehu Beach Road and in the vicinity of the project were also conducted during the same time periods as the traffic counts. In order to assess the traffic impacts of the KS Paukukalo Preschool and the DHHL office building in context with the regional traffic growth in the study area, future traffic volumes were forecasted without and with the project-generated traffic. The traffic impacts of the proposed project were determined through the analytical comparison of these two future traffic assignments.



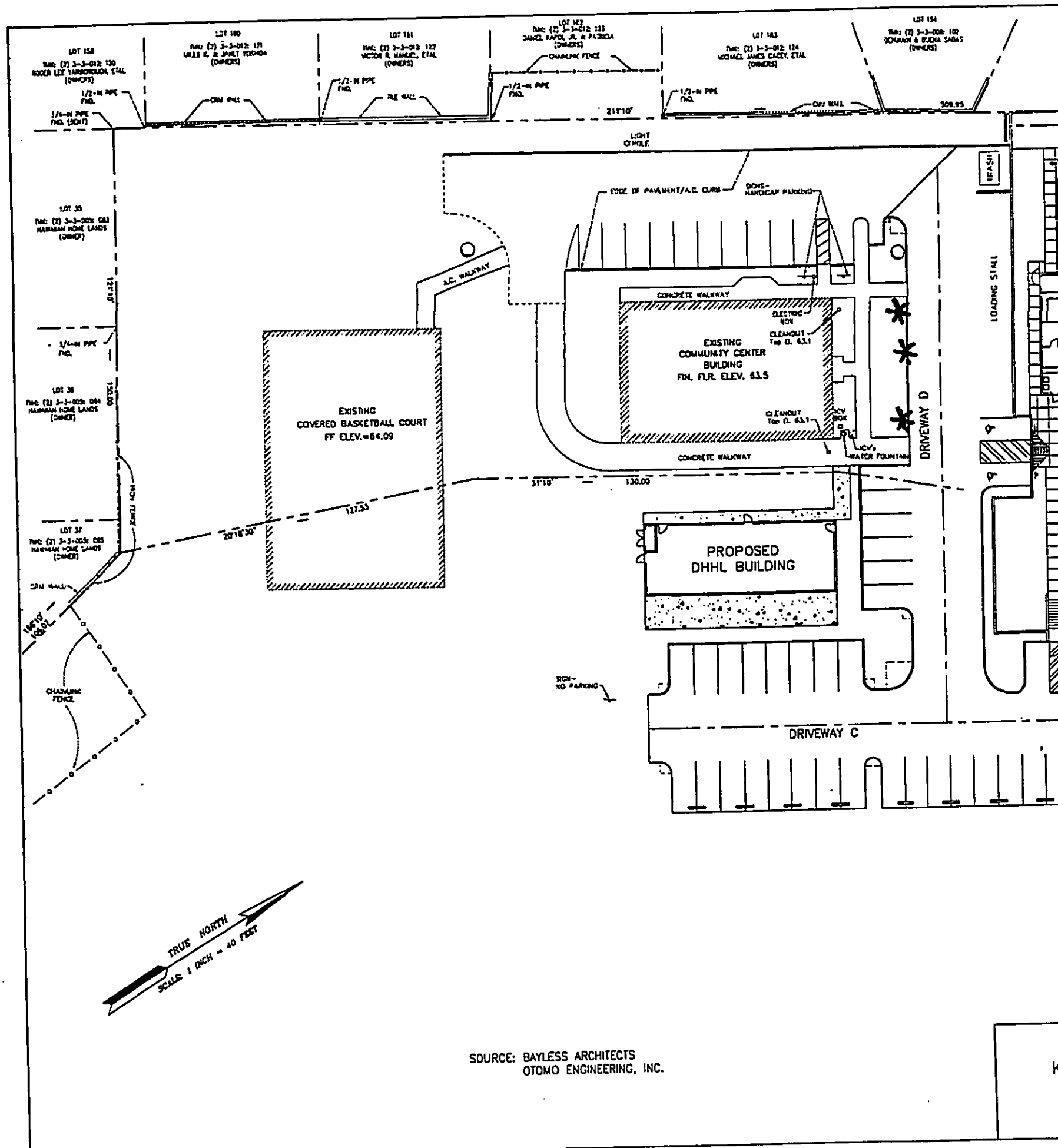
KS PAUKUKALO PRESCHOOL PAUKUKALO, MAUI, HAWAII	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII LOCATION MAP	FIGURE 1

FN: 00-088\FIGURE1



KS PAUKUKALO PRESCHOOL PAUKUKALO, MAUI, HAWAII	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII VICINITY MAP	FIGURE 2

FN: 00-088\FIGURE2



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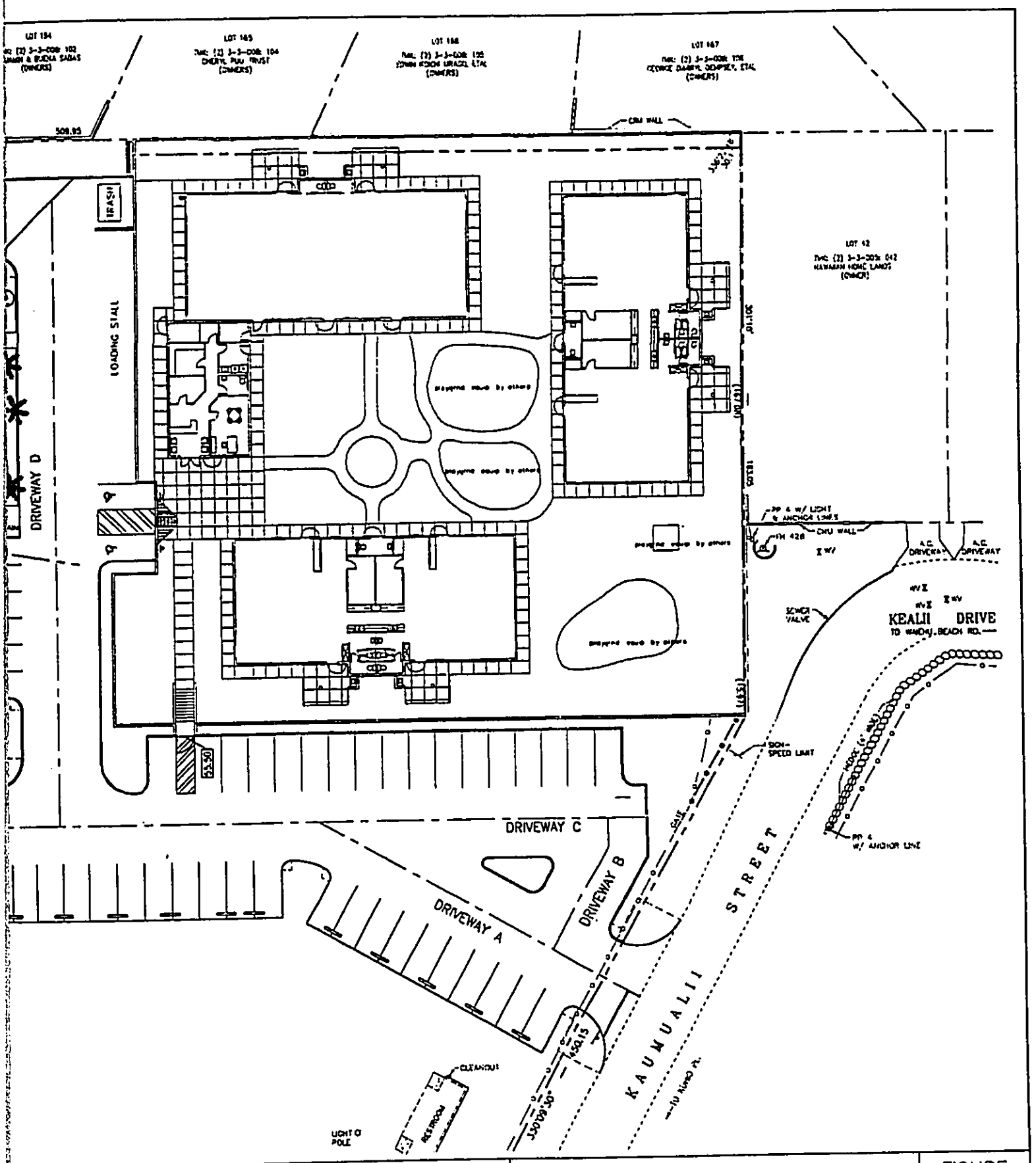
OTOMO ENGINEERING, INC.



KS PAUKUKALO PRESCHOOL PAUKUKALO, MAUI, HAWAII	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS.SURVEYORS • HONOLULU,HAWAII PRELIMINARY SITE PLAN	FIGURE 3

II. EXISTING CONDITIONS

The project site presently contains a vacant building and parking lot. The vacated building and the parking lot will be demolished for the new preschool and office building. New parking areas will be constructed in areas which are currently grassed. The existing parking lot driveway is located at the connection of Kealii Drive and Kaumualii Street.

A. Existing Roadway System

Waiehu Beach Road is a two-lane State collector roadway, which links the Waihee and Waiehu areas with the lower, industrialized area of Wailuku. In the vicinity of the project, Waiehu Beach Road has two 12-foot travel lanes, a center 10-foot two-way turn lane and paved shoulders.

Kuhio Place is the primary county collector road within the Paukukalo Subdivision. At its unsignalized cross-intersection with Waiehu Beach Road and Kaae Road, separate left-turn lanes are provided on Waiehu Beach Road. The Kuhio Place approach to the Waiehu Beach Road has sufficient width to allow two separate queues for the right-turn movements and the left-turn/through movements. The Kaae Road approach, which is off-set from the Kuhio Place approach, also has sufficient width to allow right-turn movements to pass by waiting, left-turn/through movements.

Kealii Drive is a local two-lane county road, which also serves as a secondary access to the Paukukalo Subdivision. At the unsignalized T-intersection of Waiehu Beach Road and Kealii Drive, a separate turn lane is designated for the northbound left turns and a two-way left-turn lane is striped on the north side of the intersection.

Kaumualii Street is a two-lane county road, which provides access to Paukukalo Park and residential uses. Kaumualii Street links to Waiehu Beach Road via Kuhio Place and Kealii Drive.

Paukukalo Park has two designated bus stops, one on Kaumualii Street and the other on Kawananakoa Street. School buses for Waihee (Elementary) School, Iao (Middle) School and Baldwin High School, as well as Maui Economic Opportunity (MEO) buses utilize the bus stops.

B. Existing Traffic Operations

The following sections present the existing peak hour traffic volumes and a description of the methodology utilized to analyze the intersection operating conditions.

1. Existing Traffic Volumes

Manual traffic count data and field observations were conducted on October 3-4, 2000. Existing traffic volumes during the morning and afternoon peak hours of traffic are provided in Figure 4. The traffic count data is supplied in Appendix A. The morning peak hour of traffic occurred between 6:45 – 7:45 a.m.; this time period coincides with the starting time of 7:30 a.m. of the proposed preschool. The early afternoon peak hour of 2:00 – 3:00 p.m. was selected for analysis as the proposed project traffic would be expected to peak at the preschool's ending time at 2:00 p.m.

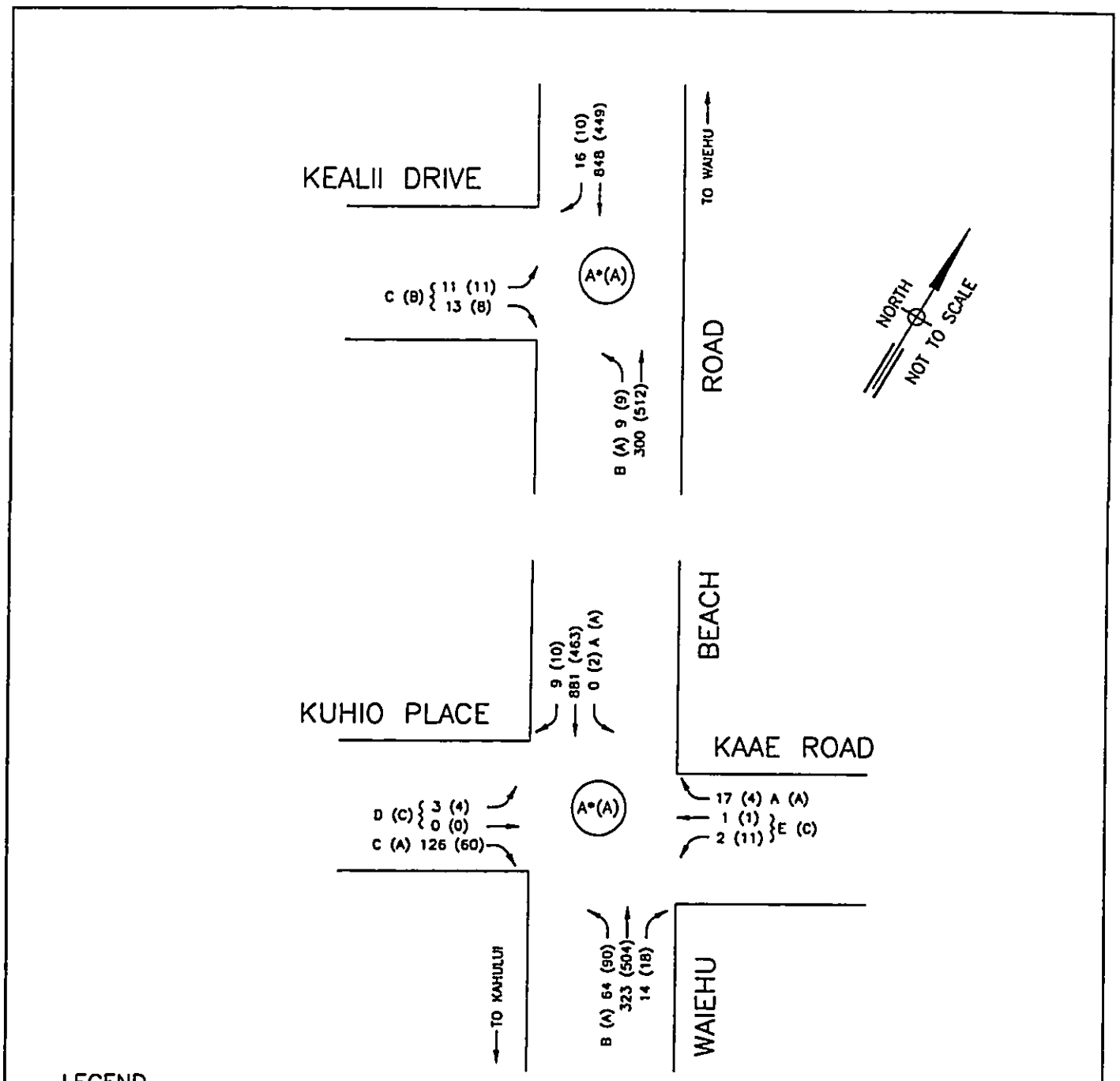
2. Technical Analysis

The technical analysis of traffic conditions is described in this section for unsignalized intersections. Level of Service (LOS) is a qualitative measure used to describe the condition of traffic flow, ranging from free flow conditions at LOS A to congested conditions at LOS F. Appendix B contains detailed descriptions of LOS for unsignalized intersections.

Unsignalized intersections are controlled by stop or yield signs on minor street approaches. The "Two-Way Stop Control" method described in the 1994 Highway Capacity Manual was employed to determine the delay and LOS for unsignalized intersections.

3. Analysis Results

The overall traffic conditions at the intersection of Waiehu Beach Road/Kuhio Place/Kaae Road are at LOS A. During the morning peak hour of traffic, the Waiehu Beach Road northbound left-turn movement is at LOS B. The Kuhio Place left-turn/through movement is at



LEGEND

123 (456)	AM (PM) PEAK HOUR TRAFFIC VOLUMES
A (A)	AM (PM) LOS FOR STOP OR YIELD CONTROL MOVEMENT AT UNSIGNALIZED INTERSECTION
(A (A))	AM (PM) LOS FOR OVERALL UNSIGNALIZED INTERSECTION

* INTERSECTION OPERATIONS CONSTRAINED BY DOWNSTREAM INTERSECTION

KS PAUKUKALO PRESCHOOL
PAUKUKALO, MAUI, HAWAII

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS • HONOLULU, HAWAII

EXISTING TRAFFIC CONDITIONS

FIGURE 4

FN: 00-088\FIGURE4

LOS D and the right-turn movement is at LOS C. The Kaae Road left-turn/through movement incurs the longest delay during the morning peak hour of traffic as it operates at LOS E. During the early afternoon peak hour of traffic, the Kuhio Place left-turn/through movement and the Kaae Road left-turn/through movement are at LOS C; the remaining movements at this intersection are at LOS A.

The overall traffic operations at the intersection of Waiehu Beach Road and Kealii Drive are at LOS A. During the morning peak hour of traffic, the Waiehu Beach Road northbound left-turn movement is at LOS B and the Kealii Drive approach is at LOS C. During the early afternoon peak hour of traffic, the northbound left-turn movement is at LOS A while the Kealii Drive approach operates at LOS B.

Observations of the morning peak hour of traffic noted that queuing occurred in the southbound direction of Waiehu Beach Road. The southbound queue extended from the Waiehu Beach Road/Eha Street intersection to approximately midway between Makaala Drive and the Wailupe Drive/Lower Waiehu Beach Road intersections. The southbound traffic flow was sluggish as it passed through the Kealii Drive and Kuhio Place/Kaae Road intersection. The intersection of Waiehu Beach Road and Eha Street is the first signalized intersection in the southbound direction and the traffic signal serves to meter traffic flow from Waiehu Beach Road into the lower Wailuku area.

In general, the Waiehu Beach Road two-way left-turn lane and left-turn bays are effective in serving as a refuge area for turning traffic which would otherwise delay through traffic. However, a couple of school buses were observed to stop in the northbound travel lane to pick up school children and block the flow of northbound traffic.

III. FUTURE BASE YEAR 2001 CONDITIONS WITHOUT THE PROJECT

For the future conditions without the project, Year 2001 was selected as the future year. Current plans indicated construction would be completed by November 2001. The preschool and office building are expected to be opened for the Fall 2001 school year.

A. Background Traffic Growth

Traffic volumes in the vicinity of the project are expected to increase due to land use changes and accompanying growth in regional traffic volumes. A review of projects in the area indicate the second phase of the nearby Waiehu Kou project, which contains 110 single-family units, is presently under construction. Approximately one-third of the Phase 2 units has been completed and fully occupied; the remaining units are expected to be completed in the next few months. The third phase of the Waiehu Kou project is in the planning stage and is not scheduled for construction at the time of this study.

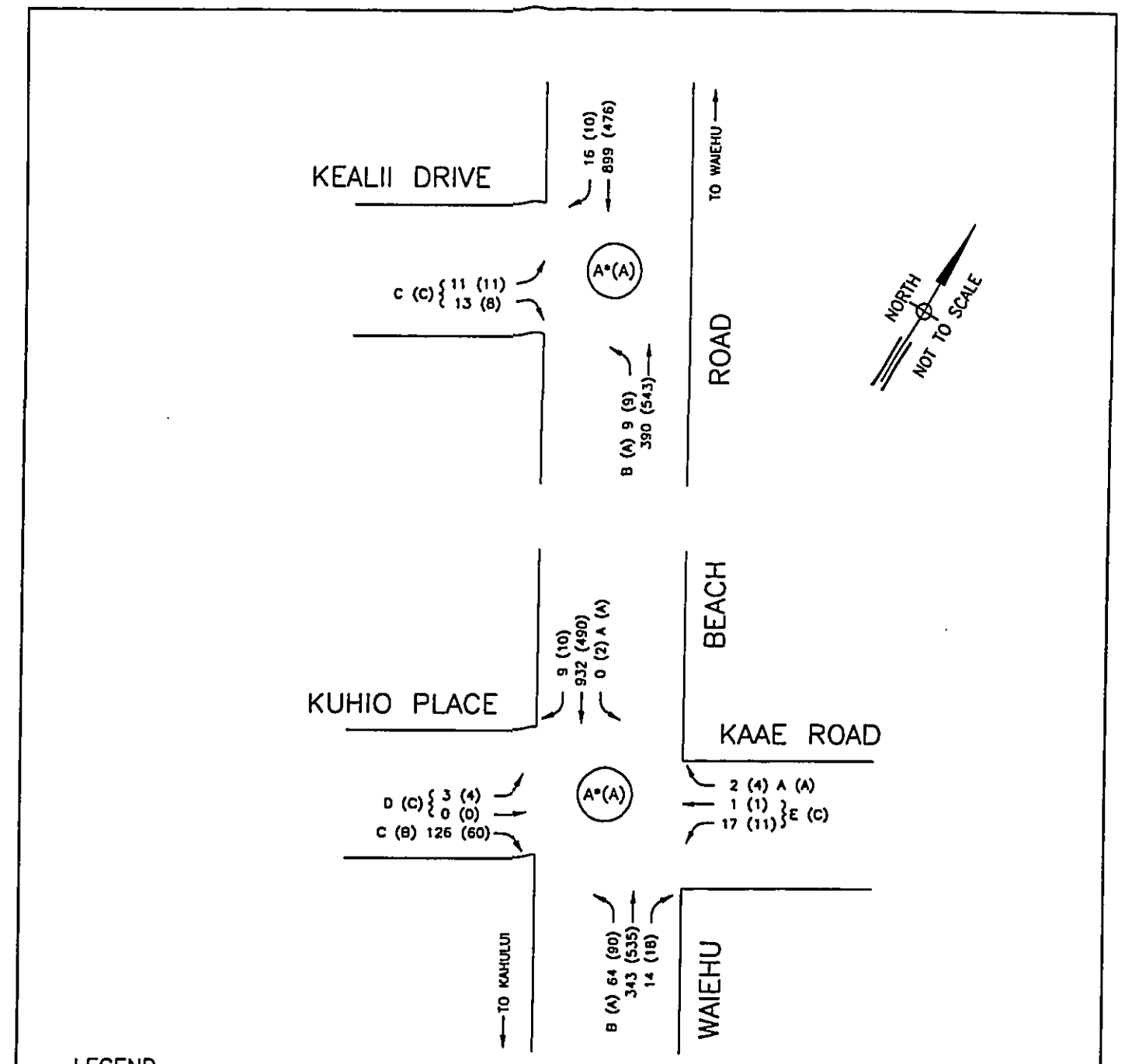
An analysis of recent State Department of Transportation historical traffic data shows a growth rate of 5.0 percent. This study assumes the near-term growth trend would be similar to the recent historical trend and that the traffic generated by nearby projects, such as the Waiehu Kou project, would be included in the regional growth in traffic volumes. The growth rate of 5.0 percent was applied to the existing traffic volumes to estimate future Year 2001 baseline traffic volumes without the project.

B. Base Roadway Improvements

There are no roadway improvements planned by the State Department of Transportation or the County of Maui that would affect the existing laneage at the study intersections.

C. Future Base Traffic Volumes and Level of Service Analysis

The traffic assignment showing the future base traffic volumes without the project is shown in Figure 5. The results of the unsignalized intersection analysis indicate the morning peak hour of traffic LOS conditions at the two study intersections would remain the same as the existing conditions.



KS PAUKUKALO PRESCHOOL PAUKUKALO, MAUI, HAWAII	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII FUTURE BASE YEAR 2001 TRAFFIC CONDITIONS WITHOUT PROJECT	FIGURE 5

FN: 00-088\FIGURES

During the early afternoon peak hour of traffic at the intersection of Waiehu Beach Road, Kuhio Place and Kaae Road, the Kuhio Place right-turn movement would drop from LOS A to LOS B and the Kaae Road left-turn/through movement would decrease from LOS C to LOS D. At the intersection of Waiehu Beach Road and Kealii Drive, the Kealii Drive approach would drop from LOS B to LOS C.

IV. PROJECT-GENERATED TRAFFIC VOLUMES

The project-generated traffic is determined through three sequential steps: trip generation, trip distribution and traffic assignment. Trip generation quantifies the number of project-generated trips. Trip distribution determines the direction of travel for the project-generated trips. Traffic assignment identifies the roadways that would be utilized by the project-generated trips

A. Trip Generation

The estimate of project-generated traffic volumes is developed by applying trip rates according to the appropriate land use parameters. Trip generation rates for the project were derived from trip rates compiled by the Institute of Transportation Engineers (ITE), Trip Generation, 6th Edition. The ITE trip rates are provided in Table 1 and the project-generated traffic volumes are shown in Table 2.

Table 1
TRIP GENERATION RATES

	Average Weekday	AM Peak Hour Enter	AM Peak Hour Exit	PM Peak Hour Enter	PM Peak Hour Exit
Daycare Center ITE Code 565	4.52	0.43	0.38	0.40	0.46
Single Tenant Office Building ITE Code 715 (per 1,000 SF GFA)	11.57	1.58	0.20	0.26	1.46

Table 2
PROJECT-GENERATED TRAFFIC VOLUMES

	Average Weekday	AM Peak Hour Enter	AM Peak Hour Exit	PM Peak Hour Enter	PM Peak Hour Exit
Preschool (120 children)	542	52	46	48	55
Office Building (1,200 SF)	14	2	0	0	2
Total	556	54	46	48	57

SF = Square Feet
GFA = Gross Floor Area

The preschool and office building will have the same starting time of 7:30 a.m.; thus, the morning peak hour of these land uses is expected to occur during the existing traffic peak hour of 6:45 - 7:45 a.m. The ending time of the preschool will be 2:00 p.m. and the office hours will end at 4:30 p.m. The preschool is expected to generate higher volumes of traffic at its ending time of 2:00 p.m. than the traffic volumes generated by the office building at 4:30 p.m. Thus, the early afternoon peak hour of 2:00 - 3:00 p.m. is utilized to analyze the impact of the project-generated traffic. The office building is expected to serve clients and generate low volumes of traffic during the early afternoon peak hour.

B. Trip Distribution

Trip distribution identifies the direction of travel of trips to and from the project site by determining the likely external origins and destinations of the project-generated trips. The trip distribution was derived from the preschool waiting list, review of existing and projected population and employment data for the Wailuku area as well as the distribution of north and southbound traffic on Waiehu Beach Road.

First priority for the preschool students will be given to an estimated 20 to 30 children that live in the Paukukalo Subdivision; many of these students would be expected to walk to school with their parents or grandparents. The students living in the Paukukalo Subdivision could also be dropped off or picked up by parents on their way to/from work; the vehicular trips between home and the preschool would occur internally within the Paukukalo Subdivision and would not be expected to increase the vehicle trips on Waiehu Beach Road as these preschool trips would be linked to existing work trips. For purposes of this traffic study it was assumed that 20 out of the 120 children attending the preschool would be from within the Paukukalo Subdivision.

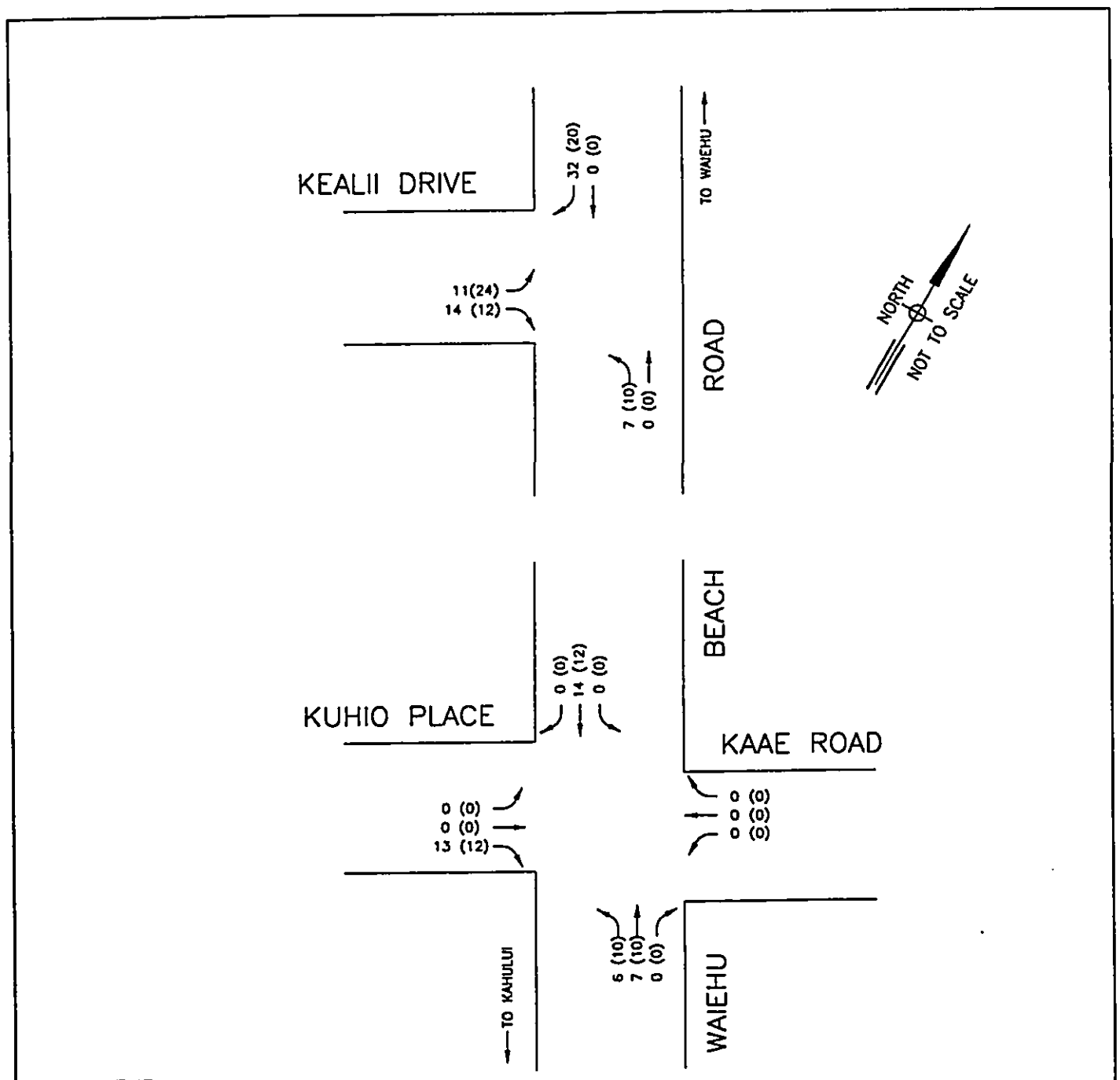
Second priority for the preschool students will be children from the Waiehu Kou Subdivision and third priority is for children from the Waihee Elementary School district area. Children of Hawaiian ancestry living elsewhere would fill the remaining openings at the preschool. Table 3 presents the trip distribution for the project-generated traffic for students/employees/clients of the preschool and office building that live external to the Paukukalo Subdivision.

Table 3
TRIP DISTRIBUTION

Direction	AM Enter	AM Exit	PM Enter	PM Exit
North	70%	30%	50%	50%
South	30%	70%	50%	50%
Total	100%	100%	100%	100%

C. Traffic Assignment

The traffic assignment determines the routes traveled by the project-generated traffic. The project-generated trips must utilize Kaumualii Street to access the project site. Figure 6 shows the project-generated traffic assignment.



KS PAUKUKALO PRESCHOOL PAUKUKALO, MAUI, HAWAII	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII PROJECT - GENERATED TRAFFIC	FIGURE 6

FN: 00-088\FIGURE6

V. FUTURE YEAR 2001 CONDITIONS WITH THE PROJECT

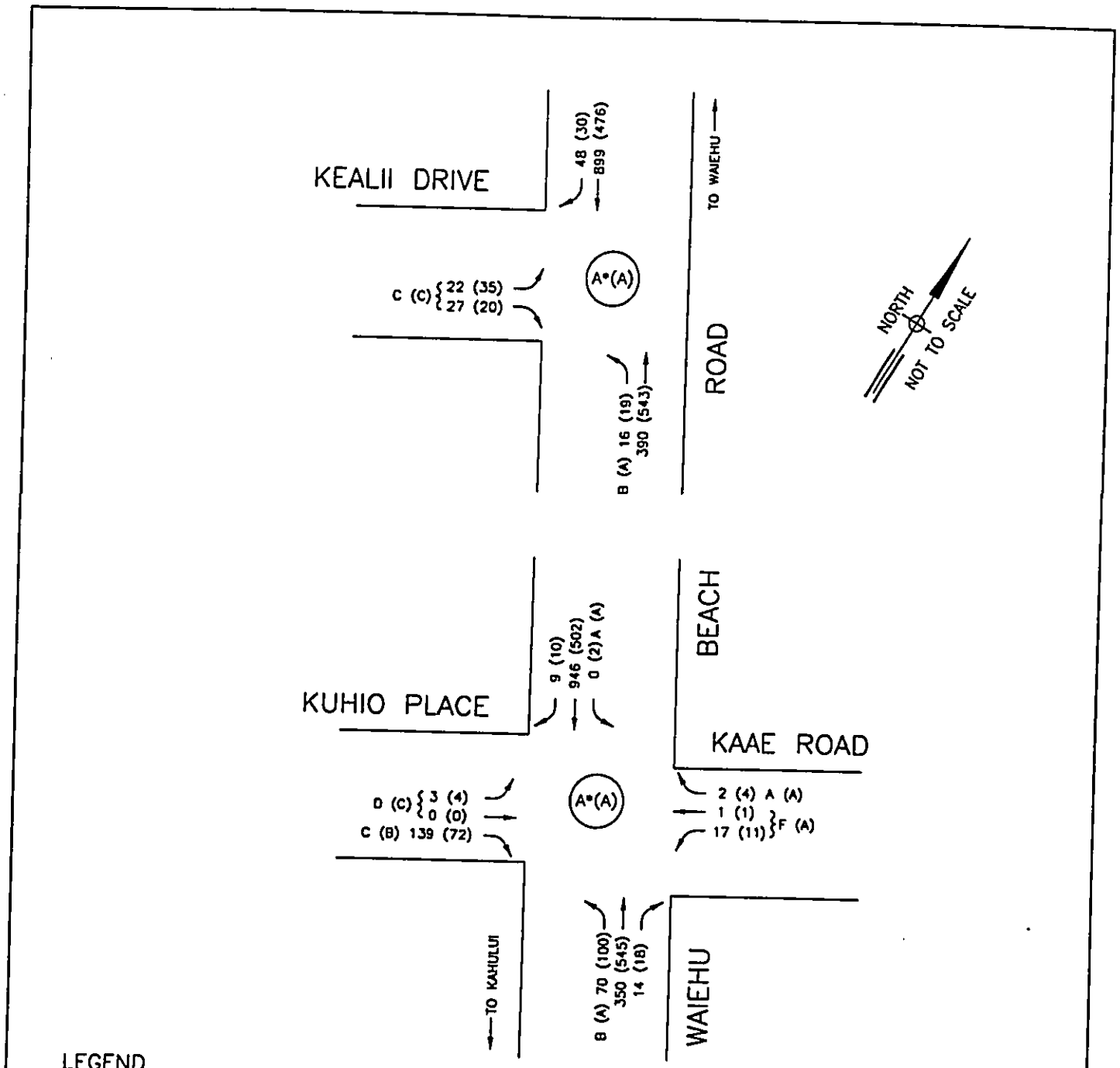
The future traffic conditions with the project-generated traffic are derived by adding the project-generated traffic volumes to the Year 2001 baseline traffic volumes.

A. Future Traffic Volumes with Project-Generated Traffic

The future traffic assignment with the project-generated traffic is shown in Figure 7.

B. Analysis Results

Longer delays are expected with the project traffic and, generally, the future LOS conditions with the project are expected to remain the same as the future LOS without the project. The Kaae Road left-turn/through movement is the exception as it is expected to decrease from LOS E to LOS F during the morning peak hour of traffic; however, traffic volumes on this approach are low (20 vehicles per hour) and account for only 1.3% of the vehicles entering the intersection in the morning peak hour of traffic. Review of the traffic signal warrants indicatae that a traffic signal will not be warranted at the Waiehu Beach Road/Kuhio Place/Kaae Road Intersection. It is not uncommon for vehicles travelling on a low-volume side street to experience long delays, especially when they try to enter or cross a major regional facility such as Waiehu Beach Road.



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FUTURE YEAR 2001
TRAFFIC CONDITIONS WITH PROJECT

FIGURE
7

FN: 00-088\FIGURE7

VI. SUMMARY OF FINDINGS AND RECOMMENDATIONS

The findings of this traffic study and recommendations to accommodate existing traffic volumes and the future traffic volumes with the project-generated traffic are as follows.

A. Findings

The results of the unsignalized intersection analysis are summarized in Table 4.

1. Existing Conditions

The overall traffic conditions at the intersections of Waiehu Beach Road/Kuhio Place/Kaae Road and Waiehu Beach Road/Kealii Drive are at LOS A. During the morning peak hour of traffic, the Kuhio Place left-turn/through movement is at LOS D and the Kaae Road left-turn/through movement operates at LOS E. The other movements at the two study intersections are at LOS C or better during the morning and early afternoon peak hours of traffic.

2. Future Base Year 2001 Traffic Conditions without Project

The LOS conditions during the morning peak hour of traffic at the two study intersections would remain the same as the existing conditions. Slightly longer delays (of less than two seconds) during the early afternoon peak hour of traffic would change LOS conditions at the intersection of Waiehu Beach Road/Kuhio Place/Kaae Road; the Kuhio Place right-turn movement would decrease from LOS A to LOS B while the Kaae Road left-turn/through movement would be lowered from LOS C to LOS D. For the intersection of Waiehu Beach Road/Kealii Drive, the Kealii Drive approach would drop from LOS B to LOS C; the other movements at this intersection would remain unchanged from the existing LOS during the early afternoon peak hour of traffic.

Table 4
UNSIGNALIZED INTERSECTIONS ANALYSIS RESULTS

Intersection	Existing Conditions AM Peak Hour Seconds	LOS	Existing Conditions PM Peak Hour Seconds	LOS	Future Conditions without Project AM Peak Hour Seconds	LOS	Future Conditions without Project PM Peak Hour Seconds	LOS	Future Conditions with Project AM Peak Hour Seconds	LOS	Future Conditions with Project PM Peak Hour Seconds	LOS
Waiehu Beach Road, Kuhio Place and Kaae Road												
Northbound Left Turn	6.3	B	3.9	A	6.7	B	4.0	A	6.9	B	4.2	A
Southbound Left Turn	3.0	A	3.7	A	3.1	A	3.9	A	3.1	A	3.9	A
Kuhio Place												
Left Turn/Through Movement	20.3	D	15.5	C	22.5	D	16.8	C	24.3	D	18.1	C
Right Turn Movement	10.2	C	4.9	A	11.0	C	5.1	B	11.8	C	5.2	B
Kaae Road												
Left Turn/Through Movement	36.6	E	18.3	C	42.4	E	20.1	D	48.0	F	21.7	D
Right Turn Movement	3.8	A	4.8	A	3.9	A	4.9	A	3.9	A	4.9	A
Overall Intersection	1.9	A	0.9	A	2.0	A	0.9	A	2.2	A	0.9	A
Waiehu Beach Road and Kealii Place												
Northbound Left Turn	5.5	B	3.5	A	5.8	B	3.6	A	6.1	B	3.7	A
Kealii Place Approach	12.3	C	9.7	B	13.5	C	10.4	C	16.8	C	13.0	C
Overall Intersection	0.3	A	0.2	A	0.3	A	0.2	A	0.7	A	0.8	A

3. Future Year 2001 Traffic Conditions with Project-Generated Traffic

Except for the Kaae Road left-turn/through movement, which would decrease from LOS E to LOS F during the morning peak hour of traffic, the future LOS conditions with the project are expected to remain the same as the future LOS without the project. The Waiehu Beach Road/ Kuhio Place/Kaae Road intersection does not warrant the installation of a traffic signal system.

B. Recommendations

There are no roadway improvements recommended at the study intersection for the project traffic. The analytical comparison of the future traffic conditions indicates there would be slightly longer delays with the project but, in general, the future LOS conditions with or without the project would be similar. There is existing queuing along Waiehu Beach Road in the southbound direction during the morning peak period due to the traffic signal at the Waiehu Beach Road/Eha Street intersection which may help the left-turn/through movements exit from Kaae Road.

REFERENCES

Institute of Transportation Engineers, Trip Generation, Sixth Edition, Washington, D.C., 1997.

Transportation Research Board, National Research Council, Highway Capacity Manual, Special Report 209, Third Edition, Washington, D.C., 1994.

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APPENDICES

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APPENDIX A
EXISTING TRAFFIC COUNT DATA

AUSTIN, TSUTSUMI & ASSOCIATES, INC.

PAUKUKALO TRAFFIC COUNTS
Waiehu Beach Road, Kuhio Place and Kaae Road
AM Peak Period

	WAIEHU BEACH ROAD						KUHIO PLACE			KAAE ROAD		
	Northbound			Southbound			Eastbound			Westbound		
TIME PERIOD	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
6:30 - 6:45 am	11	77	2	0	170	1	0	0	22	4	0	0
6:45 - 7:00	16	67	4	0	217	5	0	0	29	5	1	1
7:00 - 7:15	18	87	5	0	196	0	0	0	24	4	0	0
7:15 - 7:30	11	67	3	0	246	3	0	0	30	1	0	1
7:30 - 7:45	19	102	2	0	222	1	3	0	43	7	0	0
7:45 - 8:00	20	99	3	1	195	2	1	0	18	6	0	4
8:00 - 8:15	14	94	1	0	105	2	2	0	17	1	0	0
8:15 - 8:30 am	20	83	2	0	132	3	3	1	19	2	0	1
6:45 - 7:45 am	64	323	14	0	881	9	3	0	126	17	1	2
Total	129	676	22	1	1483	17	9	1	202	30	1	7

	WAIEHU BEACH ROAD				KUHIO PLACE		KAAE ROAD		TOTAL
	Northbound		Southbound		Eastbound		Westbound		ENTERING
TIME PERIOD	Approach	Departure	Approach	Departure	Approach	Departure	Approach	Departure	INTERSECTION
6:30 - 6:45 am	90	77	171	196	22	2	4	12	287
6:45 - 7:00	87	68	222	251	29	4	7	22	345
7:00 - 7:15	110	87	196	224	24	5	4	18	334
7:15 - 7:30	81	68	249	277	30	3	2	14	362
7:30 - 7:45	123	105	223	272	46	2	7	20	399
7:45 - 8:00	122	104	198	219	19	4	10	22	349
8:00 - 8:15	109	96	107	123	19	1	1	16	236
8:15 - 8:30 am	105	87	135	153	23	3	3	23	266
6:45 - 7:45 am	401	328	890	1024	129	14	20	74	1440
Total	827	692	1501	1715	212	24	38	147	2578

PAUKUKALO TRAFFIC COUNTS
Waiehu Beach Road, Kuhio Place and Kaae Road
PM Peak Period

	WAIEHU BEACH ROAD						KUHIO PLACE			KAAE ROAD		
	Northbound			Southbound			Eastbound			Westbound		
TIME PERIOD	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
1:30 - 1:45 pm	16	81	3	0	94	3	2	0	10	0	0	0
1:45 - 2:00	11	87	2	0	106	1	3	0	15	1	0	0
2:00 - 2:15	28	109	0	0	96	4	0	0	11	0	0	0
2:15 - 2:30	16	141	3	1	116	4	1	0	14	3	0	1
2:30 - 2:45	19	123	10	0	143	4	2	0	17	3	0	0
2:45 - 3:00	27	131	5	1	108	0	1	0	18	5	1	0
3:00 - 3:15	29	137	4	0	107	1	0	0	19	2	1	0
3:15 - 3:30 pm	25	143	4	1	112	5	1	0	12	5	0	3
2:00 - 3:00 pm	74	460	15	1	461	13	6	0	57	7	0	1
Total	171	952	31	3	882	22	10	0	116	19	2	4

	WAIEHU BEACH ROAD				KUHIO PLACE		KAAE ROAD		TOTAL ENTERING
	Northbound		Southbound		Eastbound		Westbound		
TIME PERIOD	Approach	Departure	Approach	Departure	Approach	Departure	Approach	Departure	INTERSECTION
1:30 - 1:45 pm	100	83	97	104	12	3	0	19	209
1:45 - 2:00	100	90	107	122	18	2	1	12	226
2:00 - 2:15	137	109	100	107	11	0	0	32	248
2:15 - 2:30	160	143	121	133	15	4	4	20	300
2:30 - 2:45	152	125	147	163	19	10	3	23	321
2:45 - 3:00	163	132	109	131	19	6	6	28	297
3:00 - 3:15	170	137	108	128	19	4	3	31	300
3:15 - 3:30 pm	172	147	118	129	13	5	8	30	311
2:00 - 3:00 pm	549	467	475	525	63	16	8	87	1095
Total	1154	966	907	1017	126	34	25	195	2212

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PAUKUKALO TRAFFIC COUNTS
Waiehu Beach Road and Kealii Drive
AM Peak Period

	WAIEHU BEACH ROAD				KEALII DRIVE	
	Northbound		Southbound		Eastbound	
TIME PERIOD	Left	Through	Through	Right	Left	Right
6:30 - 6:45 am	0	71	164	2	2	3
6:45 - 7:00	2	67	212 *	2	2	4
7:00 - 7:15	4	80	209 *	1	1	0
7:15 - 7:30	1	63	220 *	3	4	3
7:30 - 7:45	2	90 *	207 *	10	4	6
7:45 - 8:00	1	94 *	186 *	1	2	0
8:00 - 8:15	0	97	101	5	0	1
8:15 - 8:30 am	0	80	123	1	1	0
6:45 - 7:45 am	9	300	848	16	11	13
Total	10	642	1422	25	16	17

	WAIEHU BEACH ROAD				KEALII DRIVE		TOTAL
	Northbound		Southbound		Eastbound		ENTERING
TIME PERIOD	Approach	Departure	Approach	Departure	Approach	Departure	INTERSECTION
6:30 - 6:45 am	71	73	166	167	5	2	242
6:45 - 7:00	69	69	214	216	6	4	289
7:00 - 7:15	84	81	210	209	1	5	295
7:15 - 7:30	64	67	223	223	7	4	294
7:30 - 7:45	92	94	217	213	10	12	319
7:45 - 8:00	95	96	187	186	2	2	284
8:00 - 8:15	97	97	106	102	1	5	204
8:15 - 8:30 am	80	81	124	123	1	1	205
6:45 - 7:45 am	309	311	864	861	24	25	1197
Total	652	658	1447	1439	33	35	2132

* Adjusted for traffic counts at intersection of Waiehu Beach Road, Kuhio Place and Kaae Road

AUSTIN, TSUTSUMI & ASSOCIATES, INC.

PAUKUKALO TRAFFIC COUNTS
Waiehu Beach Road and Kealii Drive
PM Peak Period

	WAIEHU BEACH ROAD				KEALII DRIVE	
	Northbound		Southbound		Eastbound	
TIME PERIOD	Left	Through	Through	Right	Left	Right
1:30 - 1:45 pm	1	77	89	3	3	3
1:45 - 2:00	1	87	103	1	0	3
2:00 - 2:15	1	101	94	2	1	2
2:15 - 2:30	3	140	111	2	4	2
2:30 - 2:45	2	131	143	2	2	3
2:45 - 3:00	3	140	101	4	4	1
3:00 - 3:15	1	128	106	4	4	1
3:15 - 3:30 pm	0	145	118	3	2	3
2:00 - 3:00 pm	9	512	449	10	11	8
Total	12	949	865	21	20	18

	WAIEHU BEACH ROAD				KEALII DRIVE		TOTAL
	Northbound		Southbound		Eastbound		ENTERING
TIME PERIOD	Approach	Departure	Approach	Departure	Approach	Departure	INTERSECTION
1:30 - 1:45 pm	78	80	92	92	6	4	176
1:45 - 2:00	88	87	104	106	3	2	195
2:00 - 2:15	102	102	96	96	3	3	201
2:15 - 2:30	143	144	113	113	6	5	262
2:30 - 2:45	133	133	145	146	5	4	283
2:45 - 3:00	143	144	105	102	5	7	253
3:00 - 3:15	129	132	110	107	5	5	244
3:15 - 3:30 pm	145	147	121	121	5	3	271
2:00 - 3:00 pm	521	523	459	457	19	19	1042
Total	961	969	886	883	38	33	1885

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APPENDIX B
LEVEL OF SERVICE (LOS) DEFINITIONS

LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS (HCM 1994)

The level of service criteria for unsignalized intersections is defined as the average total delay, in seconds per vehicle. As used here, total delay is defined as the total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line, this time includes the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position.

While the criteria for level of service for two-way stop-controlled (TWSC) and all-way stop-controlled (AWSC) intersections are the same, procedures to calculate the average total delay may differ.

Table A-2. Level of Service Criteria for TWSC Intersections

Level of Service	Average Total Delay Vehicle (sec/veh)
A	≤ 5.0
B	>5.0 and ≤ 10.0
C	>10.0 and ≤ 20.0
D	>20.0 and ≤ 30.0
E	>30.0 and ≤ 45.0
F	> 45.0

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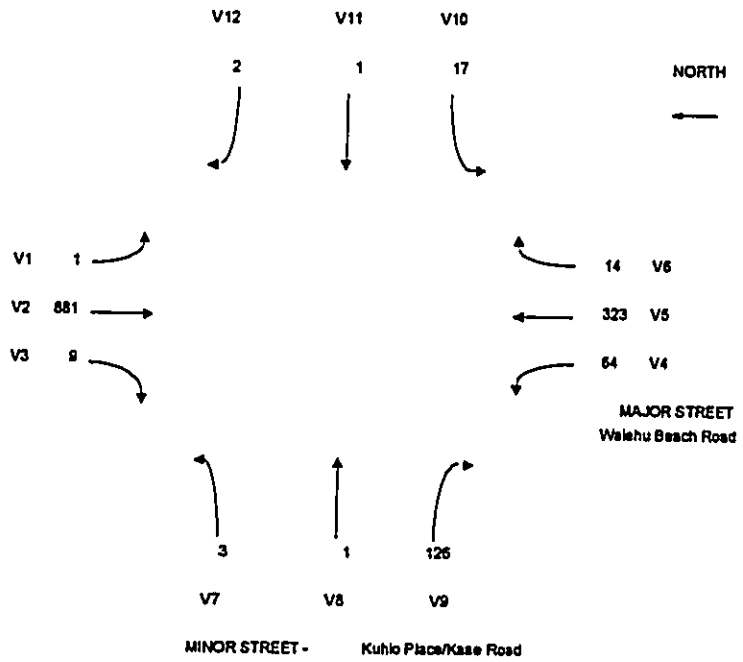
APPENDIX C
LEVEL OF SERVICE CALCULATIONS

ATA Inc. TWO-WAY STOP CONTROLLED INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street:	Waiehu Beach Road	Print Date:	31-Oct-00
Minor Street:	Kuhio Place/Kaae Road	Analyst:	SMU
Peak Hour:	AM PEAK (6:45 - 7:45 am)	File Name:	waiehu bch-kuhio-kaae exist
Scenario:	Existing		

Peak Hour Factor:	1.00
——MAJOR STREET——	
Num of Lanes - V2:	1
Excl LT - V1 (Y/N):	Y
Excl RT - V3 (Y/N):	N
Stop/Yield - V3 (Y/N):	N
Grade - V1,V2,V3:	0
Num of Lanes - V5:	1
Excl LT - V4 (Y/N):	Y
Excl RT - V6 (Y/N):	N
Stop/Yield - V6 (Y/N):	N
Grade - V4,V5,V6:	0
——MINOR STREET——	
Num of Lanes - V8:	2
Grade - V7,V8,V9:	0
Shared Lane-V7,8,9: (0=N,1=LT,2=TR,3=LTR)	1
Num of Lanes - V11:	2
Grade - V10,V11,V12:	0
Shared Lane-V10,11,12 (0=N,1=LT,2=TR,3=LTR)	1



VOLUME ADJUSTMENTS												
MOVEMENT NO.	1	2	3	4	5	6	7	8	9	10	11	12
HOURLY FLOW RATE, V(vph)	1	881	9	64	323	14	3	1	126	17	1	2
VOLUME, v (pcph)	1	881	9	70	323	14	3	1	139	19	1	2

STEP 1: RT FROM MINOR STREET				
Conflicting Flows:	Vc9 = 1/2 V3 + V2 =	886	vhp	Vc12 = 1/2 V6 + V5 = 330 vhp
Potential Capacity:	Cp,9 =	493	pcph	Cp,12 = 942 pcph
Movement Capacity:	Cm,9=Cp,9=	493	pcph	Cm,12=Cp,12= 942 pcph
Prb. of Queu-free State:	po,9=1-v9/Cm,9=	0.72		po,12=1-v12/Cm,12= 1.00
STEP 2: LT FROM MAJOR STREET				
Conflicting Flows:	Vc,4 = V2 + V3 =	890	vhp	Vc,1 = V5 + V6 = 337 vhp
Potential Capacity:	Cp,4 =	646	pcph	Cp,1 = 1184 pcph
Movement Capacity:	Cm,4=Cp,4=	646	pcph	Cm,1=Cp,1= 1184 pcph
Prb. of Queu-free State:	po,4=1-v4/Cm4=	0.89		po,1=1-v1/Cm1= 1.00
Major Left Shared Lane Prob. of Queue-free State	p*o,4=	NA		p*o,1= NA

—continued —

ATA Inc.

TWO-WAY STOP CONTROLLED INTERSECTION LEVEL OF SERVICE ANALYSIS

1994 HCM

Major Street:	Waiehu Beach Road	DATE:	31-Oct-00
Minor Street:	Kuhio Place/Kaae Road	Analyst:	SMU
Peak Hour:	AM PEAK (6:45 - 7:45 am)	File Name:	waiehu bch-kuhio-kaae exist
Scenario:	Existing		

STEP 3: TH FROM MINOR STREET

Conflicting Flows:	Vc,8 = 1/2V3+V2+V1+V6+V5+V4 =	1288	vph
Potential Capacity:	Cp,8 =	230	pcph
Capacity Adj Factor:	f8 = po,4*po,1 =	0.89	
Movement Capacity:	Cm,8 = Cp,8*f8 =	205	pcph
Prob. of Queue-free State:	po,8 = 1-v6/Cm,8 =	1.00	

	Vc,11 = 1/2V6+V5+V4+V3+V2+V1 =	1285	vph
	Cp,11 =	231	pcph
	f11 = po,4*po,1 =	0.89	
	Cm,11 = Cp,11*f11 =	206	pcph
	po,11 = 1-v11/Cm,11 =	1.00	

STEP 4: LT FROM MINOR STREET

Conflicting Flows:	Vc,7 = 1/2V3+V2+V1+1/2V6+V5+V4+ 1/2(V11+V12) =	1282	vph
Potential Capacity:	Cp7 =	192	pcph
Major Left, Minor Through Impedance Factor:	P*7=po,11*f11 =	0.89	
Major Left, Minor Through Adjusted Impedance Factor:	p*7 =	0.91	
Capacity Adjustment Factor:	f7 = p*7*po,12 =	0.91	
Movement Capacity:	Cm,7 = f7*Cp,7 =	175	pcph

	Vc,10 = 1/2V6+V5+V4+1/2V3+V2+V1+ 1/2(V8+V9) =	1344	vph
	Cp10 =	176	pcph
	p*10=po,8*f8 =	0.89	
	p*10 =	0.91	
	f10 = p*10*po,9 =	0.66	
	Cm,10 = f10*Cp,10 =	116	pcph

DELAY AND LEVEL OF SERVICE SUMMARY

MOVEMENT	v(pcph)	cm(pcph)	csh(pcph)	AVG TOTAL DELAY	LOS
MINOR LEFT TURN (7)	3	175	SHRD	SHRD	—
MINOR THROUGH (8)	1	205	181	20.30	D
MINOR RIGHT TURN (9)	139	493	--NA--	10.15	C
MINOR LEFT TURN (10)	19	116	SHRD	SHRD	—
MINOR THROUGH (11)	1	206	116	36.55	E
MINOR RIGHT TURN (12)	2	942	--NA--	3.83	A
MAJOR LEFT (1)	1	1184	--NA--	3.04	A
MAJOR LEFT (4)	70	648	--NA--	6.25	B
MINOR APPROACH (7)(8)(9)	-	-	-	10.43	C
MINOR APPROACH (10)(11)(12)	-	-	-	33.58	E
MAJOR APPROACH (1)(2)(3)	-	-	-	0.00	—
MAJOR APPROACH (4)(5)(6)	-	-	-	1.07	A
TOTAL INTERSECTION (1-12)	-	-	-	1.85	A

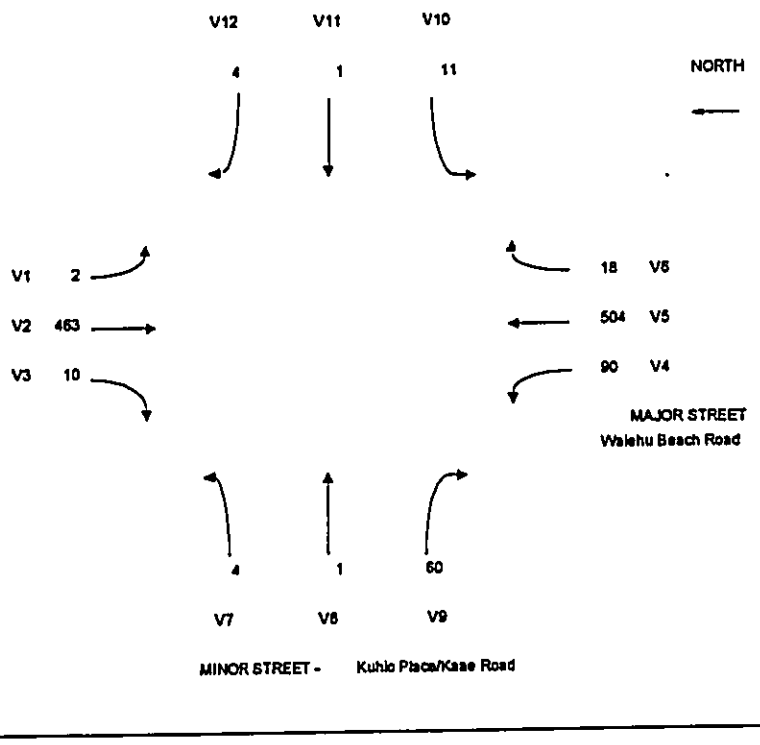
LEVEL OF SERVICE CRITERIA

LEVEL OF SERVICE	AVG TOTAL DELAY (SEC/VEH)
A	<=5
B	>5&<=10
C	>10&<=20
D	>20&<=30
E	>30&<=45
F	>45

ATA Inc. TWO-WAY STOP CONTROLLED INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street:	Waiehu Beach Road	Print Date:	31-Oct-00
Minor Street:	Kuhio Place/Kaae Road	Analyst:	SMU
Peak Hour:	PM PEAK (2:00 - 3:00 pm)	File Name:	waiehu bch-kuhio-kaae exist
Scenario:	Existing	Intesection #:	

Peak Hour Factor:	1.00
——MAJOR STREET——	
Num of Lanes - V2:	1
Excl LT - V1 (Y/N):	Y
Excl RT - V3 (Y/N):	N
Stop/Yield - V3 (Y/N):	N
Grade - V1,V2,V3:	0
Num of Lanes - V5:	1
Excl LT - V4 (Y/N):	Y
Excl RT - V6 (Y/N):	N
Stop/Yield - V6 (Y/N):	N
Grade - V4,V5,V6:	0
——MINOR STREET——	
Num of Lanes - V8:	2
Grade - V7,V8,V9:	0
Shared Lane-V7,8,9: (0=N,1=LT,2=TR,3=LTR)	1
Num of Lanes - V11:	2
Grade - V10,V11,V12:	0
Shared Lane-V10,11,12: (0=N,1=LT,2=TR,3=LTR)	1



VOLUME ADJUSTMENTS												
MOVEMENT NO.	1	2	3	4	5	6	7	8	9	10	11	12
HOURLY FLOW RATE, V(vph)	2	463	10	90	504	18	4	1	60	11	1	4
VOLUME, v (pcph)	2	463	10	99	504	18	4	1	66	12	1	4

STEP 1: RT FROM MINOR STREET					
Conflicting Flows:	Vc9 = 1/2 V3 + V2 =	468	vhp	Vc12 = 1/2 V6 + V5 =	513 vhp
Potential Capacity:	Cp,9 =	802	pcph	Cp,12 =	761 pcph
Movement Capacity:	Cm,9=Cp,9=	802	pcph	Cm,12=Cp,12=	761 pcph
Prb. of Queu-free State:	po,9=1-v9/Cm,9=	0.92		po,12=1-v12/Cm,12=	0.99
STEP 2: LT FROM MAJOR STREET					
Conflicting Flows:	Vc,4 = V2 + V3 =	473	vhp	Vc,1 = V5 + V6 =	522 vhp
Potential Capacity:	Cp,4 =	1020	pcph	Cp,1 =	967 pcph
Movement Capacity:	Cm,4=Cp,4=	1020	pcph	Cm,1=Cp,1=	967 pcph
Prb. of Queu-free State:	po,4=1-v4/Cm4=	0.90		po,1=1-v1/Cm1=	1.00
Major Left Shared Lane Prob. of Queue-free State	p*o,4=	NA		p*o,1=	NA

—continued—

ATA Inc. TWO-WAY STOP CONTROLLED INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street:	Waiehu Beach Road	DATE:	31-Oct-00
Minor Street:	Kuhio Place/Kaae Road	Analyst:	SMU
Peak Hour:	PM PEAK (2:00 - 3:00 pm)	File Name:	waiehu bch-kuhio-kaae exist
Scenario:	Existing		

STEP 3: TH FROM MINOR STREET					
Conflicting Flows:	Vc,8 = 1/2V3+V2+V1+V6+V5+V4 =	1082	vph	Vc,11 = 1/2V6+V5+V4+V3+V2+V1 =	1078 vph
Potential Capacity:	Cp,8 =	295	pcph	Cp,11 =	297 pcph
Capacity Adj Factor:	f8 = po,4*po,1 =	0.90		f11 = po,4*po,1 =	0.90
Movement Capacity:	Cm,8 = Cp,8*f8 =	266	pcph	Cm,11 = Cp,11*f11 =	267 pcph
Prob. of Queue-free State:	po,8 = 1-v8/Cm,8 =	1.00		po,11 = 1-v11/Cm,11 =	1.00

STEP 4: LT FROM MINOR STREET					
Conflicting Flows:	Vc,7 = 1/2V3+V2+V1+1/2V6+V5+V4+ 1/2(V11+V12) =	1076	vph	Vc,10 = 1/2V6+V5+V4+1/2V3+V2+V1+ 1/2(V8+V9) =	1104 vph
Potential Capacity:	Cp7 =	252	pcph	Cp10 =	243 pcph
Major Left, Minor Through Impedance Factor:	P*7=po,11*f11 =	0.90		P*10=po,8*f8 =	0.90
Major Left, Minor Through Adjusted Impedance Factor:	p'7 =	0.92		p'10 =	0.92
Capacity Adjustment Factor:	f7 = p'7*po,12 =	0.92		f10 = p'10*po,9 =	0.85
Movement Capacity:	Cm,7 = f7*Cp,7 =	231	pcph	Cm,10 = f10*Cp,10 =	206 pcph

DELAY AND LEVEL OF SERVICE SUMMARY

MOVEMENT	v(pcph)	cm(pcph)	csh(pcph)	AVG TOTAL DELAY	LOS
MINOR LEFT TURN (7)	4	231	SHRD	SHRD	—
MINOR THROUGH (8)	1	266	238	15.48	C
MINOR RIGHT TURN (9)	66	802	--NA--	4.89	A
MINOR LEFT TURN (10)	12	206	SHRD	SHRD	—
MINOR THROUGH (11)	1	267	209	18.33	C
MINOR RIGHT TURN (12)	4	761	--NA--	4.76	A
MAJOR LEFT (1)	2	967	--NA--	3.73	A
MAJOR LEFT (4)	99	1020	--NA--	3.91	A
MINOR APPROACH (7)(8)(9)	-	-	-	5.64	B
MINOR APPROACH (10)(11)(12)	-	-	-	15.14	C
MAJOR APPROACH (1)(2)(3)	-	-	-	0.02	A
MAJOR APPROACH (4)(5)(6)	-	-	-	0.62	A
TOTAL INTERSECTION (1-12)	-	-	-	0.90	A

LEVEL OF SERVICE CRITERIA

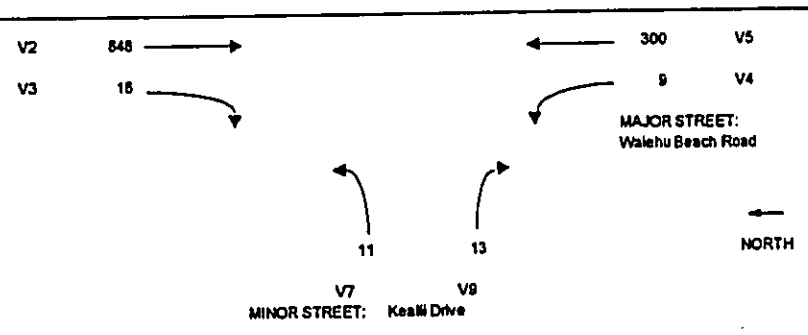
LEVEL OF SERVICE	AVG TOTAL DELAY (SEC/VEH)
A	<=5
B	>5&<=10
C	>10&<=20
D	>20&<=30
E	>30&<=45
F	>45

ATA Inc. STOP CONTROLLED T-INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street: Waiehu Beach Road
Minor Street: Keaki Drive
Peak Hour: AM (6:45 - 7:45 am)
Scenario: Existing

Print Date: 31-Oct-00
Analyst: SMU
File Name: waiehu bch-keaki exist

Peak Hour Factor:	1.00
——MAJOR STREET——	
Num of Lanes - V2:	1
Excl RT - V3 (Y/N):	N
Stop/Yield - V3 (Y/N):	N
% Grade - V2,V3:	0
Num of Lanes - V5:	1
Excl LT - V4 (Y/N):	Y
% Grade - V4,V5:	0
——MINOR STREET——	
Num of Lanes - V7,V9:	1
Shared Lane (Y/N):	Y
% Grade - V7&V9:	0



VOLUME ADJUSTMENTS

MOVEMENT NO.	2	3	4	5	7	9
VOLUME, V (vph)	848	16	9	300	11	13
VOLUME, v (pcph)	848	16	10	300	12	14

STEP 1: RT FROM MINOR STREET - V9

Conflicting Flows:	Vc,9 = 1/2*V3+V2 =	8	+	848	=	856 vph
Potential Capacity:	Cp,9 =					510 pcph
Movement Capacity:	Cm,p = Cp,9 =					510 pcph

STEP 2: LT FROM MAJOR STREET - V4

Conflicting Flows:	Vc,4 = V3+V2 =	16	+	848	=	864 vph
Potential Capacity:	Cp,4 =					664 pcph
Movement Capacity:	Cm,4 = Cp,4 =					664 pcph
Prob. of Queue-free State:	po,4 = 1-v4/Cm,4 =					0.99
Major Left Shared Lane Prob. of Queue-free State:	p*o,4 =					NA

STEP 3: LT FROM MINOR STREET - V7

Conflicting Flows:	Vc,7 = 1/2V3+V2+V5+V4 =					1165 vph
Potential Capacity:	Cp,7 =					224 pcph
Capacity Adjustment Factor Due To Impeding Movements:	f7=po,4=					0.99
Movement Capacity:	Cm,7 = Cp,7 =					221 pcph

DELAY AND LEVEL OF SERVICE SUMMARY

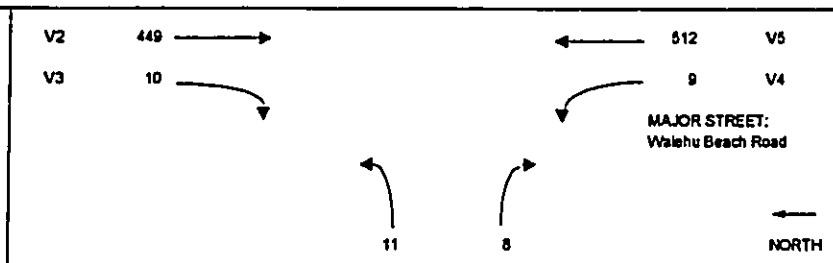
Movement	v(vcph)	cm(pcph)	csh (pcph)	AVG TOTAL DELAY	LOS
MINOR LEFT TURN (7)	12	221	SHRD	SHRD	SHRD
MINOR RIGHT TURN (9)	14	510	319	12.32	C
MAJOR LEFT TURN (4)	10	664	——	5.60	B

AVERAGE MINOR APPROACH DELAY =	12.32	sec/veh	AVERAGE TOTAL INTERSECTION DELAY = 0.32 sec/veh
LEVEL OF SERVICE =	C		LEVEL OF SERVICE = A

ATA Inc. STOP CONTROLLED T-INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street:	Waiehu Beach Road	Print Date:	31-Oct-00
Minor Street:	Kealii Drive	Analyst:	SMU
Peak Hour:	PM (2:00 - 3:00 pm)	File Name:	waiehu bch-kealii exist
Scenario:	Existing		

Peak Hour Factor:	1.00
——MAJOR STREET——	
Num of Lanes - V2:	1
Excl RT - V3 (Y/N):	N
Stop/Yield - V3 (Y/N):	N
% Grade - V2,V3:	0
Num of Lanes - V5:	1
Excl LT - V4 (Y/N):	Y
% Grade - V4,V5:	0
——MINOR STREET——	
Num of Lanes - V7,V9:	1
Shared Lane (Y/N):	Y
% Grade - V7&V9:	0



VOLUME ADJUSTMENTS						
MOVEMENT NO.	2	3	4	5	7	9
VOLUME, V (vph)	449	10	9	512	11	8
VOLUME, v (pcph)	449	10	10	512	12	9

STEP 1: RT FROM MINOR STREET - V9						
Conflicting Flows:	Vc,9 = 1/2*V3+V2 =	5	+	449	=	454 vph
Potential Capacity:	Cp,9 =					815 pcph
Movement Capacity:	Cm,p = Cp,9 =					815 pcph
STEP 2: LT FROM MAJOR STREET - V4						
Conflicting Flows:	Vc,4 = V3+V2 =	10	+	449	=	459 vph
Potential Capacity:	Cp,4 =					1036 pcph
Movement Capacity:	Cm,4 = Cp,4 =					1036 pcph
Prob. of Queue-free State:	po,4 = 1-v4/Cm,4 =					0.99
Major Left Shared Lane Prob. of Queue-free State:	p*o,4 =					NA
STEP 3: LT FROM MINOR STREET - V7						
Conflicting Flows:	Vc,7 = 1/2V3+V2+V5+V4 =					975 vph
Potential Capacity:	Cp,7 =					289 pcph
Capacity Adjustment Factor Due To Impeding Movements:	f7=po,4=					0.99
Movement Capacity:	Cm,7 = Cp,7 =					286 pcph

DELAY AND LEVEL OF SERVICE SUMMARY

Movement	v(vcph)	cm(pcph)	csh (pcph)	AVG TOTAL DELAY	LOS
MINOR LEFT TURN (7)	12	286	SHRD	SHRD	SHRD
MINOR RIGHT TURN (9)	9	815	393	9.66	B
MAJOR LEFT TURN (4)	10	1036	——	3.51	A

AVERAGE MINOR APPROACH DELAY =	9.66 sec/veh	AVERAGE TOTAL INTERSECTION DELAY =	0.24 sec/veh
LEVEL OF SERVICE =	B	LEVEL OF SERVICE =	A

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
CIVIL ENGINEERS • SURVEYORS

APPENDIX C

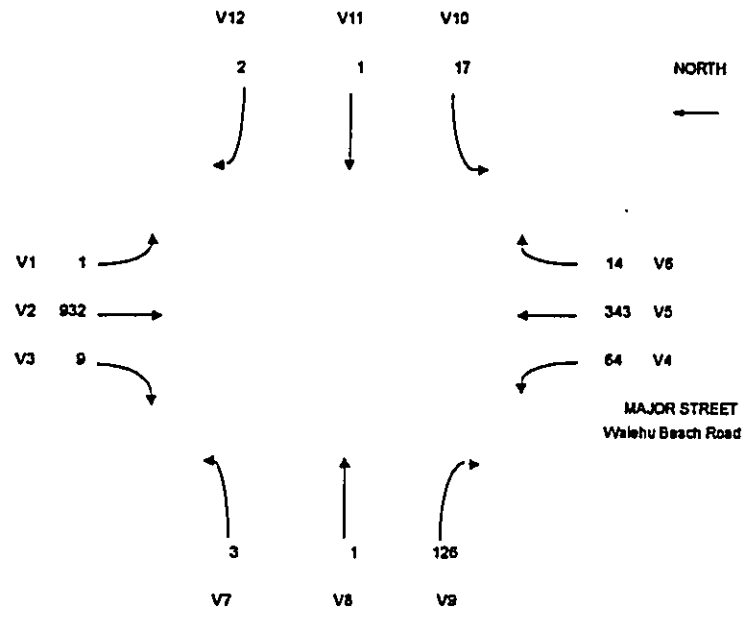
LEVEL OF SERVICE CALCULATIONS

- Future Year 2001 Without Project Conditions

ATA Inc. TWO-WAY STOP CONTROLLED INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street:	Waiehu Beach Road	Print Date:	31-Oct-00
Minor Street:	Kuhio Place/Kase Road	Analyst:	SMU
Peak Hour:	AM PEAK	File Name:	waiehu bch-kuhio-kase fwop
Scenario:	Future Conditions without Project		

Peak Hour Factor:	1.00
——MAJOR STREET——	
Num of Lanes - V2:	1
Excl LT - V1 (Y/N):	Y
Excl RT - V3 (Y/N):	N
Stop/Yield - V3 (Y/N):	N
Grade - V1,V2,V3:	0
Num of Lanes - V5:	1
Excl LT - V4 (Y/N):	Y
Excl RT - V6 (Y/N):	N
Stop/Yield - V6 (Y/N):	N
Grade - V4,V5,V6:	0
——MINOR STREET——	
Num of Lanes - V8:	2
Grade - V7,V8,V9:	0
Shared Lane-V7,8,9: (0=N,1=LT,2=TR,3=LTR)	1
Num of Lanes - V11:	2
Grade - V10,V11,V12:	0
Shared Lane-V10,11,12 (0=N,1=LT,2=TR,3=LTR)	1



VOLUME ADJUSTMENTS												
MOVEMENT NO.	1	2	3	4	5	6	7	8	9	10	11	12
HOURLY FLOW RATE, V(vph)	1	932	9	64	343	14	3	1	126	17	1	2
VOLUME, v (pcph)	1	932	9	70	343	14	3	1	139	19	1	2

STEP 1: RT FROM MINOR STREET						
Conflicting Flows:	Vc9 = 1/2 V3 + V2 =	937	vhp	Vc12 = 1/2 V6 + V5 =	350	vhp
Potential Capacity:	Cp,9 =	464	pcph	Cp,12 =	920	pcph
Movement Capacity:	Cm,9=Cp,9=	464	pcph	Cm,12=Cp,12=	920	pcph
Prb. of Queu-free State:	po,9=1-v9/Cm,9=	0.70		po,12=1-v12/Cm,12=	1.00	
STEP 2: LT FROM MAJOR STREET						
Conflicting Flows:	Vc,4 = V2 + V3 =	941	vhp	Vc,1 = V5 + V6 =	357	vhp
Potential Capacity:	Cp,4 =	610	pcph	Cp,1 =	1159	pcph
Movement Capacity:	Cm,4=Cp,4=	610	pcph	Cm,1=Cp,1=	1159	pcph
Prb. of Queu-free State:	po,4=1-v4/Cm4=	0.89		po,1=1-v1/Cm1=	1.00	
Major Left Shared Lane Prob. of Queue-free State	p*o,4=	NA		p*o,1=	NA	

—continued —

Major Street:	Waiehu Beach Road	DATE:	03-Nov-00
Minor Street:	Kuhio Place/Kaae Road	Analyst:	SMU
Peak Hour:	AM PEAK	File Name:	waiehu bch-kuhio-ksae fwop
Scenario:	Future Conditions without Project		

STEP 3: TH FROM MINOR STREET					
Conflicting Flows:	Vc,8 = 1/2V3+V2+V1+V6+V5+V4 =	1359	vph	Vc,11 = 1/2V6+V5+V4+V3+V2+V1 =	1356 vph
Potential Capacity:	Cp,8 =	211	pcph	Cp,11 =	212 pcph
Capacity Adj Factor:	f8 = po,4*po,1 =	0.88		f11 = po,4*po,1 =	0.88
Movement Capacity:	Cm,8 = Cp,8*f8 =	187	pcph	Cm,11 = Cp,11*f11 =	187 pcph
Prob. of Queue-free State:	po,8 = 1-v8/Cm,8 =	0.99		po,11 = 1-v11/Cm,11 =	0.99

STEP 4: LT FROM MINOR STREET					
Conflicting Flows:	Vc,7 = 1/2V3+V2+V1+1/2V6+V5+V4+ 1/2(V11+V12) =	1353	vph	Vc,10 = 1/2V6+V5+V4+1/2V3+V2+V1+ 1/2(V8+V9) =	1415 vph
Potential Capacity:	Cp7 =	174	pcph	Cp10 =	160 pcph
Major Left, Minor Through Impedance Factor:	P*7=po,11*f11 =	0.88		P*10=po,8*f8 =	0.88
Major Left, Minor Through Adjusted Impedance Factor:	p*7 =	0.91		p*10 =	0.91
Capacity Adjustment Factor:	f7 = p*7*po,12 =	0.91		f10 = p*10*po,9 =	0.64
Movement Capacity:	Cm,7 = f7*Cp,7 =	158	pcph	Cm,10 = f10*Cp,10 =	102 pcph

DELAY AND LEVEL OF SERVICE SUMMARY

MOVEMENT	v(pcph)	cm(pcph)	csh(pcph)	AVG TOTAL DELAY	LOS
MINOR LEFT TURN (7)	3	158	SHRD	SHRD	—
MINOR THROUGH (8)	1	187	164	22.46	D
MINOR RIGHT TURN (9)	139	464	--NA--	11.03	C
MINOR LEFT TURN (10)	19	102	SHRD	SHRD	—
MINOR THROUGH (11)	1	187	104	42.44	E
MINOR RIGHT TURN (12)	2	920	--NA--	3.92	A
MAJOR LEFT (1)	1	1159	--NA--	3.11	A
MAJOR LEFT (4)	70	610	--NA--	6.66	B
MINOR APPROACH (7)(8)(9)	-	-	-	11.35	C
MINOR APPROACH (10)(11)(12)	-	-	-	38.94	E
MAJOR APPROACH (1)(2)(3)	-	-	-	0.00	—
MAJOR APPROACH (4)(5)(6)	-	-	-	1.09	A
TOTAL INTERSECTION (1-12)	-	-	-	1.95	A

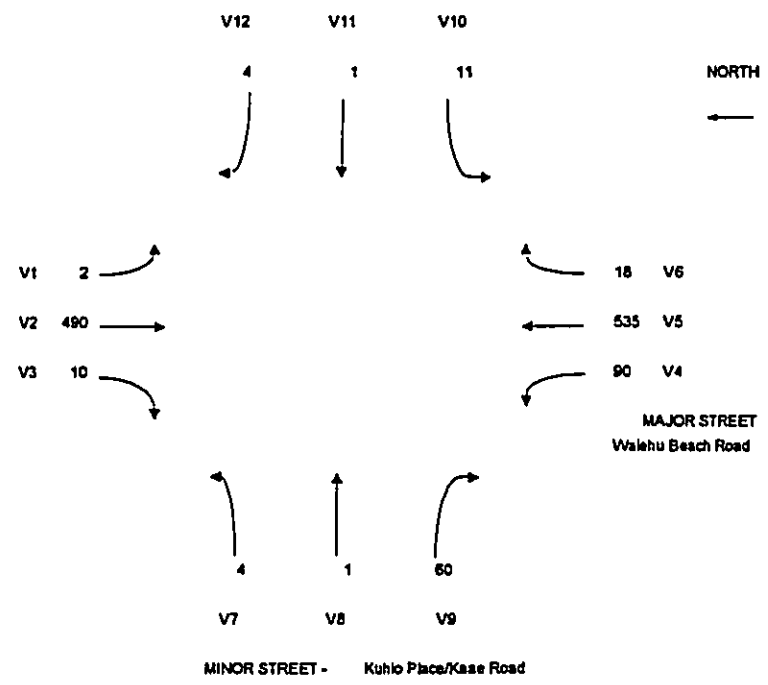
LEVEL OF SERVICE CRITERIA

LEVEL OF SERVICE	AVG TOTAL DELAY (SEC/VEH)
A	<=5
B	>5&<=10
C	>10&<=20
D	>20&<=30
E	>30&<=45
F	>45

ATA Inc. TWO-WAY STOP CONTROLLED INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street:	Waiehu Beach Road	Print Date:	31-Oct-00
Minor Street:	Kuhio Place/Kase Road	Analyst:	SMU
Peak Hour:	PM PEAK	File Name:	waiehu bch-kuhio-kase fwop
Scenario:	Future Conditions without Project	Intesection #:	

Peak Hour Factor:	1.00
——MAJOR STREET——	
Num of Lanes - V2:	1
Excl LT - V1 (Y/N):	Y
Excl RT - V3 (Y/N):	N
Stop/Yield - V3 (Y/N):	N
Grade - V1,V2,V3:	0
Num of Lanes - V5:	1
Excl LT - V4 (Y/N):	Y
Excl RT - V6 (Y/N):	N
Stop/Yield - V6 (Y/N):	N
Grade - V4,V5,V6:	0
——MINOR STREET——	
Num of Lanes - V8:	2
Grade - V7,V8,V9:	0
Shared Lane-V7,8,9: (0=N,1=LT,2=TR,3=LTR)	1
Num of Lanes - V11:	2
Grade - V10,V11,V12:	0
Shared Lane-V10,11,12: (0=N,1=LT,2=TR,3=LTR)	1



VOLUME ADJUSTMENTS												
MOVEMENT NO.	1	2	3	4	5	6	7	8	9	10	11	12
HOURLY FLOW RATE, V(vph)	2	490	10	90	535	18	4	1	60	11	1	4
VOLUME, v (pcph)	2	490	10	99	535	18	4	1	66	12	1	4

STEP 1: RT FROM MINOR STREET						
Conflicting Flows:	Vc9 = 1/2 V3 + V2 =	495	vhp	Vc12 = 1/2 V6 + V5 =	544	vhp
Potential Capacity:	Cp,9 =	777	pcph	Cp,12 =	734	pcph
Movement Capacity:	Cm,9=Cp,9=	777	pcph	Cm,12=Cp,12=	734	pcph
Prb. of Queu-free State:	po,9=1-v9/Cm,9=	0.92		po,12=1-v12/Cm,12=	0.99	
STEP 2: LT FROM MAJOR STREET						
Conflicting Flows:	Vc,4 = V2 + V3 =	500	vhp	Vc,1 = V5 + V6 =	553	vhp
Potential Capacity:	Cp,4 =	990	pcph	Cp,1 =	934	pcph
Movement Capacity:	Cm,4=Cp,4=	990	pcph	Cm,1=Cp,1=	934	pcph
Prb. of Queu-free State:	po,4=1-v4/Cm4=	0.90		po,1=1-v1/Cm1=	1.00	
Major Left Shared Lane Prob. of Queue-free State	p*o,4=	NA		p*o,1=	NA	

—continued —

ATA Inc. TWO-WAY STOP CONTROLLED INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street:	Waiehu Beach Road	DATE:	03-Nov-00
Minor Street:	Kuhio Place/Kaae Road	Analyst:	SMU
Peak Hour:	PM PEAK	File Name:	waiehu bch-kuhio-kaae fwop
Scenario:	Future Conditions without Project		

STEP 3: TH FROM MINOR STREET

Conflicting Flows:	Vc,8 = 1/2V3+V2+V1+V6+V5+V4 =	1140	vph	Vc,11 = 1/2V6+V5+V4+V3+V2+V1 =	1136 vph
Potential Capacity:	Cp,8 =	275	pcph	Cp,11 =	276 pcph
Capacity Adj Factor:	f8 = po,4*po,1 =	0.90		f11 = po,4*po,1 =	0.90
Movement Capacity:	Cm,8 = Cp,8*f8 =	247	pcph	Cm,11 = Cp,11*f11 =	248 pcph
Prob. of Queue-free State:	po,8 = 1-v8/Cm,8 =	1.00		po,11 = 1-v11/Cm,11 =	1.00

STEP 4: LT FROM MINOR STREET

Conflicting Flows:	Vc,7 = 1/2V3+V2+V1+1/2V6+V5+V4+ 1/2(V11+V12) =	1134	vph	Vc,10 = 1/2V6+V5+V4+1/2V3+V2+V1+ 1/2(V8+V9) =	1162 vph
Potential Capacity:	Cp7 =	234	pcph	Cp10 =	225 pcph
Major Left, Minor Through Impedance Factor:	P*7=po,11*f11 =	0.89		P*10=po,8*f8 =	0.89
Major Left, Minor Through Adjusted Impedance Factor:	p'7 =	0.92		p'10 =	0.92
Capacity Adjustment Factor:	f7 = p'7*po,12 =	0.91		f10 = p'10*po,9 =	0.84
Movement Capacity:	Cm,7 = f7*Cp,7 =	214	pcph	Cm,10 = f10*Cp,10 =	189 pcph

DELAY AND LEVEL OF SERVICE SUMMARY

MOVEMENT	v(pcph)	cm(pcph)	csh(pcph)	AVG TOTAL DELAY	LOS
MINOR LEFT TURN (7)	4	214	SHRD	SHRD	—
MINOR THROUGH (8)	1	247	220	16.78	C
MINOR RIGHT TURN (9)	66	777	--NA--	5.06	B
MINOR LEFT TURN (10)	12	189	SHRD	SHRD	—
MINOR THROUGH (11)	1	248	193	20.02	D
MINOR RIGHT TURN (12)	4	734	--NA--	4.93	A
MAJOR LEFT (1)	2	934	--NA--	3.86	A
MAJOR LEFT (4)	99	990	--NA--	4.04	A
MINOR APPROACH (7)(8)(9)	-	-	-	5.89	B
MINOR APPROACH (10)(11)(12)	-	-	-	16.47	C
MAJOR APPROACH (1)(2)(3)	-	-	-	0.02	A
MAJOR APPROACH (4)(5)(6)	-	-	-	0.61	A
TOTAL INTERSECTION (1-12)	-	-	-	0.90	A

LEVEL OF SERVICE CRITERIA

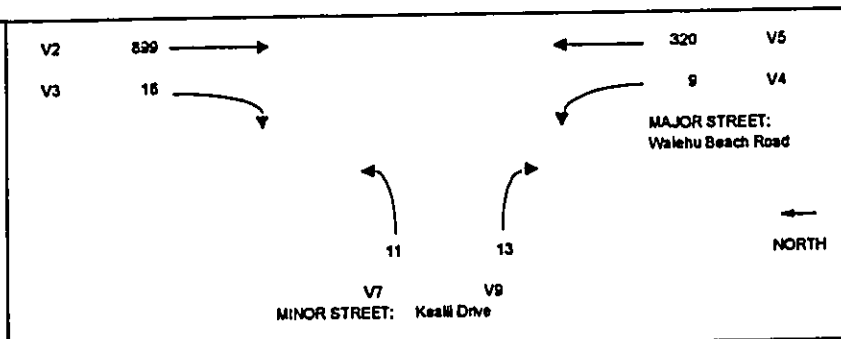
LEVEL OF SERVICE	AVG TOTAL DELAY (SEC/VEH)
A	<=5
B	>5&<=10
C	>10&<=20
D	>20&<=30
E	>30&<=45
F	>45

ATA Inc. STOP CONTROLLED T-INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street: Waiehu Beach Road
Minor Street: Kealii Drive
Peak Hour: AM PEAK
Scenario: Future Conditions without Project

Print Date: 31-Oct-00
Analyst: SMU
File Name: waiehu bch-kealii fwop

Peak Hour Factor:	1.00
MAJOR STREET	
Num of Lanes - V2:	1
Excl RT - V3 (Y/N):	N
Stop/Yield - V3 (Y/N):	N
% Grade - V2,V3:	0
Num of Lanes - V5:	1
Excl LT - V4 (Y/N):	Y
% Grade - V4,V5:	0
MINOR STREET	
Num of Lanes - V7,V9:	1
Shared Lane (Y/N):	Y
% Grade - V7&V9:	0



VOLUME ADJUSTMENTS						
MOVEMENT NO.	2	3	4	5	7	9
VOLUME, V (vph)	899	16	9	320	11	13
VOLUME, v (pcph)	899	16	10	320	12	14

STEP 1: RT FROM MINOR STREET - V9						
Conflicting Flows:	Vc,9 = 1/2*V3+V2 =	8	+	899	=	907 vph
Potential Capacity:	Cp,9 =					481 pcph
Movement Capacity:	Cm,p = Cp,9 =					481 pcph
STEP 2: LT FROM MAJOR STREET - V4						
Conflicting Flows:	Vc,4 = V3+V2 =	16	+	899	=	915 vph
Potential Capacity:	Cp,4 =					628 pcph
Movement Capacity:	Cm,4 = Cp,4 =					628 pcph
Prob. of Queue-free State:	po,4 = 1-v4/Cm,4 =					0.98
Major Left Shared Lane Prob. of Queue-free State:	p*o,4 =					NA
STEP 3: LT FROM MINOR STREET - V7						
Conflicting Flows:	Vc,7 = 1/2V3+V2+V5+V4 =					1236 vph
Potential Capacity:	Cp,7 =					204 pcph
Capacity Adjustment Factor Due To Impeding Movements:	f7=po,4=					0.98
Movement Capacity:	Cm,7 = Cp,7 =					201 pcph

DELAY AND LEVEL OF SERVICE SUMMARY

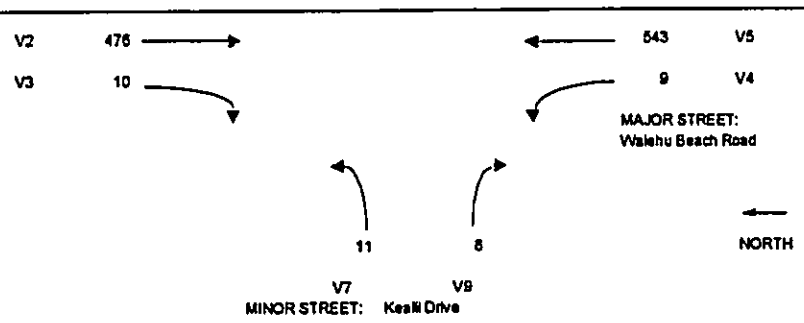
Movement	v(vcph)	cm(pcph)	csh (pcph)	AVG TOTAL DELAY	LOS
MINOR LEFT TURN (7)	12	201	SHRD	SHRD	SHRD
MINOR RIGHT TURN (9)	14	481	293	13.50	C
MAJOR LEFT TURN (4)	10	628	—	5.82	B

AVERAGE MINOR APPROACH DELAY =	13.50	sec/veh	AVERAGE TOTAL INTERSECTION DELAY =	0.33 sec/veh
LEVEL OF SERVICE =	C		LEVEL OF SERVICE =	A

ATA Inc. STOP CONTROLLED T-INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street:	Waiehu Beach Road	Prnt Date:	31-Oct-00
Minor Street:	Kealii Drive	Analyst:	SMU
Peak Hour:	PM PEAK	File Name:	waiehu bch-kealii twop
Scenario:	Future Conditions without Project		

Peak Hour Factor:	1.00
——MAJOR STREET——	
Num of Lanes - V2:	1
Excl RT - V3 (Y/N):	N
Stop/Yield - V3 (Y/N):	N
% Grade - V2,V3:	0
Num of Lanes - V5:	1
Excl LT - V4 (Y/N):	Y
% Grade - V4,V5:	0
——MINOR STREET——	
Num of Lanes - V7,V9:	1
Shared Lane (Y/N):	Y
% Grade - V7&V9:	0



VOLUME ADJUSTMENTS						
MOVEMENT NO.	2	3	4	5	7	9
VOLUME, V (vph)	476	10	9	543	11	8
VOLUME, v (pcph)	476	10	10	543	12	9

STEP 1: RT FROM MINOR STREET - V9							
Conflicting Flows:	Vc,9 = 1/2*V3+V2 =	5	+	476	=	481	vph
Potential Capacity:	Cp,9 =					790	pcph
Movement Capacity:	Cm,p = Cp,9 =					790	pcph

STEP 2: LT FROM MAJOR STREET - V4							
Conflicting Flows:	Vc,4 = V3+V2 =	10	+	476	=	486	vph
Potential Capacity:	Cp,4 =					1006	pcph
Movement Capacity:	Cm,4 = Cp,4 =					1006	pcph
Prob. of Queue-free State:	po,4 = 1-v4/Cm,4 =					0.99	
Major Left Shared Lane Prob. of Queue-free State:	p*o,4 =					NA	

STEP 3: LT FROM MINOR STREET - V7			
Conflicting Flows:	Vc,7 = 1/2V3+V2+V5+V4 =	1033	vph
Potential Capacity:	Cp,7 =	267	pcph
Capacity Adjustment Factor Due To Impeding Movements:	f7=po,4=	0.99	
Movement Capacity:	Cm,7 = Cp,7 =	264	pcph

DELAY AND LEVEL OF SERVICE SUMMARY Movement	v(vcph)	cm(pcph)	csh (pcph)	AVG TOTAL DELAY	LOS
MINOR LEFT TURN (7)	12	264	SHRD	SHRD	SHRD
MINOR RIGHT TURN (9)	9	790	367	10.39	C
MAJOR LEFT TURN (4)	10	1006	——	3.61	A

AVERAGE MINOR APPROACH DELAY =	10.39	sec/veh	AVERAGE TOTAL INTERSECTION DELAY = 0.24 sec/veh
LEVEL OF SERVICE =	C		LEVEL OF SERVICE = A

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
CIVIL ENGINEERS • SURVEYORS

APPENDIX C

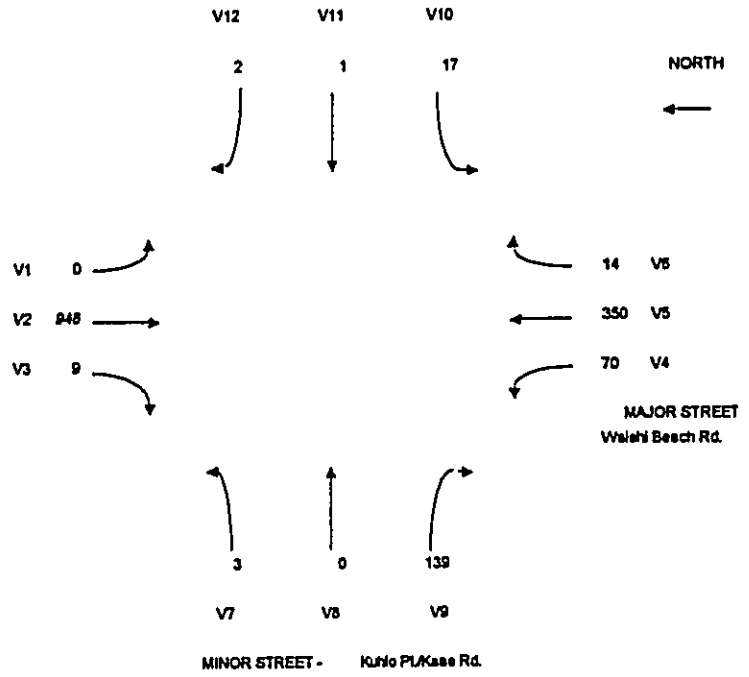
LEVEL OF SERVICE CALCULATIONS

- Future Year 2001 With Project Conditions

ATA Inc. TWO-WAY STOP CONTROLLED INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street:	Waiehi Beach Rd.	Print Date:	15-May-01
Minor Street:	Kuhio Pl/Kase Rd.	Analyst:	EV
Peak Hour:	AM PEAK	File Name:	waiehu bch-kuhio-kase fwp
Scenario:	Future Conditions with Project		

Peak Hour Factor:	1.00
MAJOR STREET	
Num of Lanes - V2:	1
Excl LT - V1 (Y/N):	Y
Excl RT - V3 (Y/N):	N
Stop/Yield - V3 (Y/N):	N
Grade - V1,V2,V3:	0
Num of Lanes - V5:	1
Excl LT - V4 (Y/N):	Y
Excl RT - V6 (Y/N):	N
Stop/Yield - V6 (Y/N):	N
Grade - V4,V5,V6:	0
MINOR STREET	
Num of Lanes - V8:	2
Grade - V7,V8,V9:	0
Shared Lane-V7,8,9:	1
(0=N,1=LT,2=TR,3=LTR)	
Num of Lanes - V11:	2
Grade - V10,V11,V12:	0
Shared Lane-V10,11,12:	1
(0=N,1=LT,2=TR,3=LTR)	



VOLUME ADJUSTMENTS

MOVEMENT NO.	1	2	3	4	5	6	7	8	9	10	11	12
HOURLY FLOW RATE, V(vph)	0	946	9	70	350	14	3	0	139	17	1	2
VOLUME, v (pcph)	0	946	9	77	350	14	3	0	153	19	1	2

STEP 1: RT FROM MINOR STREET						
Conflicting Flows:	Vc9 = 1/2 V3 + V2 =	951	vhp	Vc12 = 1/2 V6 + V5 =	357	vhp
Potential Capacity:	Cp,9 =	457	pcph	Cp,12 =	913	pcph
Movement Capacity:	Cm,9=Cp,9=	457	pcph	Cm,12=Cp,12=	913	pcph
Prb. of Queu-free State:	po,9=1-v9/Cm,9=	0.67		po,12=1-v12/Cm,12=	1.00	
STEP 2: LT FROM MAJOR STREET						
Conflicting Flows:	Vc,4 = V2 + V3 =	955	vhp	Vc,1 = V5 + V6 =	364	vhp
Potential Capacity:	Cp,4 =	601	pcph	Cp,1 =	1150	pcph
Movement Capacity:	Cm,4=Cp,4=	601	pcph	Cm,1=Cp,1=	1150	pcph
Prb. of Queu-free State:	po,4=1-v4/Cm4=	0.87		po,1=1-v1/Cm1=	1.00	
Major Left Shared Lane Prob. of Queue-free State	p*o,4=	NA		p*o,1=	NA	

—continued—

ATA Inc. TWO-WAY STOP CONTROLLED INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street: Waiehi Beach Rd.
Minor Street: Kuhio Pl/Kaae Rd.
Peak Hour: AM PEAK
Scenario: Future Conditions with Project

DATE: 15-May-01
Analyst: EV
File Name: waiehu bch-kuhio-kaae fwp

STEP 3: TH FROM MINOR STREET						
Conflicting Flows:	Vc,8 = 1/2V3+V2+V1+V6+V5+V4 =	1385	vph	Vc,11 = 1/2V6+V5+V4+V3+V2+V1 =	1382	vph
Potential Capacity:	Cp,8 =	205	pcph	Cp,11 =	205	pcph
Capacity Adj Factor:	f8 = po,4*po,1 =	0.87		f11 = po,4*po,1 =	0.87	
Movement Capacity:	Cm,8 = Cp,8*f8 =	179	pcph	Cm,11 = Cp,11*f11 =	179	pcph
Prob. of Queue-free State:	po,8 = 1-v8/Cm,8 =	1.00		po,11 = 1-v11/Cm,11 =	0.99	
STEP 4: LT FROM MINOR STREET						
Conflicting Flows:	Vc,7 = 1/2V3+V2+V1+1/2V6+V5+V4+ 1/2(V11+V12) =	1379	vph	Vc,10 = 1/2V6+V5+V4+1/2V3+V2+V1+ 1/2(V8+V9) =	1447	vph
Potential Capacity:	Cp7 =	168	pcph	Cp10 =	154	pcph
Major Left, Minor Through Impedance Factor:	P*7=po,11*f11 =	0.87		P*10=po,8*f8 =	0.87	
Major Left, Minor Through Adjusted Impedance Factor:	p*7 =	0.90		p*10 =	0.90	
Capacity Adjustment Factor:	f7 = p*7*po,12 =	0.90		f10 = p*10*po,9 =	0.60	
Movement Capacity:	Cm,7 = f7*Cp,7 =	151	pcph	Cm,10 = f10*Cp,10 =	92	pcph

DELAY AND LEVEL OF SERVICE SUMMARY

MOVEMENT	v(pcph)	cm(pcph)	csh(pcph)	AVG TOTAL DELAY	LOS
MINOR LEFT TURN (7)	3	151	SHRD	SHRD	—
MINOR THROUGH (8)	0	179	151	24.34	D
MINOR RIGHT TURN (9)	153	457	--NA--	11.80	C
MINOR LEFT TURN (10)	19	92	SHRD	SHRD	—
MINOR THROUGH (11)	1	179	95	48.02	F
MINOR RIGHT TURN (12)	2	913	--NA--	3.95	A
MAJOR LEFT (1)	0	1150	--NA--	3.13	A
MAJOR LEFT (4)	77	601	--NA--	6.87	B
MINOR APPROACH (7)(8)(9)	-	-	-	12.04	C
MINOR APPROACH (10)(11)(12)	-	-	-	44.01	E
MAJOR APPROACH (1)(2)(3)	-	-	-	0.00	—
MAJOR APPROACH (4)(5)(6)	-	-	-	1.20	A
TOTAL INTERSECTION (1-12)	-	-	-	2.18	A

LEVEL OF SERVICE CRITERIA

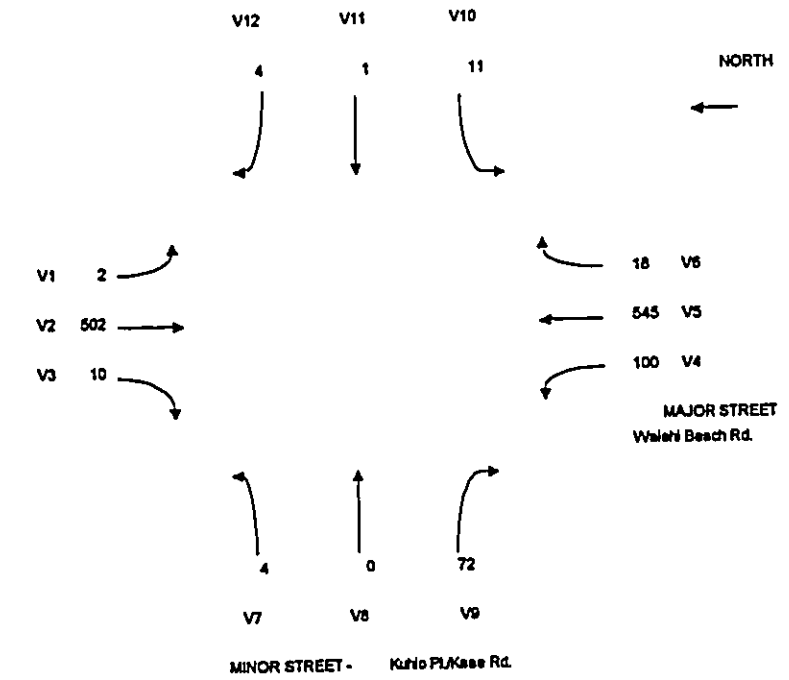
LEVEL OF SERVICE	AVG TOTAL DELAY (SEC/VEH)
A	<=5
B	>5&<=10
C	>10&<=20
D	>20&<=30
E	>30&<=45
F	>45

ATA Inc. TWO-WAY STOP CONTROLLED INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street:	Waiehi Beach Rd.	Print Date:	15-May-01
Minor Street:	Kuhio Pl./Kaae Rd.	Analyst:	EV
Peak Hour:	PM PEAK	File Name:	waiehu bch-kuhio-kaae fwp
Scenario:	Future Conditions with Project		

Peak Hour Factor: 1.00

MAJOR STREET	
Num of Lanes - V2:	1
Excl LT - V1 (Y/N):	Y
Excl RT - V3 (Y/N):	N
Stop/Yield - V3 (Y/N):	N
Grade - V1,V2,V3:	0
Num of Lanes - V5:	1
Excl LT - V4 (Y/N):	Y
Excl RT - V6 (Y/N):	N
Stop/Yield - V6 (Y/N):	N
Grade - V4,V5,V6:	0
MINOR STREET	
Num of Lanes - V8:	2
Grade - V7,V8,V9:	0
Shared Lane-V7,8,9: (0=N,1=LT,2=TR,3=LTR)	1
Num of Lanes - V11:	2
Grade - V10,V11,V12:	0
Shared Lane-V10,11,12: (0=N,1=LT,2=TR,3=LTR)	1



VOLUME ADJUSTMENTS

MOVEMENT NO.	1	2	3	4	5	6	7	8	9	10	11	12
HOURLY FLOW RATE, V(vph)	2	502	10	100	545	18	4	0	72	11	1	4
VOLUME, v (pcph)	2	502	10	110	545	18	4	0	79	12	1	4

STEP 1: RT FROM MINOR STREET

Conflicting Flows:	Vc9 = 1/2 V3 + V2 =	507	vph	Vc12 = 1/2 V6 + V5 =	554 vhp
Potential Capacity:	Cp,9 =	766	pcph	Cp,12 =	725 pcph
Movement Capacity:	Cm,9=Cp,9=	766	pcph	Cm,12=Cp,12=	725 pcph
Prb. of Queu-free State:	po,9=1-v9/Cm,9=	0.93		po,12=1-v12/Cm,12=	0.99

STEP 2: LT FROM MAJOR STREET

Conflicting Flows:	Vc,4 = V2 + V3 =	512	vhp	Vc,1 = V5 + V6 =	563 vhp
Potential Capacity:	Cp,4 =	977	pcph	Cp,1 =	924 pcph
Movement Capacity:	Cm,4=Cp,4=	977	pcph	Cm,1=Cp,1=	924 pcph
Prb. of Queu-free State:	po,4=1-v4/Cm4=	0.89		po,1=1-v1/Cm1=	1.00
Major Left Shared Lane Prob. of Queue-free State	p*o,4=	NA		p*o,1=	NA

—continued—

ATA Inc. TWO-WAY STOP CONTROLLED INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street:	Waiehi Beach Rd.	DATE:	15-May-01
Minor Street:	Kuhio Pl/Kase Rd.	Analyst:	EV
Peak Hour:	PM PEAK	File Name:	waiehu bch-kuhio-kase fwp
Scenario:	Future Conditions with Project		

STEP 3: TH FROM MINOR STREET					
Conflicting Flows:	Vc,,8 = 1/2V3+V2+V1+V6+V5+V4 =	1172	vph	Vc,,11 = 1/2V6+V5+V4+V3+V2+V1 =	1168 vph
Potential Capacity:	Cp,8 =	265	pcph	Cp,11 =	266 pcph
Capacity Adj Factor:	f8 = po,4*po,1 =	0.89		f11 = po,4*po,1 =	0.89
Movement Capacity:	Cm,8 = Cp,8*f8 =	234	pcph	Cm,11 = Cp,11*f11 =	236 pcph
Prob. of Queue-free State:	po,8 = 1-v8/Cm,8 =	1.00		po,11 = 1-v11/Cm,11 =	1.00

STEP 4: LT FROM MINOR STREET					
Conflicting Flows:	Vc,7 = 1/2V3+V2+V1+1/2V6+V5+V4+ 1/2(V11+V12) =	1166	vph	Vc,10 = 1/2V6+V5+V4+1/2V3+V2+V1+ 1/2(V8+V9) =	1199 vph
Potential Capacity:	Cp7 =	224	pcph	Cp10 =	214 pcph
Major Left, Minor Through Impedance Factor:	P*7=po,11*f11 =	0.88		P*10=po,8*f8 =	0.89
Major Left, Minor Through Adjusted Impedance Factor:	p'7 =	0.91		p'10 =	0.91
Capacity Adjustment Factor:	f7 = p'7*po,12 =	0.90		f10 = p'10*po,9 =	0.82
Movement Capacity:	Cm,7 = f7*Cp,7 =	202	pcph	Cm,10 = f10*Cp,10 =	175 pcph

DELAY AND LEVEL OF SERVICE SUMMARY

MOVEMENT	v(pcph)	cm(pcph)	csh(pcph)	AVG TOTAL DELAY	LOS
MINOR LEFT TURN (7)	4	202	SHRD	SHRD	—
MINOR THROUGH (8)	0	234	202	18.14	C
MINOR RIGHT TURN (9)	79	766	--NA--	5.24	B
MINOR LEFT TURN (10)	12	175	SHRD	SHRD	—
MINOR THROUGH (11)	1	236	179	21.72	D
MINOR RIGHT TURN (12)	4	725	--NA--	4.99	A
MAJOR LEFT (1)	2	924	--NA--	3.90	A
MAJOR LEFT (4)	110	977	--NA--	4.15	A
MINOR APPROACH (7)(8)(9)	-	-	-	6.86	B
MINOR APPROACH (10)(11)(12)	-	-	-	17.78	C
MAJOR APPROACH (1)(2)(3)	-	-	-	0.02	A
MAJOR APPROACH (4)(5)(6)	-	-	-	0.68	A
TOTAL INTERSECTION (1-12)	-	-	-	0.99	A

LEVEL OF SERVICE CRITERIA

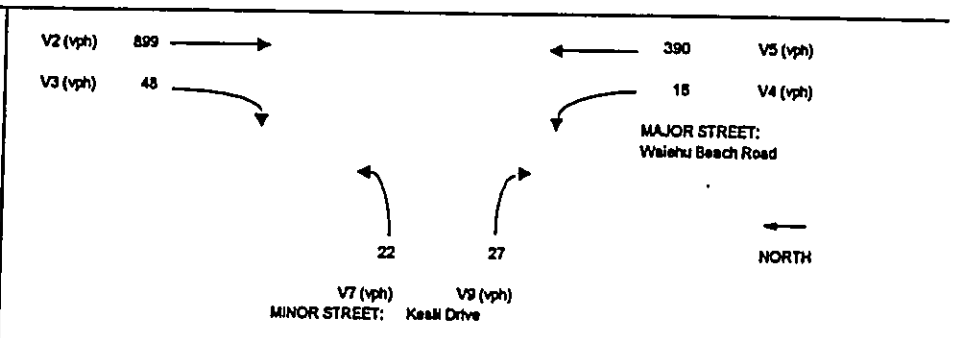
LEVEL OF SERVICE	AVG TOTAL DELAY (SEC/VEH)
A	<=5
B	>5&<=10
C	>10&<=20
D	>20&<=30
E	>30&<=45
F	>45

ATA Inc. STOP CONTROLLED T-INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street: Waiehu Beach Road
Minor Street: Kealii Drive
Peak Hour: AM
Scenario: Future Conditions with Project

Print Date: 15-May-01
Analyst: EV
File Name: waiehu bch-kealii fwp

Peak Hour Factor:	1.00
——MAJOR STREET——	
Num of Lanes - V2:	1
Excl RT - V3 (Y/N):	N
Stop/Yield - V3 (Y/N):	N
% Grade - V2,V3:	0
Num of Lanes - V5:	1
Excl LT - V4 (Y/N):	Y
% Grade - V4,V5:	0
——MINOR STREET——	
Num of Lanes - V7,V9:	1
Shared Lane (Y/N):	Y
% Grade - V7&V9:	0



VOLUME ADJUSTMENTS

MOVEMENT NO.	2	3	4	5	7	9
VOLUME, V (vph)	899	48	18	390	22	27
VOLUME, v (pcph)	899	48	18	390	24	30

STEP 1: RT FROM MINOR STREET - V9

Conflicting Flows:	Vc,9 = 1/2*V3+V2 =	24	+	899	=	923 vph
Potential Capacity:	Cp,9 =					472 pcph
Movement Capacity:	Cm,9 = Cp,9 =					472 pcph

STEP 2: LT FROM MAJOR STREET - V4

Conflicting Flows:	Vc,4 = V3+V2 =	48	+	899	=	947 vph
Potential Capacity:	Cp,4 =					606 pcph
Movement Capacity:	Cm,4 = Cp,4 =					606 pcph
Prob. of Queue-free State:	po,4 = 1-v4/Cm,4 =					0.971
Major Left Shared Lane Prob. of Queue-free State:	p*o,4 = 1-[(1-po,4)/(1-v5/s5)]					NA

STEP 3: LT FROM MINOR STREET - V7

Conflicting Flows:	Vc,7 = 1/2V3+V2+V5+V4 =	1329	vph
Potential Capacity:	Cp,7 =	180	pcph
Capacity Adjustment Factor Due To Impeding Movements:	f7=po,4=	0.971	
Movement Capacity:	Cm,7 = f7*Cp,7 =	175	pcph

DELAY AND LEVEL OF SERVICE SUMMARY

Movement	v(vph)	cm(pcph)	csh (pcph)	AVG TOTAL DELAY	LOS
MINOR LEFT TURN (7)	24	175	SHRD	SHRD	SHRD
MINOR RIGHT TURN (9)	30	472	268	16.82	C
MAJOR LEFT TURN (4)	18	606	——	6.11	B

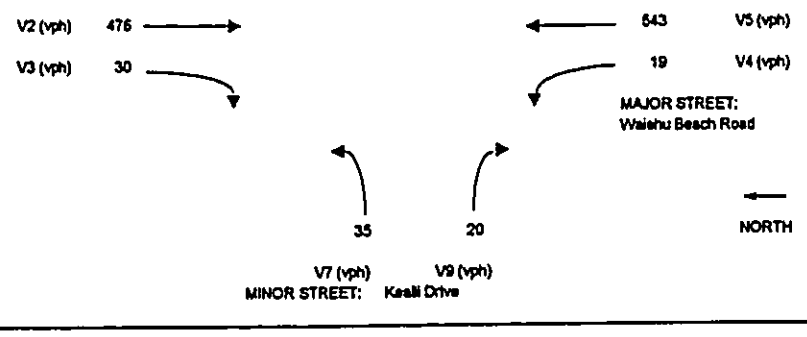
AVERAGE MINOR APPROACH DELAY =	16.82	sec/veh	AVERAGE TOTAL INTERSECTION DELAY =	0.72 sec/veh
LEVEL OF SERVICE =	C		LEVEL OF SERVICE =	A

ATA Inc. | STOP CONTROLLED T-INTERSECTION LEVEL OF SERVICE ANALYSIS | 1994 HCM

Major Street: Waiehu Beach Road
Minor Street: Kealii Drive
Peak Hour: PM
Scenario: Future Conditions with Project

Print Date: 15-May-01
Analyst: EV
File Name: waiehu bch-kealii fwp

Peak Hour Factor:	1.00
MAJOR STREET	
Num of Lanes - V2:	1
Excl RT - V3 (Y/N):	N
Stop/Yield - V3 (Y/N):	N
% Grade - V2,V3:	0
Num of Lanes - V5:	1
Excl LT - V4 (Y/N):	Y
% Grade - V4,V5:	0
MINOR STREET	
Num of Lanes - V7,V9:	1
Shared Lane (Y/N):	Y
% Grade - V7&V9:	0



VOLUME ADJUSTMENTS

MOVEMENT NO.	2	3	4	5	7	9
VOLUME, V (vph)	476	30	19	543	35	20
VOLUME, v (pcph)	476	30	21	543	39	22

STEP 1: RT FROM MINOR STREET - V9

Conflicting Flows:	Vc,9 = 1/2*V3+V2 =	15	+	476	=	491 vph
Potential Capacity:	Cp,9 =					781 pcph
Movement Capacity:	Cm,9 = Cp,9 =					781 pcph

STEP 2: LT FROM MAJOR STREET - V4

Conflicting Flows:	Vc,4 = V3+V2 =	30	+	476	=	506 vph
Potential Capacity:	Cp,4 =					984 pcph
Movement Capacity:	Cm,4 = Cp,4 =					984 pcph
Prob. of Queue-free State:	po,4 = 1-v4/Cm,4 =					0.979
Major Left Shared Lane Prob. of Queue-free State:	p*o,4 = 1-[(1-po,4)(1-v5/s5)]					NA

STEP 3: LT FROM MINOR STREET - V7

Conflicting Flows:	Vc,7 = 1/2V3+V2+V5+V4 =	1053	vph
Potential Capacity:	Cp,7 =	260	pcph
Capacity Adjustment Factor Due To Impeding Movements:	f7=po,4=	0.979	
Movement Capacity:	Cm,7 = f7*Cp,7 =	255	pcph

DELAY AND LEVEL OF SERVICE SUMMARY

Movement	v(vcph)	cm(pcph)	csh (pcph)	AVG TOTAL DELAY	LOS
MINOR LEFT TURN (7)	39	255	SHRD	SHRD	SHRD
MINOR RIGHT TURN (9)	22	781	337	13.00	C
MAJOR LEFT TURN (4)	21	984	——	3.74	A

AVERAGE MINOR APPROACH DELAY =	13.00	sec/veh	AVERAGE TOTAL INTERSECTION DELAY =	0.76 sec/veh
LEVEL OF SERVICE =	C		LEVEL OF SERVICE =	A

Appendix B-1

Traffic Report
Dated November 2, 2001

AUSTIN, TSUTSUMI & ASSOCIATES, INC. CIVIL ENGINEERS • SURVEYORS
CONTINUING THE ENGINEERING PRACTICE FOUNDED BY H. A. R. AUSTIN IN 1934

TED S. KAWAHIGASHI, P.E., FACEC
KENNETH K. KUROKAWA, P.E.
DONOHUE M. FUJII, P.E.
STANLEY T. WATANABE
TERRANCE S. ARASHIRO, P.E.
MERNA S. KIBE

#O-00-088

November 2, 2001

Munekiyo & Hiraga, Inc.
305 South High Street, Suite 104
Wailuku, Hawaii 96793

Attention: Ms. Gwen Hiraga:

Gentlemen and Ladies:

Subject: Paukukalo Preschool Traffic Report

This letter is in response to the County of Maui Planning Department's letter, dated July 27, 2001 in regards to the Draft Environmental Assessment (EA) for the Paukukalo Preschool addition of two additional classrooms and increase in student enrollment from 80 to 120 students.

In particular, we are responding to Comment No. 4 in regards to the traffic operations at Waiehu Beach Road and Kuhio Place/Kaae Road intersection. We concur with the recommendation that parents and staff be encouraged to use Kealii Drive for access to the preschool from Waiehu Beach Road. This would certainly present a more direct route to the school site from Waiehu Beach Road, and would lessen the traffic demand at the Kuhio Place/Kaae Road intersection.

A Traffic Impact Analysis Report (TIAR) normally does not discuss crashes (accidents) in the traffic study area, because the new development should not be expected to correct the existing problem(s) responsible for the crashes. And, therefore, this TIAR did not include a discussion on crashes on Waiehu Beach Road and at this intersection in particular. Further, the intersection sight distance is also an existing condition, and if it is deficient, the developer should not be tasked with its improvement.

Left-turning traffic from Kaae Road is projected to experience LOS "F" conditions in the Year 2001 under natural growth conditions, and without traffic generated by the subject project. See Figure 7 on Page 18 of the TIAR.

We trust that the above satisfactorily addresses the points raised in Comment No. 4.

Very truly yours,

AUSTIN, TSUTSUMI & ASSOCIATES, INC.

By Ted S. Kawahigashi
TED S. KAWAHIGASHI, P.E./FACEC
Principal Transportation Engineer

TSK:svol

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REPLY TO:
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OFFICES IN:
HONOLULU, HAWAII
WAILUKU, MAUI, HAWAII

Appendix C

Drainage and Erosion Control Report

DRAINAGE AND SOIL EROSION CONTROL REPORT

FOR

KSBE PAUKUKALO PRE-SCHOOL
Wailuku, Maui, Hawaii

T.M.K.: (2) 3-3-005: 086 & 087

Prepared For:

BAYLESS ARCHITECTS
305 S. High Street, Suite 101
Wailuku, Maui, Hawaii 96793

STACY A. OTOMO
LICENSED PROFESSIONAL ENGINEER
No. 5115-C
HAWAII, U.S.A.

Prepared By:

OTOMO ENGINEERING, INC.
CONSULTING CIVIL ENGINEERS
305 SOUTH HIGH STREET, SUITE 102
WAILUKU, MAUI, HAWAII 96793
PHONE: (808) 242-0032
FAX: (808) 242-5779

October, 2000

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3 Soil Survey Map

4 Flood Insurance Rate Map

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DRAINAGE AND SOIL EROSION CONTROL REPORT
FOR
KSBE Paukukalo Pre-School
Wailuku, Maui, Hawaii

I. INTRODUCTION

The purpose of this report is to examine both the existing and proposed drainage conditions for the proposed project.

In addition, this examination and plan has been prepared to determine the potential movement of soil due to rainfall and surface runoff from the project site, and to prepare for measures which will control erosion therefrom. This is in accordance with Chapter 20.08 "Soil Erosion and Sediment Control" of the Maui County Code as part of the application for the grading and building permits.

II. SITE LOCATION AND PROJECT DESCRIPTION

The subject parcels are identified as T.M.K.: (2)3-3-005: 086 and 087 which encompasses an area of 206,612 and 70,982 square feet, respectively. The project site is bordered by the Paukukalo Residence Lots and Kaumualii Street to the north, Paukukalo Park to the east, the existing Community Center building and covered basketball court to the south, and the Waiehu Terrace Subdivision to the west.

Associated improvements include the demolition of an existing building and parking area, paved parking areas, walkways, drainage system, utility connections, and landscaping.

III. EXISTING TOPOGRAPHY AND SOIL CONDITIONS

The project site is developed with the original Community Center building, the new Community Center building, covered basketball court, and paved parking. The remainder of the site is overgrown with weeds and a few trees. It is estimated that the ground slopes approximately 5% in a west to east direction.

According to the "Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii (August, 1972)," prepared by the United States Department of Agriculture Soil Conservation Service, the soil within the project site is classified as Puuone sand (PZUE). Puuone sand is characterized as having rapid permeability above the cemented layer, slow runoff, and a moderate to severe erosion hazard due to wind.

IV. EXISTING DRAINAGE CONDITIONS

Runoff from the project site presently sheet flows into Paukukalo Park. The park is a low-lying area with a grated catch basin located at the low point at the northwestern corner of the park. Runoff is intercepted from this area and conveyed across Waiehu Beach Road into the low area near the ocean.

It is estimated that the existing 50-year storm runoff from the project site is 6.3 cfs.

V. FLOOD AND TSUNAMI ZONE

According to Panel Number 150003 0190 D of the Flood Insurance Rate Map, March 16, 1995, prepared by the United States Federal Emergency Management Agency, the project site is situated in Flood Zone C. Flood Zone C represents areas of minimal flooding.

VI. PROPOSED DRAINAGE PLAN

After the development of the proposed project, it is estimated that the 50-year storm runoff will be 7.7 cfs, a net increase of 1.4 cfs.

An onsite grated catch basin will collect the additional runoff generated from the project site and divert it to an onsite subsurface drainage system. There will be no additional runoff sheet flowing from the project site into Paukukalo Park. This is in accordance with Chapter 4, "Rules for the Design of Storm Drainage Facilities in the County of Maui."

VII. HYDROLOGIC CALCULATIONS

The hydrologic calculations are based on the "Drainage Master Plan for the County of Maui," and the "Rainfall Frequency Atlas of the Hawaiian Islands," Technical Paper No. 43, U.S. Department of Commerce, Weather Bureau.

Rational Formula Used: $Q = CIA$

Where Q = rate of flow (cfs)

C = rainfall coefficient

I = rainfall intensity for a duration equal to the time of concentration (inches/hour)

A = drainage area (Acres)

See Appendix A for Hydrologic Calculations

VIII. SOIL EROSION CONTROL PLAN

A. General:

Based on the Hawaii Environmental Simulation Laboratory (HESL) equations to estimate soil loss during the construction period, and complemented by the following erosion control plan, the soil loss during the construction period is well within the tolerable limits (See Appendix B).

Based on the County Erosion Control Standards and Guidelines, the allowable erosion rate is 6,250 tons/acre/year for a 6-month grading period and the maximum tolerable severity rating number (H) is 50,000.

B. Erosion Control Plan:

The following measures will be taken to control erosion during the site development period (estimated 6 months).

1. Minimize time of construction.
2. Retain existing ground cover until latest date to complete construction.
3. Early construction of drainage control features.
4. Use temporary area sprinklers in non-active construction areas when ground cover is removed.
5. Station water truck on site during construction period to provide for immediate sprinkling, as needed, in active construction zones (weekends and holidays included).
6. Use temporary berms and cut-off ditches, where needed, for control of erosion.
7. Graded areas shall be thoroughly watered after construction activity has ceased for the day and on weekends.
8. All cut and fill slopes shall be sodded or planted immediately after grading work has been completed.

The development project is provided with adequate facilities for drainage control and storm water disposal. This, together with ultimate ground cover, shall preclude any appreciable onsite erosion.

IX. CONCLUSION

The proposed development is expected to generate a 50-year storm runoff of 7.7 cfs, with an increase of 1.4 cfs. The runoff will be intercepted by an onsite grated catch basin and conveyed to an onsite subsurface drainage system. No additional runoff will sheet flow into Paukukalo Park.

Based on our calculations, the sedimentation hazard to coastal waters and downstream properties is minimal (see Exhibit B). The soil loss per unit area and severity rating computed for the proposed development are well within the tolerable limits.

Therefore, it is our professional opinion that the proposed development will not have an adverse effect on the adjoining properties downstream.

X. REFERENCES

A. Soil Survey of Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii, prepared by U.S. Department of Agriculture, Soil Conservation Service, August, 1972.

B. Erosion and Sediment Control Guide for Hawaii, prepared by U.S. Department of Agriculture, Soil Conservation Service, March, 1981.

C. Rainfall-Frequency Atlas of the Hawaiian Islands, Technical Paper No. 43, U.S. Department of Commerce, Weather Bureau, 1962.

D. Flood Insurance Rate Maps of the County of Maui, March, 1995.

E. Chapter 4, Rules for the Design of Storm Drainage Facilities in the County of Maui, prepared by the Department of Public Works and Waste Management, County of Maui, 1995.

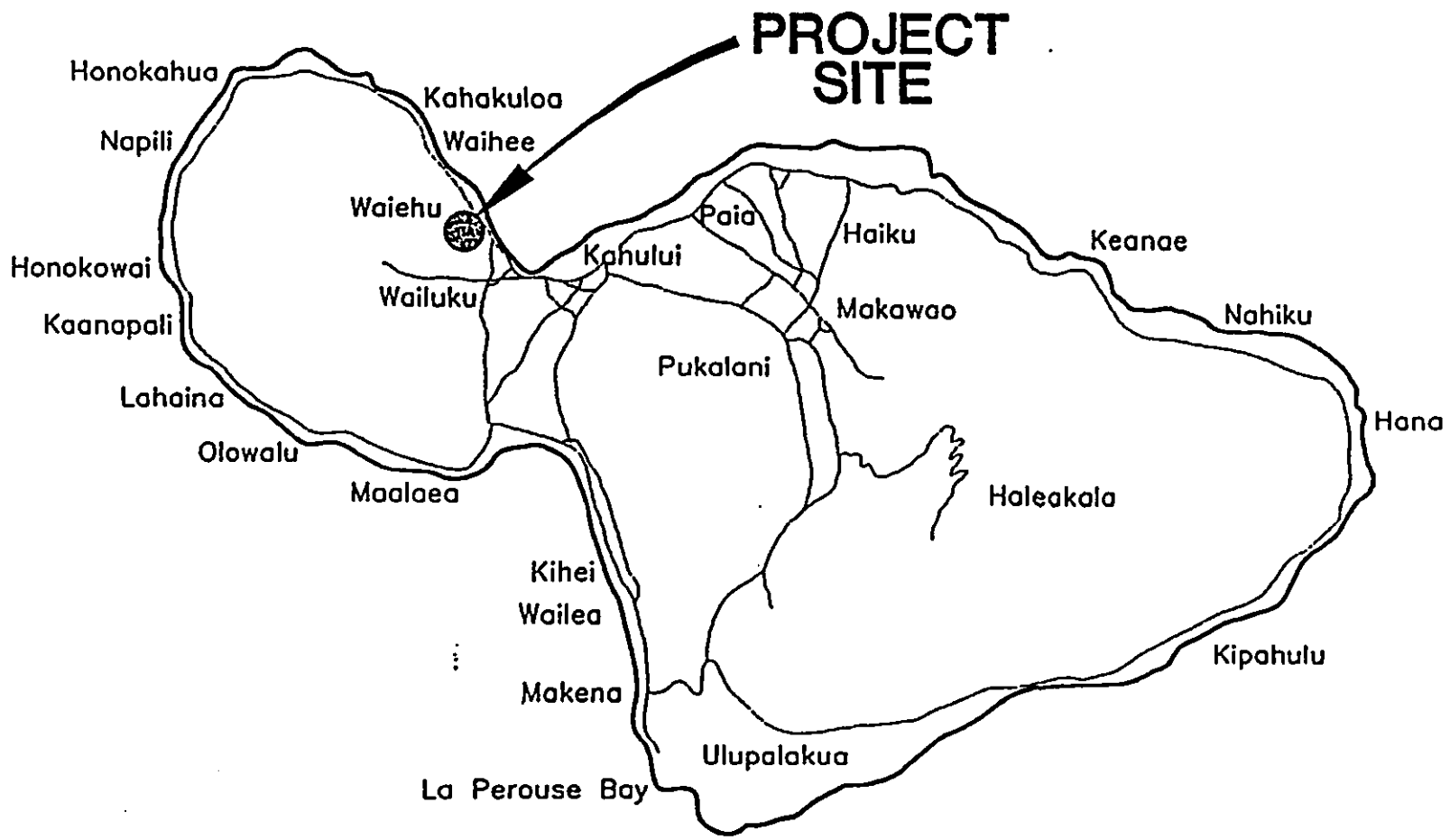
EXHIBITS

1 Location Map

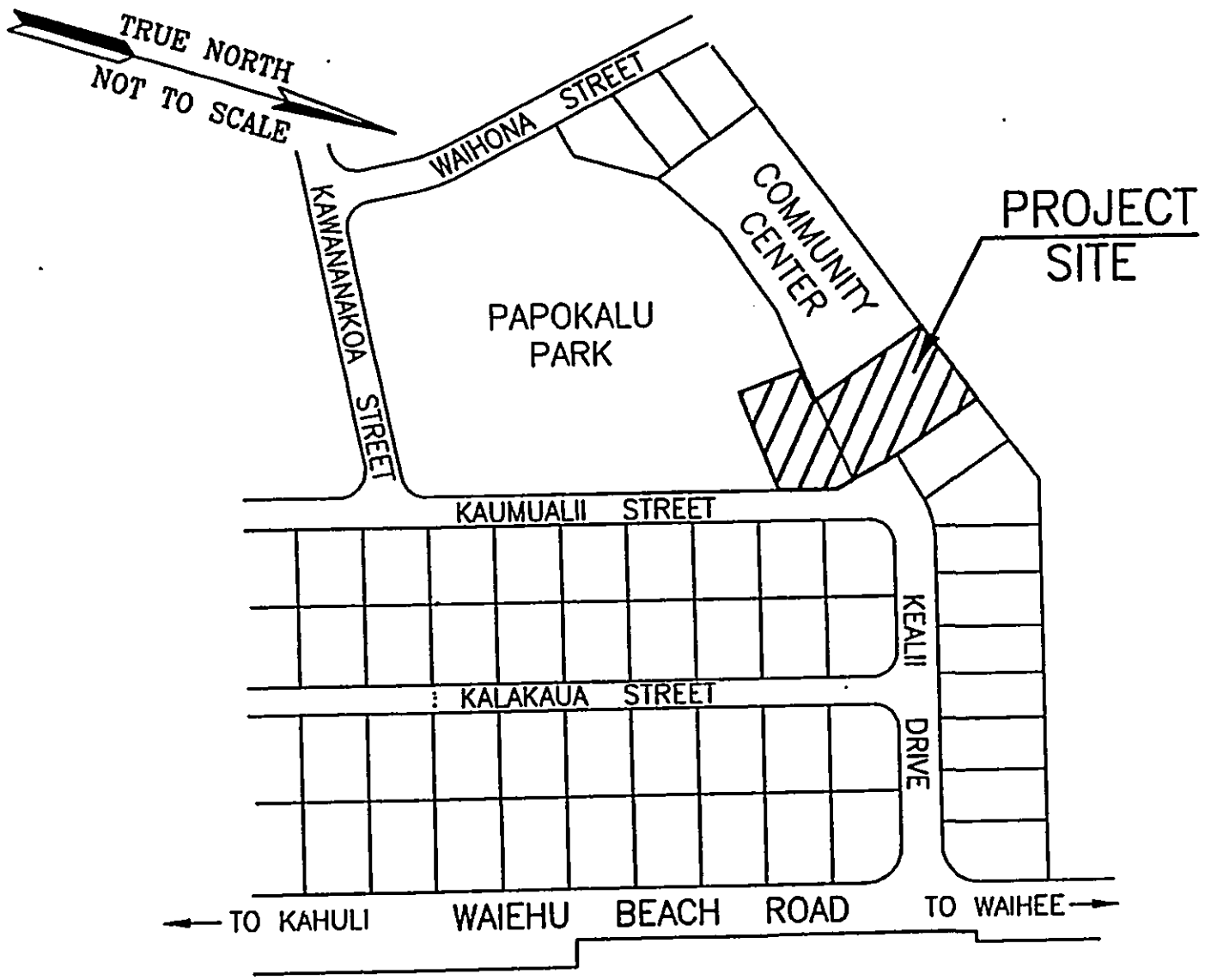
2 Vicinity Map

3 Soil Survey Map

4 Flood Insurance Rate Map



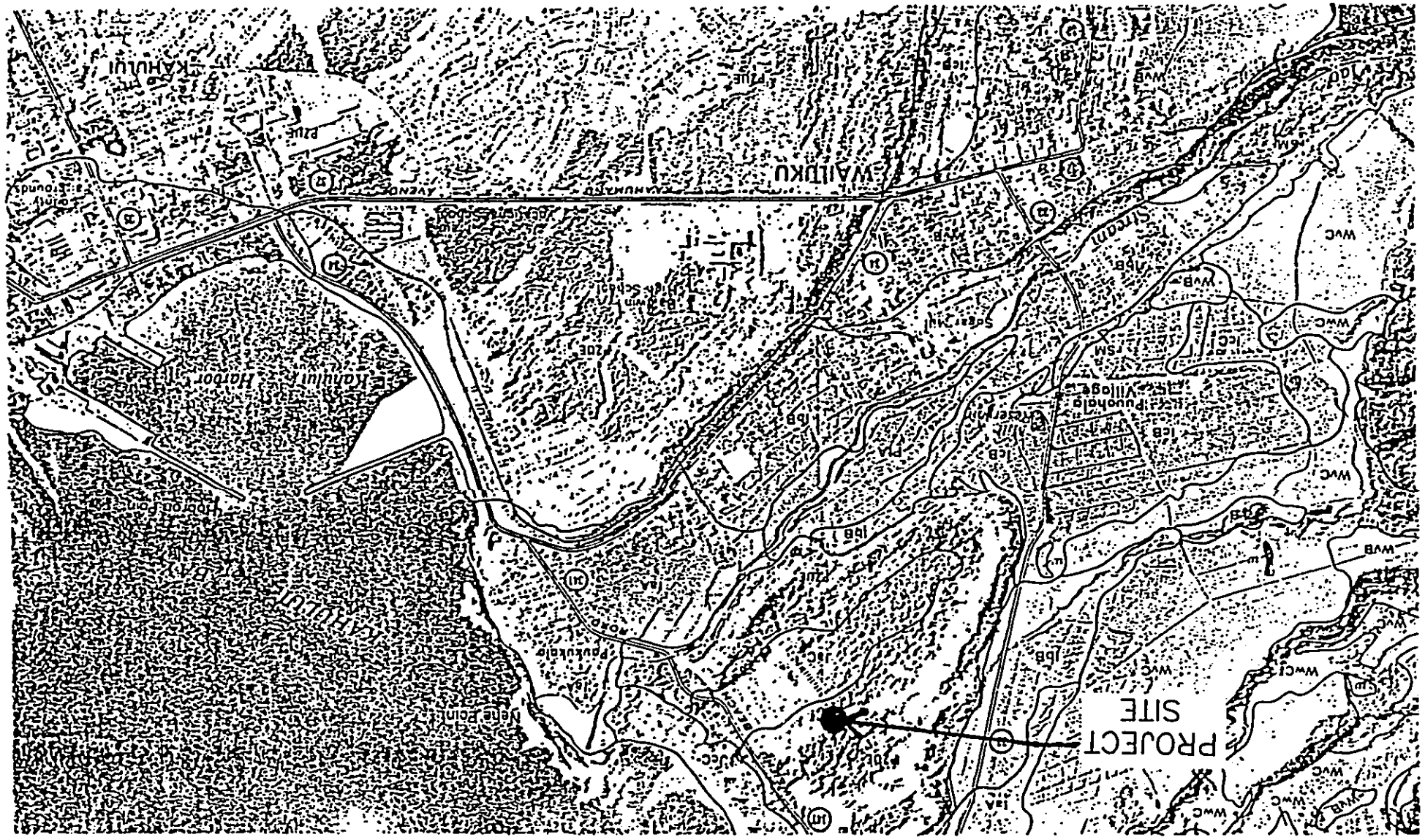
LOCATION MAP
EXHIBIT 1

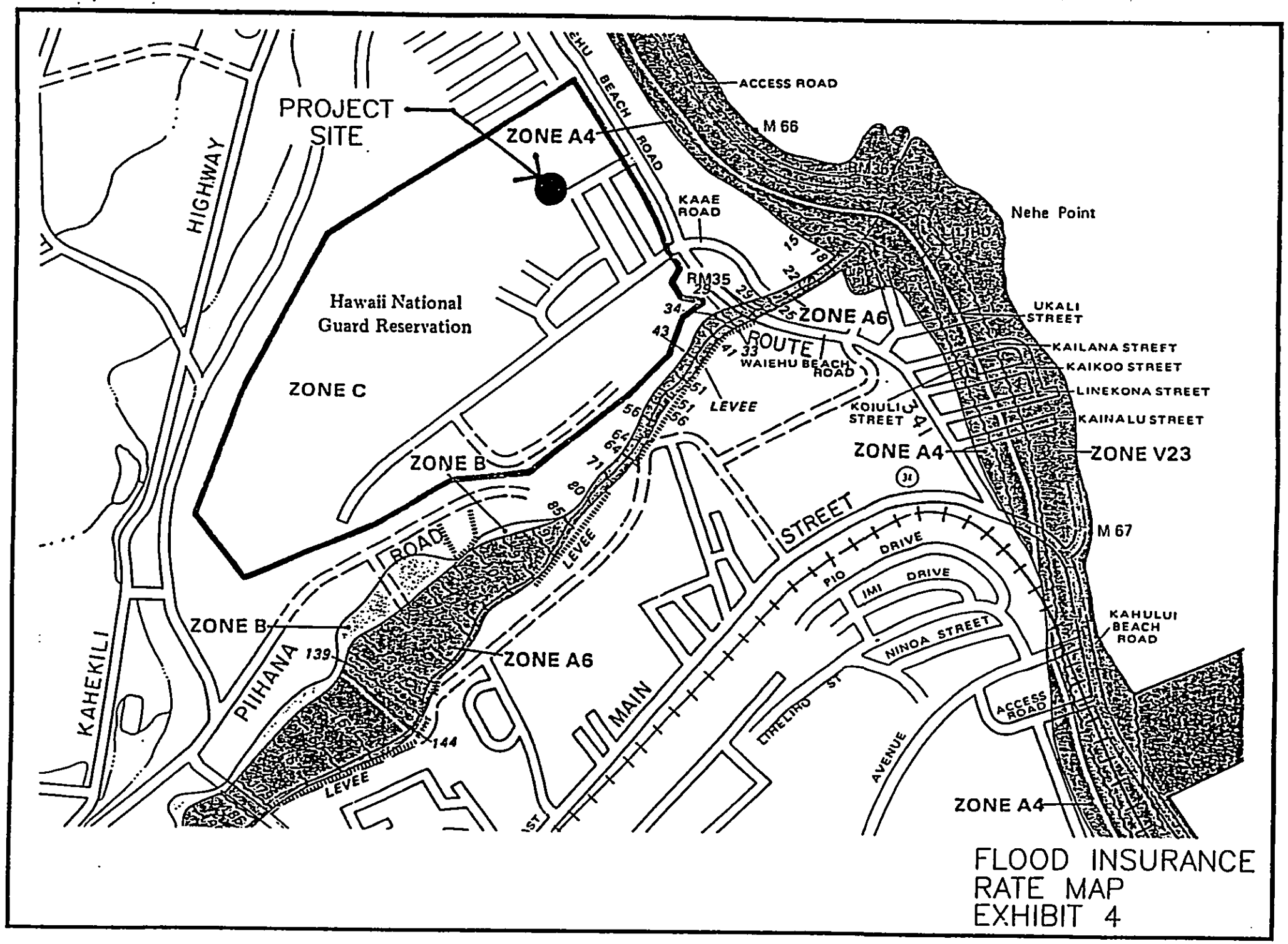


VICINITY MAP
NOT TO SCALE

VICINITY MAP
EXHIBIT 2

SOIL SURVEY MAP
EXHIBIT 3





APPENDIX A

HYDROLOGIC AND HYDRAULIC CALCULATIONS

Hydrologic Calculations

Purpose: Determine the increase in surface runoff from the development of the proposed project based on a 50-year storm.

A. Determine the Runoff Coefficient (C):

PAVEMENT AREAS:

Infiltration (Negligible)	= 0.20
Relief (Flat)	= 0.00
Vegetal Cover (None)	= 0.07
Development Type (Commercial)	= 0.55
C	= 0.82

ROOF AREAS:

Infiltration (Negligible)	= 0.20
Relief (Steep)	= 0.08
Vegetal Cover (None)	= 0.07
Development Type (Commercial)	= 0.55
C	= 0.90

LANDSCAPED AREAS:

Infiltration (Medium)	= 0.07
Relief (Flat)	= 0.00
Vegetal Cover (High)	= 0.00
Development Type (Open)	= 0.15
C	= 0.22

EXISTING CONDITION:

Pavement Areas = 0.59 Acres

Roof Areas = 0.33 Acres

Landscaped Areas = 1.58 Acres

WEIGHTED C = 0.45

DEVELOPED CONDITIONS:

Pavement Areas = 0.91 Acres

Roof Areas = 0.42 Acres

Landscaped Areas = 1.17 Acres

WEIGHTED C = 0.55

B. Determine the 50-year 1-hour rainfall:

i_{50} = 3.0 inches

Adjust for time of concentration to compute [illegible] intensity (I):

Existing Condition:

T_c = 14 mi[illegible]

I = 5.6 inches/hour

Developed Condition:

T_c = 14 minutes

I = 5.6 inches/hour

C. Drainage Area (A) = 2.50 Acres (Affected Area)

D. Compute the 50-year storm runoff volume (Q):

Q = CIA

Existing Conditions:

Q = (0.45)(5.6)(2.50)

= 6.3 cfs

Developed Conditions:

$$Q = (0.55)(5.6)(2.50)$$

$$= 7.7 \text{ cfs}$$

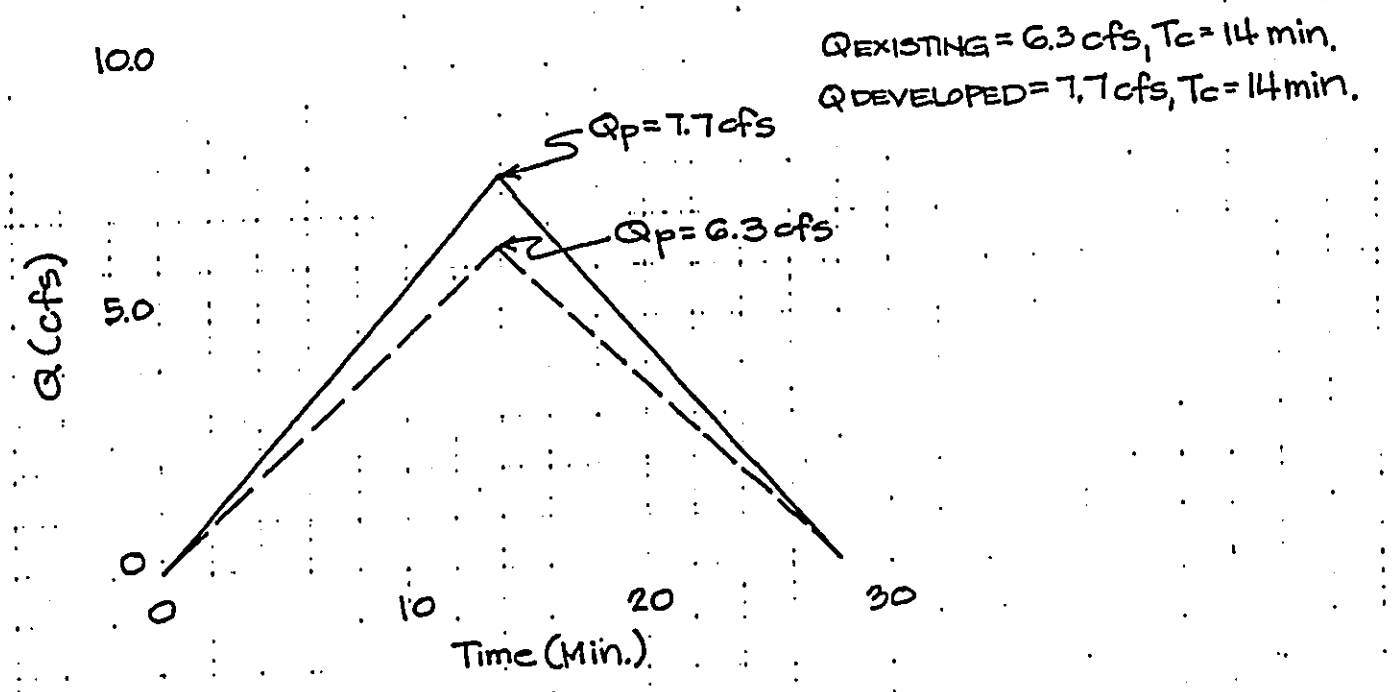
The increase in runoff due to the proposed development is 7.7 - 6.3 = 1.4 cfs.

Project KSBE - Pre-School

Calculated by S.A.O. Date 10-23-00

OTOMO ENGINEERING, INC.
CONSULTING CIVIL ENGINEERS

Determine the storage volume required for a subsurface drainage system to handle the increase in runoff from the project site for a 50-year storm. Per County of Maui drainage standards, the increase in runoff will be handled by the subsurface drainage system.



Existing Volume = (6.3 ft³/sec)(14 min)(60 sec/min) = 5,292 ft³

Developed Volume = (7.7 ft³/sec)(14 min)(60 sec/min) = 6,468 ft³

Required Storage Volume = 6,468 ft³ - 5,292 ft³ = 1,176 ft³

Project KSBE - Pre-School

Calculated by S.A.O. Date 10-23-00

OTOMO ENGINEERING, INC.
CONSULTING CIVIL ENGINEERS

Determine the size of the perforated drainage system required to handle the increase in runoff volume.

Given: Required Storage Volume = $1,176\ ft^3$
43% of the rock volume is void space
Only 50% of the rock void space to be used as storage

Use 90 feet of 36" perforated pipe.

Area = $\pi (1.50)^2 = 7.07\ ft^2$

Area of crushed rock = $[(7.0)(6.0) - 7.07] = 34.93\ ft^2$

Volume of rock voids = $(34.93)(0.43)(0.50)(90) = 676\ ft^3$

Volume of 36" pipe = $(90)(7.07) = 636\ ft^3$

Total Storage Volume Available = $676 + 636 = 1,312\ ft^3 > 1,176\ ft^3$ (ok)

$$\text{Factor of Safety} = \frac{1,312 - 1,176}{1,176} = 12\%$$

APPENDIX B

UNIVERSAL SOIL LOSS CALCULATIONS

Universal Soil Loss Calculations

A. HESL Soil Loss Calculations:

1. Erosion rate, as set forth by the County of Maui Ordinance:

$$E = R \times K \times LS \times C \times P$$

Where:

E = Soil Loss in tons/acre/year

R = Rainfall Factor = 190 tons/acre/year

K = Soil Erodibility Factor = 0.10 (Puuone sand)

L = Slope Length = 400 ft.

S = Slope Gradient = 0.05

LS = Slope Length Factor = 1.05

C = Cover Factor, Use Bare Soil = 1.0

P = Control Factor, Construction Site = 1.0

E = 190 x 0.10 x 1.05 x 1.0 x 1.0

= 20 tons/acre/year

2. Maximum Allowable Soil Loss:

Emax = Hmax / (2 F T + 3 D) A

Coastal Water Hazard (D) = Class A = 2

Downstream Hazard (F) = 2

Duration of Site Work = 6 months

Maximum Allowable Construction Area x Erosion Rate
= 6,250 tons/acre/year

B. Severity Rating Number:

1. The degree of hazard from potential damage by erosion and sediment, known as "Severity Rating Number" will be determined for each grading site as follows:

$$H = (2\,F\,T + 3\,D)\,A\,E$$

Where:

H = Severity Rating Number

F = Unit Downslope/Downstream factor = 2

D = Unit Coastal Water Hazard = 2

T = Time of Distribution (years) = 0.5

A = Area of Disturbance (acres) = 2.50

E = Erosion Rate in tons/acre/year

$$H = ((2 \times 2 \times 0.5) + (3 \times 2)) \times 2.50 \times 20 = 400$$

The maximum allowable severity rating number established is 50,000, and is greater than 400 which is computed for the project.