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## *PUPUKEA VILLAGE*



### **Environmental Assessment for a Special Management Area Use Permit**

Tax Map Key (1) 5-9-011:017, 033, and 034

September 2004

**PUPUKEA VILLAGE**

**ENVIRONMENTAL ASSESSMENT FOR A  
SPECIAL MANAGEMENT AREA USE PERMIT**

**Tax Map Key (1) 5-9-011: 017, 033, and 034**

**For: Pupukea Village LLC**

**By: Belt Collins Hawaii**

**September 2004**

## TABLE OF CONTENTS

<b>1</b>	<b>GENERAL INFORMATION</b>	<b>1</b>
1.1	APPLICANT	1
1.2	RECORDED FEE OWNER	1
1.3	AGENT	1
1.4	TAX MAP KEY (TMK)	1
1.5	LOT AREA	1
1.6	AGENCIES CONSULTED IN MAKING ASSESSMENT	2
<b>2</b>	<b>DESCRIPTION OF THE PROPOSED ACTION</b>	<b>3</b>
2.1	GENERAL DESCRIPTION	3
2.1.1	Location of the Proposed Project	3
2.1.2	Description of Proposed Project	3
2.1.2.1	Project Developer and Landowners	3
2.1.2.2	Project Description	3
2.1.3	Relation of Parcel to Special Management Area	7
2.1.4	Land Use Approvals Granted and/or Approvals Required	7
2.2	TECHNICAL CHARACTERISTICS	7
2.2.1	Use Characteristics	7
2.2.2	Physical Characteristics of the Project	7
2.2.2.1	Lot Characteristics	7
2.2.2.2	Grading	12
2.2.2.3	Floor Plans	12
2.2.2.4	Parking and Access	12
2.2.2.4.1	Parking	12
2.2.2.4.2	Access	17
2.2.2.5	Building Height	17
2.2.3	Construction Characteristics	17

2.2.4	Utility Requirements.....	20
2.2.4.1	Potable Water .....	20
2.2.4.1.1	Existing.....	20
2.2.4.1.2	Proposed.....	20
2.2.4.2	Electricity and Telephone.....	21
2.2.4.2.1	Existing.....	21
2.2.4.2.2	Proposed.....	21
2.2.4.3	Gas.....	21
2.2.4.3.1	Existing.....	21
2.2.4.3.2	Proposed.....	21
2.2.4.4	Liquid Waste .....	21
2.2.4.4.1	Existing.....	21
2.2.4.4.2	Proposed.....	22
2.2.4.5	Solid Waste Disposal.....	24
2.2.4.5.1	Existing.....	24
2.2.4.5.2	Proposed.....	25
2.2.4.6	Access to Site .....	25
2.2.4.6.1	Existing.....	25
2.2.4.6.2	Traffic Impact Analysis.....	25
2.2.4.6.3	Proposed.....	27
2.3	ECONOMIC AND SOCIAL CHARACTERISTICS.....	28
2.3.1	Estimated Cost and Time Phasing of Construction .....	28
2.3.2	Other Pertinent Information.....	28
2.3.2.1	Employment .....	28
2.4	ENVIRONMENTAL CHARACTERISTICS .....	28
2.4.1	Soils.....	28
2.4.2	Topography.....	28
2.4.3	Surface Runoff, Drainage, and Erosion Hazard.....	29
2.4.3.1	Existing.....	29
2.4.3.2	Proposed.....	29

2.4.4	Federal FIRM Zone, Land Use Ordinance (LUO) Flood Hazard District, Other Geological Hazards .....	30
<b>3</b>	<b>AFFECTED ENVIRONMENT .....</b>	<b>31</b>
3.1	DESCRIPTION OF SUBJECT SITE IN RELATION TO SURROUNDING AREA .....	31
3.1.1	Relation to Surrounding Area .....	31
3.1.2	General Plan and Development Plan Land Use Designations .....	31
3.1.2.1	General Plan .....	31
3.1.2.2	Development Plan Land Use Designations .....	32
3.1.3	Land Use Ordinance Designation .....	32
3.2	PROJECT SITE IN RELATION TO PUBLIC PLACES AND NATURAL RESOURCES .....	32
3.2.1	Beaches, Parks and Recreation Areas .....	32
3.2.2	Rare, Threatened, or Endangered Species and Their Habitat .....	33
3.2.2.1	Fauna .....	33
3.2.2.2	Flora .....	33
3.2.3	Wildlife and Wildlife Preserves .....	33
3.2.4	Wetlands, Lagoons, Tidal Lands and Submerged Lands .....	33
3.2.5	Fisheries and Fishing Grounds .....	34
3.2.5.1	Pupukea Marine Life Conservation District .....	34
3.3	PROJECT SITE IN RELATION TO HISTORIC, CULTURAL, AND ARCHAEOLOGICAL RESOURCES .....	34
3.3.1	Archaeological Resources .....	34
3.3.2	Cultural Resources .....	34
3.4	COASTAL VIEWS FROM SURROUNDING PUBLIC VIEWPOINTS AND FROM THE NEAREST COASTAL HIGHWAY ACROSS THE SITE TO THE OCEAN OR TO COASTAL LANDFORM .....	36
3.4.1	Coastal Views from Kamehameha Highway .....	36
3.4.2	Coastal Views from Pupukea Road .....	36
3.4.3	Mauka Views from Kamehameha Highway .....	36
3.5	QUALITY OF RECEIVING WATERS AND GROUNDWATER (INCLUDING POTABLE WATER) RESOURCES .....	40
3.5.1	Groundwater Resources .....	40

3.5.2	Receiving Waters .....	41
4	<b>PROJECT IMPACTS .....</b>	<b>43</b>
4.1	COASTAL ZONE MANAGEMENT OBJECTIVES AND POLICIES (SECTION 205A-2, HRS) .....	43
4.2	PROJECT IMPACTS RELATIVE TO THE SPECIAL MANAGEMENT AREA GUIDELINES (SECTION 25-3.2, ROH) .....	50
5	<b>MITIGATION MEASURES .....</b>	<b>54</b>
5.1	TRAFFIC IMPACT AND MITIGATION .....	54
5.2	FLORA/FAUNA IMPACT AND MITIGATION .....	54
5.3	ARCHAEOLOGICAL IMPACT AND MITIGATION .....	54
5.4	MAUKA VIEW IMPACT AND MITIGATION .....	55
5.5	RECEIVING WATER IMPACT AND MITIGATION .....	55
5.6	GROUNDWATER IMPACT AND MITIGATION .....	55
6	<b>REFERENCES .....</b>	<b>57</b>

## LIST OF FIGURES

1	Location Map .....	4
2	Tax Map Key 5-9-11: Parcels 17, 33 and 34 .....	5
3	Artist's Concept of Pupukea Village .....	6
4	Special Management Area (SMA).....	8
5	State Land Use Districts.....	9
6	Zoning Designations .....	10
7	Topographic Survey (1992) .....	11
8	Grading Plan .....	13
9	First Floor Leasing Plan .....	14
10	Second Floor Leasing Plan .....	15
11	Basement Parking Plan .....	16
12	Building Sections .....	18
13	Building Elevation .....	19
14	Groundwater Aquifer and UIC Line Location .....	23
15	Pupukea Marine Life Conservation District .....	35

## LIST OF PLATES

1	Makai View From Subject Property .....	37
2	Makai View From Pupukea Road .....	38
3	Mauka View of Parcel Along Kamehameha Highway .....	39

## APPENDICES

A	List of Agencies Contacted
B	Traffic Impact Study for Pupukea Village, North Shore, Oahu
C	Avifaunal and Feral Mammal Field Survey of TMK 5-9-11:17, Pupukea, Oahu
D	Botanical Field Study Letter Report, TMK 5-9-11:17
E	Archaeological Assessment for the Proposed North Shore Center at Pupukea (TMK 5-9-11:27) Located in Pupukea, Haupua'a, District of Ko'olaupua, Oahu

## ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
ADA	Americans with Disabilities Act
bgs	below ground surface
BOD	Biological Oxygen Demand
BWS	Board of Water Supply
cfs	cubic feet per second
Cl-	chloride
CZM	Coastal Zone Management
DAR	Division of Aquatic Resources (State Department of Land and Natural Resources)
DOH	Department of Health
DOT	Department of Transportation
FIRM	Flood Insurance Rate Map
ft	foot/feet
gpd	gallons per day
HAR	Hawaii Administrative Rules
HECO	Hawaiian Electric Company
hr	hour
HRS	Hawaii Revised Statute
kVA	kilovolt amps
LOS	Level of Service
LUO	Land Use Ordinance
MBR	Membrane bioreactor
mg/l	milligrams per liter
ml	milliliter
MLCD	Marine Life Conservation District
msl	mean sea level
NTU	nephelometric turbidity units
NPDES	National Pollutant Discharge Elimination System
pp	parts per



**ACRONYMS AND ABBREVIATIONS (CONTINUED)**

psi	pounds per square inch
ROH	Revised Ordinances of Honolulu
SF	square feet
SHPD	State Historic Preservation Division
SMA	Special Management Area
SMP	Special Management Area Use Permit
TMK	Tax Map Key
UIC	Underground Injection Control
UV	ultraviolet

# **1 GENERAL INFORMATION**

## **1.1 APPLICANT**

Pupukea Village LLC  
1099 Alakea Street, Suite 1580  
Honolulu, Hawaii 96813

Phone: (808) 550-4449

## **1.2 RECORDED FEE OWNER**

Lumleong Enterprises (44.44%) and Niimi L.P. (55.56%)  
59-712 Kamehameha Highway  
Haleiwa, Hawaii 96712

## **1.3 AGENT**

Belt Collins Hawaii  
2153 North King Street, Suite 200  
Honolulu, Hawaii 96819

Phone: (808) 521-5361

eight inc.  
32 Merchant Street, Suite 201  
Honolulu, Hawaii 96813

Phone: (808) 599-4480

## **1.4 TAX MAP KEY (TMK)**

TMK (1) 5-9-11: Parcels 17, 33, and 34

## **1.5 LOT AREA**

TMK (1) 5-9-011: 017	93,369 square feet (SF)
TMK (1) 5-9-011: 033	12,824 SF
TMK (1) 5-9-011: 034	<u>11,250 SF</u>
Total	117,443 SF
Or about	2.7 acres

## **1.6 AGENCIES CONSULTED IN MAKING ASSESSMENT**

The applicant initially met with the Planning Branch of the Department of Planning and Permitting, City and County of Honolulu. Subsequently, the applicant or their consultants contacted the following agencies for information to prepare this Environmental Assessment:

- Road Maintenance Division, Facility Maintenance Department, City and County of Honolulu
- Civil Engineering Branch, Site Development Division, Department of Planning and Permitting, City and County of Honolulu
- Planning Division, Department of Planning and Permitting, City and County of Honolulu
- Traffic Review Branch, Site Development Division, Department of Planning and Permitting, City and County of Honolulu
- Department of Transportation Services, City and County of Honolulu
- Planning Branch, Highways Division, Department of Transportation, State of Hawaii
- Right of Way Branch, Highways Division, Department of Transportation, State of Hawaii
- Traffic Branch, Highways Division, Department of Transportation, State of Hawaii
- Clean Water Branch, Department of Health, State of Hawaii
- Safe Drinking Water Branch, Department of Health, State of Hawaii

See Appendix A for details.

## **2 DESCRIPTION OF THE PROPOSED ACTION**

### **2.1 GENERAL DESCRIPTION**

#### **2.1.1 Location of the Proposed Project**

The proposed project, Pupukea Village, is situated at the intersection of Kamehameha Highway and Pahoe Road in Pupukea, on the North Shore of Oahu. The property is located on the mauka (inland) side of Kamehameha Highway, approximately 200 feet (ft) from the water's edge. It is separated from the water's edge by Kamehameha Highway and Pupukea Beach Park. Figure 1 shows the location of the property and its relationship to the water's edge. The project is on a 2.7-acre property that is part of the Lani-a-kea Farm Lots Tract and designated as TMK (1) 5-9-011:Parcels 17, 33, and 34 (Figure 2).

#### **2.1.2 Description of Proposed Project**

##### **2.1.2.1 Project Developer and Landowners**

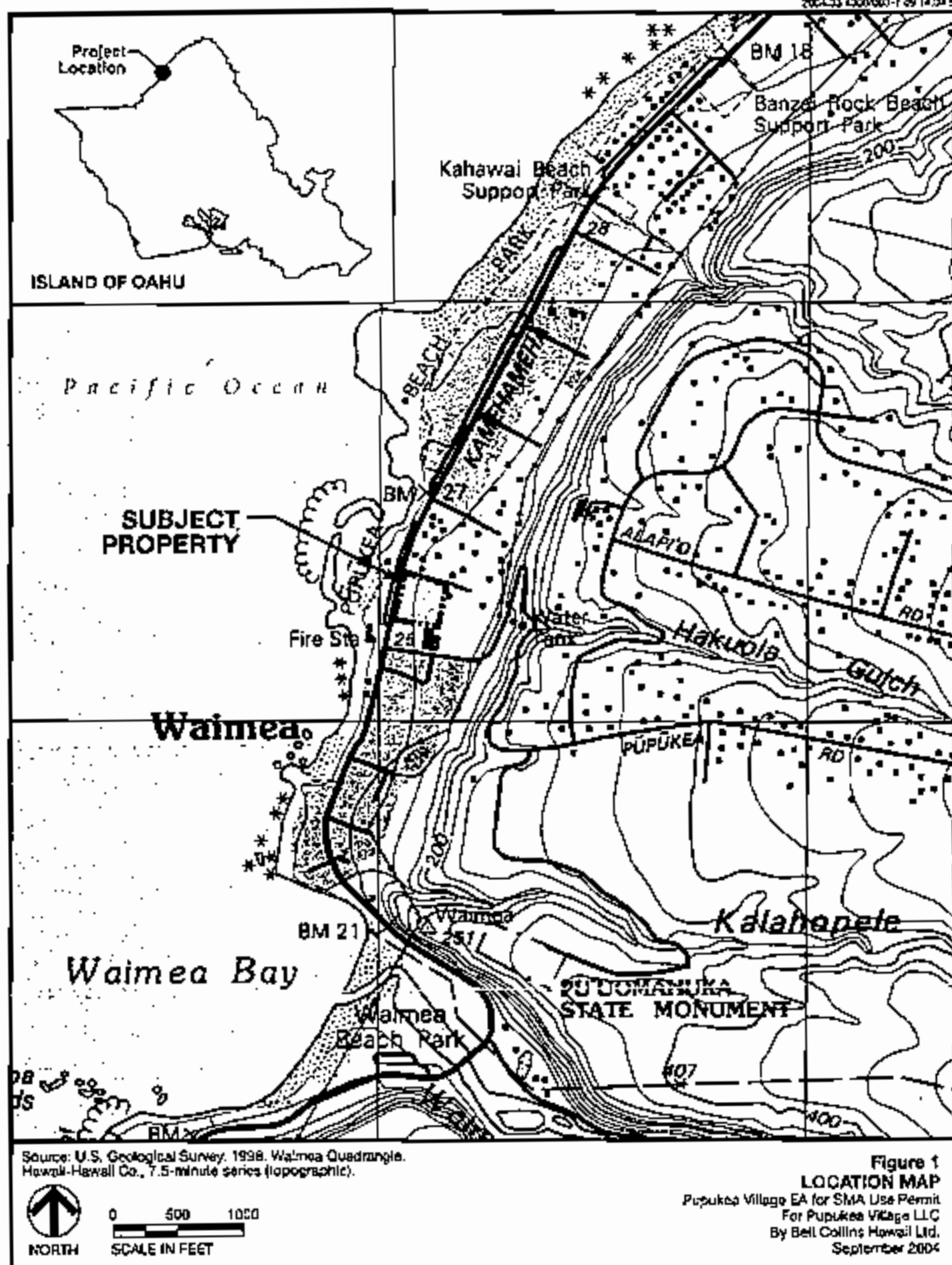
The project, Pupukea Village, is proposed by the Pupukea Village LLC (applicant) that has secured a development option on the subject property owned by Lumleong Enterprises and Niimi L.P. The Pupukea Village LLC believes that it has an easement over Pahoe Road for road and utility purposes, and is in the process of verifying its rights and securing approvals, as required, from the various owners of Pahoe Road, a privately owned street, to allow its use as the main project access. The Pupukea Village LLC will also work with the appropriate government agencies to allow for needed off-site infrastructure improvements.

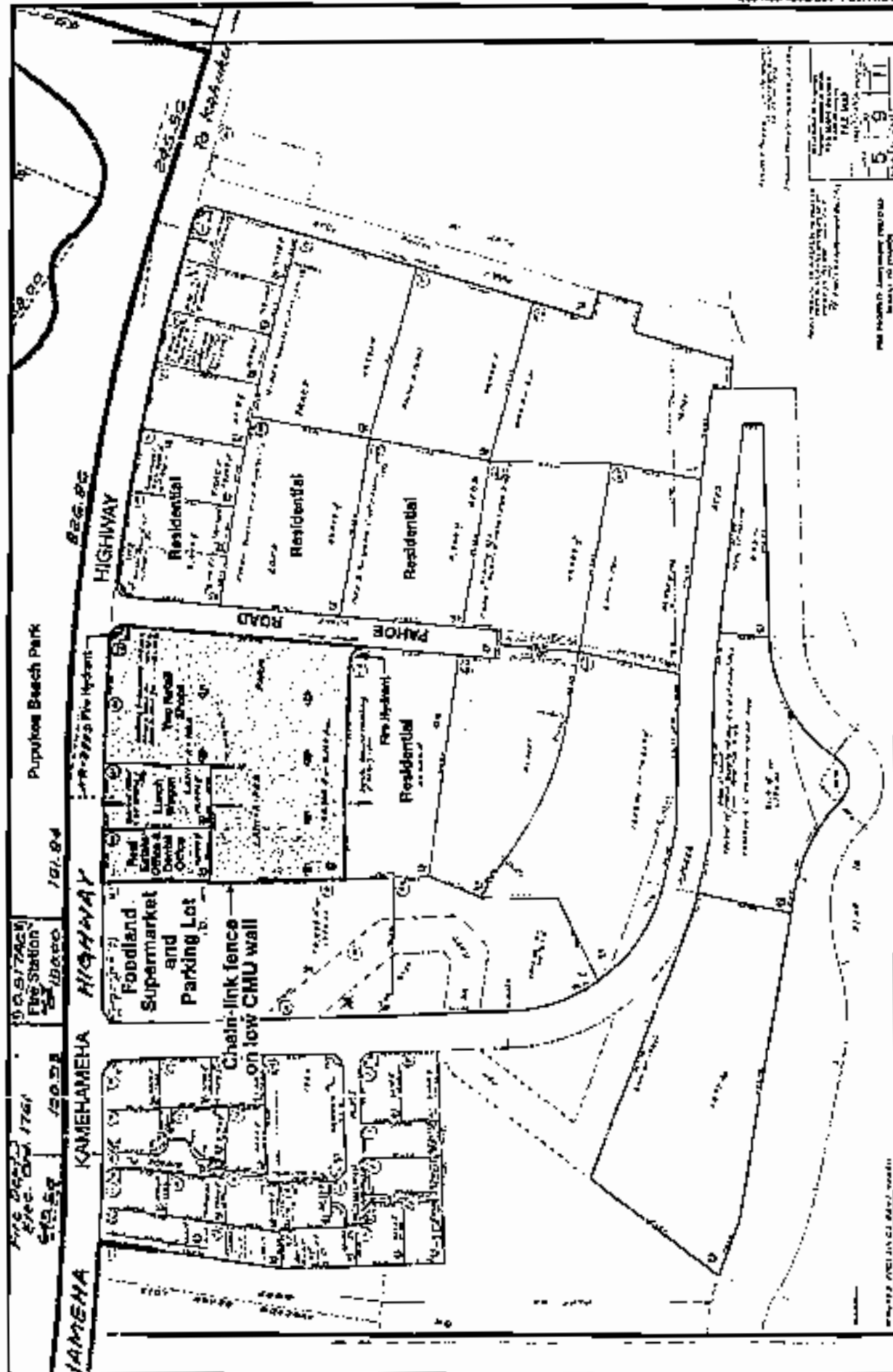
##### **2.1.2.2 Project Description**

The proposed project, Pupukea Village, is a commercial complex that will provide goods and services to residents and visitors in the Pupukea area. The project is a mix of one- and two-story buildings with 74,464 SF of total floor area linked by walkways and courtyards.

The project is designed to harmonize with the rural character of the North Shore. The buildings are designed in a rural architectural style. Vehicle access is limited to parking areas with access from Pahoe Road, a private street, instead of directly from Kamehameha Highway. Most of the parking serving the project is hidden in a basement parking area. Landscaping is provided in the setback along Kamehameha Highway and Pahoe Road. See Figure 3, Artist's Concept of Pupukea Village.

A detailed description of the proposed project and infrastructure improvements is provided in the following sections.





**Figure 2**  
**TAX MAP KEY 5-9-11: PARCELS 17, 33, AND 34**  
 Pupukea Village EA for SMA Use Permit  
 For Pupukea Village LLC  
 By Bell Co/Tina Hawaii Ltd.  
 September 2004

**LEGEND**

0 50 100 200  
 SCALE IN FEET

**NORTH**

**Subject Property**



2004 33,330,000-8-09 14 04 3

**Figure 3**  
**ARTIST'S CONCEPT OF PUPUKEA VILLAGE**  
Pupukea Village EA for SMA Use Permit  
For Pupukea Village LLC  
By Rich Collins Hawaii Ltd  
September 2004

### **2.1.3 Relation of Parcel to Special Management Area**

The subject property is within the Special Management Area (SMA), except for an approximate 50-foot-wide strip along the mauka edge of the property (see Figure 4).

### **2.1.4 Land Use Approvals Granted and/or Approvals Required**

The property is classified Urban by the State and County zoned B-1, Neighborhood Business (see Figures 5 and 6).

This proposed project is within the SMA and, therefore, requires a Special Management Area Use Permit (SMP). This Environmental Assessment is being prepared as part of the SMP application.

Other approvals are needed for this project, including Building, Grading and other construction related permits (City and County), National Pollutant Discharge Elimination System (NPDES) permit for discharges from construction activities (Department of Health (DOH)), Domestic Water Connection and Fire Protection Approval (Board of Water Supply and Fire Department, respectively), Wastewater System Approval (DOH), Underground Injection Control (UIC) permit and interpretation of UIC line or a variance (DOH), and approvals for drainage system connections and work in the highway right-of-way (Department of Transportation (DOT)). Other permits and approvals may be identified as work on this project progresses.

Proposed off-site infrastructure improvements, e.g., work on State and County properties, may require permits and approvals that initiate the Chapter 343, Hawaii Revised Statute (HRS), environmental review process.

## **2.2 TECHNICAL CHARACTERISTICS**

### **2.2.1 Use Characteristics**

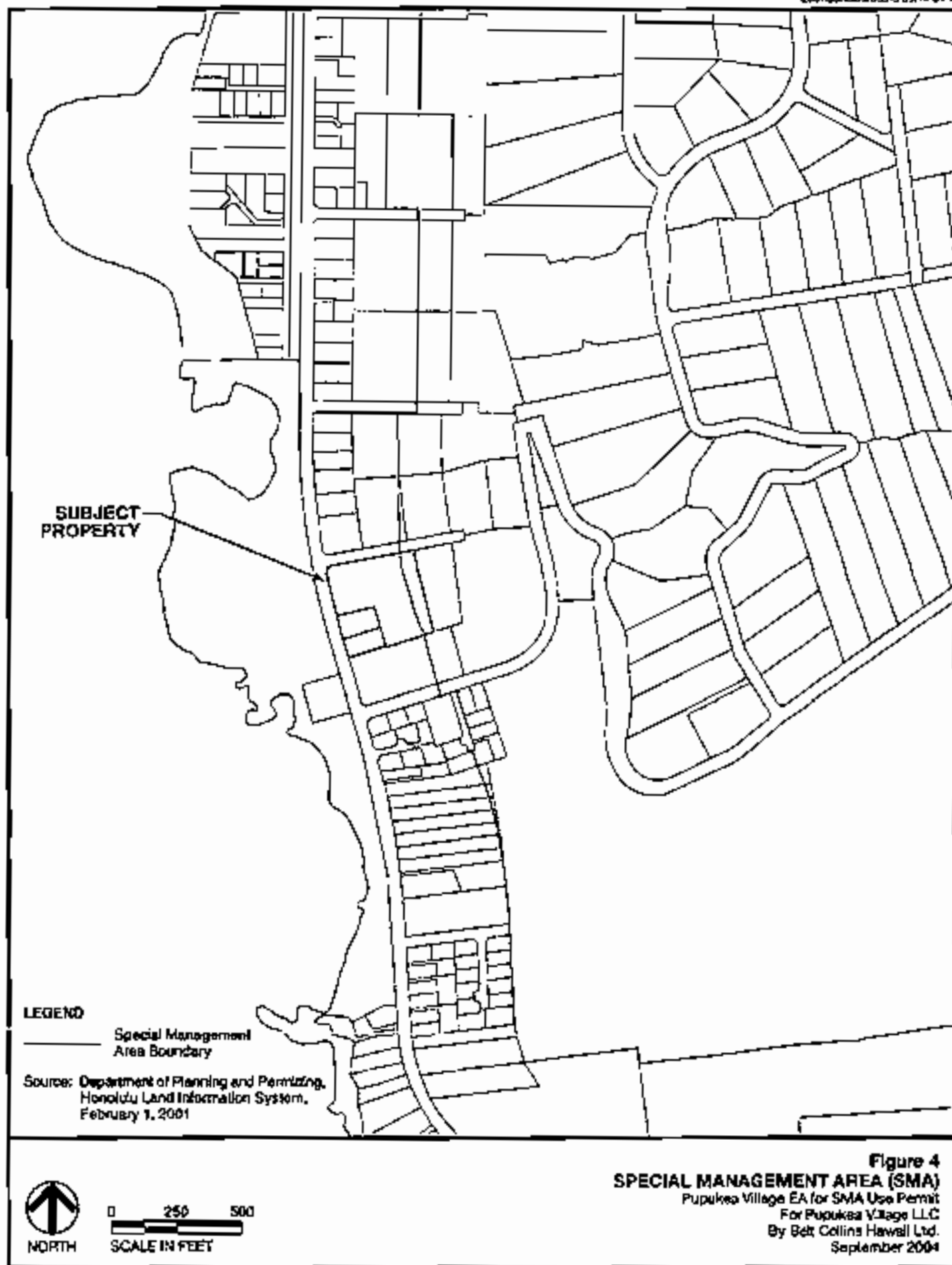
The project will include approximately 53 commercial establishments ranging in size from 444 SF to 5,500 SF of floor area. Tenant mix is expected to be retail, service, and food establishments. There may be a food court.

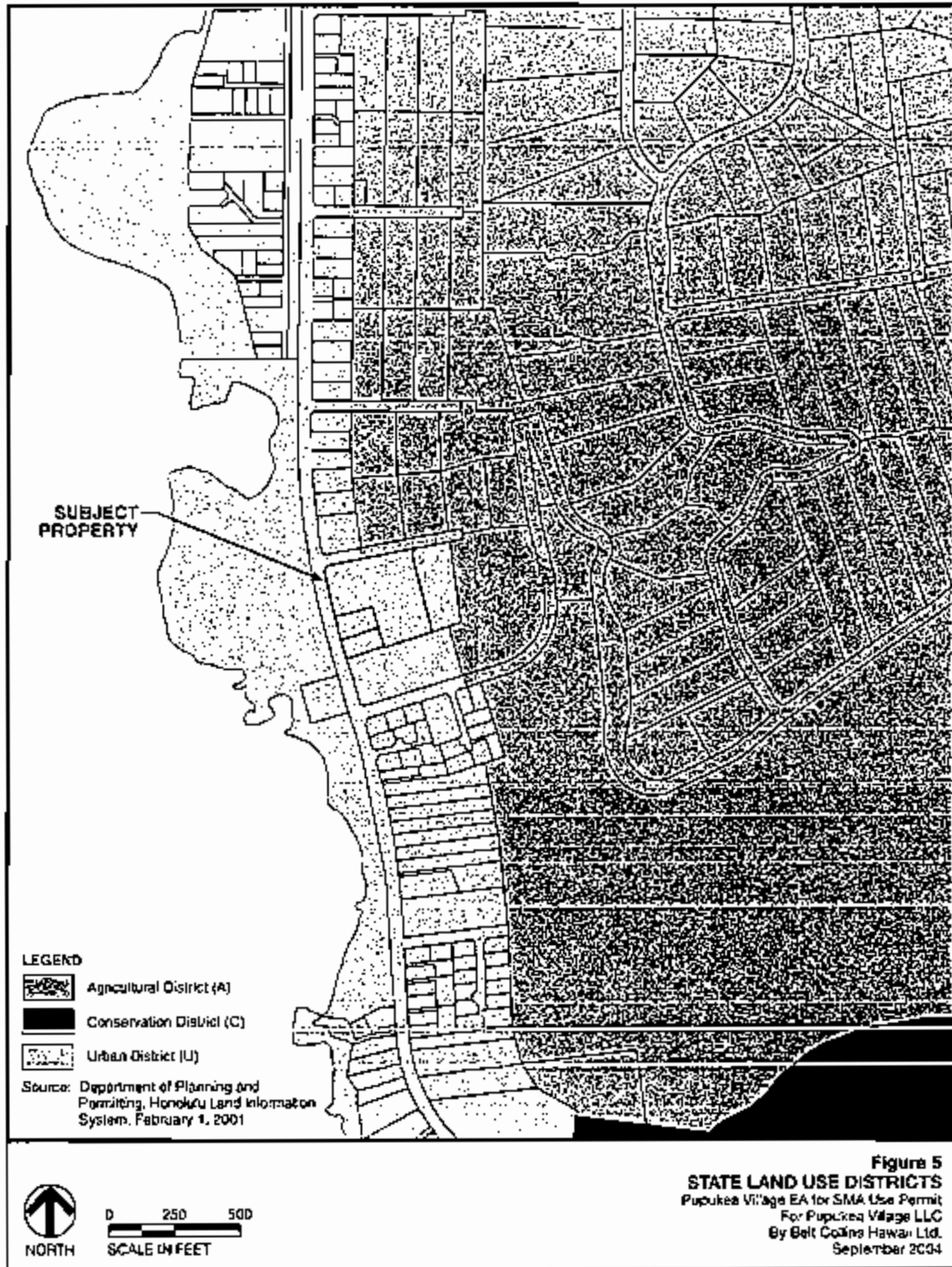
### **2.2.2 Physical Characteristics of the Project**

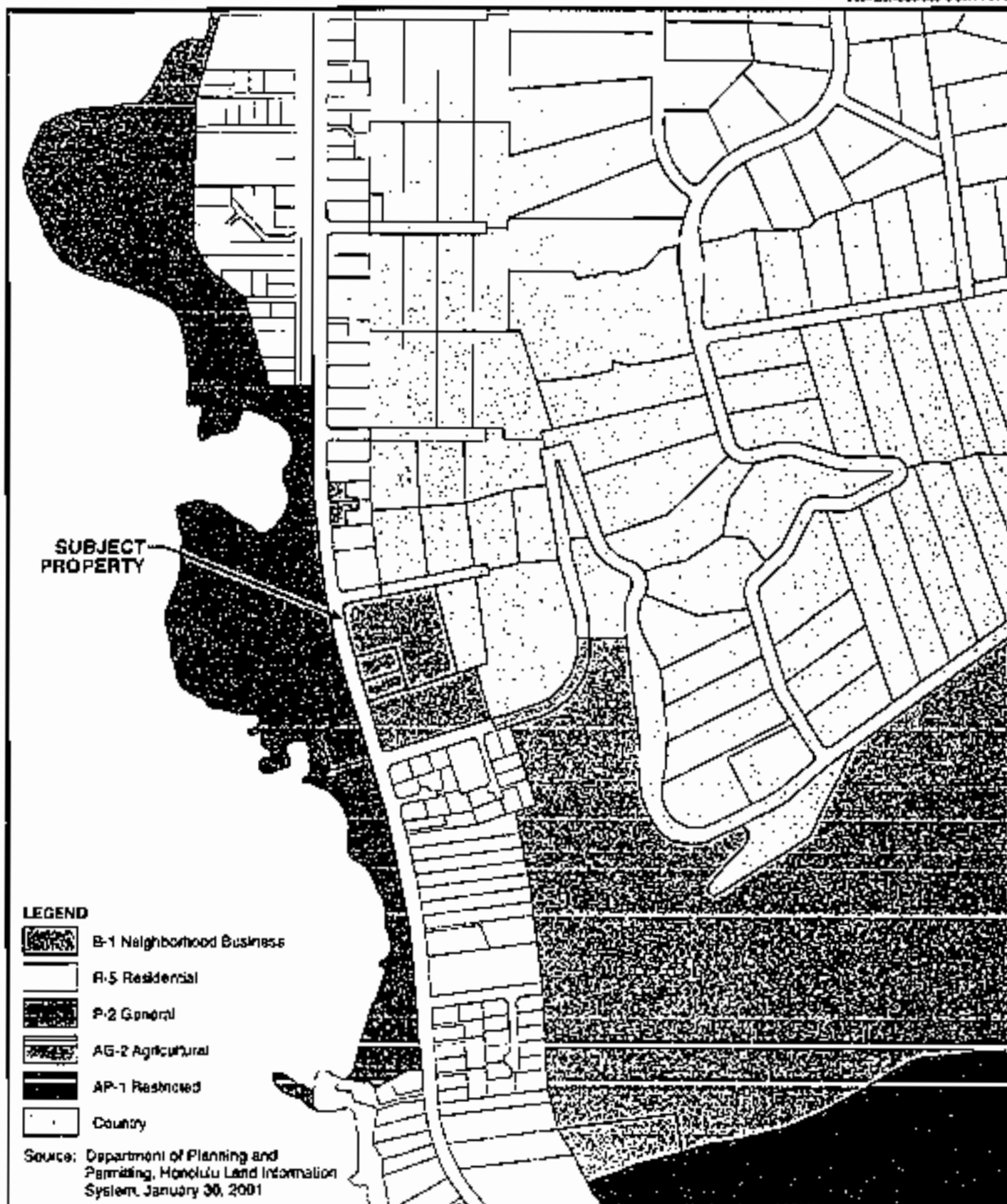
#### **2.2.2.1 Lot Characteristics**

Pupukea Village is proposed on a 2.7-acre rectangular shaped property, composed of three separate tax parcels that are part of the Lani-a-kea Farm Lots Tract. The property is approximately 360 feet in length along Kamehameha Highway and approximately 340 feet in depth. See Figure 7, Topographic Survey (1992).



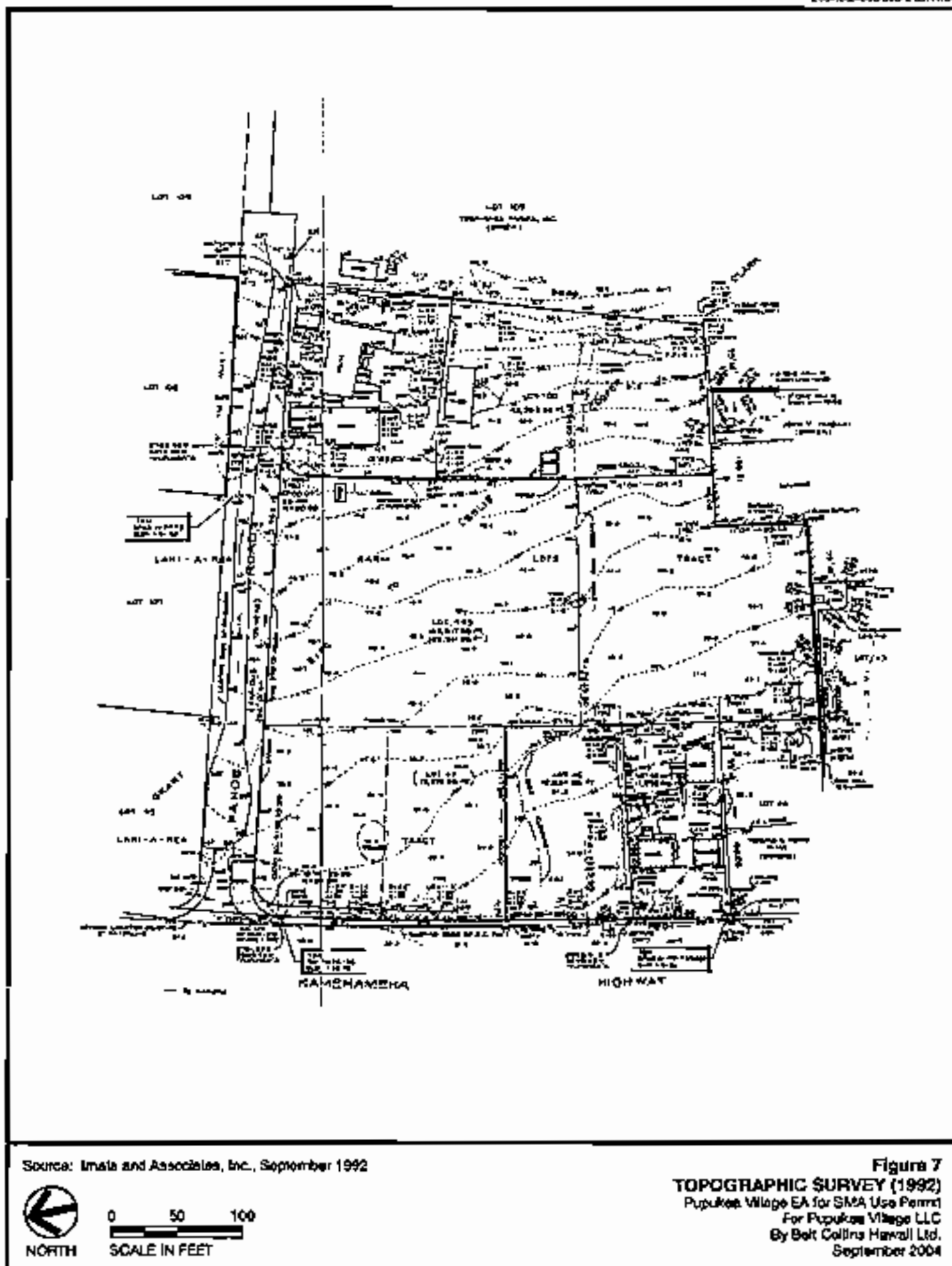






0 250 500  
SCALE IN FEET

**Figure 6**  
**ZONING DESIGNATIONS**  
Pupukea Village EA for SMA Use Permit  
For Pupukea Village LLC  
By Bell Collins Hawaii Ltd.  
September 2004



The property rises about 16 feet from the front property line to the rear property line. An old 1992 topographic survey map (Figure 7) shows the property frontage along Kamehameha Highway at approximately the 32-foot elevation mean sea level (msl) and rising to approximately the 48-foot elevation msl mauka at the rear of the property. The same map also shows the north property line about 4 feet higher than the south property line.

There are five buildings (two office, two retail, and one food establishment) along the Kamehameha Highway frontage. The remaining lot is unused and heavily vegetated.

#### **2.2.2.2 Grading**

The grading plan for the proposed project, as shown in Figure 8, shows most of the property excavated for a basement level parking area and the mauka portion of the main floor. A minor amount of fill for frontage along Kamehameha Highway to get to main floor from the highway will also be needed. The basement floor is approximately at the 27-foot elevation msl.

#### **2.2.2.3 Floor Plans**

Floor plans of the commercial buildings are shown in Figures 9 and 10. There are four one-story and two two-story buildings with a total gross floor area of 74,464 SF. (net floor area 58,979 SF). Buildings 1 and 6 are the two-story buildings.

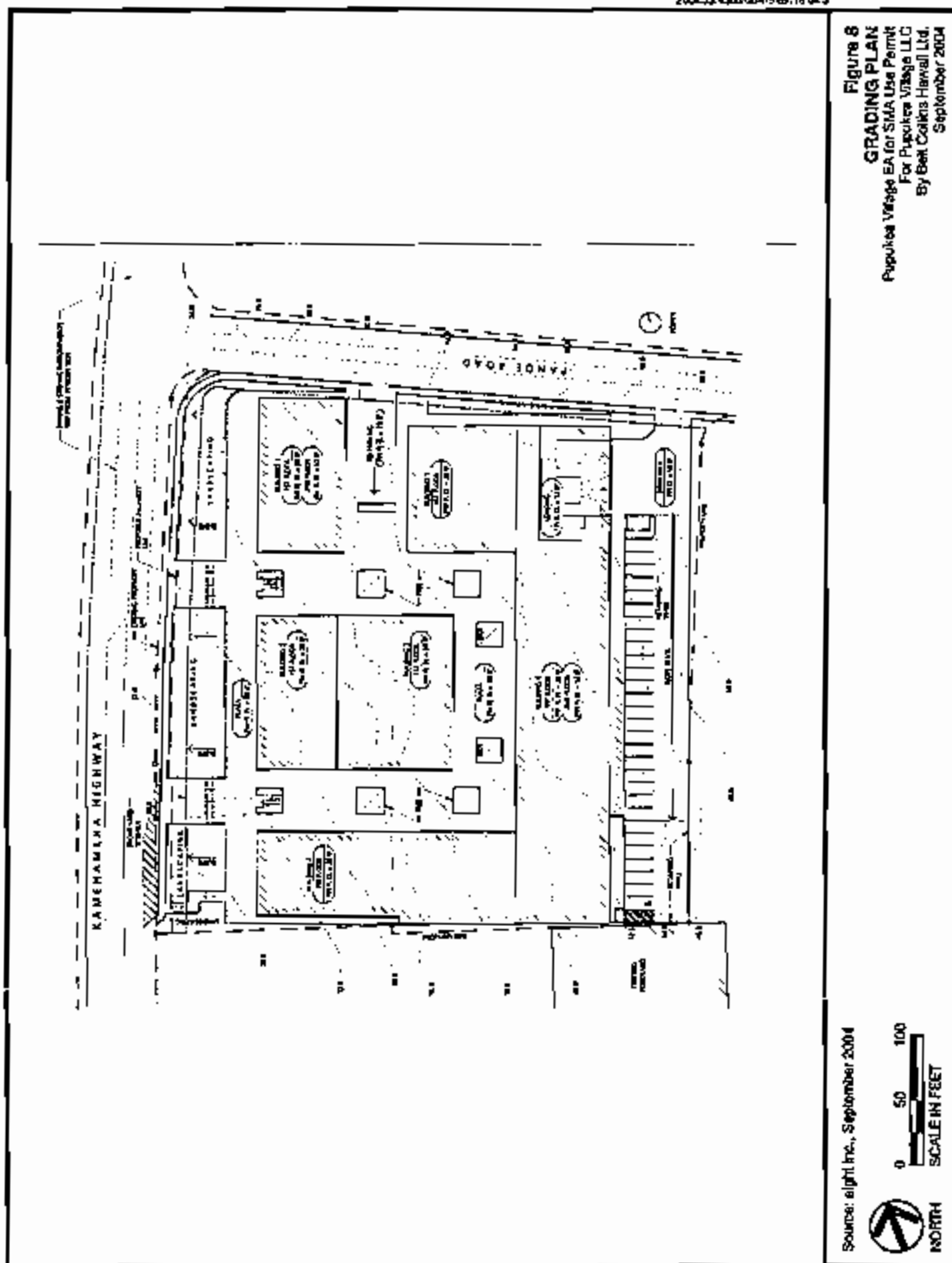
1st Building	11,000 SF (net)	
2nd Building	5,000 SF (net)	
3rd Building	7,462 SF (net)	
4th Building	8,152 SF (net)	
5th Building	3,848 SF (net)	
6th Building	23,797 SF (net)	
TOTAL	59,259 SF (net)	73,614 SF (gross)

In general, the first level will be retail and food establishments, the second level will be offices.

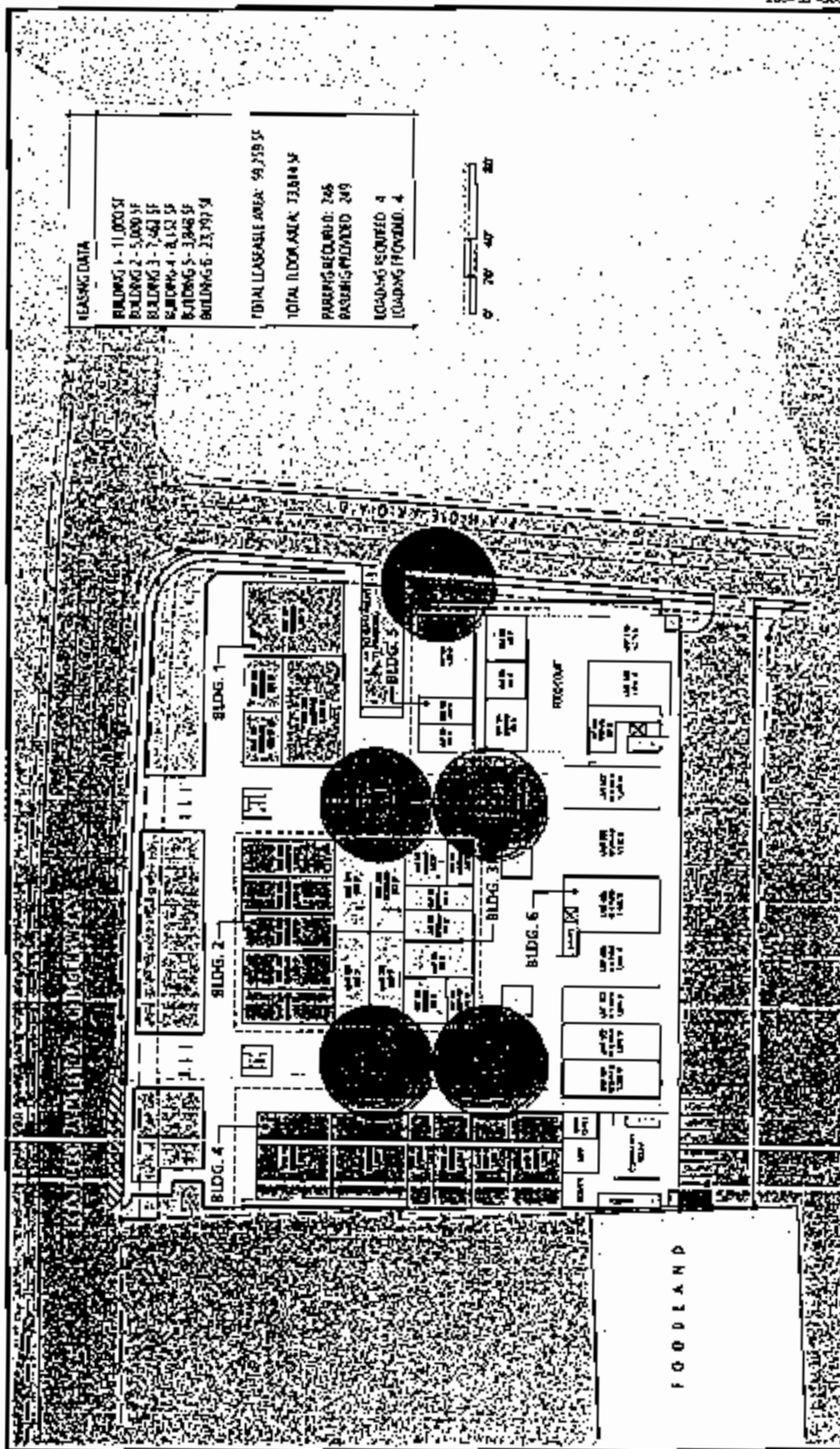
#### **2.2.2.4 Parking and Access**

##### **2.2.2.4.1 Parking**

The proposed design locates the parking spaces in a large basement parking area under the building complex and in a smaller parking area behind the building complex. There are 249 parking stalls, with 219 in the basement, and 30 on the mauka side of the site. There are seven handicapped stalls, six in the basement, and one on the mauka side of the site. Americans with Disabilities Act (ADA) access from the basement level is by elevator. Stairs also provide access in the development (see Figure 11).







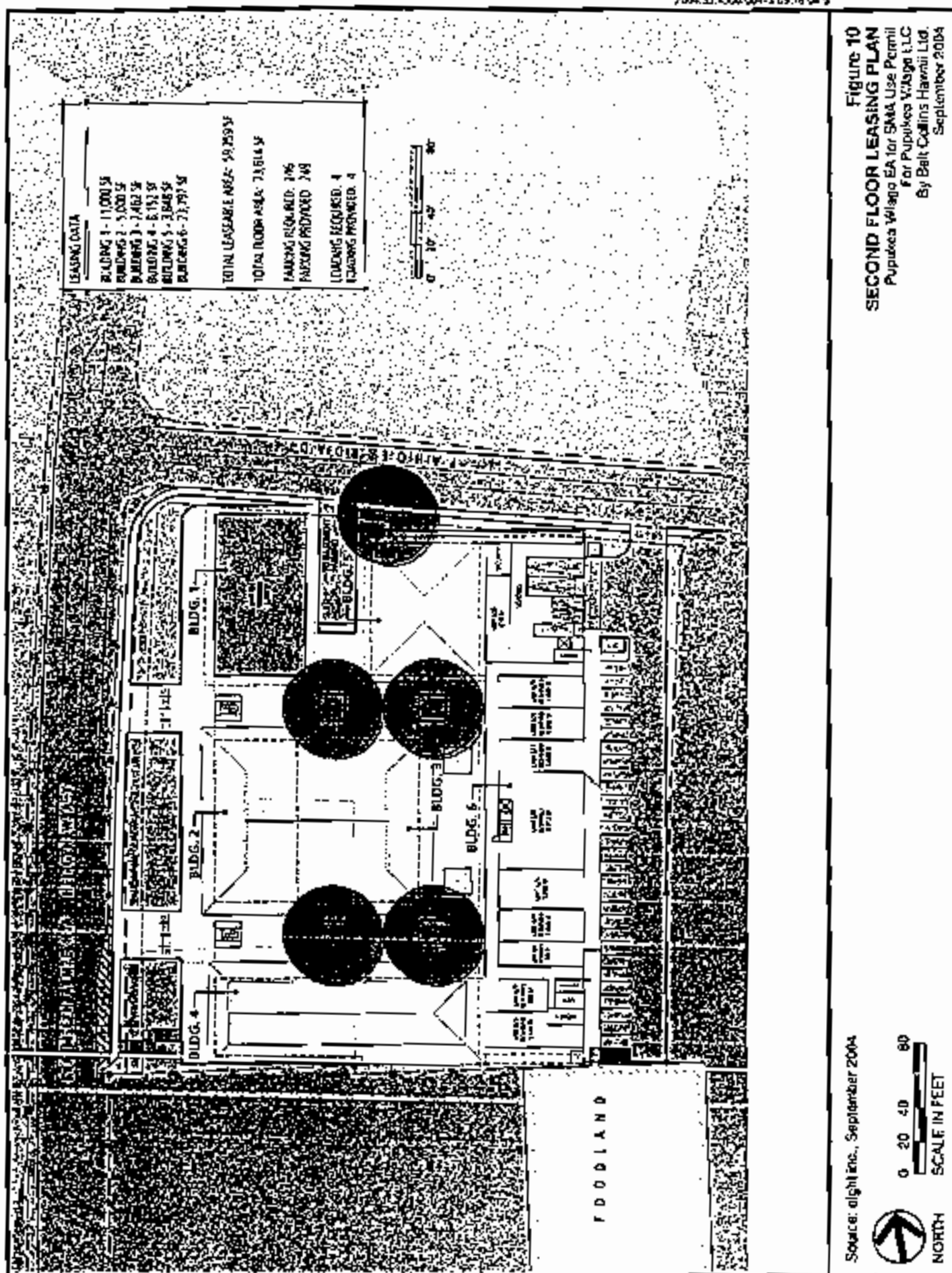
Source: eigh1 Inc., September 2004



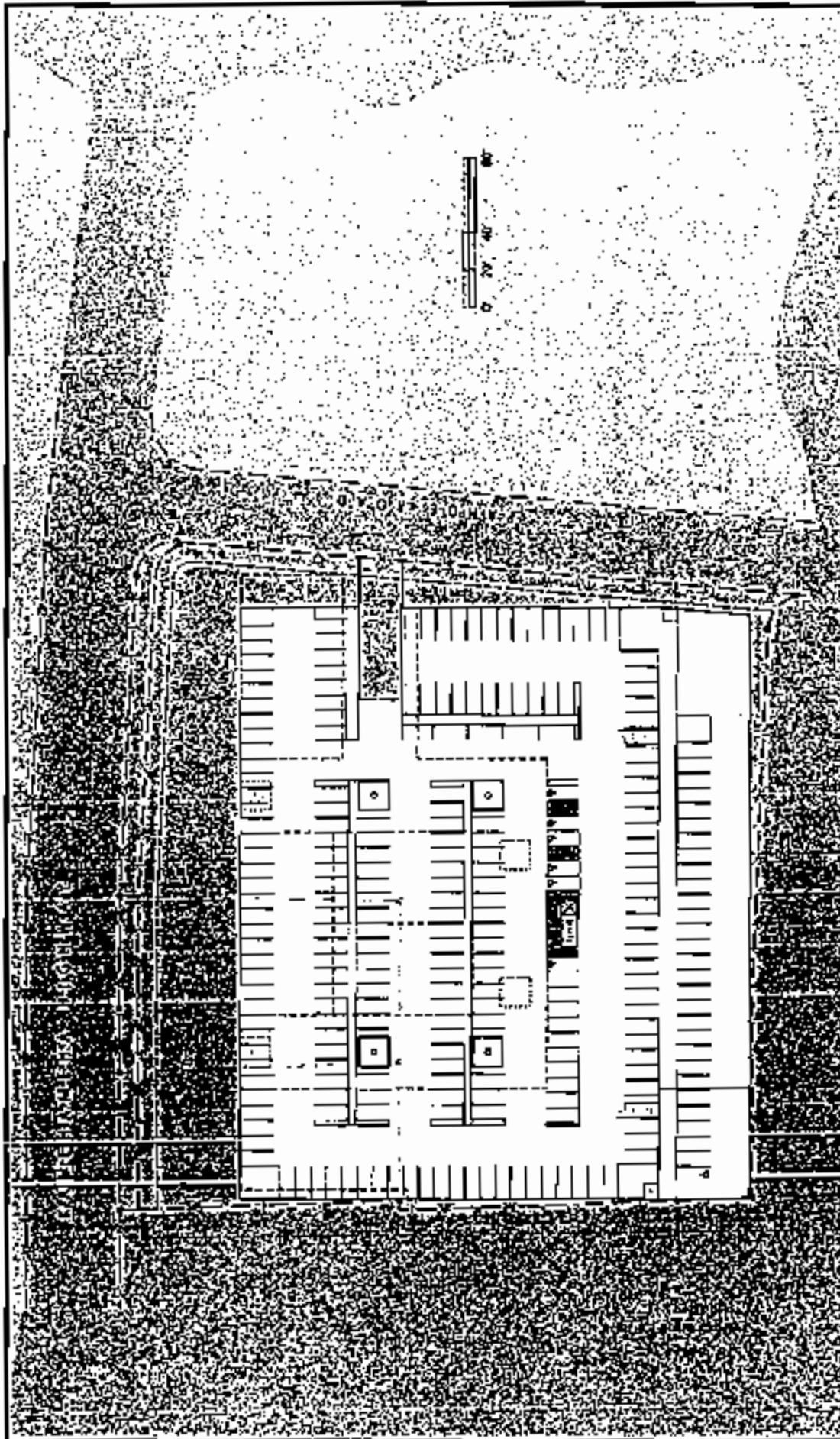
NORTH

0 20 40 80  
SCALE IN FEET

**Figure 9**  
**FIRST FLOOR LEASING PLAN**  
Euphoria Village EA for SMA Use Permit  
For Euphoria Village LLC  
By Belt Collins Hawaii Ltd.  
September 2004







Source: slight inc., September 2004



SCALE IN FEET



**Figure 11**  
**BASEMENT PARKING PLAN**  
 Pupukea Village EA for SMTA Use Permit  
 For Pupukea Village LLC  
 By B&B Collins Hawaii Ltd.  
 September 2004

#### **2.2.2.4.2 Access**

Access to the parking is via Pahoe Road, a private street, from Kamehameha Highway. Both Pahoe Road and Kamehameha Highway will require improvements to allow efficient flow of traffic. A left-turn lane from Pahoe Road onto Kamehameha Highway is proposed. A right-turn lane from Kamehameha Highway (Kahuku bound) onto Pahoe Road is proposed.

A commercial bus stop is proposed via a bus pullout on Kamehameha Highway. There are no plans to move the existing City and County of Honolulu bus stop from its present location at the adjacent Foodland property. Pedestrian access is proposed via a 4-foot-wide asphalt raised curb/sidewalk along Pahoe Road. The width of the sidewalk and the choice of material along Pahoe Road are intended to preserve a rural "feel" to the street design. Pedestrian access along Kamehameha Highway is provided via a 4-foot-wide concrete curb/sidewalk.

Road and traffic issues are discussed in a following section, Utilities Requirements.

#### **2.2.2.5 Building Height**

The maximum allowable height in a B-1 zoning district is 40 feet. Building sections are shown in Figures 12 and 13. The six buildings that form the commercial complex sit atop a platform that sets the first floor elevation at approximately 38-feet msl. Buildings 1 and 6, the two-story buildings, are about 24 feet high to the top of the wall plate and about 10 feet to the rooftop. Buildings 2 through 5 are one-story buildings and about 12 feet to the top of plate and about 11 to 15 feet to the rooftop.

#### **2.2.3 Construction Characteristics**

The existing low brush and vegetation on the property will be grubbed and cleared. The development has basement parking, and because of the silty-clay soil, some areas of the lot will be overexcavated. Existing single-story unit structures will be removed or demolished (pier supported structures likely moved/relocated offsite).

New structures will cover most of the site, so most of the grading will be the structural excavation, although there will be some fine grading of landscaping (small fill) along the edge/frontage of the development.

Monkeypod trees are proposed in interior planters. The perimeter of the project will be landscaped predominantly with low ground cover.

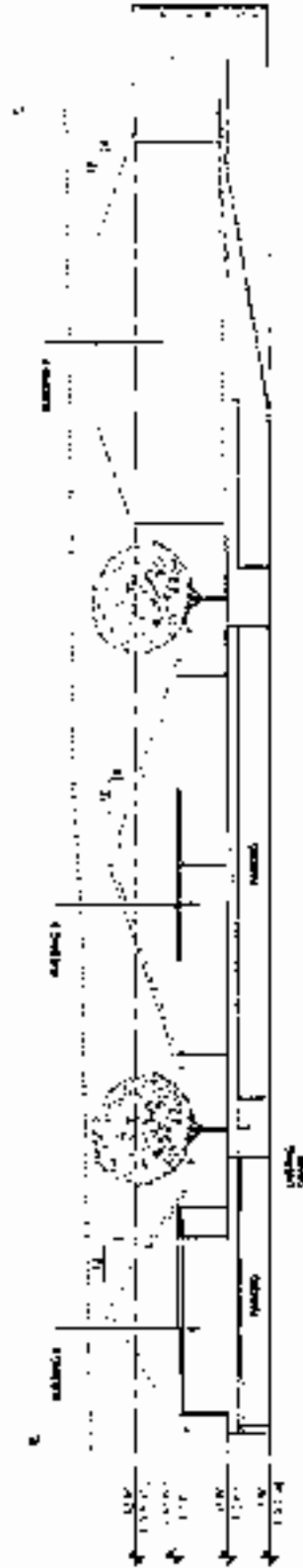
**Figure 12**  
**BUILDING SECTIONS**  
Pupukea Village EA for SIMA Use Permit  
For Pupukea Village LLC  
By Beil Collins Hawaii Ltd.  
September 2004

Source: eLight Inc., September 2004





SECTION KEY



Source: elight inc., September 2004

**Figure 13**  
**BUILDING ELEVATION**  
 Pupukea Village EA for SMA Use Permit  
 For Pupukea Village LLC  
 By Bell Collins Hawkei Ltd.  
 September 2004

0 25 50  
 SCALE IN FEET

## 2.2.4 Utility Requirements

### 2.2.4.1 Potable Water

#### 2.2.4.1.1 Existing

There is an 8-inch Board of Water Supply (BWS) water main in Kamehameha Highway fronting the three parcels and another 8-inch BWS water main in Pahoe Road. Two of the three parcels (S-9-011:17 and 34) have water service meters. There is no existing water service meter to parcel S-9-011:33.

The water mains to the site parcels are served by the Pupukea 170 Reservoir. Based on the average existing site elevation of approximately 40 feet msl, the average static pressure should be close to 56 Pounds per square inch (psi).

There is an existing fire hydrant at the corner of Pahoe Road and Kamehameha Highway, and another fire hydrant on Pahoe Road just past the end of parcel S-9-011:17.

#### 2.2.4.1.2 Proposed

No additional water mains in the roadways are proposed. The average daily water use for the project is estimated at 92,300 gallons per day (gpd).<sup>1</sup>

Fire service for the proposed structures will be by sprinkler system or dry standpipe. With the Pupukea 170 Reservoir in close proximity to the site, firefighting flow and pressure appears to be adequate, and the average daily and peak flow domestic demand pressures should also be adequate.

Domestic water lateral and meter size will be based on the fixture unit count for the proposed development. A separate fire lateral would be proposed if a sprinkler system is installed.

<sup>1</sup> Water demand: Based on the retail square footage of 32,349, and assuming an average visitor density of 5,000 customers per day, and one employee for every 500 SF, assuming each customer uses the restroom once, and each employee uses the restroom three times a day, and we assume 4 gpd per restroom use, the result is  $5,000 \times 4 \times (32,349 \text{ SF} / 500 \text{ SF}) \times 3 \times 4 = 20,800$  gpd for the retail space.

For restaurants, using the average of 15 SF per seat, we get 1,014 seats. Assuming these seats are filled on an average of two times at breakfast, two times at lunch, and two and a half times at dinner, we get 6,591 meals, and using 10 gallons per meal, we get 65,900 gpd. Also, assuming that one-third of the meals involve bar use, thus  $6,591 / 3 \times 2$  gallons per bar use = 4,400 gpd additional bar flow. Finally, there is 11,706 SF of office space, and if we assume 100 customers per day and 175 SF per office employee, we get 67 employees. If each employee uses the restroom three times a day, and we assume 4 gpd per restroom use, we get  $100 \times 4 \times 67 \times 3 \times 4 = 1,200$  gpd for the office space. Thus, the conservative average daily estimate of water use would be  $20,800 + 65,900 + 4,400 + 1,200 = 92,300$  gpd average daily water demand.

#### **2.2.4.2 Electricity and Telephone**

##### **2.2.4.2.1 Existing**

Existing overhead lines for power, telephone, and cable TV run along the makai side of Kamehameha Highway. Power and telephone lines also run along the north side of Pahoe Road.

##### **2.2.4.2.2 Proposed**

Electrical and telephone services would be provided by Hawaiian Electric Company (HECO) and Verizon, respectively.

It is anticipated that Pupukea Village will be served by HECO, Verizon, and Oceanic AOL Time Warner, via a duct line from a utility pole located on Kamehameha Highway. A HECO-owned pad mounted transformer would be located on-site, with an electric room within the facility, which will contain service equipment for telephone and cable TV. Based on preliminary per square foot estimates, a demand load of approximately 1,000 Kva is anticipated for this complex. During the design of the project, service request will be made and HECO transformer size will be confirmed.

The intersection of Kamehameha Highway and Pahoe Road will be improved. With the improvement, it is anticipated that roadway lighting will be upgraded in the vicinity of the intersection on Kamehameha Highway as well as Pahoe Road. Roadway lighting will be designed in accordance with DOT, Highways Division street lighting standards along Kamehameha Highway and in accordance with City and County of Honolulu, DTS, along Pahoe Road.

As part of the proposed project, the existing overhead lines may be placed underground along the shoulder of Kamehameha Highway.

#### **2.2.4.3 Gas**

##### **2.2.4.3.1 Existing**

There are no existing natural or propane gas lines in the vicinity of the development.

##### **2.2.4.3.2 Proposed**

An on-site propane gas tank is proposed for water heating and cooking at restaurants.

#### **2.2.4.4 Liquid Waste**

##### **2.2.4.4.1 Existing**

Two cesspools serve the existing structures.

#### 2.2.4.4.2 Proposed

A wastewater system will produce R-1 water, which is the highest quality water designated for recycling in the DOH *Guidelines for the Treatment and Use of Recycled Water* (May 15, 2002). R-1 water meets the following minimum requirements:

- Suspended solids – 30 milligrams per liter (mg/l)
- Biological Oxygen Demand, 5-day (BOD5) – 30 mg/l
- Turbidity – 2 nephelometric turbidity units (NTU)
- Fecal coliform – 2.2 per 100 milliliters (ml)

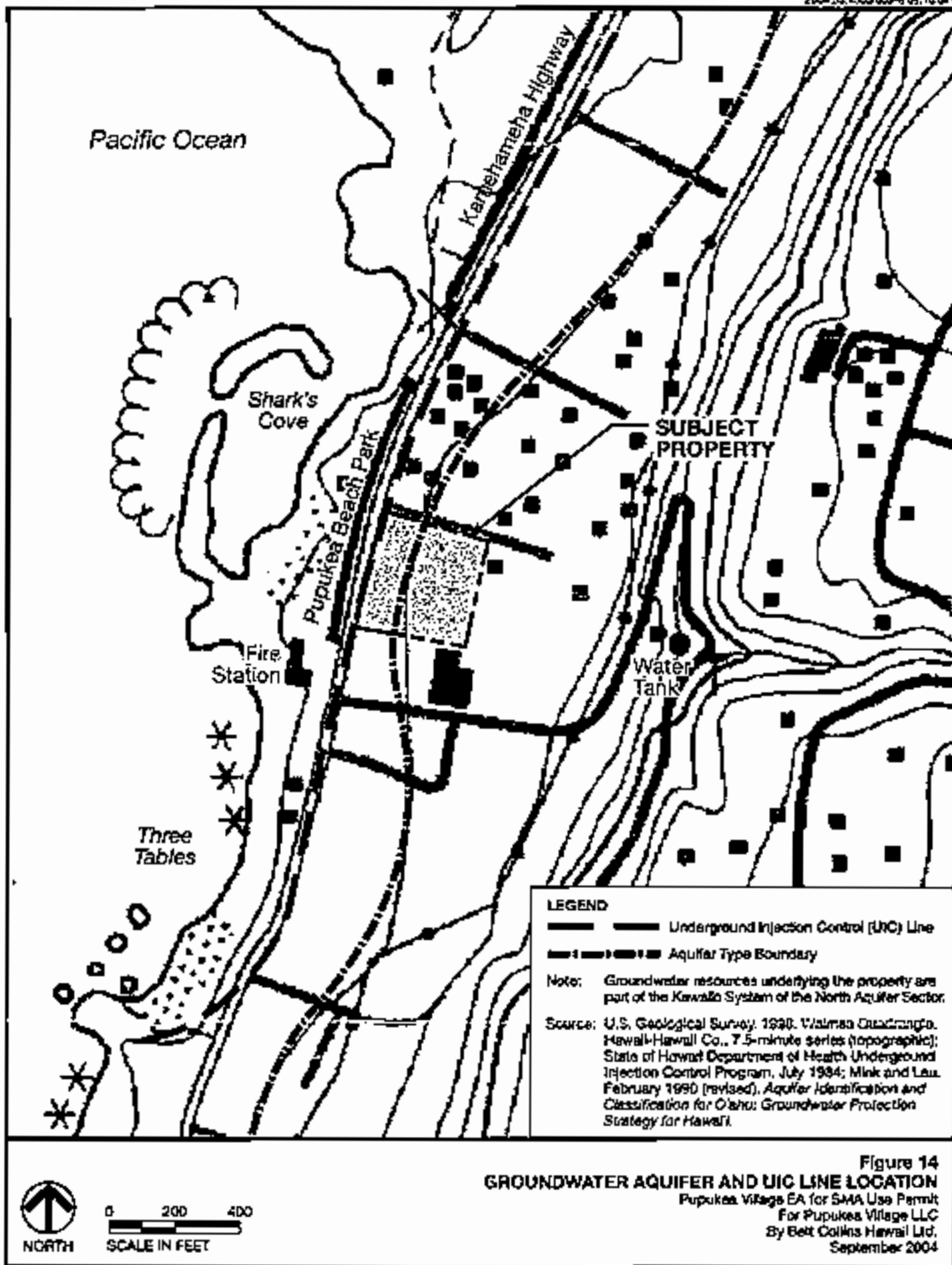
The R-1 water generated by the wastewater system will be used for toilet and unial flushing in the new structures, and for landscape irrigation. To prevent the runoff of recycled water from the site, best management practices will be used to prevent ponding or over spraying beyond the property boundary. Best management practices include the use of rain shutoff devices or soil moisture sensors to prevent over watering, matching irrigation application rates with plant water uptake rates, and proper design of spray patterns for the irrigation system.

Excess R-1 water will be disposed of in the existing cesspools, new injection wells, or both. Percolation testing at a nearby site indicated slow percolation rates (greater than 60 minutes per inch) to a depth of 15 feet. Well depths in excess of 15 feet may be needed for disposal.

The DOH underground injection control (UIC) line delineates areas mauka of the line where underground injection is restricted. Because the project site is located on a lot adjacent to the UIC line, and the UIC line is defined by a roadway, Hawaii Administrative Rules Chapter 11-23 (HAR 11-23), paragraph 5(c) allows interpretation of the UIC line to be at mauka property line of the adjacent lot, or 150 feet mauka from the UIC line, whichever is less. Given these circumstances, a UIC permit may be secured from DOH for the cesspools or injection wells so long as drinking water sources are protected (Figure 14). There are no water producing wells down gradient and near the property.

The R-1 wastewater treatment facility may include the following elements:

- Preloader to remove readily settleable and floatable material.
- Equalization basin for balancing flow to downstream treatment processes and to minimize the sizing of these units.
- Fine screens to remove material that may damage downstream treatment equipment.
- Membrane bioreactor (MBR) units that oxidizes and filters the wastewater.
- Disinfection by chlorination or ultraviolet (UV) irradiation as required by the UIC permit.
- Storage tank to hold treated water for recycling.





- Maintenance facilities to store chemicals used to clean the MBR units and for disinfection.

Anticipated wastewater effluent volume will approximate potable water consumption. Wastewater generated from kitchen facilities will be pretreated by grease interceptors before entering the wastewater system. On a regular basis, preloader contents, screenings and biosolids in the MBR units will need to be hauled off site to a municipal facility.

An advantage of a MBR plant over a conventional R-1 plant is the consistently high quality effluent produced. A conventional plant uses final clarifiers and media filters that are susceptible to solids breakthrough. Membranes used in a MBR plant provide a physical barrier to remove solids and prevent solids breakthrough.

Since April 2003, the University of Hawaii and Engineering Solutions, Inc. has been conducting a study to determine the performance of MBR equipment in treating various waste streams.<sup>2</sup> Equipment from the world's leading manufacturers of this technology is being used at the Honouliuli Wastewater Treatment Plant. During side-by-side operation to treat raw wastewater, all equipment met the following minimum effluent requirements (DOH requirements for R-1 water are in parenthesis):

- Suspended solids less than 2 mg/l (30 mg/l)
- BOD5 less than 3.5 mg/l (30 mg/l)
- Turbidity less than 0.1 NTU (2 NTU)
- Nitrogen less than 30 mg/l N (no requirement)
- Phosphorus less than 3.5 mg/l P (no requirement)
- Fecal coliform was 0 (2.2 per 100 ml)
- Coliphage virus was 0 (no requirement)

Although the pilot units for the study were not set up to maximize nitrogen removal, a MBR plant may be designed to produce effluent nitrogen concentrations less than 10 mg/L N.

#### **2.2.4.5 Solid Waste Disposal**

##### **2.2.4.5.1 Existing**

The City and County of Honolulu provides trash collection service to residences in the North Shore area and disposes the trash at HPOWER or Waimanalo Gulch Landfill. The food establishment, based on a trash bin in its parking area, appears to be using a private trash collection service.

<sup>2</sup> Email communication from Westley Chun, Engineering Solutions, to Beth Collins Hawaii, September 9, 2004

#### 2.2.4.5.2 Proposed

The volume of solid waste generated will depend on the businesses that locate within the project. The applicant estimates approximately 373 cubic yards per year, or an average of one three-cubic yard dumpster filled every three days.<sup>3</sup> A private collection service will be used. The project will have a least two 3-cubic yard trash bins in an enclosure on the mauka side of the project site.

#### 2.2.4.6 Access to Site

##### 2.2.4.6.1 Existing

Kamehameha Highway, State Highway 83, provides the north-south regional access to the subject property. The highway is a 50-foot right-of-way with two vehicle lanes, one in each direction. No parking is allowed along the highway.

Abutting the north side of the property is Pahoe Road, a private street with various owners, that serves one of the subject parcels (TMK 5-9-11:17) and several other residential and agricultural lots. The road is a 40-foot right-of-way with two vehicle lanes, one in each direction.

To the south of the property is Pupukea Road, a mauka-makai street, that provides access to the residential and agricultural lots on the plateau above the subject property. Pupukea Road is a signalized "T" intersection at Kamehameha Highway.

##### 2.2.4.6.2 Traffic Impact Analysis

A traffic impact study by Kaku Associates analyzed the intersections of Kamehameha Highway with Pupukea Road and Pahoe Road (Appendix B). The analysis was conducted during the morning peak hour (typically between 7 a.m. and 9 p.m.), afternoon peak hour (typically between 4:15 p.m. and 5:15 p.m.) and the Saturday midday peak (between 1:00 p.m. and 2:00 p.m.).

The traffic impact study noted an existing weekday daily traffic volume of 14,993 vehicles per day and a higher weekend (Saturday) daily traffic volumes of 16,997 vehicles per day. This higher weekend volume is projected to continue in future time periods.

<sup>3</sup> Solid waste: For the retail space (32,349 SF), the typical generation rate is 0.6 tons per employee per year, which is estimated to be  $(32,349/500) \times 0.6 = 39$  tons per year. For the restaurants, assume one pound/seat/day  $\times 1,014$  seats = 1,014 pounds/day = 185 tons per year. Thus the estimated total is 224 tons per year. Assuming a density of 1,200 lbs/cubic yard, the result is 373 cubic yards, or an average of one 3-yd dumpster filled every three days.

The traffic impact study projected daily traffic volumes in 2006 without the project and with the project. The traffic projection anticipates a general increase in 2006 without the project and a greater increase with the project, as shown below:

**Cumulative Average Daily Volumes on Kamehameha Highway: Existing, Year 2006 without Project, and Year 2006 with Project**

	Existing	Year 2006 Without Project	Year 2006 With Project
Weekday	14,993	16,342	17,827
Saturday	16,997	18,527	19,936

Source: Kaku Associates, August 2004

On Pahoe Road, the traffic impact study noted weekday and Saturday daily traffic volumes at 61 and 90, respectively. By comparison, Pupukea Road had volumes of 4,974 and 5,346, respectively. In 2006, the traffic impact study projects a nominal increase without the project and a large increase with the project as shown below:

**Cumulative Average Daily Volumes on Pahoe Road: Existing, Year 2006 without Project, and Year 2006 with Project**

	Existing	Year 2006 Without Project	Year 2006 With Project
Weekday	61	66	3,337
Saturday	90	98	3,200

Source: Kaku Associates, August 2004

The traffic in 2006 both with and without the project is not projected to greatly affect the Kamehameha Highway and Pupukea Road intersection. The project is not expected to change the Level of Service (LOS) at this intersection.

At the Kamehameha Highway and Pahoe Road intersection, the traffic impact study identifies no LOS without the project. With the project, the study found a reduction in LOS during the morning and Saturday peak hours. Based on their analysis, the report concluded "...no significant project impacts are anticipated."

As a result of the analysis, the traffic impact report recommended the following:

1. Widening of Pahoe Road;
2. Widening of Kamehameha Highway; and
3. Realignment of Kamehameha Highway.

These recommendations are reflected in the present design for the project. Refer to the traffic impact study (Appendix B) for more details of the traffic analysis, projections, and recommendations.

#### 2.2.4.6.3 Proposed

Based on the traffic analysis, roadway changes are proposed as part of this Project to ensure efficient flow of traffic along this project area.

1) Pahoe Road: Improve Pahoe Road by widening the pavement to accommodate the following road cross-section (from north to south):

Sidewalk and curb	4.5	feet
Outbound lane (right-turn)	11	feet
Outbound lane (left-turn)	10	feet
Inbound lane	14	feet
Sidewalk and curb	<u>4.5</u>	<u>feet</u>
Total width	44	feet

This improvement will require placing the sidewalk on the south side within a pedestrian easement on the subject property. Both sidewalk and curb will be constructed of asphalt to maintain the rural character of the area.

2) Kamehameha Highway: Several improvements are proposed on this highway.

a) Improve Kamehameha Highway along the property by providing additional turning lanes and a sidewalk along the Project frontage. The following cross-section (from west to east) is proposed:

Shoulder (along beach park)	6	feet
Southbound lane	12	feet
Acceleration lane	12	feet
Northbound lane	12	feet
Deceleration lane (right turn)	12	feet
Sidewalk (along project)	<u>4</u>	<u>feet</u>
Total width	58	feet

The acceleration lane would be for completing left turns out of Pahoe Road. The deceleration lane would be for vehicles turning right onto Pahoe Road and a portion of this lane will serve as a pullout for commercial buses. This improvement, as proposed, requires the highway right-of-way be widened an additional 8 feet. The sidewalk would likely be concrete to meet DOT standards, although the applicant would prefer to construct the sidewalk of asphalt to maintain the rural character of the area.

b) Realign Kamehameha Highway north of Pahoe Road by restriping the southbound lane so that it matches the proposed location of the southbound lane in front of the subject property.

The road improvements described in this section are proposals that may change after discussions with the appropriate regulatory agencies. The improvements described here are based on concepts proposed in the traffic study, however, some of the details (e.g. lane widths) differ because the traffic study was done early in the design process.

## **2.3 ECONOMIC AND SOCIAL CHARACTERISTICS**

### **2.3.1 Estimated Cost and Time Phasing of Construction**

The applicant hopes to secure needed permits and approvals by mid-2005. Construction would begin shortly thereafter and is expected to be completed by the Fall of 2006.

This project is estimated to cost approximately \$17,000,000.

### **2.3.2 Other Pertinent Information**

#### **2.3.2.1 Employment**

The proposed project will provide employment opportunities. Over the short-term period, existing businesses and associated employment will be displaced and construction related employment will be provided. Over the long-term period, the establishments in the project will provide employment and entrepreneurial opportunities at Pupukea.

## **2.4 ENVIRONMENTAL CHARACTERISTICS**

### **2.4.1 Soils**

The Property is located on the North Shore of the island of Oahu, on the plains of the Koolau Range (an eroded remnant of a shield volcano). (Macdonald, G.A. et al 1983) According to the United States Department of Agriculture's (USDA) soil survey of Oahu, two soils at the Property are designated as Waialua silty clay with three to eight percent slopes. Waialua silty clay is a moderately well-drained soil identified by a 12-inch-thick surface layer of reddish-brown silty clay loam over a subsoil of dark reddish-brown silty clay with block fragments. Permeability is moderate, runoff is slow, and the erosion hazard is classified as no more than slight. (USDA 1972)

### **2.4.2 Topography**

Regional topography generally slopes west, towards the coast, and the topography of the Property, while relatively flat, generally follows the regional east to west slope. The site elevation along the east property line ranges from approximately 46 to 50 feet msl. The site elevation along Kamehameha Highway (the west property line) ranges from approximately 30 to 34 feet msl. The Property elevation drops

approximately 16 feet from the eastern property line to the western property line along Kamehameha Highway. Based on the site topography it appears that surface drainage would sheet flow across the site from east to west and from north to south.

The property is at the base of the plateau situated between Kalunawaikaala Stream/Gulch and Kalahopele Stream. Pupukea Road provides access to that mauka Paumahu Plateau. Directly upland of the property is Hakuola Gulch, a minor drainageway that is diverted by a ditch along the mauka side of Pupukea Road.

## **2.4.3 Surface Runoff, Drainage, and Erosion Hazard**

### **2.4.3.1 Existing**

The Property lies below Hakuola Gulch and Pupukea Road as it snakes up the hillside. There is an existing drainage system that consists of 36-inch concrete pipe, a 3 ft by 2 ft box culvert, and open ditches on both sides of Pupukea Road to handle storm flow from Hakuola Gulch; the gulch is normally dry. The estimated 100-year storm flow is 910 cubic feet per second (cfs) based on a previous environmental assessment for the Pupukea Road Relief Drain, Unit II.<sup>4</sup> The upgraded system that was proposed in the environmental assessment consisted of 66-inch, 71-inch, and 84-inch drainage pipelines and a 5 ft by 8 ft box culvert. Therefore, while the existing Pupukea Road drainage system may be able to handle short-term frequency storm flows of between 5-year (yr) to 10-yr and shorter frequencies, larger storms of longer frequencies will overwhelm the existing drainage system and potentially impact the site.

The soil of the existing site, according to the Soil Survey prepared by the Soil Conservation Service (1976), is primarily Wailua silty clay, which has a moderate to severe erosion hazard.

The Property slopes and drains toward the southeast (Haleiwa-makai) corner of the Property. A short wall along the Foodland parcel prevents runoff water from crossing the Foodland boundary. An area of about 4.3 acres mauka of the site, between Pupukea Road and the mauka site boundary drains into the site. Existing 10-yr, 1-hour (hr), on-site peak runoff flow is estimated to be 4.9 cfs, and existing 10-yr, 1-hr, off-site peak runoff flow is estimated to be 5.2 cfs. Storm water drains to Kamehameha Highway, where it would be picked up by the drainage system on the highway fronting Foodland. It is estimated that these flows plus the Foodland peak flow overwhelm the existing drainage system during a 10-yr, 1-hr storm.

### **2.4.3.2 Proposed**

On-site development will theoretically raise the on-site 10-yr, 1-hr, peak runoff flow from 4.9 cfs to 14.6 cfs. It is not desirable to add this additional peak flow, above 4.9 cfs, to the existing Kamehameha Highway drainage system, unless this drainage system is improved.

<sup>4</sup> Prepared by Ben Collins Hawaii, December 20, 1979, for City and County of Honolulu, Department of Public Works.

The desired alternative is to add storage tanks to the site to ensure that the proposed peak flow matches the existing peak flow. This reduction of peak flow would require an 87,000-gallon storage tank located near the Haleiwa-makai corner of the site. An overflow from the tank would allow flows in excess of the 10-yr, 1-hr storm flow, and a pump would be used to drain the tank. The pump discharge would be through a pipe running along Kamehameha Highway and connected to the existing drainage system in Kamehameha Highway.

The off-site 10-yr, 1-hr peak runoff flow of 5.2 cfs would be conveyed to Kamehameha Highway through the site; this is allowed since it is an existing flow. The runoff would be conveyed via a drainage inlet in the Haleiwa-mauka corner of the mauka parking area, and an 18 inch concrete pipe along the Foodland boundary to the lower corner. This pipe would be connected to the proposed storage tank to allow flow through the storage tank.

Another less desirable alternative to disposing the additional on-site flow is to provide a new drainage pipe from the site to the existing headwall makai of the Sunset Beach Fire Station. This pipe would be concrete, ranging in diameter from 18-inches at the beginning to 24-inches at the outlet, and would run from the site, parallel to Kamehameha Highway, cross the highway perpendicularly, and through the City park between the tennis courts and the fire station. There is not enough capacity in the existing 18-inch pipe adjacent to the Sunset Beach Fire Station to be able to connect to this existing pipe.

In either case of a storage tank system or a directly piped system, downspouts would be connected with piping directly to the on-site drainage system, and there would be strategically placed on-site drain inlets connected to the on-site drain system. The basement sump should not be connected to the on-site drainage system because of potential pollutants (e.g., oil and grease); it should be connected to the wastewater system.

#### **2.4.4 Federal FIRM Zone, Land Use Ordinance (LUO) Flood Hazard District, Other Geological Hazards**

The property is located within the Zone X of the Flood Insurance Rate Map (FIRM) that is defined as, "Areas determined to be outside the 500-year floodplain" (Federal Emergency Management Agency November 20, 2000).

### **3 AFFECTED ENVIRONMENT**

#### **3.1 DESCRIPTION OF SUBJECT SITE IN RELATION TO SURROUNDING AREA**

##### **3.1.1 Relation to Surrounding Area**

The majority of the Property is undeveloped and heavily vegetated. The portion of the Property along Kamehameha Highway is occupied by a dental office, a real estate office, a food establishment and four single-story retail structures.

The adjoining properties include a range of uses. Pahoe Road, a private road off Kamehameha Highway, adjoins the Property along the northern boundary; residential structures are located on the parcels immediately north of the road. Residential parcels are located adjacent to the east of the Property, and a supermarket (Foodland) with a parking lot is located adjacent to the south of the Property. The adjoining parcel across Kamehameha Highway to the west contains Pupukea Beach Park with associated parking, paved court and comfort station. The beach park overlooks Shark's Cove, an ocean recreation and resource area, which is within the Pupukea Marine Life Conservation District (MLCD).

##### **3.1.2 General Plan and Development Plan Land Use Designations**

###### **3.1.2.1 General Plan**

The General Plan is a document design to attain the desired future for the Island of Oahu. The General Plan Development Pattern map shows the proposed project within the Rural areas of the North Shore. The proposed project appeared to be supportive of the following objectives and policies:

###### **VII. Physical Development and Urban Design**

**Objective A:** To coordinate change in the physical environment of Oahu to ensure that all new developments are timely, well-designed, and appropriate for the areas in which they will be located.

**Policy 7:** Locate new industries and new commercial areas so that they will be well related to their markets and suppliers, and to residential areas and transportation facilities.

**Discussion:** The proposed project, located near the intersection of Pupukea Road and Kamehameha Highway, seems poised to serve the needs of the Pupukea community, as well as the regional North Shore community.

**Objective D:** To maintain those development characteristics in the urban-fringe and rural areas which make them desirable places to live.



Policy 4: Maintain rural areas as areas which are intended to provide environments supportive of lifestyle choices which are dependent on the availability of land suitable for small to moderate size agricultural pursuits, a relatively open and scenic setting, and/or a small town, country atmosphere consisting of communities which are small in size, very low density and low rise in character, and may contain a mixture of uses.

Discussion: The proposed project has been designed to fit into the small town, country atmosphere by many of the design features incorporated into the proposal. For instance, maintaining a relative low building height, hiding the parking underground, the architectural styles used, and through small touches, such as the proposed asphalt walkways and curbs.

### **3.1.2.2 Development Plan Land Use Designations**

The property is designated as a Rural Community Commercial Center in the North Shore Sustainable Communities Plan (July 2004). The plan states, "The area between Foodland Supermarket and the adjacent commercially zoned properties between Pupukea Road and Pahoa Road is designated as a Rural Community Commercial Center." According to the plan, "These commercial establishments may include grocery stores, sundries stores, or other services and shops catering to residents and visitors to the region."

### **3.1.3 Land Use Ordinance Designation**

The subject property is designated B-1, Neighborhood Business, that allows for a range of retail and commercial uses.

## **3.2 PROJECT SITE IN RELATION TO PUBLIC PLACES AND NATURAL RESOURCES**

### **3.2.1 Beaches, Parks and Recreation Areas**

The Pupukea Beach Park, a City and County of Honolulu facility, is located across Kamehameha Highway from the Property. The park includes paved volleyball and basketball courts, parking and grassed area fronting the Pupukea Beach area. The Pupukea MLCD and popular swimming and snorkeling areas, Three Tables and Shark's Cove, are located adjacent to the beach park.

Other beach parks, Waimea Beach and Sunset Beach, are located south and north of the property, respectively.

### **3.2.2 Rare, Threatened, or Endangered Species and Their Habitat**

#### **3.2.2.1 Fauna**

An avifaunal and feral mammal field survey was conducted on the larger parcel, TMK 5-9-11:17, that is mostly unused and heavily vegetated. The survey observed no native birds, seabirds or migratory shorebirds and found no habitat of importance to these species. 12 species of alien (introduced) birds and a species of mongoose were observed. For more details, the survey report is attached as Appendix C (Avifaunal and Feral Mammal Field Survey of TMK 5-9-11:17 Pupukea, Oahu).

The survey report noted the possibility of cats, rats, or mice as likely inhabitants of the area. The survey report also noted that the native endangered Hawaiian Hoary Bat occurs at a higher elevation and may forage and roost in the lower coastal areas. The development, according to the survey report, may "alter the relative abundance of some alien birds in the immediate area."

#### **3.2.2.2 Flora**

A botanical field survey of the larger parcel, TMK 5-9-11:17, found the property to be covered by alien (introduced) species of plants, such as dense koa haole thickets, Guinea grass, Christmas berry, and ivy gourd. No native species, threatened and endangered species, or species of concern were observed on the parcel. The report, attached herein as Appendix D, concluded that "...the proposed development of the site is not expected to have a significant negative impact on the botanical resources."<sup>5</sup>

### **3.2.3 Wildlife and Wildlife Preserves**

No wildlife preserves are affected by this project. Refer to the previous section for a description of the fauna survey of the subject property.

### **3.2.4 Wetlands, Lagoons, Tidal Lands and Submerged Lands**

Neither the fauna nor flora survey identified any wetlands on the subject property.

The subject property does not abut the shoreline, but the Pupukea MLCD is located across the highway from the property. Refer to the following Section for a discussion of the MLCD.

<sup>5</sup> Char and Associates, August 4, 2004, Letter Report to Bell Co. Inc. Hawaii Ltd, Subject TMK 5-9-11:17.

### **3.2.5 Fisheries and Fishing Grounds**

#### **3.2.5.1 Pupukea Marine Life Conservation District**

The coastal area west of the subject property is part of the Pupukea MLCD that was established in 1983 to protect its marine resources and to manage the marine related activities there (HAR 13-34).

The MLCD includes the submerged lands and overlying waters from Kulalua Point on the northern side of Sunset Beach to Wananapaoa Islets on the southern side of Waimca Bay (Figure 15). The MLCD includes the popular recreational areas of Waimca Bay, Three Tables and Shark's Cove. Figure 14 shows the location of the subject property in relation to this MLCD.

The State Department of Land and Natural Resources manages fishing and gathering activities through its Division of Aquatic Resources (DAR) and recreational use seaward of the shoreline through its Division of Outdoor Boating and Recreation.

The State DAR manages the fishing and gathering activities within the MLCD. In 2000, DAR updated the Pupukea MLCD rules on permitted fishing and gathering activities within the MLCD at Waimca Bay. One of the early meetings of the task force involved in updating the Pupukea MLCD rules identified the following issues: "...unenforceable regulations leading to overfishing, overuse by SCUBA diving tours, trash buildup, not enough parking, storm runoff, and general overuse of the area."

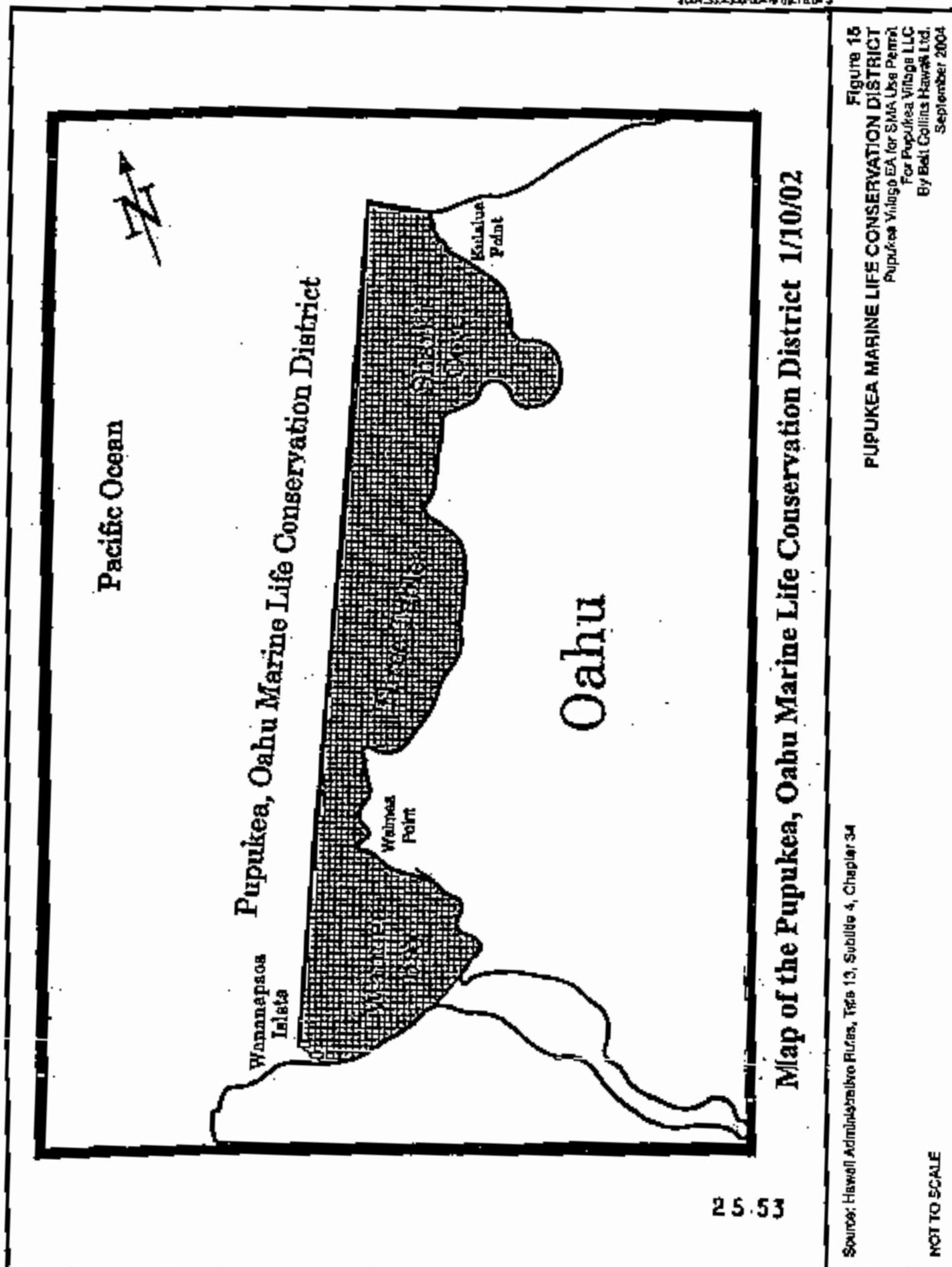
### **3.3 PROJECT SITE IN RELATION TO HISTORIC, CULTURAL, AND ARCHAEOLOGICAL RESOURCES**

#### **3.3.1 Archaeological Resources**

An archaeological assessment of the property was conducted by Pacific Legacy, Inc. The assessment report observed no cultural deposit on the Property due in part to the extensive farming that has occurred on this Property that is part of the Lani-a-kea Farm Lots. The assessment report did not recommend an archaeological inventory survey for the Property. See Appendix E.

#### **3.3.2 Cultural Resources**

The archaeological report by Pacific Legacy, Inc. concludes with a finding of no cultural deposits on the property. The report, in an earlier discussion on settlement patterns, speculates that "The current project area would have been an ideal location for habitation considering it is in close proximity to water sources in Waimea combined with its wealth of marine resources..." The property, however, has been



Source: Hawaii Administrative Rules, Title 13, Subtitle 4, Chapter 34

NOT TO SCALE

Figure 13  
**PUPUKEA MARINE LIFE CONSERVATION DISTRICT**  
 Pupukea Village EA for SMA Use Permit  
 For Pupukea Village LLC  
 By Belt Collins Hawaii Ltd.  
 September 2004

extensively farmed in the past as part of Lani-a-kea Farm Lots Tract. A cultural impact assessment was not conducted because, although the property is vacant and overgrown, it is in fact a disturbed urban property, which is confirmed by the flora and archaeological studies.

The archaeological report notes the following known sites in the project's vicinity that were recorded in an islandwide survey by J. Gilbert McAllister of the Bishop Museum, in the 1930s:

- Site 245, Fishing Shrine, is located on a bluff (Palipilo) at Waimea Bay.
- Site 248, Kuhale Heiau, a small heiau, is located on the north side of the Waimea River.
- Site 249, Puu o Mahuka Heiau, is located on Pupukea ridge overlooking Waimea River, with a view to Kaaena Point. This heiau is on both the National and Hawaii Register of Historic Places. This site, about a half mile south of the Property, is described in more detail in the Archaeological Assessment (Appendix E).

Along the shoreline to the north of the project area is Kulalua Point. This area has stones known as Pele's Followers (Clark 1977).

### **3.4 COASTAL VIEWS FROM SURROUNDING PUBLIC VIEWPOINTS AND FROM THE NEAREST COASTAL HIGHWAY ACROSS THE SITE TO THE OCEAN OR TO COASTAL LANDFORM**

#### **3.4.1 Coastal Views from Kamehameha Highway**

The property is located on the mauka side of Kamehameha Highway and, therefore, does not obstruct coastal views of Pupukea Beach coastline. See Plate 1.

#### **3.4.2 Coastal Views from Pupukea Road**

Pupukea Road winds up above the property at about elevation 160 feet msl or about 110 ft above the subject property. The road looks back across the property to the coastline. Due to the elevation difference, coastal views from Pupukea Road should not be obstructed. See Plate 2.

#### **3.4.3 Mauka Views from Kamehameha Highway**

Although the SMA focuses on coastal views, the North Shore Sustainable Communities Plan does identify the mauka views from Kamehameha Highway to the plateaus as an open space resource. The plateau is visible from the property through the existing parking area as one travels along Kamehameha Highway. See Plate 3.

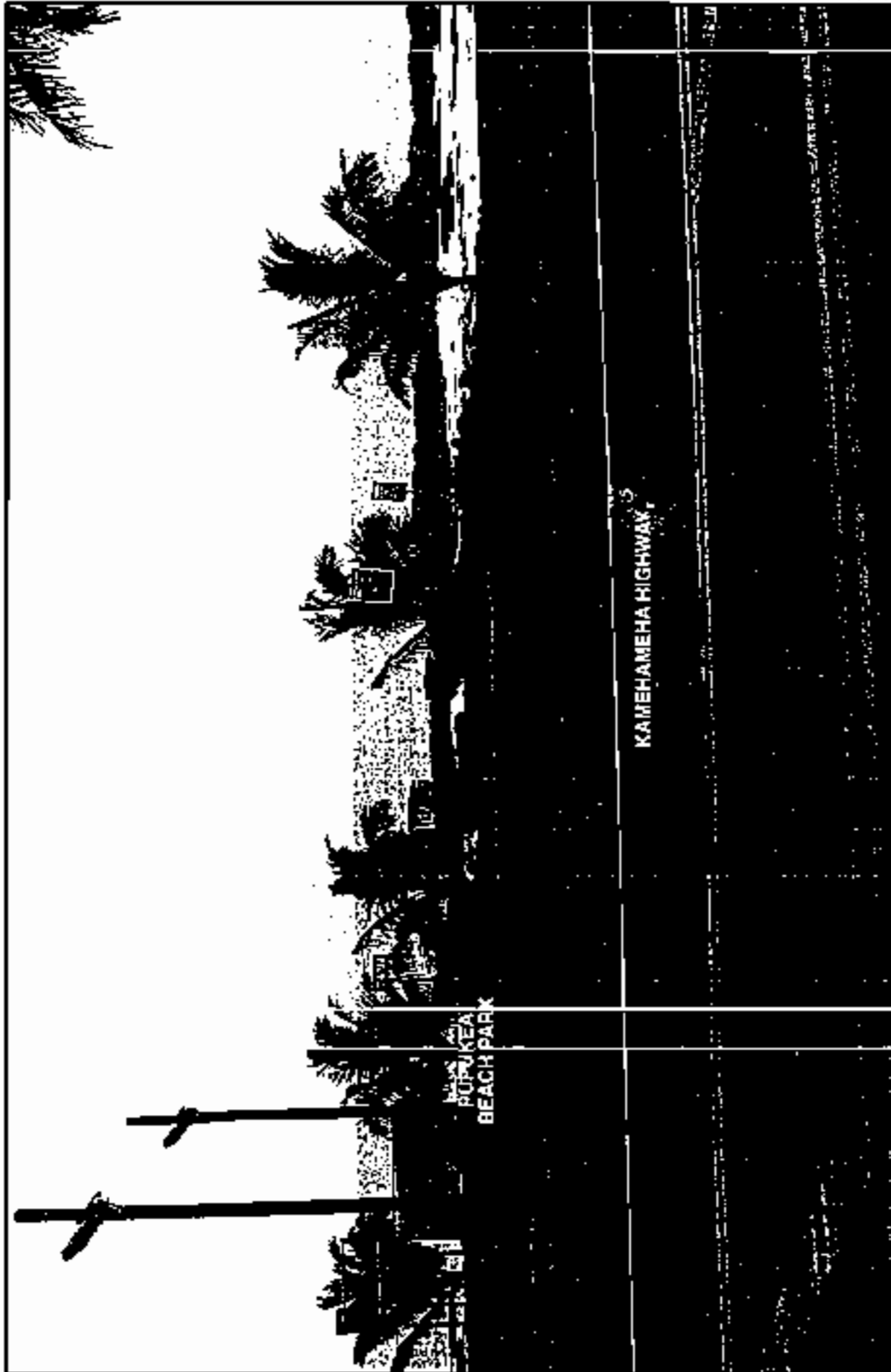


Plate 1  
MAKAI VIEW FROM SUBJECT PROPERTY  
Pupukea Village For SMA Use Permit  
For Pupukea Village LLC  
By BDI Collins Hawaii, Ltd.  
September 2004

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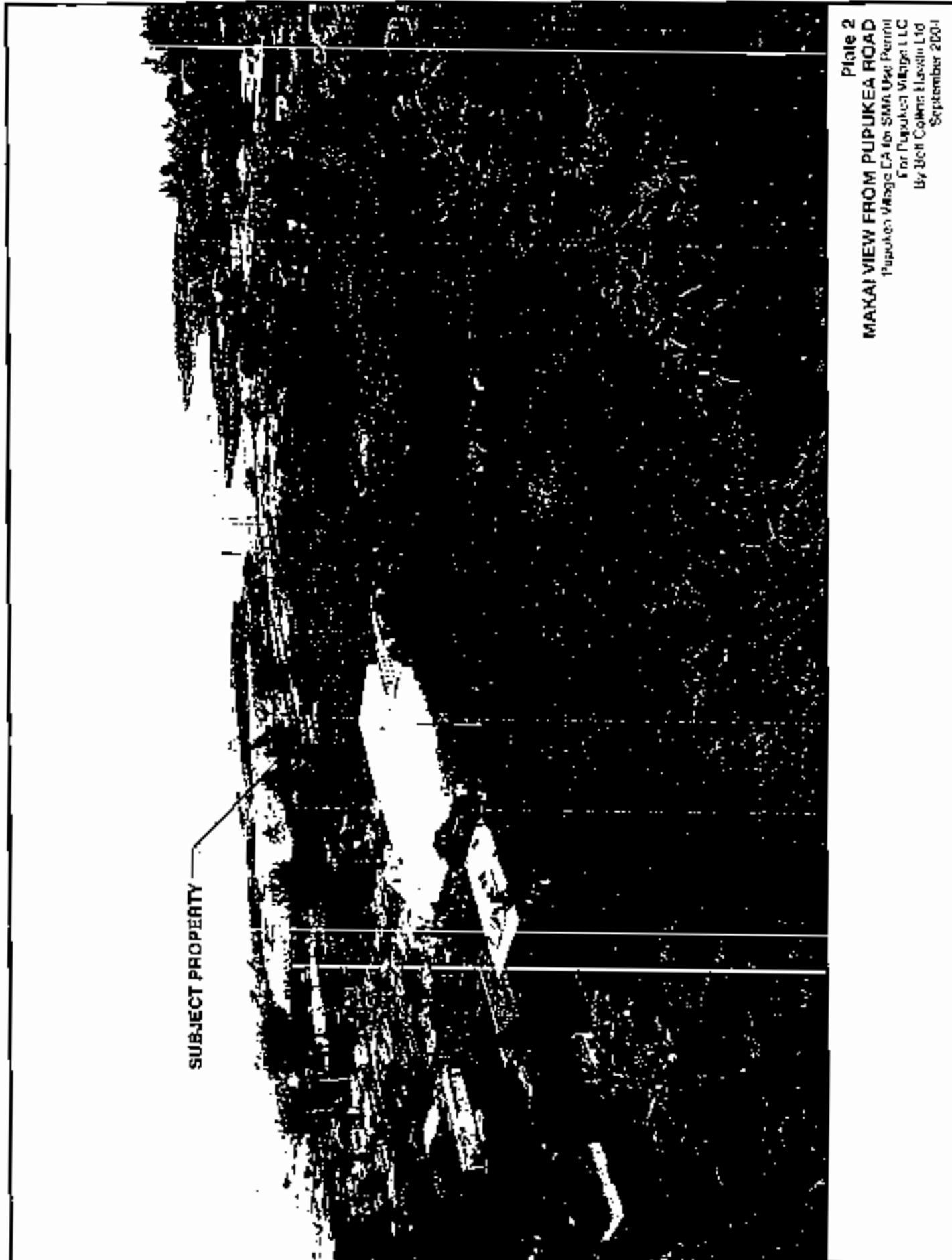


Plate 2  
MAKAI VIEW FROM PUPUKEA ROAD  
Pupukea Village EA for SMA Use Permit  
For Pupukea Village LLC  
By Brett Collins Hawaii Ltd  
September 2004

2004.11.13 13:00:00.1 27 14 04 2



1. At Pahoe Road



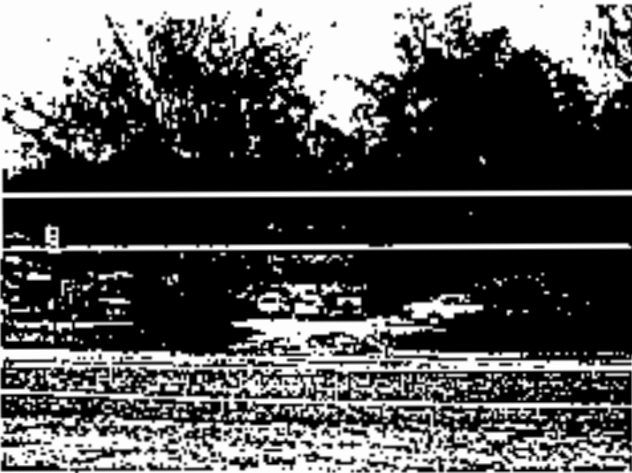
2. Retail building nearest Pahoe Road



3. Second retail building



4. Eating establishment



5. Parking between restaurant and offices



6. Real estate office and dentistry office

Plate 3  
MAUKA VIEW OF PARCEL ALONG KAMEHAMEHA HIGHWAY  
Pupukea Village EA for SMA Use Permit  
For Pupukea Village LLC  
By Bell Collins Hawaii Ltd.  
September 2004



### **3.5 QUALITY OF RECEIVING WATERS AND GROUNDWATER (INCLUDING POTABLE WATER) RESOURCES**

#### **3.5.1 Groundwater Resources**

The groundwater resources beneath the Property belong to the Kawaihoa aquifer system of the North aquifer sector. The Property is located at the boundary of multiple aquifer types within this system. The majority of the Property is located over an aquifer type characterized as basal (fresh water in contact with seawater) and unconfined (water table is the upper surface of the saturated aquifer), and occurs in flank deposits (horizontally extensive lavas). The aquifer is fresh (less than 250 milligrams per liter chloride [mg/l Cl-]) and irreplaceable, with a high vulnerability to contamination. It is currently used as a drinking water aquifer.

The makai portion of the Property appears to be located over an aquifer type characterized as an unconfined sedimentary caprock aquifer resting on a confined aquifer (bounded by impermeable or poorly permeable formations where the top of the saturated aquifer is below groundwater surface) that occurs in flank deposits (Figure 14). Both the upper and lower aquifers are identified as ecologically important, but are not drinking water sources. The upper aquifer has low salinity (250 to 1,000 mg/l Cl-), while the lower aquifer is moderately saline (1,000 to 5,000 mg/l Cl-). Both are irreplaceable, and the upper aquifer has a high vulnerability to contamination while the lower aquifer's vulnerability is low (Mink and Lau 1990).

Depth to groundwater at the Property is estimated to be approximately 40 ft below ground surface (bgs), based on the site elevation above sea level. The direction of groundwater flow beneath the Property is not definitively known. Characterization would require subsurface exploration, installation of groundwater monitoring wells, and surveys of groundwater elevations. In the Hawaiian Islands, groundwater is generally assumed to flow downgradient and toward the ocean (in this case, toward the western or makai side of the Property). However, localized flow direction in the vicinity of the Property may vary from this pattern as a result of tidal influence.

The Property is located just mauka of the State of Hawaii DOH-established UIC line (Figure 14). The UIC program was established to protect the quality of underground sources of drinking water from pollution by subsurface disposal of fluids (HAR 11-23). The UIC line is generally the boundary between non-drinking water aquifers (generally makai of the UIC line) and underground sources of drinking water (generally mauka of the UIC line). Review of the UIC map indicates that there are no drinking water wells on the Property or adjoining properties. The nearest drinking water well is located approximately 1.2 miles northeast of the Property, which is generally upgradient from the site.

There are no actively used supply or injection wells on or adjacent to the Property. The State of Hawaii Commission of Water Resource Management Well Index Database lists an unused well on Parcel 17 (State of Hawaii Commission on Water Resource Management July 12, 2001).

### 3.5.2 Receiving Waters

The coastal waters east of the property, within the Pupukea MLCD, are classified as Class AA marine waters. The Pacific Ocean beyond the MLCD is classified as Class A marine waters. The Pupukea MLCD encompasses waters within an area defined as 100 ft offshore at Kulalua Point to the Wananapaoa Islets at the southern side of Waimea Bay (Figure 15). Class AA marine waters are to remain in their natural pristine condition with an absolute minimum of pollution or alteration from human-caused sources or action (HAR 11-54-3[c][1]). Class A marine waters are to be protected for recreational purposes and aesthetic enjoyment. Other uses are permitted as long as they are compatible with protection and propagation of marine biota and with recreation (HAR 11-54-3[c][2]).

An Individual NPDES Permit is required for any storm water and other discharges to Class AA waters. This permit requires that best management practices be developed to reduce pollutant discharge to state waters, and water quality monitoring is also required for some activities (e.g., discharge of construction dewatering effluent). In addition, Hawaii's antidegradation policy does not allow the lowering of water quality in waters of better quality than state standards (HAR 11-54-1.1).

The DOH conducts weekly water quality monitoring for Enterococcus, an indicator bacteria, and other water quality parameters in Waimea Bay, which is approximately 1,600 ft southwest of the Property. Water quality data collected at the shoreline of Waimea Bay during the period June 9, 2004 to August 30, 2004 provide the following baseline information:<sup>6</sup>

Parameter	High	Low
Enterococcus (colonies/100 ml)	66	0.3
Turbidity (NTU)	27.3	24.4
pH (standard units)	8.3	8.03
Dissolve Oxygen (mg/L)	6.14 (112.9%)	4.78 (64.5%)
Temperature (°C)	27.3	24.4
Salinity (parts per [pp] thousand)	35.1	30.24

<sup>6</sup> E-mail communication, September 9, 2004, from Mr. Terence Tanaya, DOH, to Jane Dewell, Belt Collins Hawaii.

The time of sampling was between 7:10 a.m. and 9:07 a.m., and weather conditions varied from periods of no wind or rain, to overcast, to light winds with rains. The *Enterococcus* values fell below the water quality standard limitation of a geometric mean of 200 colonies per 100 ml (HAR 11-54-8[b]). Values for pH were within the water quality standards range of 7.6 to 8.6 (HAR 11-54-6). Values for turbidity exceeded the water quality standards for embayments and open coastal waters (standards are based upon mean values, which were not provided; HAR 11-54-6).

## 4 PROJECT IMPACTS

The following is a discussion of the project impacts relative to the Coastal Zone Management (CZM) Objectives and Policies (Section 205A-2, HRS), and the SMA Guidelines (Section 25-3.2, Revised Ordinances of Honolulu [ROH]).

### 4.1 COASTAL ZONE MANAGEMENT OBJECTIVES AND POLICIES (SECTION 205A-2, HRS)

(a) The objectives and policies in this section shall apply to all parts of this chapter.

(b) Objectives.

(1) Recreational resources;

(A) Provide coastal recreational opportunities accessible to the public.

**Discussion:** The property does not abut the shoreline.

(2) Historic resources;

(A) 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.

**Discussion:** An archaeological assessment of the property found no cultural deposits and did not recommend an archaeological inventory.

(3) Scenic and open space resources;

(A) Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources.

**Discussion:** The proposed project will develop currently unused, vegetated property. The project will provide attractively landscaped areas along the street frontages.

(4) Coastal ecosystem;

(A) Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.

**Discussion:** Construction of the project will temporarily increase the risk of sediment in storm water runoff. The project will be constructed using

accepted best management practices to minimize potential impacts from soil erosion and other pollutants in runoff.

Storm water runoff volume from the developed site will increase due to increased building coverage and paved area. This increased runoff volume may be controlled through diversion to landscaped areas. Excess storm water runoff will flow into an existing storm water drainage system, or into new piping that connects to existing storm water drainage system. Pollutants in storm water will be reduced by reducing erosion potential at the site (i.e., coverage by buildings, paving, and landscape), and by locating most parking underground.

Wastewater treatment on-site will be handled via a wastewater system that produces R-1 water. R-1 water will be reused on-site in the toilets and for landscape irrigation. Control systems to avoid excess irrigation will be in place to reduce the potential for runoff from the site. Excess R-1 wastewater will be disposed in existing cesspools or into an injection well on the property. An injection well would require a UIC permit or a variance, depending on interpretation of location of the UIC line.

The Pupukea MLCD could potentially receive storm water runoff from the property. This runoff could result in a temporary influx of fresh water to the nearshore; potential for pollutants, such as soil and automotive fluids, should be reduced due to controls on the Property (e.g., erosion control, location of parking).

(5) Economic use;

- (A) Provide public or private facilities and improvements important to the State's economy in suitable locations.

**Discussion:** The retail and commercial establishments within the proposed project will provide long-term employment opportunities. Over the short-term, the project will provide construction related employment opportunities.

(6) Coastal hazard;

- (A) Reduce hazard to life and property from tsunamis, storm waves, stream flooding, erosion, subsidence, and pollution.

**Discussion:** The property is designated as being in Zone X of the Flood Insurance Rate Maps (FIRM), which is outside of the 500-year floodplain. The property is not within the tsunami inundation area or adjacent to the shoreline. See discussion under "Coastal Ecosystem" regarding erosion and pollution.

(7) Managing development;

- (A) Improve the development review process, communication, and public participation in the management of coastal resources and hazards.

**Discussion:** This property has been designated for commercial use on the North Shore Sustainable Communities Plan that involved public participation. The processing of the SMA use permit application associated with this Environmental Assessment will allow further public participation.

(8) Public participation;

- (A) Stimulate public awareness, education, and participation in coastal management.

**Discussion:** See the previous response.

(9) Beach protection;

- (A) Protect beaches for public use and recreation.

**Discussion:** This property does not abut the shoreline.

(10) Marine resources;

- (A) Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

**Discussion:** This property does not abut the shoreline.

(c) Policies.

(1) Recreational resources;

- (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 uses 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, and county authorities; and crediting such dedication against the requirements of section 46-6.

**Discussion:** Generally, not applicable since the property does not abut the shoreline. See discussion under "Coastal Ecosystem."

(2) Historic resources;

- (A) Identify and analyze significant archaeological 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.

**Discussion:** An archaeological assessment of the property observed no cultural deposits and recommended no archaeological inventory was needed. The study did not include a cultural impact analysis.

(3) Scenic and open space resources;

- (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 by and along the shoreline;

- (C) Preserve, maintain, and where desirable, improve and restore shoreline open space and scenic resources; and
- (D) Encourage those developments that are not coastal dependent to locate in inland areas.

**Discussion:** The project, while located within the SMA, is situated on the mauka side of Kamehameha Highway and, thereby, minimizes its impacts on coastal resources. The mauka location, however, will partially obscure mauka views of the "...Koolau Mountains and Pali..." that have been identified in the North Shore Sustainable Community Plan as an open space. See Plate 3.

- (4) Coastal ecosystems;
  - (A) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;
  - (B) Improve the technical basis for natural resource management;
  - (C) Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;
  - (D) 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
  - (E) Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.

**Discussion:** See discussion under "Coastal Ecosystem."

- (5) Economic uses;
  - (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 industry 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 use for developments and permit reasonably 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.

**Discussion:** The proposed project will provide commercial goods and services to the residents and visitors to the area. The project is not located on the shoreline and is therefore in conformance with the economic objective (A).

(6) Coastal hazards;

- (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 source pollution hazards;
- (C) Ensure that developments comply with requirements of the Federal Flood Insurance Program; and
- (D) Prevent coastal flooding from inland projects.

**Discussion:** The property is within Zone X of the Federal FIRM, outside of the 500-year floodplain. There are no residences or living quarters associated with this development. See discussion under "Coastal Ecosystems" regarding point and nonpoint source pollution.

(7) Managing development;

- (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 or overlapping or 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.

**Discussion:** This proposed project is consistent with the North Shore Sustainable Communities Plan and the LUO. Designation of this property for neighborhood business use was preceded by extensive public planning and review process.

(8) Public participation;

- (A) Promote public involvement in coastal zone management processes;
- (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 issues, developments, and government activities; and
- (C) Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.

**Discussion:** See previous discussion.

(9) Beach protection;

- (A) Locate new structures inland from the shoreline setback to conserve open space, 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.

**Discussion:** The property, as stated previously, is not located on the beach.

(10) Marine resources;

- (A) Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;
- (B) Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency;

- (C) 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;
- (D) 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
- (E) Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

**Discussion:** Not applicable. The property is not located on the shoreline.

#### **4.2 PROJECT IMPACTS RELATIVE TO THE SPECIAL MANAGEMENT AREA GUIDELINES (SECTION 25-3.2, ROH)**

Identify impacts of the project relative to Management Area guidelines (Section 25-3.2, ROH)

##### **Sec. 25-3.2 Review Guidelines**

The following guidelines shall be used by the council or its designated agency for the review of developments proposed in the special management area.

- (a) All development in the special management area shall be subject to reasonable terms and conditions set by the council to ensure that:
  - (1) Adequate access, by dedication or other means, to publicly owned or used beaches, recreation areas and natural reserves is provided to the extent consistent with sound conservation principles;

**Discussion:** The proposed project is located across the highway from the Pupukea Beach Park. The proposed project is not located on the beach and will not block access to the beach.

- (2) Adequate and properly located public recreation areas and wildlife preserves are reserved;

**Discussion:** Not applicable. The subject property is not identified as a public recreation area in the North Shore Sustainable Communities Plan and does not include any wildlife preserves.

- (3) Provisions are made for solid and liquid waste treatment, disposition and management which will minimize adverse effects upon special management area resources; and

**Discussion:** As discussed in the previous section (Coastal Ecosystem), an onsite wastewater system will be constructed and operated to treat and dispose of liquid waste. The R-1 wastewater effluent may be reused in toilets or irrigating landscape. Safeguards to prevent runoff will include irrigation controls to avoid overwatering. Excess R-1 wastewater will be disposed in existing cesspools or an injection well developed on-site. The injection well will require a UIC permit or variance. Solid waste will be taken off-site by private trash collection companies and disposed at a permitted landfill.

- (4) Alterations to existing land forms and vegetation; except crops, and construction of structures shall cause minimum adverse effect to water resources and scenic and recreational amenities and minimum danger of floods, landslides, erosion, siltation or failure in the event of earthquake.

**Discussion:** Construction of the proposed project will require alteration of the existing land and clearing of the existing vegetation. Best management practices for construction will be used to minimize erosion in storm water runoff. After development, erosion potential from the site will be reduced; buildings, paving, and landscape will cover most of the site.

(b) No development shall be approved unless the council has first found that:

- (1) The development will not have any substantial, adverse environmental or ecological effect except as such adverse effect is minimized to the extent practicable and clearly outweighed by public health and safety, or compelling public interest. Such adverse effect shall include, but not be limited to, the potential cumulative impact of individual developments, each one of which taken in itself might not have a substantial adverse effect and the elimination of planning options;

**Discussion:** Storm water runoff volume from the developed site will increase due to increased building coverage and paved area. This increased runoff volume will be controlled through diversion to landscaped areas. Excess storm water runoff will flow into an existing storm water drainage system, or into new piping that connects to existing storm water drainage system. Pollutants in storm water will be reduced by reducing erosion potential at the site (i.e., coverage by buildings, paving, and landscape), and by locating most parking underground.

Wastewater treatment on-site will be handled via a wastewater system that produces R-1 water. R-1 water will be reused on-site in the toilets and for landscape irrigation. Control systems to avoid excess irrigation will be in

place to reduce the potential for runoff from the site. Excess R-1 wastewater will be disposed in existing cesspools or into an injection well on the property. An injection well would require a UIC permit or a variance, depending on interpretation of location of the UIC line.

The Pupukea MLCD could potentially receive storm water runoff from the property. This runoff could result in a temporary influx of fresh water to the nearshore; potential for pollutants, such as soil and automotive fluids, should be reduced due to controls on the Property (e.g., erosion control, location of parking).

- (2) The development is consistent with the objectives and policies set forth in Section 25-3.1 and area guidelines contained in HRS Section 205A-26;

**Discussion:** The proposed project as discussed in the previous section will generally be consistent with the objectives and policies of Section 25-3-1 and area guidelines in HRS Section 205A-16.

- (3) The development is consistent with the county general plan, development plans and zoning. Such a finding of consistency does not preclude concurrent processing where a development plan amendment or zone change may also be required.

**Discussion:** The North Shore Sustainable Communities Plan designates the property as a Rural Community Commercial Area.

(c) The council shall seek to minimize, where reasonable:

- (1) Dredging, filling or otherwise altering any bay, estuary, salt marsh, river mouth, slough or lagoon;

**Discussion:** This plan involves a property that is situated away from the shoreline and, therefore, does not propose alteration of the coastline.

- (2) Any development which would reduce the size of any beach or other area usable for public recreation;

**Discussion:** This project does not involve any beach or other public recreation area.

- (3) Any development which would reduce or impose restrictions upon public access to tidal and submerged lands, beaches, portions of rivers and streams within the special management area and the mean high tide line where there is no beach;

**Discussion:** There are no public access routes through this property.

- (4) Any development which would substantially interfere with or detract from the line of sight toward the sea from the state highway nearest the coast; and

**Discussion:** The property is situated across the highway from the coastline, and, therefore, would not interfere with ocean views from Kamehameha Highway.

- (5) Any development which would adversely affect water quality, existing areas of open water free of visible structures, existing and potential fisheries and fishing grounds, wildlife habitats, or potential or existing agricultural uses of land.

**Discussion:** There are no open water or fisheries/fishing grounds on the property. A fauna survey of the property recorded alien species of birds and mammals associated with the site, but no rare or endangered species.

The property is not in agriculture and has been designated by the State and County for urban and commercial use.

See previous discussions regarding storm water and wastewater at the site.

## **5 MITIGATION MEASURES**

The following are a summary of identified impacts and proposed mitigation measures:

### **5.1 TRAFFIC IMPACT AND MITIGATION**

As discussed in Section 2.2.4.6 and the Traffic Impact Study (Appendix B), the retail and commercial activities at this project are expected to impact traffic at the Kamehameha Highway and Pahoe Road intersection. With the project opening in 2006, the weekday morning and Saturday peak hours are projected to decrease from level of service (LOS) A to B, and C to D, respectively.

To mitigate this, the project proposes the following improvements:

- Widen Pahoe Road to include two outbound lanes (for left and right turns onto Kamehameha Highway).
- Widen Kamehameha Highway to include a deceleration lane (right turn onto Pahoe Road) and an acceleration lane (for cars turning left from Pahoe Road onto Kamehameha Highway).
- Realign southbound lane of Kamehameha Highway north of Pahoe Road to match the southbound lane in front of the subject property.
- Provide sidewalks around the project to separate pedestrian and vehicles.
- Provide a commercial bus pullout on Kamehameha Highway to allow passengers to disembark without impeding the highway traffic.

### **5.2 FLORA/FAUNA IMPACT AND MITIGATION**

Based on the flora and fauna surveys of the subject property, no rare, threatened, or endangered species or habitat are affected by this project.

The proposed project will remove existing vegetation as part of the construction and will impact introduced species of plants and animals. This removal of this vegetation will be mitigated to some extent by the landscape plantings in the setback and courtyard areas of the project.

### **5.3 ARCHAEOLOGICAL IMPACT AND MITIGATION**

The archaeological report (Section 3.3 and Appendix E) indicated that discovery of any cultural deposits was unlikely because of the soil type and modern agricultural activities on the property. If any cultural deposits are found during construction, the State Historic Preservation Division (SHPD) must be notified. If any human remains are discovered during construction, construction must be halted and SHPD notified.

#### **5.4 MAUKA VIEW IMPACT AND MITIGATION**

The views of the plateaus from the highway will be obscured by the proposed buildings. The architecture style of the buildings and landscaping along the setback area and within the courtyards will soften the visual impact of these buildings.

#### **5.5 RECEIVING WATER IMPACT AND MITIGATION**

During construction of the project, stormwater runoff from the site may enter the Pupukea MLC. Stormwater runoff could carry eroded soils and other pollutants to the storm drainage system along Kamehameha Highway and on to the Pacific Ocean. An Individual NPDES permit will be required for discharges since construction would disturb one or more acres.

Mitigation measures would include implementing a best management practices plan to prevent pollutants from entering Class AA waters. Specific measures could include phasing of grading and ground disturbance, placing erosion control mats and inlet protectors at appropriate locations, establishing landscaping around the project perimeter, and installing silt fences.

After project development, there will be an increase in runoff generated at the site due to decreased permeable surfaces. This increased runoff could convey eroded soil and other pollutants to the Pupukea MLC. In addition, R-1 wastewater will be used to irrigate landscaping. Mitigation measures for these surface water discharges include the following:

- Install a storage tank for excess stormwater runoff to ensure flow rates leaving the site does not increase over existing conditions.
- Divert storm water to landscaping and to the storage tank, where eroded soil will settle out.
- Locate most parking in basement lot; stormwater that drains to this lot will be directed to the wastewater system.
- Ensure landscaping is not overwatered using R-1 wastewater through a combination of soil moisture sensors and/or irrigation system controls.

#### **5.6 GROUNDWATER IMPACT AND MITIGATION**

Treated R-1 wastewater will be generated by the onsite wastewater system for the project. Excess wastewater not used for flushing toilets or irrigating landscape will be disposed in onsite cesspools or a permitted underground injection well. There is the potential for contaminants in wastewater to migrate to groundwater underlying the site.

An UIC permit is required for such wells.



Mitigation measures to reduce potential contamination to groundwater may include the following:

- Locate injection wells over the makai aquifer, which is not used as a drinking water source, and makai of the UTC line.
- Perform regular testing on R-1 effluent to ensure it meets UTC permit requirements, or requirements for disposal in existing cesspools.
- Provide periodic monitoring.

## 6 REFERENCES

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2. City and County of Honolulu Department of Planning and Permitting. July 2000. *North Shore Sustainable Communities Plan.*
3. Clark, John R.K. 1977. *The Beaches of Oahu.*
4. Federal Emergency Management Agency, National Flood Insurance Program, Flood Insurance Rate Map, City and County of Honolulu, Hawaii, Panel 20 of 395, November 20, 2000.
5. Gray Hong Bills & Associates, Inc. October 1998. *Engineering Report for Ke Iki Road Relief Drain, Pupukea, Oahu, Hawaii, TMK: 5-9-03.*
6. Hawaii Administrative Rules, Title 11, Chapter 23. September 22, 1992.
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8. Mink and Lau. 1990. *Aquifer Identification and Classification for Oahu: Groundwater Protection Strategy for Hawaii Technical Report No. 179.*
9. State of Hawaii Commission on Water Resource Management. Well Index Database, <http://www.state.hi.us/dlnr/cwrm/data/database.htm>. Accessed July 12, 2001 (database is no longer available to the public).
10. Sterling, Elspeth and Catherine C. Summers. *Sites of Oahu.* Bishop Museum Press, 1978.
11. U.S. Department of Agriculture, Soil Conservation Service. 1972. *Soil Survey of Islands of Kauai, Oahu, Molokai, and Lanai, State of Hawaii.*
12. Wilson Okamoto & Associates. May 21, 1979. *Environmental Assessment for the Ke Nui Road Drainage Project, Pupukea, Koolauloa, Oahu, Hawaii, TMK: 5-9-19, 20.*

## **Appendix A**

### **List of Agencies Contacted**

## Appendix A

<u>Agency</u>	<u>Date</u>	<u>Comments</u>
Planning Division, Department of Planning and Permitting, City and County	July 7, 2004	Applicant and Architect met with Eric Crispin, Eileen Mark, and Lowell Chun.
Department of Transportation Services, City and County	Awaiting meeting	Traffic Consultant sent traffic study and awaiting followup meeting.
Department of Transportation, State of Hawaii	Awaiting Meeting	Traffic Consultant sent traffic study and awaiting followup meeting.
Traffic Review Branch, Site Development Division, Department of Planning and Permitting, City and County	September 2, 2004 - September 3, 2004	Engineering Consultant phone contact for information related to Pahoe Road.
Civil Engineering Branch, Site Development Division, Department of Planning and Permitting, City and County	September 2, 2004	Engineering Consultant phone contact for information related to Pahoe Road.
Road Maintenance Division, Facilities Maintenance Department	September 2, 2004	Engineering Consultant phone contact for information related to Pahoe Road.
Traffic Branch, Highways Division, Department of Transportation, State of Hawaii	September 3, 2004	Engineering Consultant phone contact for information related to Kamehameha Highway.
Right of Way Branch, Highways Division, Department of Transportation, State of Hawaii	September 7, 2004	Engineering Consultant phone contact for information related to Kamehameha Highway.
Civil Engineering Branch, Site Development Division, Department of Planning and Permitting, City and County	September 7, 2004	Engineering consultant phone contact for information related to drainage.
Department of Planning and Permitting, City and County	August 30, 2004 - September 7, 2004	Engineering consultant phone contact for Kamehameha Highway/Pahoe Road/Foodland plans.
Planning Branch, Highways Division, Department of Transportation, State of Hawaii	September 3, 2004	Engineering consultant phone contact for Kamehameha Highway plans.
Clean Water Branch, Department of Health, State of Hawaii	September 9, 2004	Engineering consultant phone contact for water quality and water monitoring.
Safe Drinking Water Branch, Department of Health, State of Hawaii	September 10, 2004	Wastewater consultant phone contact for underground injection control well issues.

**Appendix B**

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**Traffic Impact Study for Pupukea  
Village, North Shore, Oahu**

***DRAFT***  
**TRAFFIC IMPACT STUDY  
FOR  
PUPUKEA VILLAGE, NORTH SHORE, OAHU**

SEPTEMBER 2004

PREPARED FOR  
PUPUKEA VILLAGE LLC

PREPARED BY  
**KAKU ASSOCIATES**  
A Corporation

***DRAFT***

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September 2004

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## TABLE OF CONTENTS

I.	Introduction .....	1
	Project Description.....	1
	Study Scope.....	6
	Organization of Report.....	7
II.	Existing Conditions.....	9
	Existing Street System.....	9
	Existing Transit Conditions .....	10
	Existing Traffic Volumes and Levels of Service .....	10
III.	Future Traffic Projections .....	16
	Cumulative Base Traffic Projections.....	16
	Project Traffic Volumes.....	16
	Cumulative Plus Project Traffic Projections.....	20
IV.	Future Year Traffic Impact Analysis.....	24
	Significant Traffic Impact Criteria.....	24
	Cumulative Base Traffic Conditions .....	24
	Cumulative Plus Project Traffic Conditions .....	26
	Project Impacts .....	26
V.	Parking and Site Access .....	27
	Parking.....	27
	Site Access .....	27
VI.	Summary and Conclusions.....	31
	Appendix A: Intersection Lane Configurations	
	Appendix B: Existing Traffic Counts (to be provided)	
	Appendix C: Level of Service Worksheets (to be provided)	



## LIST OF FIGURES

### NO.

1	Project Site Plan.....	2
2	Pahoe Road Widening.....	4
3	Kamehameha Highway Improvements.....	5
4	Study Area.....	8
5	Existing Peak Hour Traffic Volumes.....	11
6	Cumulative Base Peak Hour Volumes.....	17
7	Project Traffic Distribution.....	21
8	Project Only Peak Hour Traffic Volumes.....	22
9	Cumulative Plus Project Peak Hour Traffic Volumes.....	23

## LIST OF TABLES

### NO.

1	Level of Service Definitions for Signalized Intersections.....	13
2	Level of Service Definitions for Unsignalized Intersections Two-Way Stop-Controlled Intersections.....	14
3	Intersection Level of Service Analysis – Existing Conditions.....	15
4	Project Trip Generation Estimates.....	19
5	Intersection Level of Service Analysis – Future Conditions.....	25
6	Right-Turn Deceleration Lane Criteria – Turning Volumes vs. Posted Speed.....	28

## I. INTRODUCTION

This report summarizes a study conducted by Kaku Associates, Inc. to assess the potential access impacts associated with the proposed Pupukea Village project on the North Shore, Oahu, Hawaii.

### PROJECT DESCRIPTION

The project location is located at 53-59 Pahoe Road on the southeast corner of Kamehameha Highway (mauka side) and Pahoe Road on the North Shore of Oahu. Existing land uses on the 117,443 square foot site include two buildings used as offices and several temporary structures with tourist oriented businesses along the frontage of Kamehameha Highway on the western edge of the project site. Figure 1 provides an illustration of the project site plan.

The proposed project includes removal of the existing structures and construction of a new multi-story structure that will provide 73,614 square feet of neighborhood retail space. A lower level parking area will be provided underneath the building. There is also a limited amount of surface parking located along the mauka side behind the building.

Two driveways located on Pahoe Road will provide site access. The primary driveway provides access to the lower level parking under the building while a separate secondary driveway provides access to the surface lot and loading docks behind the building. The lower level parking area will provide the majority of parking stalls. The surface lot will provide the remainder.

Integral to this project are several roadway improvements. They include the following:

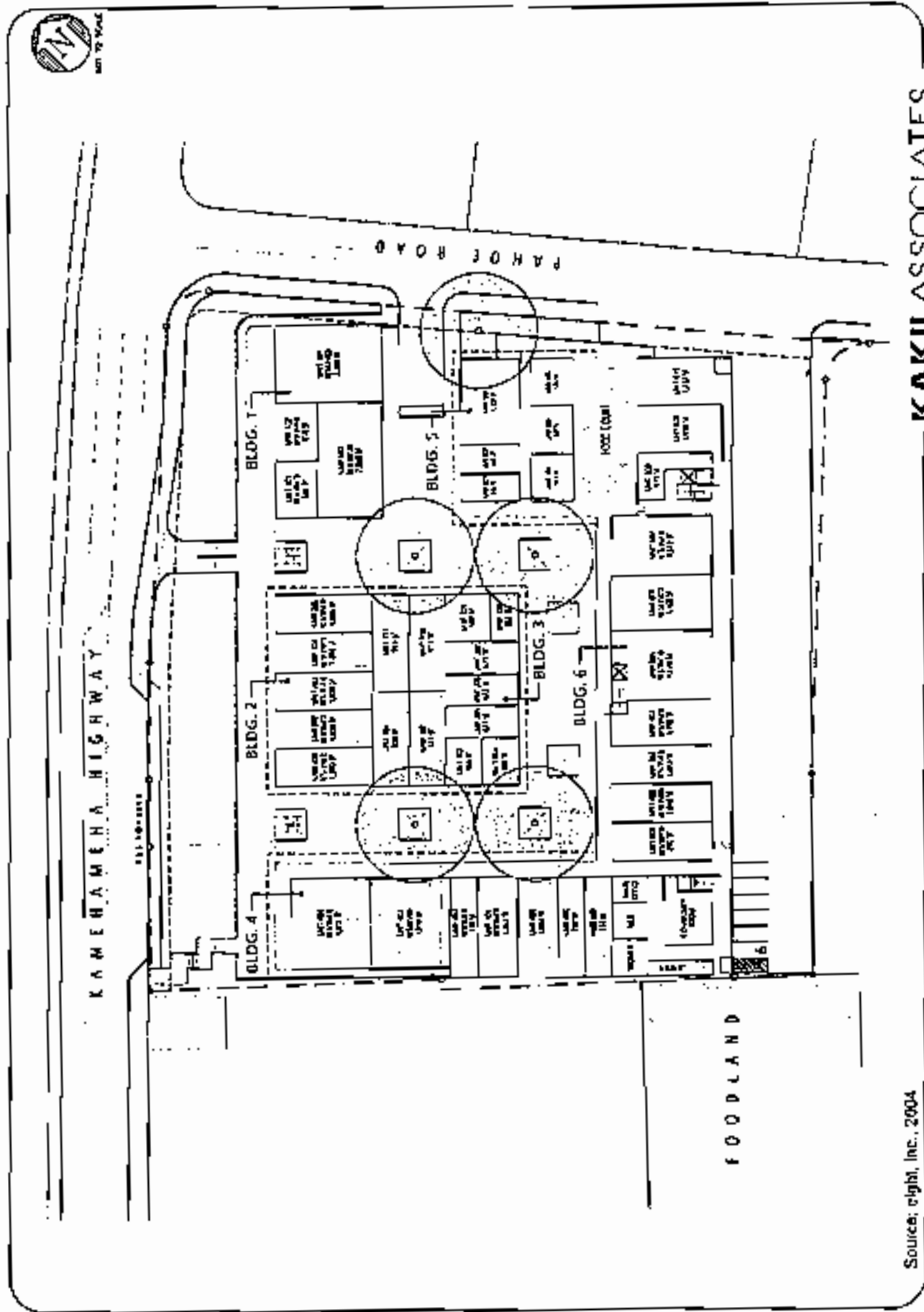


FIGURE 1  
PROJECT SITE PLAN

Source: Kaku, Inc., 2004

- **Widening of Pahoe Road** - Pahoe Road at Kamehameha Highway is a private paved road that is currently 16 feet wide accommodating two-way traffic, one lane in each direction. With the placement of both project driveways on Pahoe Road, all project-generated traffic will need to access the site using this roadway. To accommodate this future traffic, it is recommended that the roadway be widened to accommodate three lanes of traffic, one inbound from Kamehameha Highway traveling in the mauka direction and two outbound onto the highway traveling in the makai direction. It is proposed that Pahoe Road be widened to 38 feet to accommodate the two 12-foot outbound lanes and one 14-foot inbound lane. This widening with the three-lane cross section should extend from the intersection at Kamehameha Highway past the project driveway. The use 12 and 14-foot lanes are suggested widths; the actual lane widths will range from 10 to 14 feet. Beyond this point, the roadway should remain 38 feet in width but be striped to accommodate two 19-foot lanes, one in each direction. The widened portion of Pahoe Road should extend approximately 340 feet back from Kamehameha Highway, or the full length of the property. The width of these lanes are suggested, the actual width will range from 16 to 20 feet. Figure 2 provides a schematic illustration of the proposed improvement plan; the actual dimensions of the proposed improvements will vary as discussed above.

- **Widening of Kamehameha Highway** - Kamehameha Highway adjacent to the project site is currently an approximately 22-foot roadway providing one lane in each direction with an approximately four-foot paved shoulder on each side. In order to accommodate the project-generated traffic activity onto and off of Kamehameha Highway as it accesses the project site, it is suggested that three improvements be made. The first is the addition of a right-turn deceleration lane on the mauka side of Kamehameha Highway for northbound traffic desiring to turn right onto Pahoe Road to access the project site. A 125-foot deceleration lane with a 12-foot width and a 100-foot taper for the transition from the through lane to the right-turn lane would be required.

The second improvement is the addition of a two-way left-turn lane in the median of Kamehameha Highway that runs the entire length of the project site frontage. This 10-foot turn lane would be provided to facilitate the completion of left turns from outbound on Pahoe Road, in the makai direction, to southbound on Kamehameha Highway.

The third improvement proposed for Kamehameha Highway is the addition of a bus pullout area along the makai side of Kamehameha Highway at the southern edge of the site frontage. This pullout would be 10 feet wide and 85 feet long.

These improvements would require the widening of Kamehameha Highway to widths that vary from 34 feet at the south end of the property to 45 feet at the north end. Figure 3 provides a schematic illustration indicating the suggested dimensions of the various improvements on Kamehameha Highway; although specific lane widths are suggested, the actual lane widths will range from 10 to 14 feet.

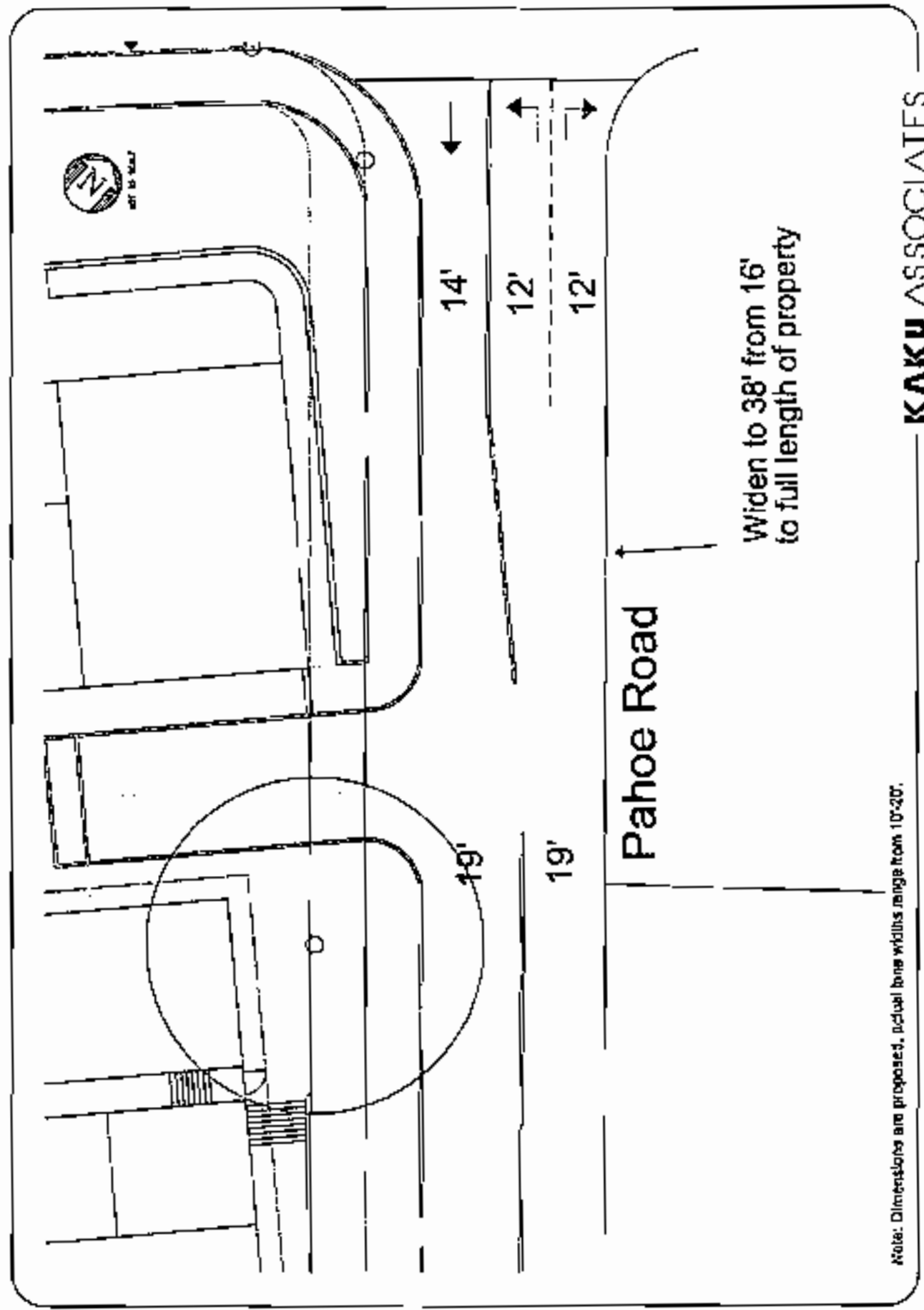


FIGURE 2  
PAHOE ROAD WIDENING

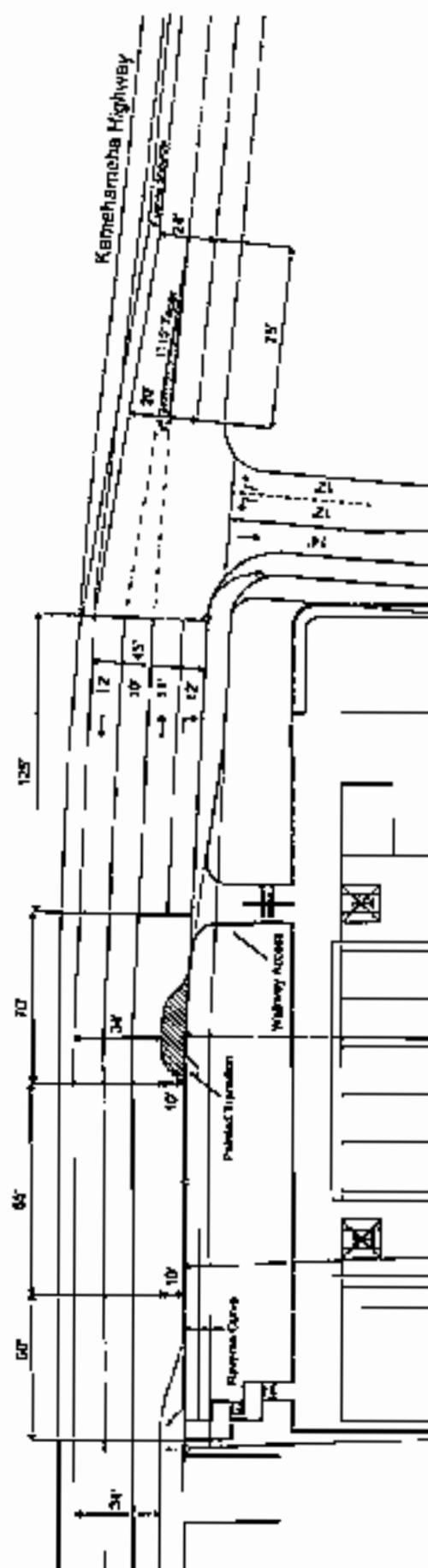
- **Widening of Pahoe Road** - Pahoe Road at Kamehameha Highway is a private paved road that is currently 16 feet wide accommodating two-way traffic, one lane in each direction. With the placement of both project driveways on Pahoe Road, all project-generated traffic will need to access the site using this roadway. To accommodate this future traffic, it is recommended that the roadway be widened to accommodate three lanes of traffic, one inbound from Kamehameha Highway traveling in the mauka direction and two outbound onto the highway traveling in the makai direction. It is proposed that Pahoe Road be widened to 38 feet to accommodate the two 12-foot outbound lanes and one 14-foot inbound lane. This widening with the three-lane cross section should extend from the intersection at Kamehameha Highway past the project driveway. The use 12 and 14-foot lanes are suggested widths; the actual lane widths will range from 10 to 14 feet. Beyond this point, the roadway should remain 38 feet in width but be striped to accommodate two 19-foot lanes, one in each direction. The widened portion of Pahoe Road should extend approximately 340 feet back from Kamehameha Highway, or the full length of the property. The width of these lanes are suggested, the actual width will range from 16 to 20 feet. Figure 2 provides a schematic illustration of the proposed improvement plan; the actual dimensions of the proposed improvements will vary as discussed above.

- **Widening of Kamehameha Highway** - Kamehameha Highway adjacent to the project site is currently an approximately 22-foot roadway providing one lane in each direction with an approximately four-foot paved shoulder on each side. In order to accommodate the project-generated traffic activity onto and off of Kamehameha Highway as it accesses the project site, it is suggested that three improvements be made. The first is the addition of a right-turn deceleration lane on the mauka side of Kamehameha Highway for northbound traffic desiring to turn right onto Pahoe Road to access the project site. A 125-foot deceleration lane with a 12-foot width and a 100-foot taper for the transition from the through lane to the right-turn lane would be required.

The second improvement is the addition of a two-way left-turn lane in the median of Kamehameha Highway that runs the entire length of the project site frontage. This 10-foot turn lane would be provided to facilitate the completion of left turns from outbound on Pahoe Road, in the makai direction, to southbound on Kamehameha Highway.

The third improvement proposed for Kamehameha Highway is the addition of a bus pullout area along the makai side of Kamehameha Highway at the southern edge of the site frontage. This pullout would be 10 feet wide and 85 feet long.

These improvements would require the widening of Kamehameha Highway to widths that vary from 34 feet at the south end of the property to 45 feet at the north end. Figure 3 provides a schematic illustration indicating the suggested dimensions of the various improvements on Kamehameha Highway; although specific lane widths are suggested, the actual lane widths will range from 10 to 14 feet.



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**FIGURE 3  
KAMEHAMEHA HIGHWAY IMPROVEMENTS**

- **Realignment of Kamehameha Highway** - In order to properly implement the proposed improvements on Kamehameha Highway adjacent to the project site described above, it will be necessary to make an additional improvement on the highway north of Pahoe Road. This improvement involves the minor realignment of the southbound lane on Kamehameha Highway toward the makai side of the roadway. This is necessary to ensure that the southbound traffic aligns itself correctly with the southbound lane of the highway adjacent to the property after it crosses Pahoe Road. Figure 3 includes the realignment of this portion of the highway; specific lane widths are suggested, the actual lane widths will range from 10 to 14 feet.

## STUDY SCOPE

The scope of work for this study was developed based on field review and consultation with the client and his representatives. The study, which analyzes the potential project-generated traffic impacts on the adjacent street system, assumes that the project will be completed by 2006. The analysis of future year traffic forecasts is based on projected conditions in 2006 both with and without the addition of the project traffic. The following traffic scenarios have been developed and analyzed as part of this study:

- **Existing 2004 Conditions** - The analysis of existing traffic conditions provides a basis for the remainder of the study. The existing conditions analysis includes a description of the street system serving the site, current traffic volumes, and an assessment of the operating conditions at these locations.
- **Cumulative Base (2006) Conditions** - Future traffic conditions without the proposed project are developed for the year 2006. The objective of this analysis is to project the future traffic growth and operating conditions that could be expected from regional growth and related projects in the vicinity of the project site by the year 2006.
- **Cumulative (2006) plus Project Conditions** - This traffic scenario provides projected traffic volumes and an assessment of operating conditions under future conditions with the addition of project-generated traffic. The impacts of the proposed project on future traffic operating conditions can then be identified.

Two intersections were analyzed as part of the scope of work for this study:

- Kamehameha Highway and Pupukea Road
- Kamehameha Highway and Pahoe Road



These intersections were analyzed in the morning peak hour (typically between 7 a.m. and 9 a.m.), the evening peak hour (between 4 p.m. and 6 p.m.), and the Saturday midday peak period (12 p.m. to 2 p.m.). Figure 4 illustrates the location of the project site and analyzed intersections in relation to the surrounding street system.

#### ORGANIZATION OF REPORT

This report is divided into six chapters. Chapter I provides an introduction to the study and describes the various elements of the study. Chapter II describes the existing conditions in the study area, including an inventory of the streets and highways in the study area, a summary of traffic volumes, and an assessment of the operating conditions of these streets. The methodologies used to develop traffic forecasts for the cumulative base and cumulative plus project scenarios and the forecasts themselves are included in Chapter III. Chapter IV presents an assessment of the proposed project's potential traffic impacts. Chapter V discusses parking, site access, and circulation. Chapter VI provides a summary of the results. Appendices to this report include details of the technical analysis.

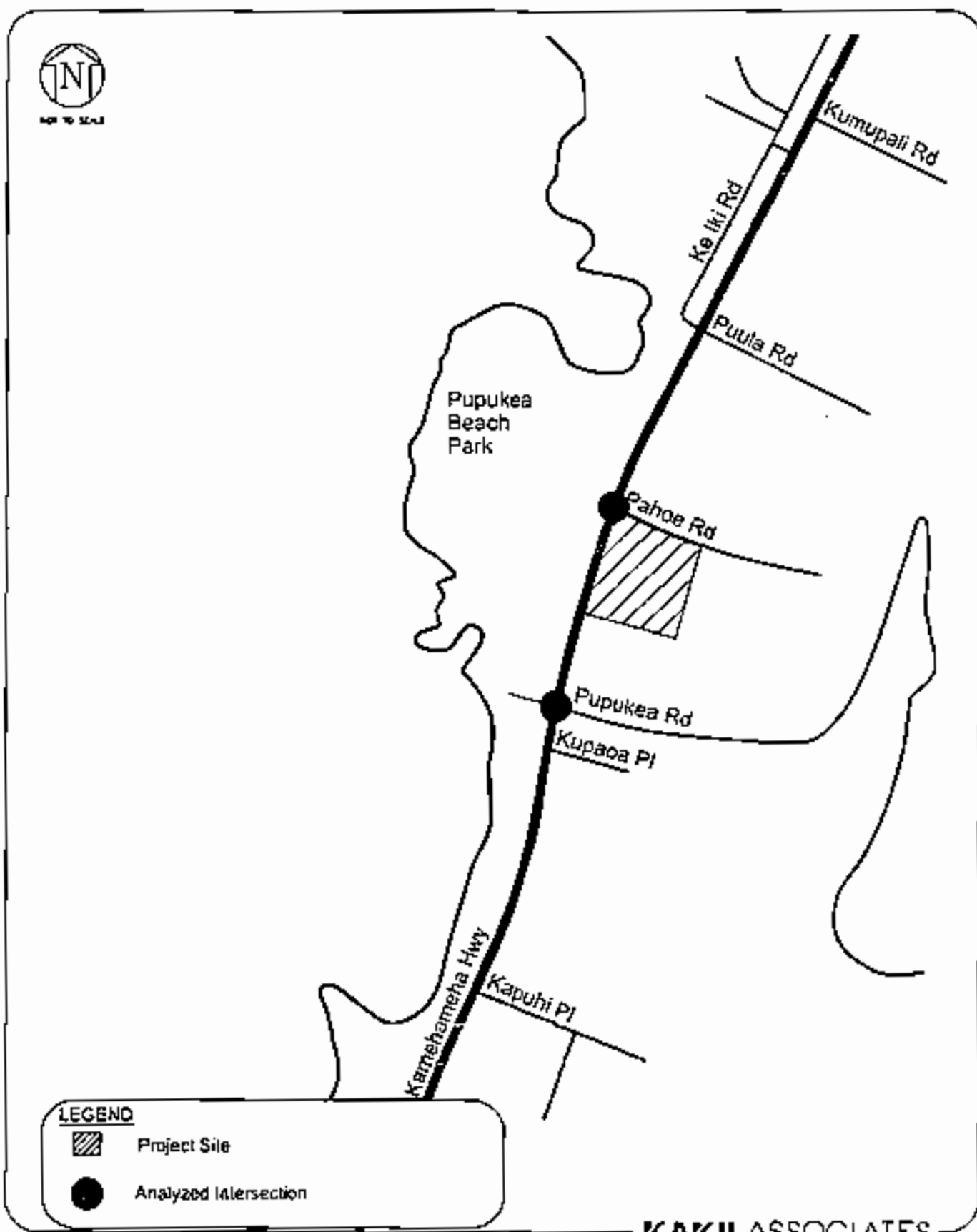


FIGURE 4  
STUDY AREA

## II. EXISTING CONDITIONS

A comprehensive data collection effort was undertaken to develop a detailed description of existing conditions within the study area. The assessment of conditions relevant to this study includes a description of the study area, an inventory of the local street system in the vicinity of the project site, a review of traffic volumes on these facilities, and an assessment of the existing operating conditions. A detailed description of these elements is presented in this chapter.

### EXISTING STREET SYSTEM

Kamehameha Highway (State Highway 83) runs in a north-south direction on the makai side of the project site and provides direct frontage to the proposed project site. The project site is located on the south side of Pahoe Road, a private mauka-makai roadway that has a "T" intersection with Kamehameha Highway. Pahoe Road is located just north of Pupukea Road, a two-lane mauka-makai roadway that has a signalized "T" intersection with Kamehameha Highway. Two driveways on Pahoe Road will provide vehicular access to the project site. The primary driveway, located closest to Kamehameha Highway, provides access to the lower level parking. The second driveway, located at the mauka end of the site, provides access to the small surface lot located behind the project and to the loading dock. The following provides a brief description of the highway and street system serving the project site:

- Kamehameha Highway (State Highway 83) - Kamehameha Highway is a north-south arterial highway that provides two travel lanes, one lane in each direction. Parking is prohibited on both sides of the highway. The posted speed limit is 35 miles per hour (mph).
- Pahoe Road - Pahoe Road is a private mauka-makai local street that provides one travel lane in each direction with a "T" intersection at Kamehameha Highway. On-street parking is not allowed on either side of the street. The posted speed limit is 25 mph.
- Pupukea Road - Pupukea Road is a mauka-makai street that provides two travel lanes, one lane in each per direction, with a signalized "T" intersection at Kamehameha Highway. On-street parking is not allowed on either side of the street. The posted speed limit is 25 mph.

## EXISTING TRANSIT CONDITIONS

TheBus, operated by Oahu Transit Services, Incorporated, currently provides service with two bus lines in the study area. These transit lines are described below:

- TheBus Route 52 (Mililani-Wahaiwa Circle-Isle) - Route 52 provides daily service from the Turtle Bay Resort in Kahuku to the Ala Moana Shopping Center in Honolulu. Typical headways of 30 minutes during peak and 60 minutes during off-peak periods can be expected. Within the study area, Route 52 operates along Kamehameha Highway.
- TheBus Route 88A (North Shore Express) - Route 88A provides daily service from the Turtle Bay Resort in Kahuku to the Ala Moana Shopping Center during the morning service hours. Route 88A provides return service from the Ala Moana Shopping Center to the Turtle Bay Resort during the afternoon service hours. Typical headways of 30 minutes during peak and 60 minutes during off-peak periods can be expected. Route 88A operates along Kamehameha Highway within the study area.

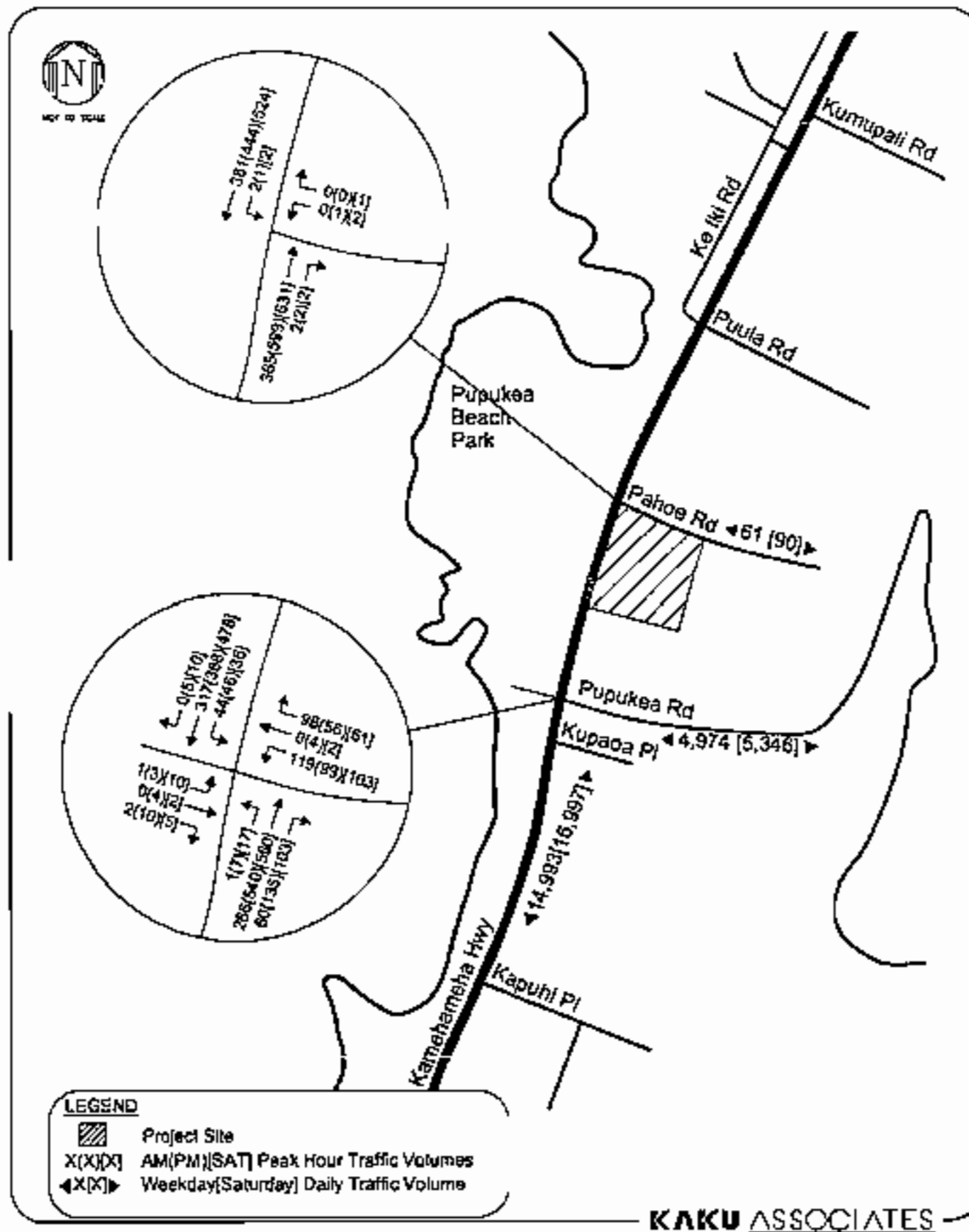
## EXISTING TRAFFIC VOLUMES AND LEVELS OF SERVICE

This section presents the existing peak hour turning movement traffic volumes for the intersection and roadway segments analyzed in the study, describes the methodology used to assess the traffic conditions at each intersection, and analyzes the resulting operating conditions at each, indicating volume/capacity ratios and levels of service.

### Existing Traffic Volumes

Existing morning peak hour, evening peak hour, and Saturday midday peak period intersection turning movement counts were conducted in June 2004 and are illustrated in Figure 5. These volumes represent the existing conditions for the purposes of this analysis.

The morning peak hour was found to be between 7:30 a.m. and 8:30 a.m.; the evening peak was found to be between 4:15 p.m. and 5:15 p.m.; and the Saturday midday peak was found to be



**FIGURE 5**  
**EXISTING PEAK HOUR TRAFFIC VOLUMES**

between 1:00 p.m. and 2:00 p.m. The counts indicate that the actual peak hours of the intersections did fall within the peak periods described in Chapter 1. The traffic count data is available in Appendix B.

#### **Level of Service Methodology**

Level of service (LOS) is a qualitative measure used to describe the condition of traffic flow on the street system, ranging from excellent conditions at LOS A to overloaded conditions at LOS F. The intersection of Kamehameha Highway and Pupukea Road was analyzed using the Signalized Intersection method from the HCM. The corresponding levels of service were determined from the relationships indicated in Table 1. The intersection of Kamehameha Highway and Pahoe Road was analyzed using the Two-Way Stop Controlled method from the HCM. The corresponding levels of service were determined from the relationships indicated in Table 2.

#### **Existing Levels of Service**

The traffic volumes presented in Figure 5 were analyzed using the methodology described above to determine the current operating conditions at the study intersection. Table 3 summarizes the delay and corresponding LOS at the study intersections. As indicated, the Kamehameha Highway and Pupukea Road operates at LOS B during the morning peak hour and at LOS A during the evening peak hour; during the Saturday midday peak period, the intersection operates at LOS A. The existing traffic signal at this intersection is actuated, i.e. the amount of green-light time given to any particular movement is assigned based on demand. Therefore, the time required to complete one signal cycle will vary.

The intersection of Kamehameha Highway and Pahoe Road operates at LOS A during the morning peak hour and LOS C during the evening peak hour; the intersection operates at LOS C during the Saturday midday peak period.

**TABLE 1**  
**LEVEL OF SERVICE DEFINITIONS FOR SIGNALIZED INTERSECTIONS**

Level of Service	Average Control Delay per Vehicle (seconds)	Definition
A	$\leq 10.0$	EXCELLENT. No vehicle waits longer than one red light and no approach phase is fully used.
B	$> 10.0$ and $\leq 20.0$	VERY GOOD. An occasional approach phase is fully utilized; many drivers begin to feel somewhat restricted within groups of vehicles.
C	$> 20.0$ and $\leq 35.0$	GOOD. Occasionally drivers may have to wait through more than one red light; backups may develop behind turning vehicles.
D	$> 35.0$ and $\leq 55.0$	FAIR. Delays may be substantial during portions of the rush hours, but enough lower volume periods occur to permit clearing of developing lines, preventing excessive backups.
E	$> 55.0$ and $\leq 80.0$	POOR. Represents the most vehicles intersection approaches can accommodate; may be long lines of waiting vehicles through several signal cycles.
F	$> 80.0$	FAILURE. Backups from nearby locations or on cross streets may restrict or prevent movement of vehicles out of the intersection approaches. Tremendous delays with continuously increasing queue lengths.

Source: Transportation Research Board, *Highway Capacity Manual*, 2000

**TABLE 2**  
**LEVEL OF SERVICE FOR UNSIGNALIZED INTERSECTIONS**  
**TWO-WAY STOP-CONTROLLED INTERSECTIONS**

LEVEL OF SERVICE	AVERAGE VEHICLE DELAY (seconds)
A	$\leq 10.0$
B	$>10.0$ and $\leq 15.0$
C	$>15.0$ and $\leq 25.0$
D	$>25.0$ and $\leq 35.0$
E	$>35.0$ and $\leq 50.0$
F	$> 50.0$

Source: Transportation Research Board, *Highway Capacity Manual*, 2000



**TABLE 3**  
**INTERSECTION LEVEL OF SERVICE ANALYSIS - EXISTING CONDITIONS**

Intersection	Peak	Delay [sec]	V/C	LOS
	Hour			
1. Kamehameha Hwy & Pupukea Rd	AM	10.7 sec	0.256	B
	PM	6.8 sec	0.432	A
	SAT	6.8 sec	0.426	A
2. Kamehameha Hwy & Pahoe Rd [a]	AM	8.0 sec	.	A
	PM	19.2 sec	.	C
	SAT	18.7 sec	.	C

Note:

[a] - Intersection is stop sign controlled on the minor approach.

### **III. FUTURE TRAFFIC PROJECTIONS**

In order to evaluate properly the potential impacts of the proposed project on the local street system, estimates of future traffic conditions both with and without the project were developed. Future traffic volumes without the project were first estimated, representing the cumulative base conditions. The traffic generated by the proposed project was then estimated and separately assigned to the surrounding street system. The sum of the cumulative base and project-generated traffic represents the cumulative plus project conditions.

#### **CUMULATIVE BASE TRAFFIC PROJECTIONS**

The cumulative base traffic projections reflect future traffic conditions before inclusion of the proposed project. Ambient or background traffic growth is typically used as a proxy for projecting future conditions.

Historical traffic count data was consulted to determine areawide traffic growth. This historical count data was provided by HDOT. According to the data, traffic in the vicinity of the study area has increased at a rate of 4.5% per year. To make a conservative estimate, future increases in the background traffic volumes due to areawide regional growth were projected to continue at this rate. With an assumed completion date of 2006, the existing 2004 traffic volumes were adjusted upward by a factor of 9% to reflect this areawide regional growth, as illustrated in Figure 6.

#### **PROJECT TRAFFIC VOLUMES**

The development of traffic generation estimates for the proposed project involved the use of the three-step process discussed below.

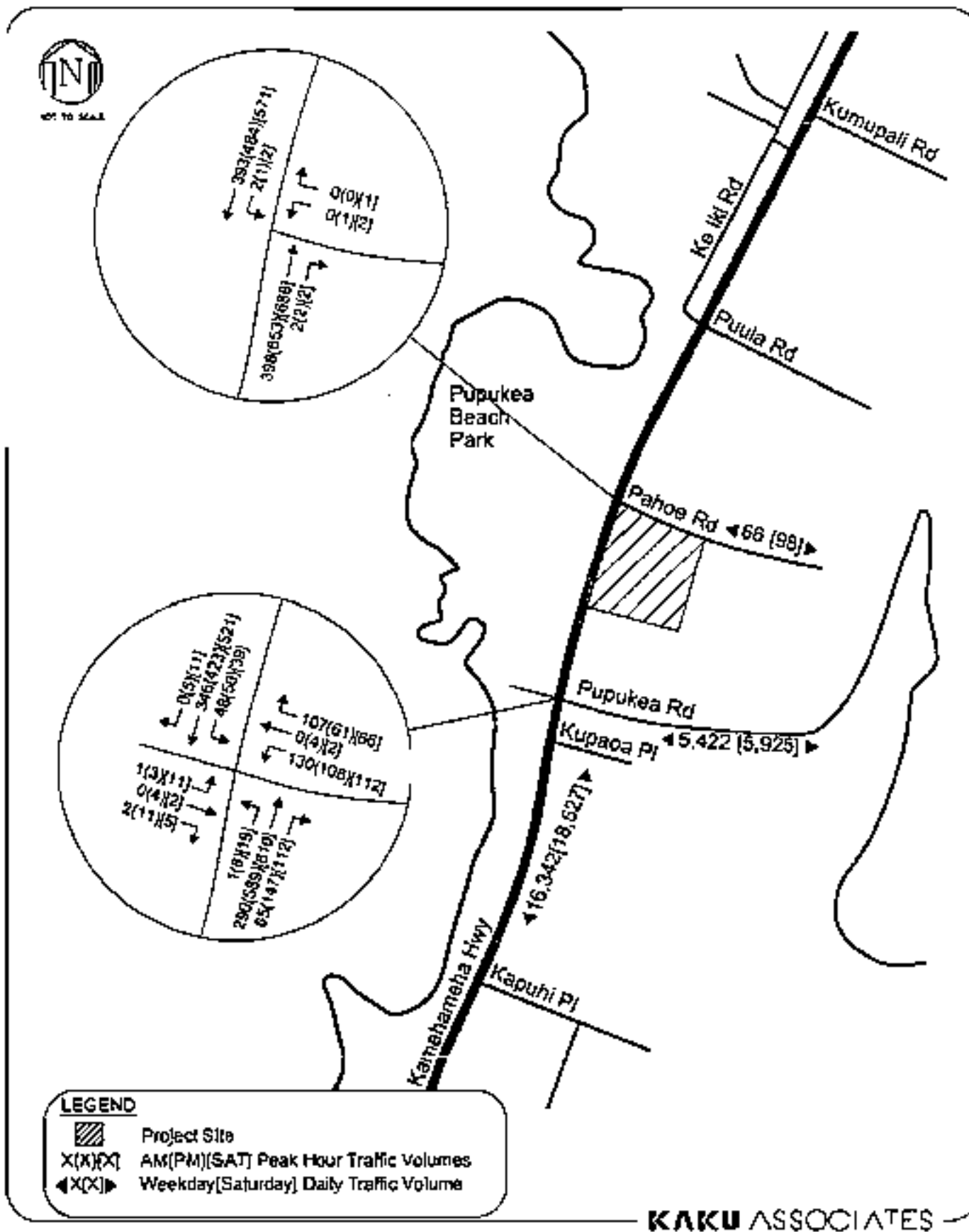


FIGURE 6  
CUMULATIVE BASE PEAK HOUR TRAFFIC VOLUMES

### Project Traffic Generation

Trip generation estimates for each of the proposed projects was developed using trip generation rates contained in *Trip Generation, 7<sup>th</sup> Edition* (Institute of Transportation Engineers, 2003). As defined by the ITE, a specialty retail center (ITE B14) contains "a variety of retail shops and specializes in quality apparel; hard goods; and services, such as real estate offices, dance studios, florists and small restaurants (ITE, 2003)." A shopping center (ITE B20) is "an integrated group of commercial establishments that is planned, developed, owned and managed as a unit. A shopping center's composition is related to its market area in terms of size, location, and type of store (ITE, 2003)."

This project is described as a center with neighborhood serving retail; the goods and services offered are geared toward the local residents. Given this description, trip generation estimates for this project were calculated using the specialty retail rate. Rates for the morning peak hour and Saturday midday peak period are not provided by the ITE. In light of this, a comparison was performed between the available specialty retail and shopping center trip rates; the comparison reveals that specialty retail represents approximately 70% of the trips generated by a shopping center. This proportion was then applied to the appropriate shopping center rate to derive the morning peak hour and Saturday midday peak period rates for a specialty retail center.

The application of trip credits are typically involved in the removal of existing land uses. When a particular land use is removed to make way for a new project, the trips generated by this land use are removed from the street system or credited to the proposed project. For the purposes of this analysis, a conservative approach was taken. The analysis did not apply trip credits from the existing land uses to the proposed project.

Given these assumptions, the project is expected to generate 53 vehicles per hour (vph) during the morning peak hour, 199 vph during the evening peak hour, and 256 vph during the Saturday midday peak period. The project is also expected to generate approximately 3,263 daily weekday trips and 3,095 daily Saturday trips (i.e. trips over the course of the day). Table 4 summarizes the project trip generation calculations.

**TABLE 4**  
**PROJECT TRIP GENERATION ESTIMATES**

Land Use	Size	Daily Trips	AM Peak Hour			PM Peak Hour			Saturday Midday		
			In	Out	Total	In	Out	Total	In	Out	Total
Neighborhood Retail Center	73,614 sf	3,263	32	21	53	88	111	199	133	123	256

Trip Rates:

Daily Weekday - 44.32 per 1,000 sf  
 AM - 0.72 per 1,000 sf, 61% In / 39% Out (a)  
 PM - 2.71 per 1,000 sf, 44% In / 56% Out

Daily Weekend - 42.04 per 1,000 sf  
 Saturday Midday - 3.46 per 1,000 sf, 52% In / 48% Out (a)

Notes:

(a) - No rate available for specialty retail (ITE 814) during AM and Saturday midday peak hours. The proportional rate of shopping center (ITE 820) was applied. A comparison of trip rates indicates that specialty retail generates approximately 70% of shopping center trips; therefore this proportion was applied to the shopping center rates and used to estimate trip generation for specialty retail.

Source: *Trip Generation, 7th Edition*; ITE, 2003.

#### **Project Traffic Distribution**

The geographic distribution of the traffic generated by the proposed project depends on several factors. These factors include the geographic distribution of population from which the patrons would be drawn, and the location of the project in relation to the surrounding street system. The specific distribution pattern developed for this project is illustrated in Figure 7.

#### **Project Traffic Assignment**

The traffic expected to be generated by the proposed project was assigned to the street network using the distribution pattern described in Figure 6. Figure 7 illustrates the assignment of this traffic to the intersections analyzed in this study.

#### **CUMULATIVE PLUS PROJECT TRAFFIC PROJECTIONS**

The project-generated traffic volumes from Figure 8 were added to the cumulative base traffic volumes illustrated in Figure 6 to develop cumulative plus project peak hour traffic volumes, as illustrated in Figure 9.

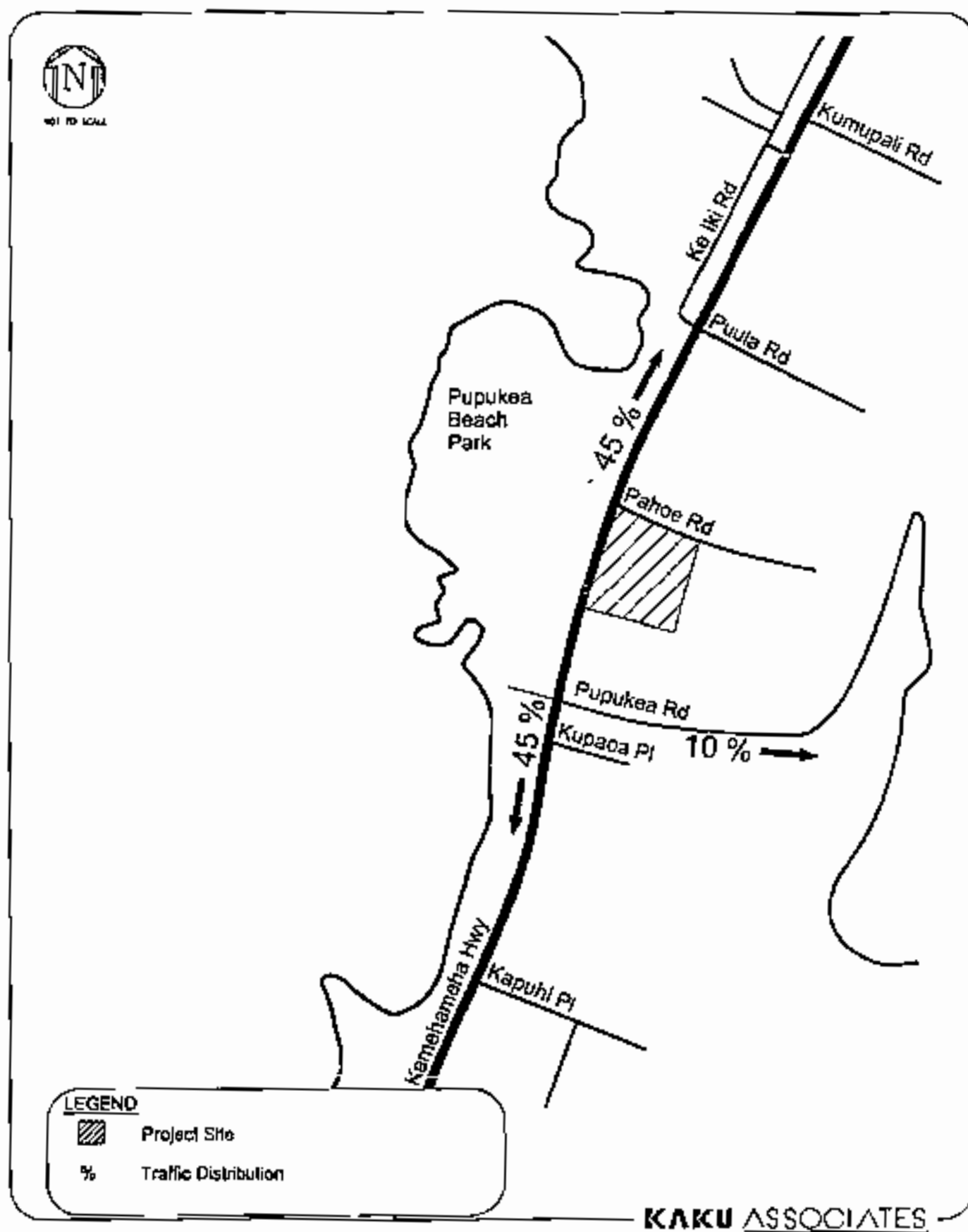
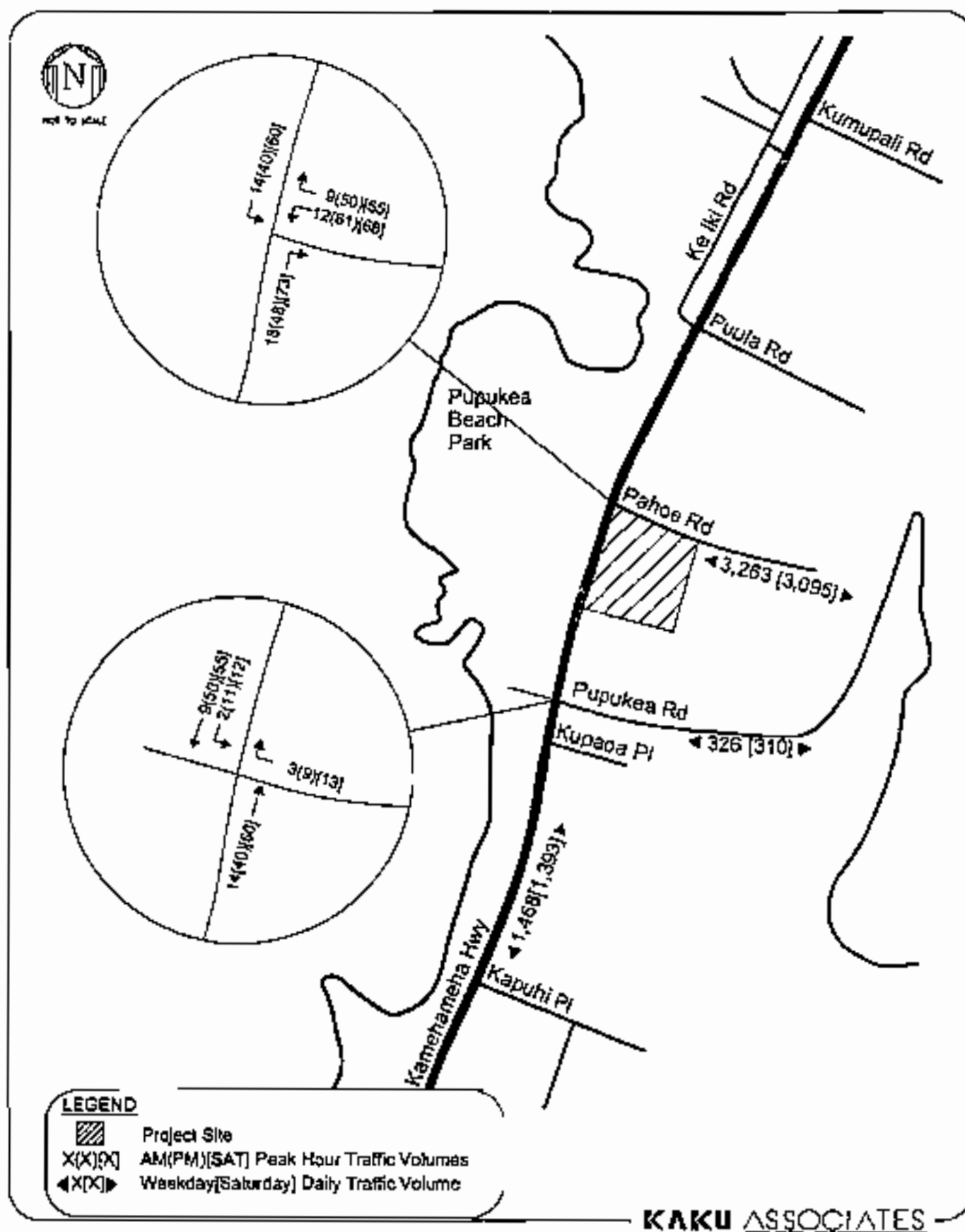
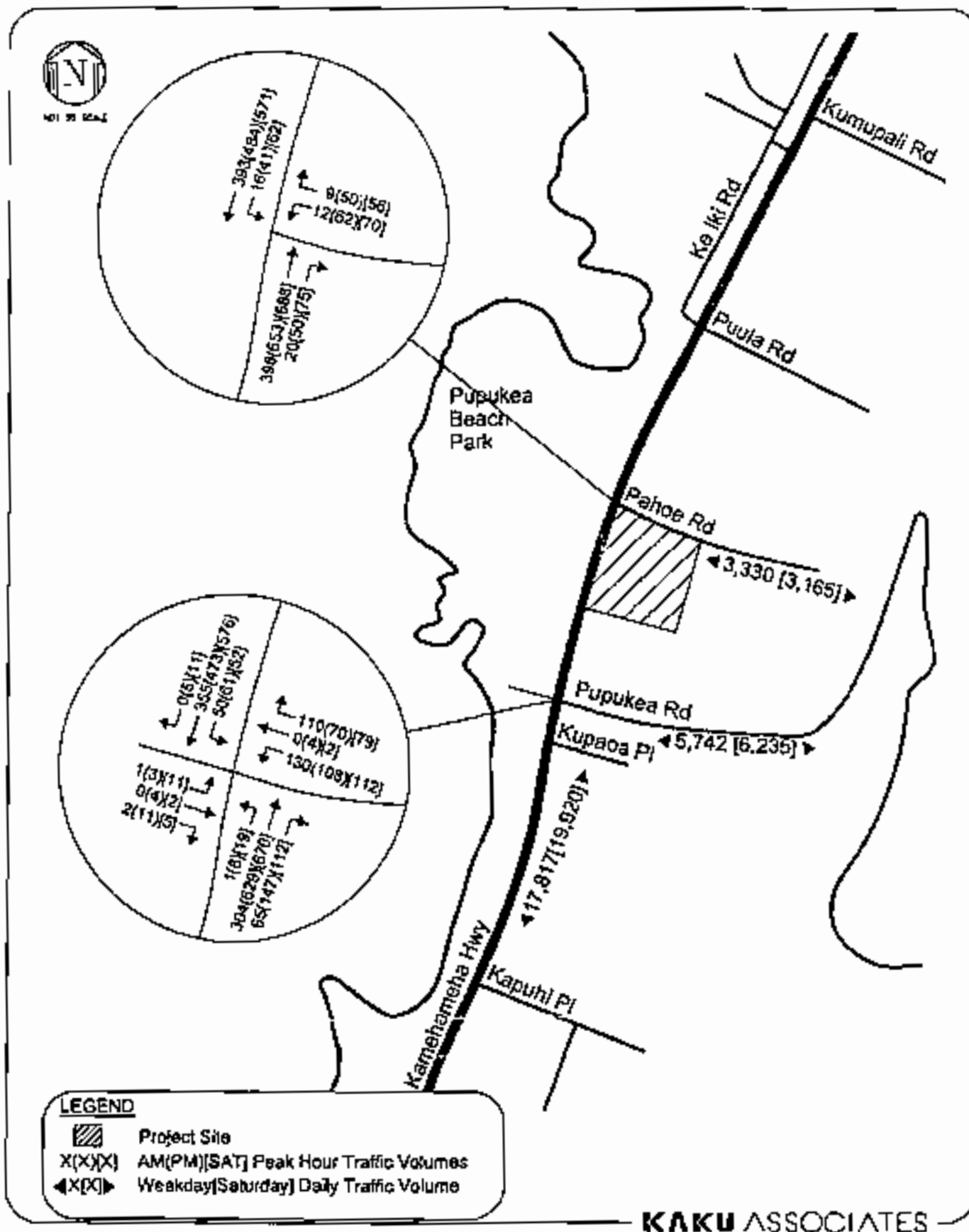


FIGURE 7  
PROJECT TRAFFIC DISTRIBUTION



**FIGURE 8**  
**PROJECT ONLY PEAK HOUR TRAFFIC VOLUMES**





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FIGURE 9  
CUMULATIVE PLUS PROJECT PEAK HOUR TRAFFIC VOLUMES

#### IV. FUTURE YEAR TRAFFIC IMPACT ANALYSIS

The traffic impact analysis compares the projected levels of service at each of the study intersections under the cumulative base and cumulative plus project conditions to estimate the traffic impacts caused by the proposed project.

##### SIGNIFICANT TRAFFIC IMPACT CRITERIA

The City and County of Honolulu have not established an officially adopted significance impact criteria for assessing the level of significance for project related impacts on the operating condition of intersections. It is, however, recognized that the potential significance of a proposed project's impact is measured by either the change in the LOS to an unacceptable condition or the change in the average vehicular delay, depending on the base LOS. For example, if an intersection is operating at LOS D or better before the addition of project traffic, the project is expected to have a significant impact if it is projected to operate at LOS E or F after the addition of project traffic. Typically, if the base LOS is E or F, significance is defined in terms of change in the V/C ratio (as calculated by the HCM operational method). This difference in methodology is part of the criteria recognizing that average vehicular delay cannot be calculated using the HCM operational method if the projected traffic volume at one or more of the approaches at an intersection would result in over-saturated conditions.

##### CUMULATIVE BASE TRAFFIC CONDITIONS

The cumulative base peak hour traffic volumes were analyzed to determine the projected levels of service for the analyzed intersections. Table 5 summarizes the results of the analysis. During weekday morning and evening peak periods, the intersection at Pupukea Road is projected to

**TABLE 5**  
**INTERSECTION LEVEL OF SERVICE ANALYSIS - FUTURE CONDITIONS**

Intersection	Peak Hour	Cumulative Base (2006)			Cumulative Plus Project (2006)			Significant Impact?
		Delay (sec)	V/C	LOS	Delay (sec)	V/C	LOS	
1. Kamehameha Hwy & Pupuaka Rd	AM	10.8 sec	0.279	B	10.7 sec	0.287	B	NO
	PM	6.8 sec	0.471	A	6.8 sec	0.492	A	NO
	SAT	6.9 sec	0.463	A	6.8 sec	0.495	A	NO
2. Kamehameha Hwy & Pahoe Rd [a]	AM	8.1 sec	-	A	13.6 sec	-	B	NO
	PM	21.1 sec	-	C	23.9 sec	-	C	NO
	SAT	20.6 sec	-	C	33.0 sec	-	D	NO

Note:

[a] - Intersection is stop sign controlled on the minor approach.

operate at LOS B and A, respectively. During the Saturday midday peak period, the intersection is projected to operate at LOS A.

The intersection at Pahoe Road is projected to operate at LOS A and LOS C during the morning and evening peak hours, respectively. The projected level of service during the Saturday midday peak period is LOS C.

#### **CUMULATIVE PLUS PROJECT TRAFFIC CONDITIONS**

The cumulative plus project peak hour traffic volumes, illustrated in Figure 7, were analyzed to determine the projected future operating conditions with the addition of traffic generated by the proposed project. The two intersections are projected to operate at LOS D or better during all analyzed periods. The results of the cumulative plus project analysis are presented in Table 5.

#### **PROJECT IMPACTS**

While the City and County of Honolulu have not established significance impact incremental criteria, the minimum acceptable level of service is LOS D. Using this policy as a determination of project impacts, the North Shore Center at Pupukea would not impact the street system in a way that exceeds the minimum acceptable level of service. The analyzed locations would continue to meet the requirement to operate at LOS D or better after the addition of project traffic. Therefore, no significant project impacts are anticipated.

## **V. PARKING AND SITE ACCESS**

This chapter discusses the issues of parking and site access in relation to the North Shore Center at Pupukea.

### **PARKING**

This discussion compares the proposed parking supply on the project site to the amount of spaces required by the Revised Ordinances of Honolulu (ROH). Section 21, Article 6 of the ROH requires new retail developments to provide a total of one parking space per 300 square feet. This requirement results in a minimum requirement of 249 parking spaces for the proposed project. The proposed project supply of 249 spaces, of which seven spaces are designated handicapped accessible, satisfies the minimum parking code requirements.

The provision of handicapped accessible spaces in new construction is governed by the Americans with Disabilities Act (ADA). The total number of parking spaces provided in the parking lot determines the number of accessible spaces that are required as indicated in Part 38, Appendix A, Section 4.1.2 of the ADA. The minimum number of accessible spaces required is seven spaces, for parking lots totaling 201 to 300 spaces. The proposed accessible parking of seven spaces satisfies the minimum ADA requirements for new construction.

### **SITE ACCESS**

Project plans include the use of two driveways Pahoe Road to provide access to the site. The primary parking area, the underground parking facility beneath the project, is accessible from the first driveway located makai of Kamehameha Highway on Pahoe Road. The secondary parking area, a small surface lot located on the mauka side of the building, is accessed via a driveway located at the rear of the project site off Pahoe Road.

#### **Northbound Deceleration Lane**

An analysis was conducted to verify the necessity of a deceleration lane for the northbound right-turns off Kamehameha Highway and Pahoe Road. The current configuration of the northbound approach would allow for a shared through/right-turn lane. Table 5 summarizes the criteria used to determine the necessity of a deceleration lane according to the *Access Management Manual* (Transportation Research Board, 2003). For each roadway classification, right-turn volumes must exceed the value given for the posted speed to qualify for a right-turn deceleration lane. Kamehameha Highway is classified as a rural arterial with a posted speed limit of 35 miles per hour. Therefore, the northbound right-turn volumes at Kamehameha Highway and Pahoe Road must exceed 25 vehicles to meet criteria for a right-turn deceleration lane. Traffic projections developed for this project indicate that approximately 50 vehicles per hour would make the right-turn from northbound Kamehameha Highway onto Pahoe Road with the addition of project traffic. Therefore, this intersection is a candidate for a right-turn deceleration lane to assist in the safe completion of this movement.

TABLE 6  
RIGHT-TURN DECELERATION LANE CRITERIA  
TURNING VOLUMES VS. POSTED SPEED

Right-Turn Volume Threshold (vehicles per hour)	Posted Speed	
	<45 mph	≥45 mph
Roadway Classification		
Rural Arterial - A	25	25
Rural Arterial - B	25	25

The design standard of the right-turn deceleration lane is also discussed in the *Access Management Manual*. The recommended width for such lanes is typically the same as adjacent through lanes, in this case 12 feet. The typical length of the deceleration lane is dictated by the speed of adjacent traffic lanes.

Based on the desirable maneuvering distance table found in the manual, a vehicle traveling 35 mph will require approximately 220 feet to slow down. An additional calculation was performed using the right-turn storage equation; the results indicate that another five feet of queue length will be necessary. A total of 225 feet will be required for deceleration and storage; additionally, a 50-foot transition taper is recommended to ease traffic into the deceleration lane. Therefore, 275 feet will be required to accommodate the deceleration lane and transition taper.

Within the context of the project frontage along Kamehameha Highway, a 125-foot lane will be provided and the additional 150 feet needed for deceleration will extend into the proposed bus pullout. The bus pullout is 85 feet long with a 60-foot transition; combined with the 70 foot transition area between the bus pullout and the deceleration lane, this will adequately provide the additional space need for deceleration. The transition between the bus pullout and the deceleration lane will be demarcated with a striped and hatched area, allowing shared usage. Bus schedules indicate that the pullout will see usage approximately four times within an hour. This light usage by transit will facilitate the sharing of the two spaces.

The addition of a deceleration lane will likely require the widening of Kamehameha Highway directly in front of the project site. According to right-of-way maps from HDOT, the public right-of-way accompanying Kamehameha Highway is 50 feet wide; field measurements indicate that the northbound lane is 12 feet wide. Kamehameha Highway will require widening at the intersection of Pahoe Road. This will likely require widening along the mauka side of Kamehameha Highway and onto the project site to accommodate the additional lane.

#### Southbound Gap Analysis

A detailed traffic operations analysis was also conducted at the Intersection of Kamehameha Highway and Pahoe Road to assess the operational efficiency of this intersection with the intersection addition of project-generated traffic. Under current conditions, vehicles traveling southbound on Kamehameha Highway desiring to turn left at Pahoe Road would share the travel lane with vehicles that expect to travel through the intersection. The ability to complete this left turn is limited to the number and size of the gaps in the opposing northbound traffic and, therefore, could potentially impede the flow of southbound through traffic.

The traffic volumes for this intersection after the additional of project-generated traffic are projected to be 41 vehicles per hour during the evening peak hour, the most critical peak period. A gap analysis was performed for the project operating conditions during the evening peak hour using the HCM 2000 Unsignalized Intersection Methodology. Based on the peak traffic volumes projected at this intersection, the results of the analysis indicates that an average critical gap of approximately 4.1 seconds would be available for each of the left turns attempted at this location, resulting in an average queue length of approximately 0.2 vehicles. In other words, on average only one of every five vehicles traveling southbound through this intersection during the evening peak hour would encounter a delay due to a left-turning vehicle. On average, there will be one left-turning vehicle every 80 seconds.

In addition to the gap analysis, a maximum queue length test was performed to project the worst case queuing scenario. Again, the HCM 2000 Unsignalized Intersection Methodology was utilized for this test. Results from the traffic analysis indicate that the volume/capacity (V/C) ratio for the Kamehameha Highway and Pahoe Road intersection is 0.532 during the evening peak hour. The daily traffic volume is approximately 15,000 vehicles per day. Based on the volume-to-capacity ratio and total daily traffic volume, it is estimated that the maximum queue length expected to occur at this intersection resulting from left-turning vehicles would be four vehicles. Because this worst-case scenario is only expected to occur very infrequently, a dedicated left-turn pocket is not considered to be necessary for this movement.



## VI. SUMMARY AND CONCLUSIONS

This study was undertaken to analyze the potential traffic impacts of the proposed North Shore Center at Pupukea on the local street system. The following summarizes the results of this analysis:

- The proposed project is composed of a new multilevel structure with below-grade parking, which would provide 73,614 square feet of neighborhood retail space, and street improvements. Trip generation estimates for the project indicate that the proposed project is expected to generate a total of 3,263 daily weekday vehicle trips and 3,095 Saturday daily vehicle trips. Project-generated traffic during the morning peak hour is 53 vehicles per hour (vph), 199 vph during the evening peak hour, and 256 vph during the Saturday midday peak hour.
- The intersections of Kamehameha Highway/Pupukea Road and Kamehameha Highway/Pahoe Road were selected for evaluation during weekday morning and evening peak hour and the Saturday midday peak hour periods.
- Under existing conditions, both intersections operate at LOS C or better during all analyzed periods.
- Under cumulative base conditions, i.e., future conditions without the project, traffic projections indicate that the intersections will continue to operate at LOS C or better during all analyzed periods.
- Under cumulative plus project conditions, i.e., future conditions with the proposed project, traffic projections indicate that the intersection of Kamehameha Highway and Pupukea Road will continue to operate at LOS B or better during all analyzed periods. The intersection of Kamehameha Highway and Pahoe Road is projected to operate at LOS C and LOS D during the evening peak hour and Saturday midday peak period, respectively.
- Although the City and County of Honolulu has not established an official quantitative basis or criterion to determine significant impact of project traffic, the minimum acceptable level of service is LOS D. Therefore, since both intersections will continue to operate at LOS D or better during all time periods even with the addition of project traffic, it can be determined that the project will not create any significant impacts on the surrounding street system.
- The parking code requirement for this project is 249 spaces. The project will provide 249 off-street parking spaces, of which seven will be disabled accessible, satisfying the parking code and Americans with Disabilities Act requirements.

APPENDIX A  
INTERSECTION LANE CONFIGURATIONS



NOT TO SCALE

## INTERSECTION LANE CONFIGURATIONS

	<u>EXISTING CONDITIONS</u>	<u>FUTURE CONDITIONS</u>
1. Kamehameha Hwy & Pupukeh Rd		Same As Existing
2. Kamehameha Hwy & Pahoe Rd		

Legend  
4 Stop Controlled

**KAKU ASSOCIATES**

**Appendix C**

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**Avifaunal and Feral Mammal  
Field Survey of TMK 5-9-11:17,  
Pupukea, Oahu**

**AVIFAUNAL AND FERAL MAMMAL FIELD SURVEY  
OF TMK 5-9-11:17 PUPUKEA, Oahu**

**Prepared for:**

**Belt Collins Hawaii Ltd.**

**Prepared by:**

**Phillip L. Bruner  
Environmental Consultant  
Faunal (Bird and Mammal) Surveys  
BYUH Box 1775  
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Laie, Hawaii 96762**

**5 July 2004**

## INTRODUCTION

This report presents the findings of a one day (1 July 2004) field survey of birds and mammals on a 2.1 acre site (TMK 5-9-11:17) located at Pupukea, Oahu. References to pertinent published sources are also included to provide a broader perspective of birds and mammals known from this region of Oahu. The goals of the field survey were to:

- 1- Record the species of birds and mammals found on or near the property.
- 2- Note any features of the site that contain habitat of particular importance to native and migratory birds.

## GENERAL SITE DESCRIPTION

The property is presently covered in dense alien vegetation. There are no wetlands on the site. Surrounding lands are developed as either residential lots or commercial properties.

## METHODS OF THE FIELD SURVEY

The site was surveyed by walking the perimeter and areas open enough to permit access. The site was also examined from above along Pupukea Road. All species of birds and mammals seen or heard on the site were noted. No trapping of mammals

was attempted. The length and nature of this survey did not warrant trapping. Weather during the survey was partly cloudy with brief, light, passing showers.

The scientific and common names used in this report follow Pyle (2002) and Honacki et al. (1982). These two sources use the names currently found in the scientific literature.

## **RESULTS OF THE FIELD SURVEY**

### **Native Land Birds:**

No native land birds were recorded on the survey. This property is too low in elevation and too disturbed with alien vegetation and surrounding commercial and residential properties to be attractive to native land birds.

### **Native Waterbirds:**

No native waterbirds were found on the site and none would be expected due to the absence of appropriate habitat for these species.

### **Seabirds:**

No seabirds were observed on the survey. This site is too exposed to disturbance and predators for nesting seabirds.

### **Migratory Shorebirds:**

No migratory shorebirds were tallied on the survey. This site does not presently contain suitable habitat for shorebirds since they are on their arctic breeding grounds

from late April until August. The most abundant shorebird seen in Hawaii is the Pacific Golden-Plover (*Pluvialis fulva*). Much research has been conducted on this species (Johnson et al. 1981, 1989, 1993, 2001a, 2001b, 2004). The Hawaiian name of Pacific Golden-Plover is Kolca. They are territorial while on the wintering grounds here in Hawaii. Lawns and habitats with low vegetation such as pastures are preferred foraging sites for these birds. None of the migratory shorebirds which winter in Hawaii are listed as either threatened or endangered.

**Alien (Introduced) Birds:**

A total of 12 species of alien (introduced) birds were recorded on the field survey. Table One gives the names of these species. None of these birds are listed as either threatened or endangered. The array of species found on the survey was typical of what would be expected in this type of habitat in this region of Oahu (Parr et al. 1987, Hawaii Audubon Society 1997).

**Mammals:**

Two Small Indian Mongoose (*Herpestes auro-punctatus*) were seen along the edge of the site at Pahoe road. No cats, rats or mice were observed but likely occur in this area. The native endangered Hawaiian Hoary Bat (*Lasiurus cinereus semotus*) is more common on Kauai and the Big Island rather than Oahu (Kepler and Scott 1990). I have seen bats above this property near the Pupukea Boy Scout Camp as recently as five years ago. It is possible they also forage at lower elevation along the coast. This species roosts



solitarily, usually in trees. They forage for flying insects at dusk as well as after dark (Tomich 1986).

### CONCLUSIONS

This field survey found the typical array of alien birds and mammals expected in this type of habitat at this elevation. No unexpected species were recorded. No habitat of particular importance to native and migratory birds was found on the property. The native, endangered Hawaiian Hoary Bat does occur at higher elevation above this site. It could forage and roost on or near the coast. Because this species is rare on Oahu the chances of seeing it on this property are likely very low. The Hawaiian Hoary Bat can utilize urban as well as less developed habitats (pers. observations). The development of this property may alter the relative abundance of some alien birds in the immediate area.

TABLE ONE

Alien (introduced) birds recorded on a field survey of TMK 5-9-11:17 Pupukea, Oahu on July 1, 2004.

COMMON NAME	SCIENTIFIC NAME
Red Jungle Fowl	<i>Gallus gallus</i>
Spotted Dove	<i>Streptopelia chinensis</i>
Zebra Dove	<i>Geopelia striata</i>
Red-vented Bulbul	<i>Pycnonotus cafer</i>
White-rumped Shama	<i>Copsychus malabaricus</i>
Japanese White-eye	<i>Zosterops japonicus</i>
Common Myna	<i>Acridotheres tristis</i>
Red-crested Cardinal	<i>Paroaria coronata</i>
Northern Cardinal	<i>Cardinalis cardinalis</i>
House Finch	<i>Carpodacus mexicanus</i>
House Sparrow	<i>Passer domesticus</i>
Common Waxbill	<i>Estrilda astrild</i>

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**Appendix D**

**Botanical Field Study Letter  
Report, TMK 5-9-11:17**

## **CHAR & ASSOCIATES**

Botanical/Environmental Consultants

4471 Puu Panini Ave.  
Honolulu, Hawaii 96816  
(808) 734-7820

04 August 2004

Belt Collins Hawaii Ltd.  
2153 North King Street, Suite 200  
Honolulu, Hawaii 96819-4554

Attention: Lee Sichter

SUBJECT TMK 5-9-11: 17  
Pupukea, O'ahu

Dear Mr. Sichter:

Field studies to assess the botanical resources on the Pupukea parcel were conducted on 14 July 2004. The parcel is composed of about 2.1 acres located on the mauka side of Kamehameha Highway, between Foodland and Pahoe Road. Along the highway side of the property, there are a few small shops, but most of the parcel is covered by dense koa haole (Leucaena leucocephala) thicket.

The primary objectives of the field studies were to:

- 1) prepare a general description of the vegetation on the project site;
- 2) search for threatened and endangered species as well as species of concern;  
and
- 3) identify areas of potential environmental problems or concerns and propose appropriate mitigation measures.

The information from this study will be used in an Environmental Assessment document. A small shopping center is proposed for the Pupukea parcel.

### Description of the Vegetation

The plant names used in this report follow Wagner et al. (1990) and Wagner and

Herbst (1999). The few recent name changes are those reported in the Hawaii Biological Survey series (Evenhuis and Eldredge, eds. 1999-2002).

The vegetation on the majority of the property is characterized by dense koa haole thicket, 12 to 25 ft. tall, with clumps of Guinea grass (Panicum maximum), 3 to 4 ft. tall, filling in the matrix between the shrubs. Other plants found scattered throughout the koa haole thicket include young trees of Chinese banyan (Ficus microcarpa) and African tulip tree (Spathodea campanulata), shrubs of Christmas berry (Schinus terebinthifolius) and castor bean (Ricinus communis), and vines of Neotonia wightii, blue potato vine (Solanum seaforthianum), and passion fruit or liliko'i (Passiflora edulis forma flavicarpa). In places where the koa haole canopy cover is very dense and the ground heavily shaded, the more shade-tolerant Chinese violet (Asystasia gangetica) forms lumpy mats, 1 to 2 ft. tall.

Where the parcel borders Pahoe Road and a residential lot, a number of ornamental/landscape species are found in small numbers. These are mock orange (Murraya paniculata), mother-in-law's tongue (Sansevieria trifasciata), arrowhead vine (Synгонium podophyllum), taro vine (Epipremnum pinnatum), autograph tree (Glusia rosea), airplant (Bryophyllum pinnatum), and a tangerine tree (Citrus reticulata).

Behind the small shops along the highway, the koa haole thicket appears to have been cleared somewhat recently. Tall, robust clumps of Guinea grass make up most of the plant cover in this area with scattered shrubs of koa haole. Ivy gourd vines (Coccinia grandis) form dense tangles on the koa haole shrubs. Other weedy species in this more open area occur as scattered, smaller patches and include Spanish needle (Bidens pilosa), Neonotonia, Philippine violet (Barleria cristata), sourbush (Pluchea carolinensis), hairy abutilon (Abutilon gradifolium), false mallow (Malvastrum coromandelianum), garden spurge (Chamaesyce hypericifolia), and field bindweed (Ipomoea obscura).

Discussion

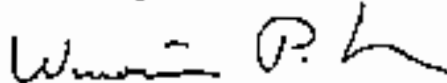
The vegetation on the Pupukea parcel (TMK 5-9-11: 17) is dominated by introduced or alien plants such as koa haole, Guinea grass, Christmas berry, ivy gourd, etc. Introduced species are all those plants which were brought to the Hawaiian Islands by humans, intentionally or accidentally, after Western contact, that is, Cook's arrival in the islands in 1778.

No native species were observed on the study site. No threatened and endangered species or species of concern (U.S. Fish and Wildlife Service 1999a, 1999b; Wagner *et al.* 1999) occur on the parcel. This is not surprising as the koa haole thicket and dense clumps of Guinea grass tend to exclude most other species. The parcel is also located in an urbanized/developed environment, and appears to have been graded in the past as the topography is level throughout.

Given these findings, the proposed development of the site is not expected to have a significant negative impact on the botanical resources. There are no botanical reasons to impose any restrictions, conditions, or impediments to the proposed use of the parcel for a small shopping center.

Please do not hesitate to contact me should you have any questions regarding the findings in this report.

Sincerely,



Winona P. Char

References

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**Appendix E**

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**Archaeological Assessment for  
the Proposed North Shore Center  
at Pupukea (TMK 5-9-11:27)  
Located in Pupukea, Haupua‘a,  
District of Kō‘olaupā, Oahu**

ARCHAEOLOGICAL ASSESMENT FOR  
THE PROPOSED NORTH SHORE CENTER  
AT PŪPŪKEA (TMK 5-9-11:17) LOCATED  
IN PŪPŪKEA AHUPUA'A, DISTRICT OF  
KO'OLAULOA, OAHU

*Prepared by:*

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30 August 2004

## ABSTRACT

*Pacific Legacy, Inc.*, under contract to Belt Collins Hawaii, Ltd. conducted an archaeological assessment for the proposed North Shore Center at Pūpūkea, island of O'ahu, Hawai'i (TMK 5-9-11:17). The project area is approximately 2.143 acres in size. A site assessment survey was conducted on August 19, 2004 by James McIntosh, B.A. and Juanita Aguerreberre Beck, B.A., with Paul L. Cleghorn serving as Principal Investigator. A total of eight person hours were spent in the field.

Background and literature search indicates that there is no record of any Land Commission Awards for the project area or the immediate vicinity. The parcel was formerly in commercial agriculture (vegetable and flowers) prior to the 1950's and contained no structures or buildings.

No traditional or historic cultural remains were observed on the parcel. Recent earth moving activities (dumping) and modern farming remnants were documented. Given the use of the property as modern farm land and the disturbance of recent dumping is unlikely that any cultural deposits are present on the parcel. As result, no further work is recommended. However, should any cultural deposits be found during construction activities, the State Historic Preservation Division must be notified (Elaine Jourdane, 692-8027). If human remains be encountered, construction activities must halt at once and the State Historic Preservation Division must be notified immediately (Nathan Napoka, 587-0193).

## TABLE OF CONTENTS

<b>1.0 INTRODUCTION</b>	<b>3</b>
1.1 Project Location	3
1.2 Environmental Setting	3
<b>2.0 TRADITIONAL AND CULTURAL LAND USE</b>	<b>7</b>
2.1 Historic Era	7
2.2 The Great Māhele	8
<b>3.0 ARCHAEOLOGICAL BACKGROUND</b>	<b>10</b>
<b>4.0 SETTLEMENT PATTERN</b>	<b>12</b>
<b>5.0 SURVEY RESULTS</b>	<b>13</b>
<b>6.0 DISCUSSION AND RECOMMENDATIONS</b>	<b>14</b>
<b>7.0 REFERENCES</b>	<b>15</b>
<b>APPENDIX</b>	<b>17</b>

## LIST OF FIGURES

Figure 1. Project Location map on USGS Quadrangular Map.	4
Figure 2. TMK Map.	5
Figure 3. Ahupua'a map showing Pupukea ahupua'a.	8
Figure 4. 1904 map with approximate project location.	9

## 1.0 INTRODUCTION

Pacific Legacy, Inc., under contract to Belt Collins Hawaii, Ltd., conducted an archaeological assessment for the proposed North Shore Center at Pūpūkea Project. The project area is approximately 2.143 acres in size and is located in Pūpūkea on the north shore of the island of O'ahu, Hawai'i (TMK 5-9-11:17).

An archaeological assessment is generally conducted when there is a low likelihood of a project encountering cultural resources. The Pūpūkea Project is located in an area demarcated as "Laniākea Farm Lots" on the Tax Maps for this area. This suggests that mechanical land alterations may have taken place on the subject parcel and there may be a low likelihood that any surface archaeological resources will be present. The purpose of this archaeological assessment is to test this hypothesis. The archaeological assessment consisted of archival research of the project area, and a half day field inspection of the property. The purpose of this investigation is to:

1. determine a history of land use in this portion of the north shore of O'ahu;
2. determine if any archaeological sites have been recorded in the vicinity of the project; and;
3. determine if there is evidence of bulldozing or land altering activities on the subject parcel.

Archival research was conducted on O'ahu at the following repositories:

- State Historic Preservation Division
- State Archives
- State Survey Office
- Bureau of Conveyances

### 1.1 PROJECT LOCATION

The project area is located on the North Shore of O'ahu in the area known as Pūpūkea. It is located directly *maka* of Shark's Cove and Kamehameha Highway, and is situated adjacent to the Foodland Shopping Center (Figure 1 & Figure 2). The project is located in the traditional land division (*ahupua'a*) of Pūpūkea within Ko'olaupoko District.

### 1.2 ENVIRONMENTAL SETTING

Vegetation in the project area consists of *koe lula* (*Leucaena glauca*), bowstring hemp (*Sansevieria trifasciata*), Christmas berry (*Schinus terebinthifolius*) and various grasses.

Shark's Cove is the reef located *maka* of the project area that is comprised of basalt formations, which is shaped into a cove or inlet. A large variety of marine life can be seen in their natural environment (i.e., gastropods, fish, white tip sharks, turtles, etc). The ocean drops off to about 25 feet at the edge of the reef. The reef can only be accessed during the months of March through October when the seas are calm. During the winter months, the reef cannot even be seen due to the large waves (up to 40-50 feet) (Hawaiiweb.com 2004).

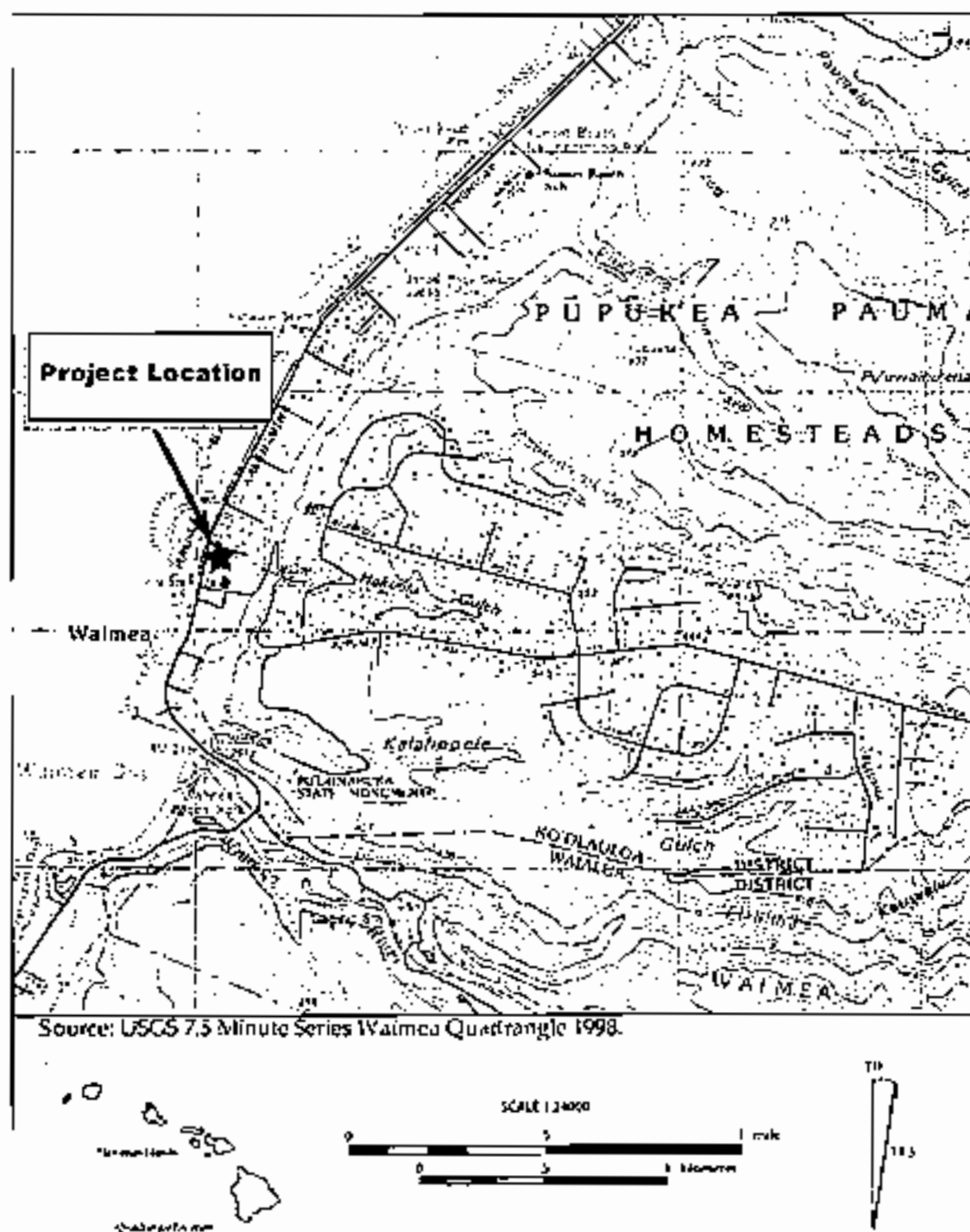


Figure 1. Project Location map on USGS Quadrangular Map.

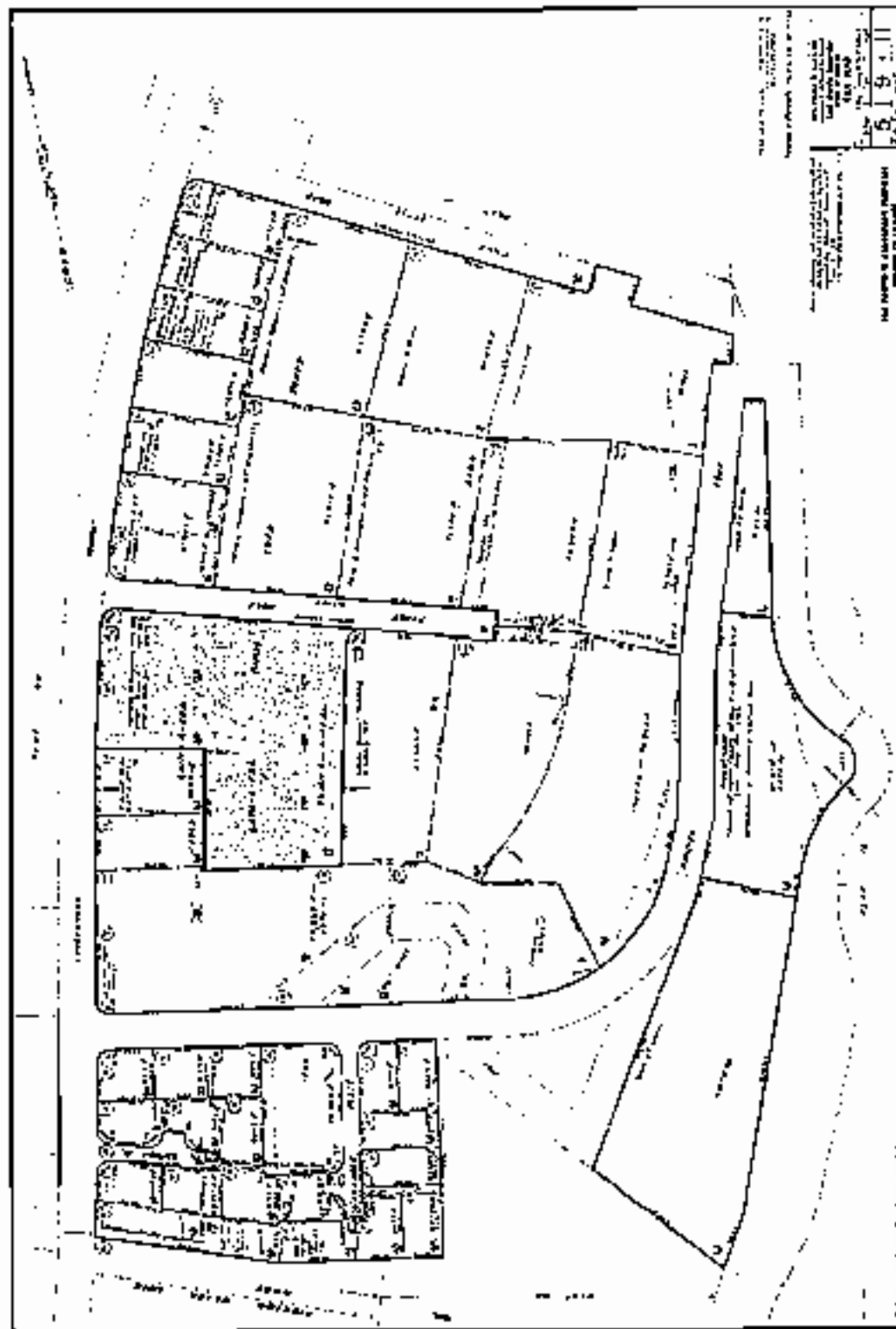


Figure 2. TMK Map.

The soils for the project area are composed of Waialua silty clay, 3 to 8 percent slopes in the Waialua Series. Foote et al. (1972) describes these soils as follows:

**Waialua Series**

This series consists of moderately well drained soils on alluvial fans on the island of Oahu. These soils developed in alluvium weathered from basic igneous rock. They are nearly level to steep. Elevations range from 10 to 100 feet. The annual rainfall amounts to 25 to 50 inches; most of it occurs between November and April. . On this soil, runoff is slow and the erosion hazard is slight. . This soil is used for sugarcane, truck crops, and pasture (Foote et al. 1972:128).

**Waialua silty clay, 3 to 8 percent slopes**

On this soil, runoff is slow and the erosion hazard is slight. This soil is used for sugarcane, truck crops and pasture (Foote et al. 1972:129).



## 2.0 TRADITIONAL AND CULTURAL LAND USE

This section will discuss the traditional and cultural land use practices relevant to the project area prior to Western Contact in 1778. Many of these practices continued into the post-Contact era and were described by Native Hawaiians and Westerners on O'ahu. These accounts provide insight into the traditional and cultural land use and practices of the general area prior to Contact. In addition, historical documents and records provide further insight into traditional practices of the area.

Traditionally, O'ahu was divided into 6 districts: Ko'olaupoko, Ko'olaupua, Waialua, Wai'anae, 'Ewa and Kona. The project area is located in the Ko'olaupua district, which is comprised of 34 *ahupua'a*. Figure 1 shows that the project area is located in the *ahupua'a* of Pūpūkea (Figure 3).

The area of Pūpūkea was said to be *kahuna* (priests) lands:

... Lands given to the kahunas were Waimea, Pupukea, Waihole and Hakipu'u. These lands belonged to the priests from ancient times down to that of Kāhahana. In the time of Kāhekili and Kālanikupule, these were given to the kahunas and also in the reign of Kamehameha I (Kamakau 1992:231).

### 2.1 HISTORIC ERA

The earliest written descriptions of the Ko'olaupua District are from the first landings of European and American sailing ships at Waimea Bay, directly south of the project area (at the border of the Waialua and Ko'olaupua Districts). After Captain Cook's landing in 1779, reports of the availability of fresh water and sheltered anchorage at Waimea encouraged others to follow (Takemoto 1974: 6).

Perhaps the most infamous of the early historic landings on the north shore of O'ahu was by the British ship *Daedalus* in 1792, when the landing party was ambushed. This confrontation resulted in the death of three crew members of the *Daedalus*, and the surviving crew members retaliated with gunfire aimed widely throughout Waimea valley. The number of Hawaiian casualties is unknown. The British retaliation also resulted in damage to Pu'u O Mahuka Heiau, a well known *heiau* located on the Pūpūkea Ridge overlooking Waimea Valley (Estioko-Griffin 1986). Some reports indicate that the bodies of the three slain crew members of the *Daedalus* were sacrificed at Pu'u O Mahuka.

The early historic period in Hawaii coincided with Kamehameha's conquest of the islands (ca. 1780 to 1810). This period involved a series of bloody wars and conflicts. Although the project area was not a key component in these wars, Kamehameha's followers and descendants came to control these and other territories. Much of the land around the project area became owned by Kamehameha III.



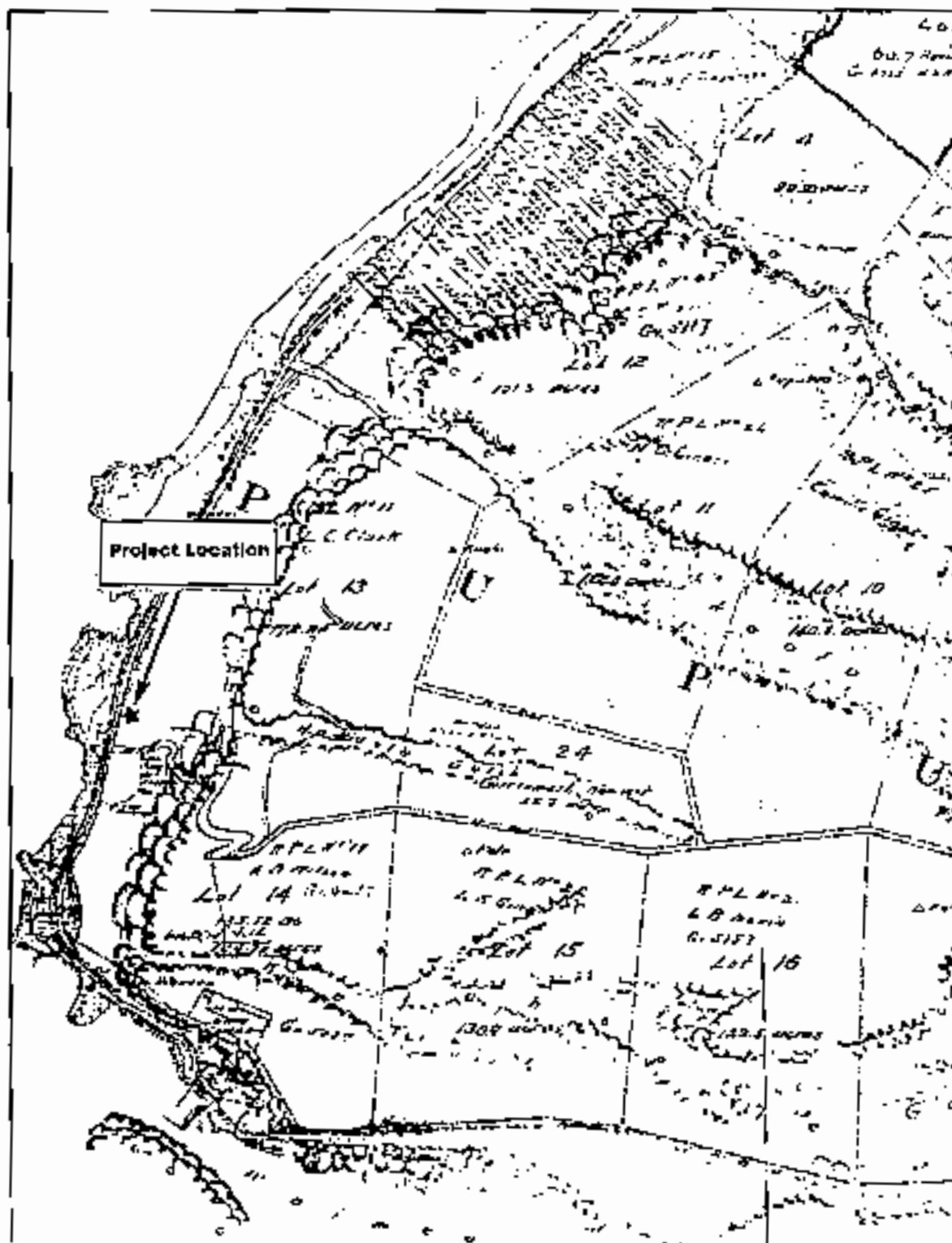


Figure 4. 1904 map with approximate project location.

### 3.0 ARCHAEOLOGICAL BACKGROUND

Several sites were known to exist south of the current project area, although none are located in the immediate vicinity of the project area. These sites were initially recorded by J. Gilbert McAllister of the Bishop Museum, who conducted an island wide survey in the early 1930's. Below are several excerpts of McAllister's site descriptions which are taken from Sterling and Summers (1978).

#### Site 245, Fishing Shrine

Site 245. Top of the bluff known as Palipito Waimea Bay. Here there was once said to have been a fishing shrine (ko'a). The site is now planted in pineapples (McAllister 1933 in Sterling and Summers 1978: 129).

#### Site 248, Kuhale Heiau, was located on the north side of Waimea River

Site 248. A small heiau on the Kahuku side of the inlet, said to have been a fishing shrine (ko'a) or *uniu*. The present site is occupied by a haunted house which usually stands vacant and in which few people have ever lived (McAllister 1933 in Sterling and Summers 1978: 131).

#### Site 249, Pu'u o Mahuka Heiau is situated on the Pūpūkea ridge, south of the project area, with a commanding view south to Kaaena Point.

Site 249. Pu'u o Mahuka Heiau, located on the ridge north of the Waimea inlet. Approximately 300 feet in elevation. It is the largest heiau on Oahu. These adjoining enclosures form what was probably the heiau proper with two smaller inclosures (sic) on the sea side and on the edge of the pali, one directly in front of the other. They average about 25 by 35 feet in size with low surrounding stone walls. The lower inclosure of the heiau proper is smaller and is said by Thrum to be of more modern construction "to commemorate a kahuna's successful wager with an alii, but it is no part of it (the heiau)." Together the two larger inclosures (sic) are 520 feet in length. The lower contains a maze of small, low stone walls; the upper inclosure contains smaller terraces and platforms. . . . It is thought probable that the bodies of the three of Vancouver's men were sacrificed at this heiau. They were killed by the natives when attempting to procure water for the Daedalus at the mouth of the river. . . . Due to the rapid erosion of the loose soil surrounding the inclosures, the walls are being exposed and in some places undermined, causing them to fall, particularly at the southwest corner (McAllister in Sterling and Summers 1978: 142).

On December 29, 1962, Pu'u o Mahuka Heiau was declared a National Historic Landmark and placed on the National Register of Historic Places. It was subsequently placed on the Hawai'i Register on January 29, 1981.

McAllister also writes of the burials associated with the *heiau*:

Site 251. Burials, ridge north of the Waimea inlet. Rock shelters on the face of the cliff

upon which stands Puu o Mahuka helau (Site 249- -Koolauloa) have been used as burial caves. Only one of those visited now contains skeletal material. It appears to have been disturbed. The shelter is about 10 feet deep and 3 feet high and wide. It looks as though it had once been walled up. It contained a portion of a wooden platter, badly decayed, which was slightly more than 1 foot wide and probably 3 feet or more long. At one end is a suggestion of ornamentation. There were also three pointed saplings. The longest is 6.1 feet in length, 1 inch in diameter, and has one end artificially pointed. Though it is a rough sapling, it may represent a spear. Another is 4.3 feet long with one end pointed. The smallest is 2.2 feet long and appears to be artificially shaped. It is badly decayed. All appear to be of great age, and as the site is dry the material may have been preserved for a long time (McAllister 1933 in Sterling and Summers 1978:131-132).

There are no recorded sites to the north of the project area that were documented by McAllister. However, recent work conducted to the north of the project area at Sunset Beach has contributed to a plethora of sites and documentation for traditional land use (Haun and Henry 2001, McIntosh et al. 2000, and Athens and Magnuson 1998). Haun and Henry (2001) documented sites relating to agricultural use, water storage, habitation and burials. McIntosh et al. (2000) located three rockshelters used for burials and one terrace with an attached enclosure. Athens and Magnuson (1998) found subsurface midden deposits dating to prehistoric use AD 1502-1652.

#### 4.0 SETTLEMENT PATTERN

The paucity of historical documentation of the project area may be a reflection of the remoteness of this area apart from other major activity centers and also the agriculturally marginal nature of these lands. In the project area, the topography and climate are not well suited for traditional wetland cultivation techniques (Handy and Handy 1972: 463). However, the project area would have been well suited for dryland agriculture, as well as marine exploitation.

Based on previous work in the Sunset Beach area it appears that a sparse scattering of habitation sites would have been present in the *aliupua'a* of Pūpūkea, but the main focus of habitation was likely close to the shoreline and in areas closer to permanent water sources such as in Waimea (McIntosh et al 2000: Appendix A). LCAs for the area show that *kūlana* lots were used for dryland agriculture north of the project area, farther away from Waimea. The traditional land-use pattern for the project area was likely similar to that documented in these LCAs. The coastal plain was probably used for dryland agricultural pursuits, primarily raising 'uala (sweet potato, *Ipomoea batatas*).

The current project area would have been an ideal location for habitation considering it is in close proximity to water sources in Waimea combined with its wealth of marine resources. Marine exploitation at Shark's Cove would have provided an abundance of marine resources during summer months and calm periods during the winter. Evidence of this sort would include subsurface midden deposits. It is likely that a fishing shrine, (*ko'a*) may have been present in the vicinity of the project area. At minimum, temporary habitation could have been likely in the project area considering it's proximity to Shark's Cove.

## 5.0 SURVEY RESULTS

A site assessment survey was conducted on August 19, 2004 by James McIntosh, B.A. and Juanita Aguerreberre Beck, B.A. A total of eight person hours were spent in the field. The project area is bounded by Kamehameha Hwy. to the west, Pahoe Rd. and residential housing to the north, residential housing to the east, and Foodland Supermarket and other commercial businesses to the south. Nearly the entire 2.143 acre project area is covered with vegetation. The western portion of the project area bordering Kamehameha Hwy. contains two wooden structures occupied by retail businesses and a permanent food wagon. There is a small unpaved parking area for the wooden structures and a larger crushed-coral parking lot for the food wagon. A selection of photographs of the project area is presented in the Appendix at the end of this report.

A basalt cobble and boulder alignment extends along the Pahoe Rd. side of the parcel. The alignment is less than two-courses high and is approximately 25 meters long. On top of the alignment is a barbed wire fence that extends along a segment of the wall. Saw cut wooden posts support the barbed wire. These serve as a property boundary demarcating the northern end of the parcel.

The vegetated portion of the western side of the property is extremely disturbed by mechanical activity. There are several small mounds of mixed gravel and soil present along with concrete chunks, concrete masonry units, and concrete slabs remnants. The vestige of at least one abandoned automobile is also present on the site.

There is no evidence of earth moving activity in the eastern portion of the property. In this area, black plastic sheeting fragments and black rubber irrigation hoses were observed throughout; evidence of agricultural activities that once took place on the site and were simply abandoned. The east and south edges of the property are demarcated by a chain-link fence line.

No traditional or historic cultural remains were observed on the parcel. Given the use of the property as modern farm land and the disturbance of recent dumping is unlikely that any cultural deposits are present on the parcel. Further, it is unlikely that any subsurface features are present on the parcel, given the nature of the soil present (silty clay).

In a telephone conversation with Ms. Susan Niimi (with James McIntosh on August 24, 2004), who's family has owned the property since the 1950's, she stated that the concrete slabs found on the site were deposited there less than a year ago by the former owner of the lunch wagon located on the property. The concrete are the remnants of a handicap ramp that was used for access to the lunch wagon. She says that the area was once a vegetable garden owned by Mr. Chin Ho. Ms. Niimi says that there were never any structures on the property.

## 6.0 DISCUSSION AND RECOMMENDATIONS

At the request of Belt Collins Hawaii, Ltd., Pacific Legacy, Inc. conducted an archaeological assessment for the proposed North Shore Center at Pūpūkea. The project area is approximately 2.143 acres in size and is located Pūpūkea *ānupua* on the north shore of the island of O'ahu, Hawai'i (TMK 5-9-11:17). An archaeological assessment is generally conducted when there is a low likelihood of a project encountering cultural resources.

A search of available literature indicates that there is no record of Land Commission Awards for the project area or the immediate vicinity. The parcel was formerly in commercial agriculture (vegetable and flowers) prior to the 1950's and contained no structures or buildings. Soils in the project area are derived from the Waialua Series, specifically, silty clay, 3 to 8 percent slopes. This soil type is developed in alluvium weathered from basic igneous rock that forms the cliffs upslope.

The archaeological assessment conducted in the project area failed to identify any archaeological features. It appears that a portion of the project area has been recently used as a dump for material generated in other sections of the property (concrete rubble). Also, remnants of black plastic sheeting and rubber irrigation hose were found on the site, evidence the land was formerly used for commercial agriculture. No traditional or historic cultural remains were observed on the parcel.

Based upon the information presented above, no archaeological inventory survey is recommended. Given the type of soil that is present, the use of the property for modern agricultural activities, and the disturbance of recent dumping, it is very unlikely that any cultural deposits are present on the parcel. However, should any cultural deposits be found during construction activities, the State Historic Preservation Division must be notified (Elaine Jourdan, 692-8027). If human remains be encountered, construction activities must halt at once and the State Historic Preservation Division must be notified immediately (Nathan Napoka, 587-0193).



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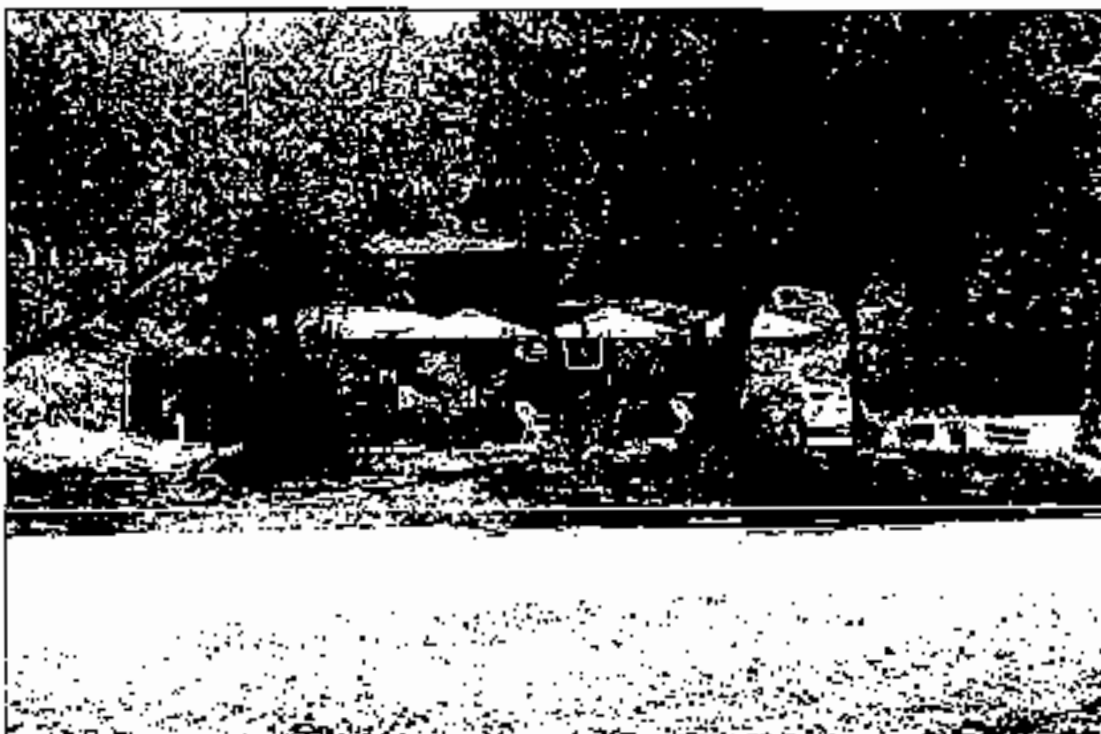
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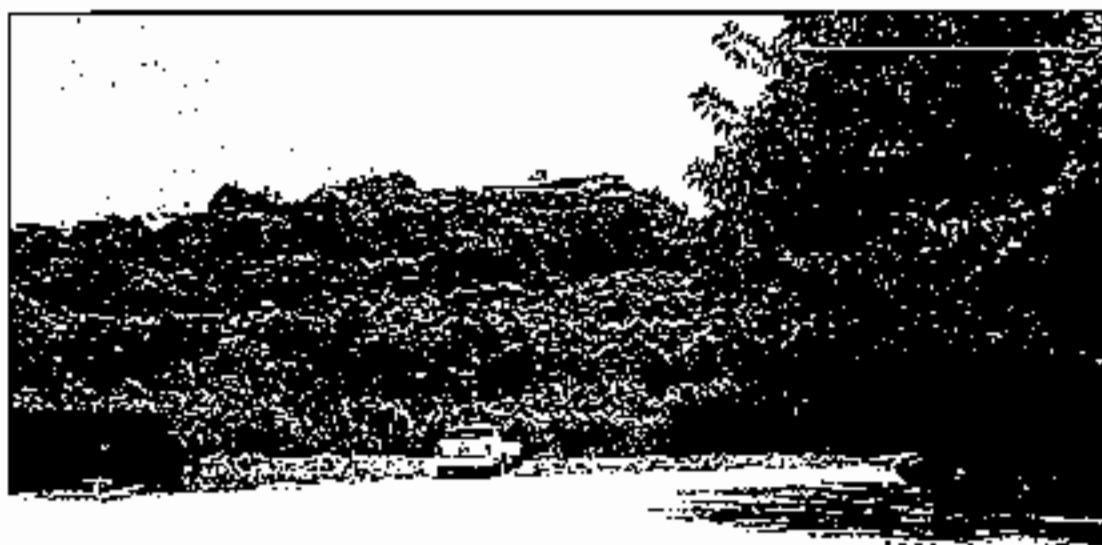
APPENDIX  
PROJECT AREA PHOTOS



Retail structures located on the west edge of project area along Kamehameha Hwy, view to north.



Overview of the lunch wagon, view to east.



Crushed-coral parking lot adjoining the lunch wagon, view to east.



The north edge of the project area on Pahoe Road, view to southeast.



The east edge of the project area neighboring a residential structure; a chain link fence is in the dense brush, view to southwest.



Boundary fence with rock alignment, north edge of parcel along Pahoe Road, view to north.



Remnants of the concrete ramp from the adjacent food wagon.



Close-up of concrete rubble discarded on site.



Black irrigation hose, evidence that the area was once used for agriculture.



Another abandoned concrete slab fragment on the side of a soil mound.





A concrete masonry unit discarded on the parcel.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100