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IN REPLY REFER TO:

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TO: GENEVIEVE SALMONSON, DIRECTOR
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

FROM: KAZU HAYASHIDA, DIRECTOR OF TRANSPORTATION

SUBJECT: PROPOSED KAHULUI AIRPORT ACCESS ROAD, ISLAND OF MAUI, INTERSECTION OF KAHULUI AIRPORT ACCESS ROAD AND DAIRY ROAD. A&B PROPERTIES, INC., MAUI BUSINESS PARK, PHASE 1B SUBDIVISION, TMK (2) 3-8-06:73

In accordance with the provisions of Chapter 343, Hawaii Revised Statutes, and Title 11, Chapter 200 of the Administrative Rules of the State Department of Health, a Final Environmental Assessment (EA) has been prepared for the proposed project.

As the approving agency, the State Department of Transportation believes that there will be no significant impacts as a result of the proposed action and is filing a Finding of No Significant Impact (FONSI).

Enclosed are one (1) copy of the OEQC Publication Form and four (4) copies of the Final EA. In addition, please be advised that the Project Summary has not changed since the publication of the Draft EA. We respectfully request that notice of the availability of the Final EA be published in the next edition to the Environmental Notice. Please call Michael Okamoto at 692-7331 if you have any questions.

Enclosures

cc: Rick Stack, A&B Properties, Inc.
Glenn Tadaki, Munekiyo, Arakawa & Hiraga, Inc.

2000-03-08-MA-FEA

Final Environmental Assessment

MAUI BUSINESS PARK, PHASE IB SUBDIVISION

Prepared for:

A&B PROPERTIES, INC.
A Subsidiary of Alexander & Baldwin, Inc.

February 2000

MUNEKIYO, ARAKAWA & HIRAGA, INC.

Final
Environmental Assessment

MAUI BUSINESS PARK, PHASE IB SUBDIVISION

Prepared for:

A&B PROPERTIES, INC.
A Subsidiary of Alexander & Baldwin, Inc.

February 2000

MUNEKIYO, ARAKAWA & HIRAGA, INC.

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Preface

The applicant, A&B Properties, Inc., is proposing to develop a light industrial subdivision in Kahului, Maui, Hawaii. Identified by TMK 3-8-06:73, the proposed subdivision will encompass approximately 34 acres and will consist of ten (10) lots ranging in size from 0.413 acre to 1.053 acres, as well as two (2) larger lots containing 12.749 acres and 13.971 acres, respectively.

Since the proposed subdivision involves the use of State lands for roadway access purposes, this Environmental Assessment (EA) has been prepared as required by Chapter 343, Hawaii Revised Statutes to document the proposed action's technical characteristics, environmental impacts and alternatives, and advances findings and conclusions relative to the significance of the project.

Chapter I

Project Overview

I. PROJECT OVERVIEW

A. PROPERTY LOCATION, BACKGROUND, AND LAND OWNERSHIP

The applicant, A&B Properties, Inc., is proposing to develop a 12-lot light industrial subdivision and related improvements in Kahului, Maui, Hawaii. See Figure 1.

Identified by TMK 3-8-06:73, the project site consists of 33.793 acres and includes former agricultural lands that are occupied by lowlying scrub vegetation.

The project site is situated along the southeastern limits of Kahului and is bordered by Dairy Road to the northwest, the Kahului Fire Station and the Maui Marketplace to the northeast, a sugar cane field cultivated by Hawaiian Commercial & Sugar Company (HC&S) to the southeast, and Puunene Avenue and the First Assembly of God's Cathedral of the King to the southwest. Access to the proposed subdivision will be provided from Puunene Avenue and an access connection from Dairy Road and the future Kahului Airport Access Road.

The project site is located in the State "Urban" district and is designated "Light Industrial" by the Wailuku-Kahului Community Plan and "M-1, Light Industrial" by Maui County zoning, respectively. A&B Properties, Inc. is the fee simple owner of the land underlying the project site.

B. PROPOSED ACTION

The proposed subdivision will encompass an area of about 34 acres. A total of 13 lots will be created by the subdivision, including 12 developable lots and a roadway lot containing 1.834 acres. See Figure 2. Of the developable lots, ten (10) lots, ranging in size from 0.413 acre to 1.053

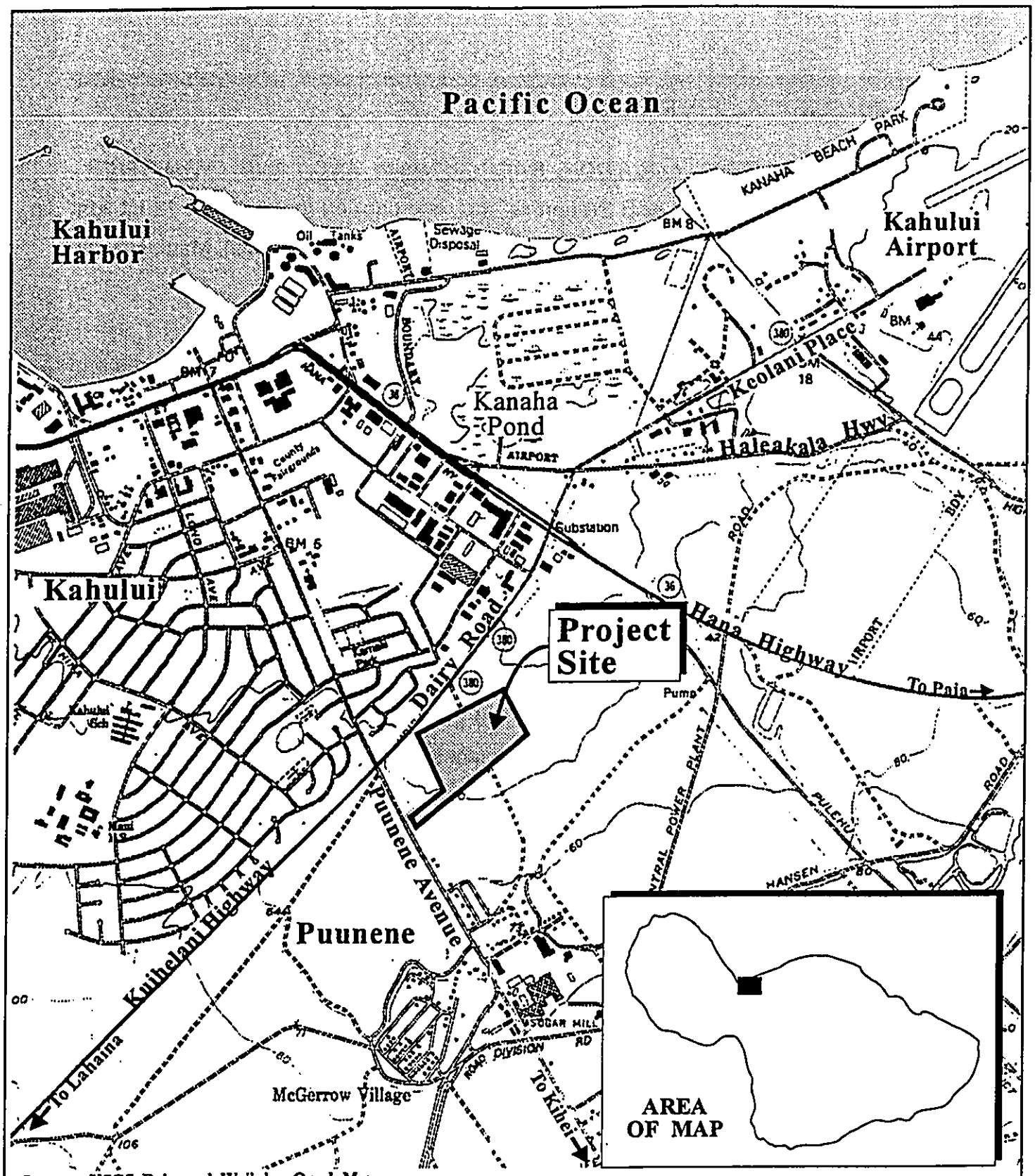


Figure 1

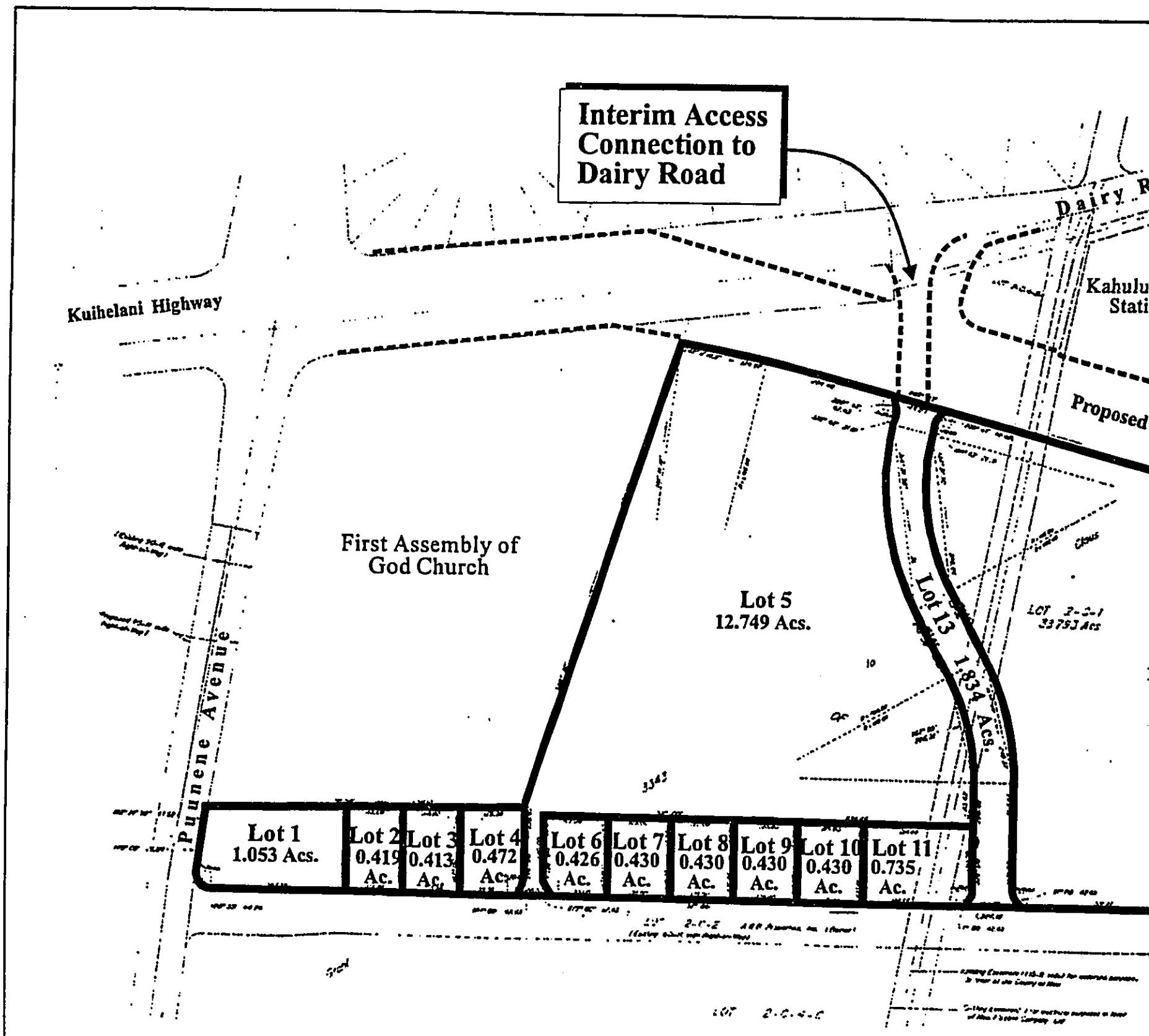
Maui Industrial Park, Phase 1B Subdivision

Regional Location Map

0 500 1000 2000

MUNEKIYO, ARAKAWA & HIRAGA, INC.

Prepared for: A&B Properties, Inc.



Source: A&B Properties, Inc.

Figure 2

Maui Industrial Park, Phase1B Subdivisi

Preliminary Subdivision

Prepared for: A&B Properties, Inc.

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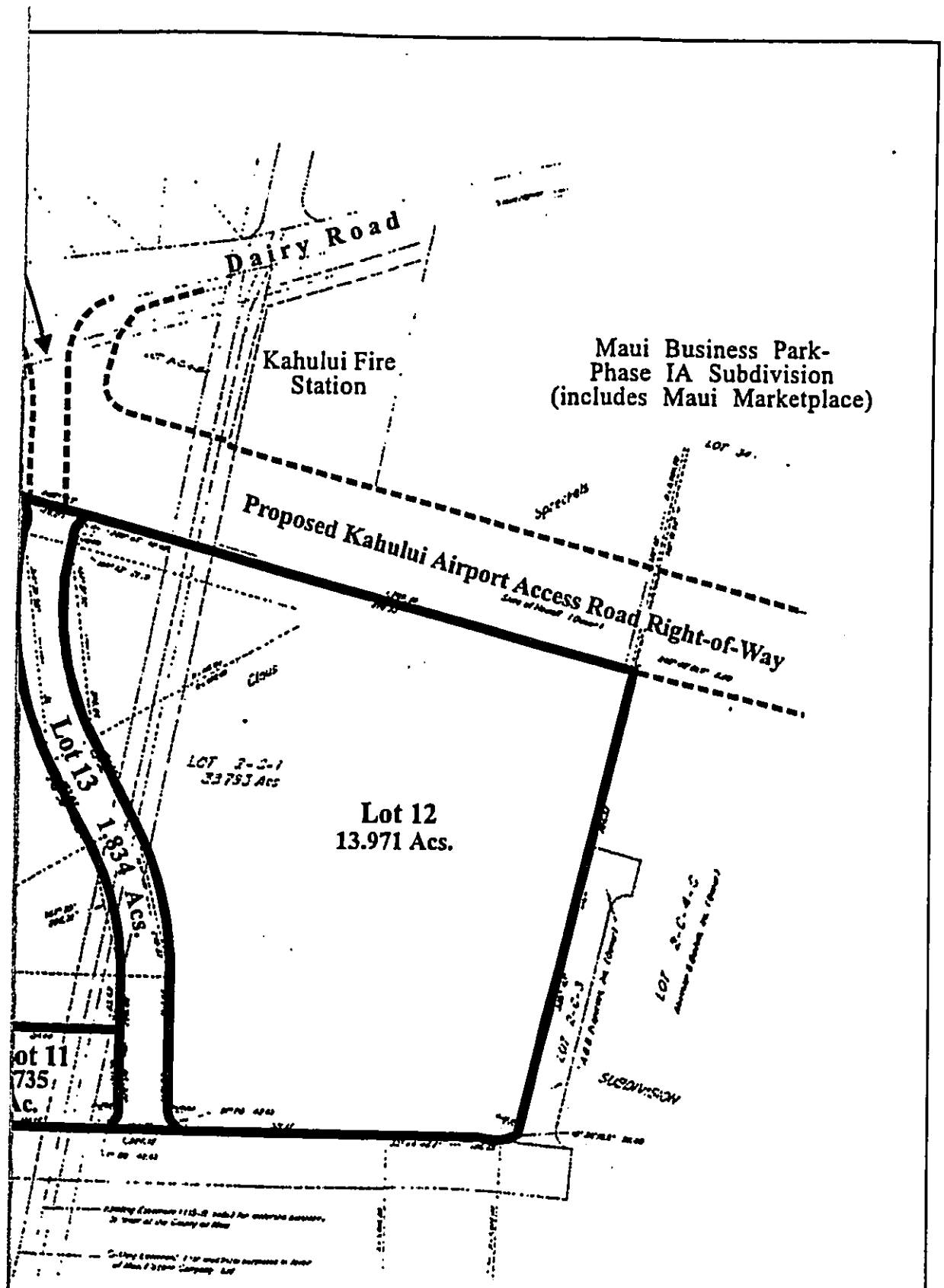


Phase1B Subdivision

ubdivision

NOT TO SCALE

MUNEKIYO, ARAKAWA & HIRAGA, INC.

acres, will be provided to meet the needs of small businesses. Two (2) larger lots, consisting of 12.749 acres and 13.971 acres each, will be provided to accommodate larger users or future subdivision into smaller lots depending on market conditions.

The improvements associated with the development of the proposed subdivision include the following:

1. Clearing, grubbing, and grading for each lot in accordance with drainage and setback criteria;

2. Installation of water, sewer, electrical, telephone, and CATV lines to serve each of the developable lots;

3. Installation of landscape planting;

4. Construction of drainage system improvements for the collection and conveyance of stormwater runoff; and

5. Construction of access and internal roadways to provide for ingress/egress to the subdivision, as well as the circulation of traffic within the subdivision.

It should be noted that the currently approved accesses to the proposed subdivision are on Puunene Avenue, approximately 1,000 feet east of the Puunene Avenue/Kuihelani Highway/Dairy Road intersection and on Dairy Road via a roadway connection to the future Airport Access Road. Refer to Figure 2. However, since the status and timetable for the construction of the Airport Access Road is uncertain, an interim roadway connection to the existing Dairy Road is also proposed. Connection to the future Airport Access Road, as well as the provision of the interim access to Dairy Road, will involve the use of a State Department of Transportation right-of-way.

The preliminary subdivision plan has been developed to ensure that the developable lots meet the spatial and functional requirements of prospective purchasers. Design guidelines, as well as covenants, conditions, and restrictions, will be utilized to ensure that structures and activities within the subdivision comply with development standards for the project.

The estimated construction cost for the proposed project is about $3.3 million. Subdivision improvements will be developed in a single phase, with construction expected to commence upon the receipt of applicable regulatory permits and approvals. The estimated construction time frame for the project is approximately six (6) months.

Since the proposed project involves the use of State lands (i.e., State highway right-of-way), an Environmental Assessment (EA) has been prepared pursuant to the requirements of Chapter 343, Hawaii Revised Statutes (HRS).

Chapter II

Description of the Existing Environment

II. DESCRIPTION OF THE EXISTING ENVIRONMENT

A. PHYSICAL ENVIRONMENT

1. Surrounding Land Uses

The project site is located in Kahului, the island of Maui's center of commerce. Kahului is home to Kahului Harbor, the island's only deep water port, and the Kahului Airport, the second busiest airport in the State. With its proximity to the harbor and airport, the Kahului region has emerged as the focal point for heavy industrial, light industrial and commercial activities and services such as warehousing, baseyard operations, automotive sales and maintenance, and retailing for equipment and materials suppliers. The region is considered Central Maui's commercial retailing center with the Kaahumanu Center, the Maui Mall, the Kahului Shopping Center, and the Maui Marketplace located within proximity of the project site.

Surrounding this commercial core is an expansive residential area comprised principally of single-family residential units. Residential uses encompass the area extending from Maui Memorial Medical Center to Puunene Avenue.

Land uses immediately surrounding the project site include Dairy Road to the northwest, the Kahului Fire Station and the Maui Marketplace to the northeast, an HC&S sugar cane field to the southeast, and Puunene Avenue and the First Assembly of God's Cathedral of the King to the southwest.

Situated beyond Dairy Road, to the northwest of the project site, lie single-family developments such as Phase 2 of the Kuihelani Subdivision and the first increment of the Kahului Town

Development. To the north of the site, light industrial development in the vicinity of Dairy Road is characterized by the Maui Industrial Park and the Dairy Road and Hana Highway Industrial Subdivisions. To the northeast of the site, beyond the Maui Marketplace, lies the remainder of Phase IA of the Maui Business Park Subdivision (also known as Kahului Industrial Park), while to the southeast, beyond the sugar cane field, lies the HC&S sugar mill. To the southwest of the site, land use beyond Puunene Avenue consists of fields of cultivated sugar cane.

2. ***Climate***

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

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

3. ***Topography and Soil Characteristics***

The subject property has been previously filled and rough graded. The project site is characterized by generally level terrain with an average slope of about 1.0 percent. Elevations within the site range from approximately 20 to 44 feet above mean sea level

(amsl). The site gently slopes in a northerly direction and includes a graded swale near the center of the property.

According to the Soil Conservation Service's Soil Survey, soils in the project area are from the Ewa, Pulehu, and Waiakoa series. See Figure 3. The Ewa and Pulehu series consist of well-drained soils in basins and on alluvial fans. These soils developed in alluvium derived from basic igneous rock.

Ewa silty clay loam (EaA) contains a surface layer that is dark reddish-brown silty clay loam. On this soil, run-off is very slow and the erosion hazard is no more than slight.

Pulehu clay loam, with slopes less than 3 percent (PsA), and Waiakoa very stony silty clay loam, with slopes of 3 to 7 percent (WgB), also underlie the project site. For both soil types, permeability is moderate, runoff is slow, and the erosion hazard is no more than slight. See Figure 4.

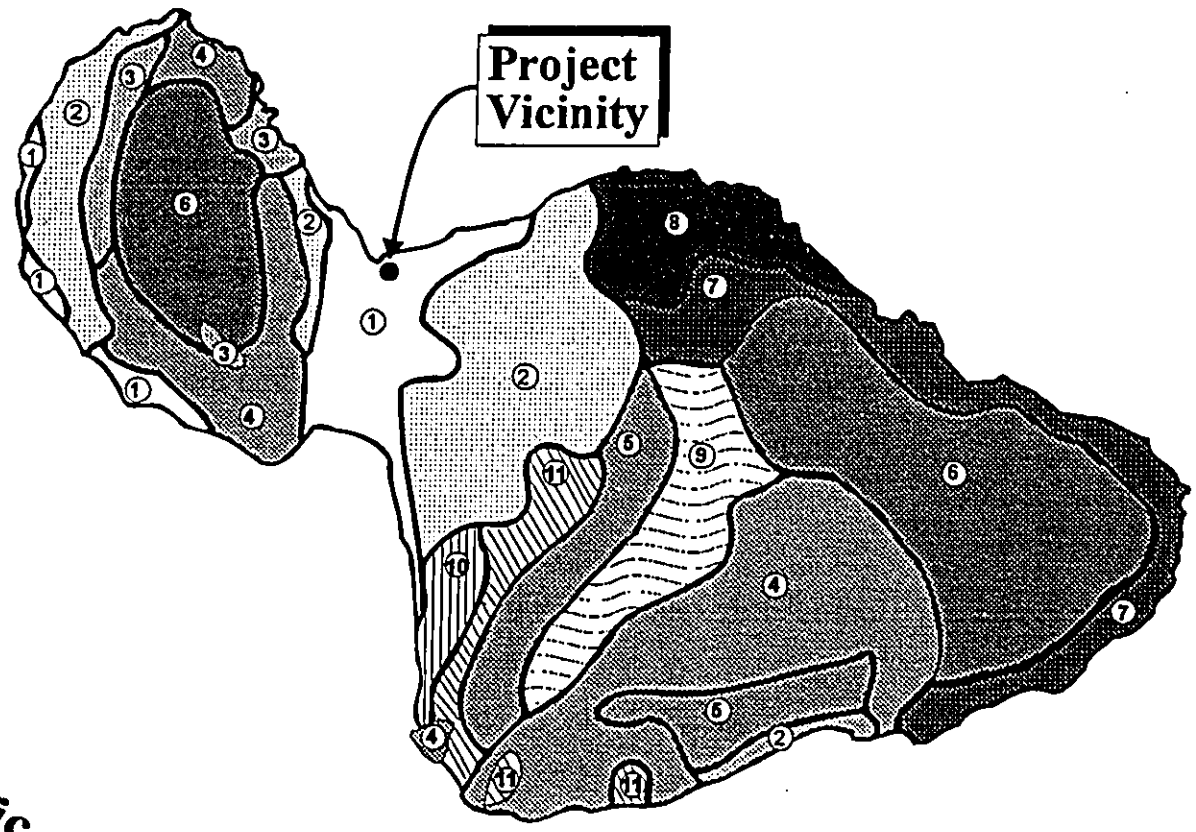
The Detailed Land Classification-Island of Maui, establishes a soil productivity rating ranging from "A" to "E", with "A" representing the highest level of productivity and "E" being very poor for agricultural production (University of Hawaii Land Study Bureau, May 1967). This rating system is based on factors including machine tillability, stoniness, texture, clay properties, drainage, rainfall, elevation, and slope. The project site includes soils rated "A".

4. *Flood and Tsunami Hazard*

The project site is situated in an area designated Zone "C" by the Flood Insurance Rate Map. See Figure 5. Zone "C" is an area of

LEGEND

- ① Pulehu-Ewa-Jaucas association
- ② Waiakoa-Keahua-Molokai association
- ③ Honolua-Olelo association
- ④ Rock land-Rough mountainous land association
- ⑤ Puu Pa-Kula-Pane association
- ⑥ Hydrandepts-Tropaquods association
- ⑦ Hana-Makaalae-Kailua association
- ⑧ Pauwela-Haiku association
- ⑨ Laumaia-Kaipoipoi-Olinda association
- ⑩ Keawakapu-Makena association
- ⑪ Kamaole-Oanapuka association



Map Source: USDA Soil Conservation Service

Figure 3 Maui Industrial Park, Phase 1B Subdivision
Soil Association Map

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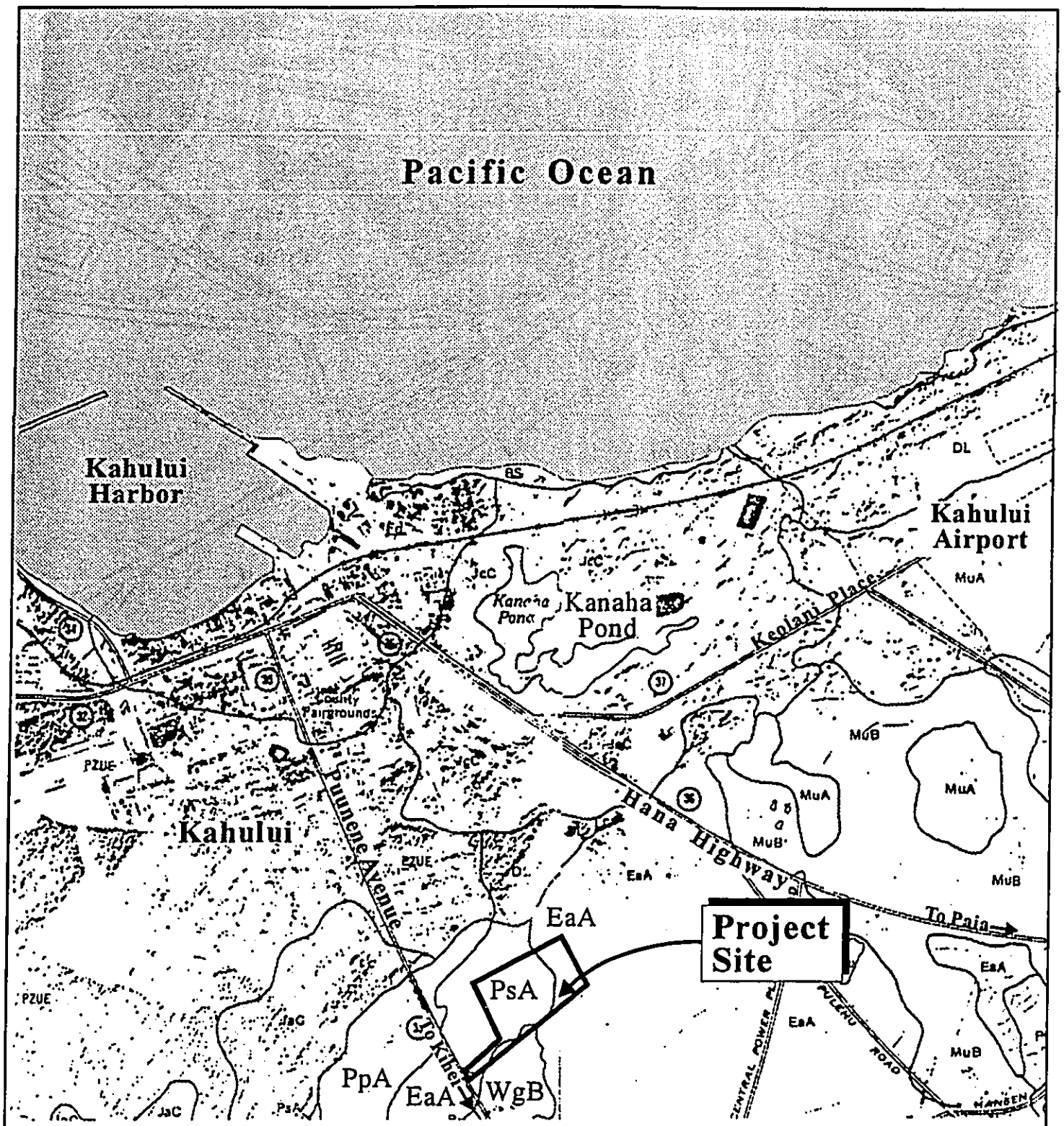
MUNEKIYO, ARAKAWA & HIRAGA, INC.

Prepared for: A&B Properties, Inc.



Source: USDA Soil Conservation Service

Figure 4

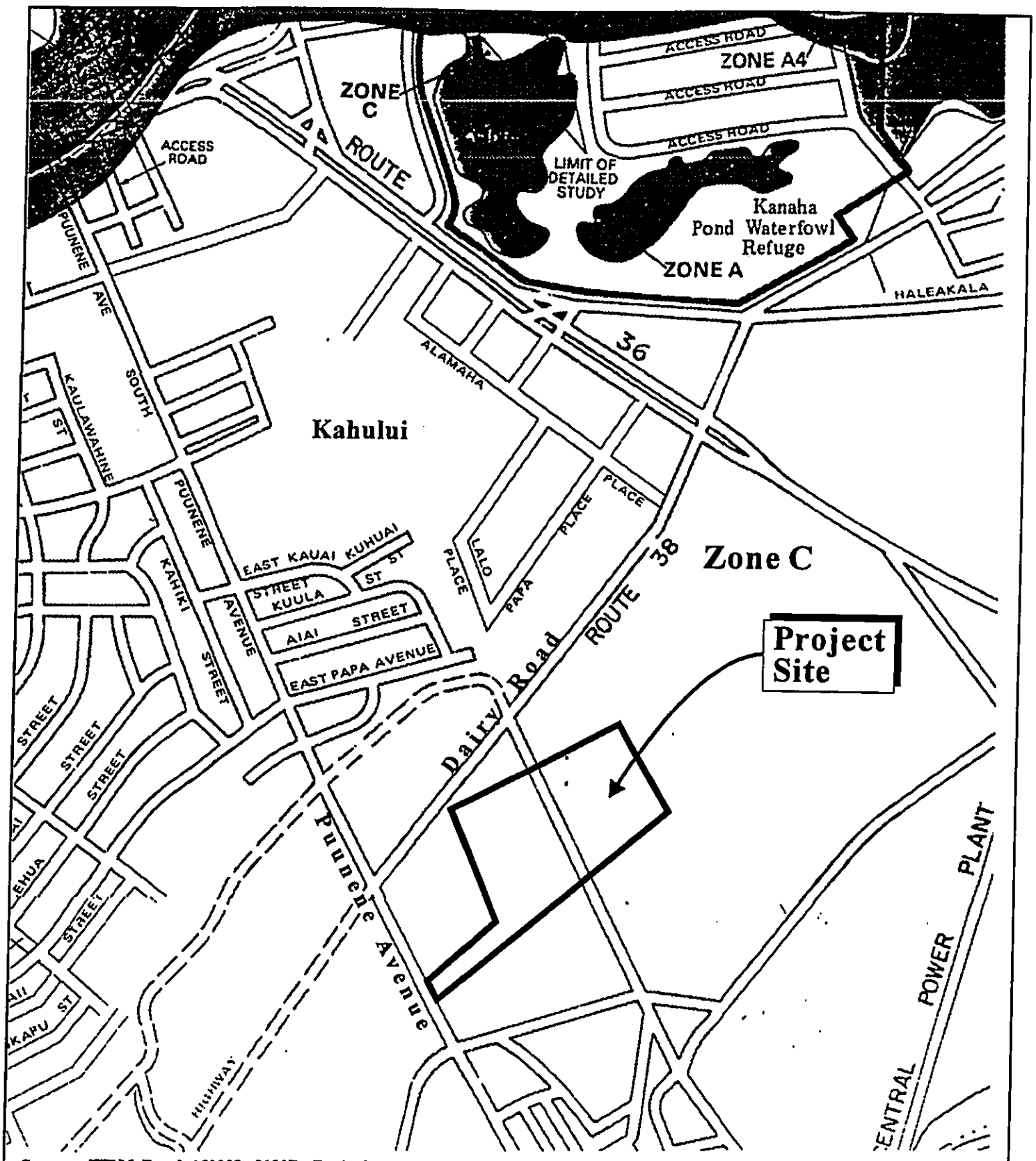
Maui Industrial Park, Phase 1B Subdivision

Soil Classification Map

0 500 1000 2000

MUNEKIYO, ARAKAWA & HIRAGA, INC.

Prepared for: A&B Properties, Inc.



Source: FIRM Panel 150003, 0190D, Revised (3/16/95)

Figure 5

Maui Industrial Park, Phase 1B Subdivision

Flood Insurance Rate Map

0 250 500 1000

Prepared for: A&B Properties, Inc.

MUNEKIYO, ARAKAWA & HIRAGA, INC.

minimal flooding.

5. ***Flora and Fauna***

The project site includes former agricultural lands occupied with lowlying scrub vegetation. Other plant life within the site is generally characterized by vegetation such as nutgrass, buffel grass, koa haole, and castorbean.

Terrestrial fauna within the project site include introduced species, such as rats, feral cats and mongoose. Avifauna typical in this area include the Mynah, Spotted Dove, Barred Dove, Japanese White-Eye, Cardinal, and Red-Crested Cardinal.

There are no known rare, threatened, or endangered, species of flora and fauna located within the project site. In addition, there are no wetland areas located within the project site.

6. ***Archaeological Resources***

The project site consists of former agricultural lands which have been previously disturbed in connection with mechanized sugar cane cultivation activities.

An archaeological inventory survey was prepared in 1988 in connection with a District Boundary Amendment for the urbanization of the project site.

The survey identified an aggregation of what appears to be volcanic glass near the junction of an agricultural road and an irrigation ditch near the project site. The occurrence of the possible

volcanic glass materials, however, could not be linked to the existence of subsurface deposits.

No significant surface or subsurface cultural artifacts or archaeological features were located during the survey.

7. ***Air Quality***

Air quality in the Wailuku-Kahului region is considered good as emissions from point sources, including the Maui Electric Company (MECO) power plant and the HC&S sugar mill, as well as non-point sources such as automobile emissions, do not generate problematic concentrations of pollutants. The relatively high quality of air can also be attributed to the region's constant exposure to winds which quickly disperse concentrations of emissions. This rapid dispersion is evident during burning of sugar cane in fields located to the southeast of the Kahului residential core.

8. ***Noise***

Traffic noise is the predominant source of background noise in the vicinity of the project site. In addition, distant noise from Kahului Airport and aircraft flying by the project area contributes to the background noise levels in the surrounding region.

9. ***Visual Resources***

Scenic resources to the southwest of the project site include Iao Valley and the West Maui Mountains. Looking east, Haleakala is clearly visible. To the northeast, lies the Kahului Harbor and the Pacific Ocean.

B. SOCIO-ECONOMIC ENVIRONMENT

1. Population

The population of the County of Maui has exhibited relatively strong growth over the past decade with the 1990 population estimated to be 100,374, a 41.7 percent increase over the 1980 population of 70,847. Growth in the County is expected to continue, with resident population projections to the years 2005 and 2010, estimated to be 134,064 and 140,060, respectively (Community Resources, Inc., January 1994).

2. Economy

The Kahului region is the island's center of commerce. Combined with neighboring Wailuku, the region's economic character encompasses a broad range of commercial, service, and governmental activities. In addition, the region is surrounded by significant agricultural acreages which include sugar cane fields. The vast expanse of agricultural land, managed by HC&S, is considered a key component of the local economy.

Presently, light industrial activities in the Wailuku region are primarily accommodated by the Wailuku Industrial Park and Millyard Industrial Subdivision, while in Kahului, these uses are supported by the Maui Industrial Park Subdivision and Phase IA of the Maui Business Park Subdivision, as well as the Dairy Road and Hana Highway Industrial Subdivisions.

In 1990, approximately 52,000 Maui residents were employed in jobs relating to tourism, finance, health care, government, retailing, wholesaling, real estate, agriculture, construction, transportation, manufacturing, and public utilities. By the year 2010, the number

of jobs are projected to increase to about 72,000, an increase of approximately 38 percent.

Jobs in the trade and service industries are projected to increase from their 1990 levels of about 13,000 and 16,000, to approximately 21,000 and 24,000 by the year 2010, an increase of 56 percent and 44 percent, respectively. (Community Resources, Inc, January 1994).

C. PUBLIC SERVICES

1. Recreational Facilities

The Wailuku-Kahului region encompasses a full range of recreational opportunities, including shoreline and boating activities at the Kahului Harbor and adjoining beach parks, and individual and organized athletic activities offered at numerous County parks and the War Memorial Complex. Major Central Maui recreational facilities include the recently completed Keopuolani Park, the Kahului Community Center, the County's Kanaha Beach Park and Iao Valley State Park.

2. Police and Fire Protection

Police protection for the Wailuku-Kahului region is provided by the Maui Police Department headquartered at the Wailuku Station, approximately 2.0 miles from the project site. The region is served by the department's Central Maui patrol.

Fire prevention, suppression, and protection services for the Wailuku-Kahului region are provided by the Maui Fire Department's Wailuku Station located in Wailuku Town about 3.75 miles from the

project site, and the department's Kahului Station, which lies to the northeast of the subject property.

3. ***Solid Waste***

Single-family residential solid waste collection service is provided by the County of Maui on a once-a-week basis. Residential solid waste collected by County crews are disposed at the County's 55-acre Central Maui Landfill, located 4.0 miles southeast of the Kahului Airport. In addition to County-collected refuse, the Central Maui Landfill accepts commercial waste from private collection companies. Refuse collection for the subdivision's tenants will be provided by a private collection company.

4. ***Health Care***

Maui Memorial Medical Center, the only major medical facility on the island, services the Wailuku-Kahului region. Acute, general and emergency care services are provided by this facility, which is licensed for 194 beds. In addition, numerous privately operated medical/dental clinics and offices are located in the area to serve the region's residents.

5. ***Schools***

The Wailuku-Kahului region is served by the State Department of Education's public school system as well as several privately operated schools accommodating elementary, intermediate and high school students. Department of Education facilities in the Kahului area include Lihikai and Kahului Schools (Grades K-5), Maui Waena Intermediate School (Grades 6-8), and Maui High School (Grades 9-12). Existing facilities in the Wailuku area

include Wailuku Elementary School (Grades K-5), Iao Intermediate School (Grades 6-8), and Baldwin High School (Grades 9-12).

D. INFRASTRUCTURE

1. Roadways

The Wailuku-Kahului region is served by a roadway network which includes arterial, collector and local roads. Major roadways in the vicinity of the project site include Dairy Road, Kuihelani Highway, and Puunene Avenue.

Dairy Road is a four-lane, two-way collector roadway which is generally oriented in the north/south direction. Dairy Road begins at the intersection of Puunene Avenue/Kuihelani Highway as the fourth leg of the intersection, and continues northward toward Kahului Airport and terminates at its intersection with Haleakala Highway and Keolani Place. It forms a major intersection with Hana Highway before its intersection with Haleakala Highway. The posted speed limit on Dairy Road is 30 miles per hour (mph).

Kuihelani Highway is a controlled-access, two-lane, two-way State arterial highway. It terminates in a "Tee" intersection with Honoapiilani Highway at its westerly extent (near Maalaea). The posted speed limit on Kuihelani Highway is generally 55 mph. The speed limit on Kuihelani Highway reduces to 35 mph as it approaches the Puunene Avenue/Dairy Road intersection.

Puunene Avenue is a major collector road, generally oriented in the east/west direction. It begins at the HC&S sugar mill at its intersection with Mokulele Highway in Puunene, and continues westward, intersecting with Kuihelani Highway/Dairy Road, into

Kahului and ultimately intersects with Kaahumanu Avenue. Fronting the southern limit of the subdivision site, Puunene Avenue is a two-lane State highway with a posted speed limit of 45 mph. The Puunene Avenue approaches to the Kuihelani Highway/Dairy Road intersection have two (2) through lanes, a left-turn storage lane and a right-tune lane.

Access to the subject property is provided by Puunene Avenue, which is located to the southwest of the parcel, and an access connection from the future Airport Access Road, situated to the west of the site. At the proposed access to the project site, Puunene Avenue is a five-lane roadway with left-turn storage lanes for the First Assembly of God Church and Hookele Street, the proposed project access road. The western boundary of the project site adjoins the right-of-way for the future Kahului Airport Access Road. Dairy Road, a five-lane roadway between Puunene Avenue and Hana Highway, is situated to the west of the future Airport Access Road. See Appendix A.

2. ***Wastewater***

Domestic wastewater generated in the Wailuku-Kahului region is conveyed to the County's Wailuku-Kahului Wastewater Treatment Facility located 0.5 mile south of Kahului Harbor. The design capacity of the facility is 7.9 million gallons per day (MGD). Cumulative wastewater flow allocated is approximately 6.6 MGD.

There is no existing sewer system within the project site. There is an existing 10-inch County sewerline that ends in the State's right-of-way for the future Kahului Airport Access Road. This 10-inch sewerline is an extension of the existing system that serves Maui

Business Park, Phase IA, and is connected to a 16-inch sewerline in Dairy Road and Alamaha Street. Sewage from this pipeline gravity flows into the Alamaha Street pump station. An 8-inch force main then takes flows to the Kahului Pump Station where it is pumped through a 20-inch force main to the Wailuku-Kahului Wastewater Treatment Facility. Refer to Appendix A.

3. ***Water***

Domestic water for the Wailuku-Kahului region is provided by the Department of Water Supply's (DWS) Central Maui Water System. The major source of water for this system is the Iao Aquifer. The sustainable yield of the Iao Aquifer is 20 MGD. As of December 1999, the annual average groundwater withdrawals from this aquifer were 18.655 MGD. The DWS is implementing a plan to bring new water sources on-line; two (2) wells in North Waihee were brought on-line in July 1997. A new well, with a production rate of about 1.0 MGD, will be coming on-line during the first quarter of the year 2000.

The project area is served by the DWS system. An existing 8-inch waterline is located in an easement that traverses the project site, from Dairy Road to Hansen Road in Puunene. The source for this water is the Waihee wells that were developed by the Central Maui Source Joint Venture. The three (3) developed wells currently have a total capacity of 13.5 MGD. The water storage tanks that serve the system for this area are located in Wailuku. Refer to Appendix A.

4. ***Drainage***

The project site consists of former agricultural lands that are covered with lowlying scrub vegetation. There are no existing drainage system improvements serving the site. Elevations on the project site range from approximately 20 to 44 feet amsl with an average slope of about 1.0 percent.

Runoff from the existing undeveloped site flows to a graded swale around the center of the project site. There are two (2) existing retention basins which adjoin the project site to the north. The swale directs storm water flows into the western most retention basin. Runoff that does not flow towards the swale sheet flows into adjacent HC&S sugar cane fields.

Runoff from the undeveloped site for a 50-year, 1-hour storm is estimated at about 26.72 cubic feet per second (cfs). Refer to Appendix A.

5. ***Electrical and Communication Systems***

Electrical, telephone and cable television (CATV) services to the project site are available through Maui Electric Company, GTE Hawaiian Tel, and Hawaiian Cablevision, respectively.

The primary electrical, telephone and cable television (CATV) systems in the vicinity of the project site are above ground and located along Dairy Road. An existing overhead telephone system is also located along Puunene Avenue. A 70-foot wide electrical easement between Dairy Road and Hansen Road bisects the project site.

Chapter III

Potential Impacts and Mitigation Measures

III. POTENTIAL IMPACTS AND MITIGATION MEASURES

A. PHYSICAL ENVIRONMENT

1. Surrounding Uses

The project site is situated along the southeastern limits of Kahului in an area of existing and ongoing urban development. Existing uses bordering the site include the Kahului Fire Station, the Maui Marketplace, and the First Assembly of God's Cathedral of the King. Single-family development within close proximity of the site consist of Phase 2 of the Kuihelani Subdivision and the first increment of the Kahului Town Development, while light industrial development in the area is exemplified by the Maui Industrial Park and the Dairy Road and Hana Highway Industrial Subdivisions, as well as the remainder of Phase IA of the Maui Business Park Subdivision (also known as Kahului Industrial Park).

The project site consists of former agricultural lands that are covered with lowlying scrub vegetation. The proposed project will not involve the displacement or relocation of any residents within the surrounding area.

The proposed project is anticipated to provide an area for uses permitted within the M-1, Light Industrial District, which is consistent with the existing land uses within proximity of the project site.

The development of the proposed subdivision is consistent with surrounding land uses.

2. ***Topography and Landform***

Site work for the proposed subdivision will involve clearing, grubbing, and grading, as well as excavation and fill. The project site will be subdivided into 12 light industrial lots and one (1) roadway lot. Lot 5 will be graded to provide a building pad and parking areas for a prospective buyer. The remaining lots will be graded so that surface runoff will flow to the proposed subdivision roads. To the extent practicable, finished contours will follow existing grades to minimize earthwork costs and maintain existing drainage patterns.

While terrain within the project site will be locally modified to meet design requirements, the proposed use of the property is not anticipated to alter the slope characteristics in the vicinity.

3. ***Flora and Fauna***

There are no known significant habitats or rare, threatened, or endangered species of flora or fauna located on the project site. In addition, the proposed improvements are not anticipated to impact wetland areas and wildlife habitats. Project-related lighting will utilize appropriate design features to minimize impacts to migratory seabirds traversing the area. As such, the development of the project is not anticipated to adversely impact these elements of the natural environment.

4. ***Archaeological Resources***

The project site is comprised of former agricultural lands which have been extensively disturbed in connection with mechanized agricultural operations. The archaeological inventory survey conducted in 1988 in support of the District Boundary Amendment

for the urbanization of the project site and surrounding areas, did not identify any significant surface or subsurface historic remains. Accordingly, the proposed subdivision action is not anticipated to have an adverse effect upon significant cultural or archaeological resources.

However, in the event that unrecorded historic remains (i.e., human bones, cultural artifacts, archaeological features) are discovered during construction of the project, work will promptly cease in the immediate area of the find, and the State Historic Preservation Division will be immediately notified to ensure that proper mitigation measures will be implemented in compliance with Chapter 6E, HRS.

5. *Air Quality*

Emissions from construction equipment and other vehicles involved in construction activities may temporarily affect the ambient air quality within the immediate vicinity. However, these effects can be minimized by properly maintaining construction equipment and vehicles.

In addition, dust generated during construction, especially from earth-moving operations such as excavating, trenching, and filling, may also result in a temporary decrease in ambient air quality. Mitigation measures include utilizing dust barriers, waterwagons, and/or sprinklers to control dust, and watering graded areas upon the completion of daily construction activities and/or weekends and holidays to the extent practicable.

On a long-term basis, emissions associated with subdivision traffic, as well as vehicles and equipment involved in daily business operations, are not expected to adversely impact air quality conditions. Accordingly, the proposed project is not anticipated to generate adverse air quality impacts.

6. ***Noise***

Ambient noise conditions may be temporarily affected by construction activities. Heavy construction machinery, such as backhoes, dump trucks, front-end loaders, paving equipment, and material-transport vehicles, are anticipated to be the dominant noise-generating sources during the construction period.

Proper equipment and vehicle maintenance are anticipated to minimize noise levels. Equipment mufflers or other noise attenuating equipment may also be employed as required. All construction activities will be limited to daylight working hours.

Upon completion, the primary noise generators will be vehicles passing through the area and loading, unloading and delivery activities associated with the subdivision's tenants. These activities, however, are not anticipated to adversely affect ambient noise conditions and are considered consistent with existing light industrial and retail operations in the area. While distant noise from Kahului Airport and aircraft flying by the project area are also expected to add to background noise levels, the proposed M-1, Light Industrial zoning use of the site is compatible with these noise levels. From a long-term perspective, the proposed subdivision is not anticipated to generate adverse noise conditions.

7. *Visual Resources*

The proposed subdivision will utilize landscaping and design guidelines to provide a development which is not only compatible with its surrounding environment but satisfies spatial, aesthetic, and functional requirements as well.

The project site is not part of a scenic corridor and will not affect views from inland vantage points. Accordingly, the proposed project is not anticipated to have an adverse impact upon the scenic and visual character of the surrounding area.

B. *SOCIO-ECONOMIC ENVIRONMENT*

1. *Population and Economy*

The proposed project is not anticipated to have an adverse effect on population parameters.

As previously noted, the number of jobs on Maui are projected to increase to about 72,000 by the year 2010, an increase of approximately 38 percent from the 52,000 jobs in the year 1990. In this regard, the proposed subdivision will provide opportunities for economic development and create positive short- and long-term benefits for the Island's economy. On a short-term basis, the proposed project will provide construction employment and support construction-related services and suppliers. Upon completion, businesses located in the subdivision will contribute to the long-term support of the regional economy through their contributions of property taxes, payment of employee salaries and wages, and purchases of goods and services from local merchants and service providers. Purchases relating to facilities maintenance will also benefit the local economy.

2. ***Police, Fire, and Medical Services***

Medical, police and fire protection services are not expected to be adversely impacted by the proposed project. The proposed Airport Access Road and Interim Access Road improvements have been designed to have no adverse effect on Kahului Fire Station operations and response capabilities. The proposed project will not extend existing service area limits for emergency services.

3. ***Solid Waste***

As previously noted, the project site contains former agricultural lands covered with lowlying scrub vegetation.

The clearing of the project site will be implemented in accordance with the provisions of Chapter 20.08 of the Maui County Code pertaining to Soil Erosion and Sedimentation Control.

Once the project is completed, solid waste for the subdivision's tenants will be handled by a private refuse collection company.

C. *INFRASTRUCTURE*

1. ***Traffic***

There are two (2) proposed access roads to the project site. The Ho'okele Street access will connect to Puunene Avenue, while the Pakaula Street access will connect to the future Kahului Airport Access Road. Both access roads will include 56-foot wide streets (curb to curb) within 80-foot wide right-of-ways. An Interim Access Road from Dairy Road to the Phase IB Subdivision is proposed pending the completion of the future Airport Access Road. A traffic study for the project addresses the proposed Interim Access Road connection to Dairy Road, the permanent connection to the future

Airport Access Road, and the Puunene Avenue access connection. See Appendix B.

It is noted that the future Airport Access Road will begin at the present intersection of Puunene Avenue/Kuihelani Highway/Dairy Road, replacing Dairy Road as the fourth leg of this intersection. The alignment of the Airport Access Road will veer to the northeast from the original alignment of Dairy Road to intersect with Hana Highway and continue on to Kahului Airport. The southern extent of Dairy Road will ultimately be realigned to form a "Tee" intersection with the Airport Access Road, approximately 1,300 feet north of the existing Puunene Avenue/Kuihelani Highway/Dairy Road intersection.

Since the status and timetable for the construction of the future Airport Access Road is uncertain, an Interim Access Road off Dairy Road is planned. This Interim Access Road will form a "Tee" intersection with Dairy Road.

With regard to the Interim Access Road from Dairy Road, an updated set of recommendations has been prepared and are incorporated in Appendix B-1 of this document. These recommendations are as follows:

1. The intersection of the proposed Interim Access Road from Phase IB of the Maui Business Park to Dairy Road be relocated approximately 400 feet south of the Hukilike Street intersection, without significantly impacting the left-turn storage lane on Dairy Road at the Hukilike Street intersection. This can be accomplished by widening Dairy Road between Hukilike Street and a point approximately 360 feet south of Hukilike Street to continue the two (2) southbound through lanes on Dairy Road.

2. A traffic signal system be installed at this intersection. Based upon recent development information from A&B, the vehicular trips generated by Phase IB of the Maui Business Park would meet the traffic signal warrants as contained in the Manual on Uniform Traffic Control Devices for Streets and Highways. A pole and span-wire system is proposed for the traffic signal system because of the temporary nature of the road system.

At the signalized intersection of the Interim Access Road and Dairy Road, the following geometrics would be provided:

- A southbound left-turn lane on Dairy Road for left-turning traffic onto the new access road. See Figure 6.

- A northbound shared through/right-turn lane on Dairy Road to facilitate right-turn movements onto the new access road.

- Separate left-turn and right-turn lanes on the Interim Access Road for vehicles entering Dairy Road.

With the widening of Dairy Road between Hukilike Street and a point approximately 360 feet south of Hukilike Street, appropriate restriping would also be implemented to provide the necessary transitions for continuing four (4) travel lanes on Dairy Road.

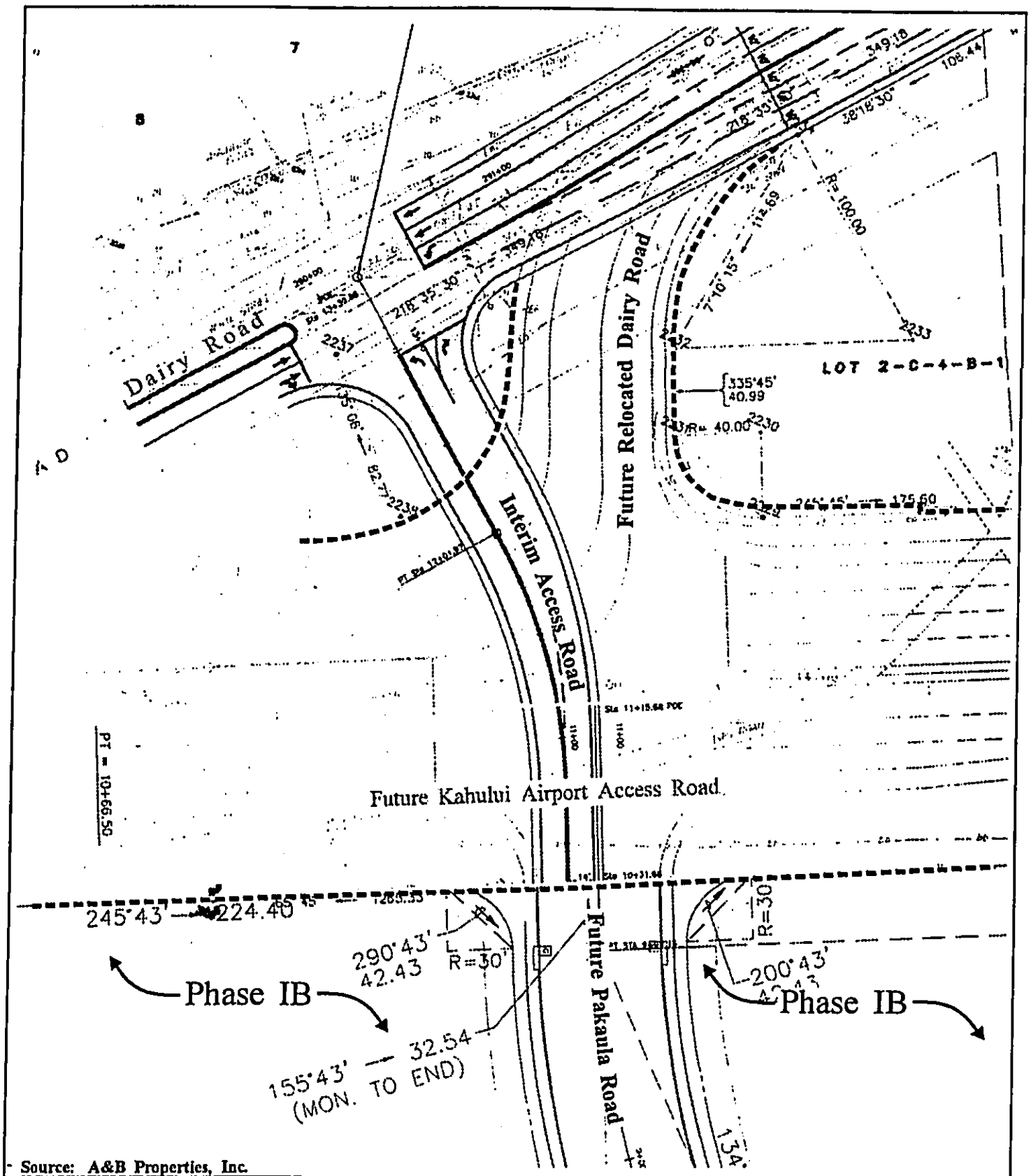
The proposed location of the Dairy Road/Interim Access Road intersection and its associated traffic signal system will have the following effects:

1. Reduces the length of the Interim Access Road by having a straight alignment from Maui Business Park to Dairy Road. This will also facilitate the implementation of traffic detouring operations during the construction of the Kahului Airport Access Road.

2. Increases the distance between the proposed intersection and the high volume Puunene Avenue/Kuihelani Highway/Dairy Road intersection.

3. Improves traffic safety for ingress and egress at the Dairy Road/Interim Access Road intersection.

Once the future Airport Access Road is constructed, the Interim



Source: A&B Properties, Inc.

Figure 6 — Maui Industrial Park, Phase 1B Subdivision

Access Road Detailed Site Plan

NOT TO SCALE

Prepared for: A&B Properties, Inc.

MUNEKIYO, ARAKAWA & HIRAGA, INC.

Access Road will be replaced with the relocated Dairy Road which will form a cross intersection with the Airport Access Road and the subdivision's Pakaula Road. Refer to Figure 6. Work to be performed for the permanent connection to this signalized intersection would include the provision of turning lanes and modification to the signal system to allow for a cross intersection with Dairy Road.

2. ***Wastewater System***

The design capacity of the County's Wailuku-Kahului Wastewater Treatment Facility is 7.9 million gallons per day (MGD). The facility serves the Kahului, Wailuku, Paia, Kuau and Spreckelsville areas. Presently, cumulative allocated wastewater flows from the Kahului facility are approximately 6.6 MGD.

The proposed subdivision is anticipated to generate about 54,400 gallons per day (gpd) of wastewater. Refer to Appendix A. A new 8-inch sewerline will be connected to an existing 10-inch sewerline located in the Airport Access Road right-of-way. The existing sewer system runs through Maui Business Park, Phase IA into a 16-inch sewerline that directs flows to the Alamaha Street pump station. All of the existing sewerlines were designed to accommodate the flows from Phases IA and IB of the Maui Business Park. The Wailuku-Kahului Wastewater Treatment Facility has adequate capacity to accommodate this flow.

The onsite wastewater system will be designed in accordance with Department of Public Works and Waste Management (DPWWM) standards.

An allocation of capacity, as well as any necessary wastewater contribution calculations, will be coordinated with the DPWWM as

part of the project's subdivision application process.

The proposed project is not expected to have an adverse effect upon the region's wastewater capacities and facilities.

3. ***Water System***

Water for the proposed project will be furnished by the County's domestic water system servicing the area.

The average water demand for the proposed subdivision is estimated to be approximately 79,300 gpd, with actual consumption subject to the type of light industrial activity which will occur on each lot. Refer to Appendix A. The existing 8-inch waterline that is located in an easement that traverses the project site will be replaced with a 12-inch line. This new line will be connected to the existing 12-inch waterline in the Airport Access Road right-of-way. This proposed system will provide adequate water to meet domestic and fire flow requirements.

The source of water for the proposed subdivision will be provided by the Waihee wells that were developed by the Central Maui Source Joint Venture and dedicated to the Department of Water Supply (DWS). A&B Properties, Inc. is a member of this joint venture and has an allocation of 4/19 of the water produced. Water for the Phase IB Subdivision will be provided from A&B's allocation.

Domestic water and fireflow requirements, as well as connection to the County's domestic water system will be coordinated with the DWS as part of the project's subdivision application process.

The proposed water system improvements will be constructed in accordance with applicable regulatory design standards. The proposed project is not anticipated to have an adverse effect on water sources and storage facilities as well as transmission and distribution systems.

4. ***Drainage***

A drainage and erosion control report was prepared by Sato & Associates, Inc. in December 1999 in connection with the proposed project. See Appendix C.

Surface runoff from the First Assembly of God parcel, located to the southwest of the project site, does not enter the subject property and is retained on the north corner of the church site. The runoff from the sugar cane field located to the southeast of the project site, will not enter the site since Hookele Street, a proposed subdivision roadway, will be constructed at a height that exceeds existing surrounding grades. Instead, the runoff will be directed to the cane field area south of Hookele Street via various HC&S ditches and will pond and eventually percolate into the ground.

Based on a 1-hour, 50-year storm, the proposed subdivision, once completed, will produce runoff at a rate of 167.94 cubic feet per second (cfs), an incremental increase of 141.22 cfs.

An onsite drainage system, designed to DPWWM standards, will be used to collect stormwater runoff within the proposed subdivision. The runoff will then be conveyed to two (2) existing retention basins that adjoin the project site to the northeast. These retention basins have been designed for 100-year, 24-hour storms

and have sufficient capacity to accommodate the flows from the Phase IB Subdivision.

Development of Phase IB of the Maui Business Park is not expected to cause any adverse effects to adjacent developments. Stormwater runoff from the site will be collected and routed to retention basins. Soil loss during construction is below the County's allowable rate, therefore, erosion during construction is not anticipated to result in adverse impacts. Upon completion of grading, all exposed areas will be grassed, as required. In addition, the following measures will be considered for controlling erosion during construction:

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

5. ***Electrical, Telephone and CATV Systems***

Electrical, telephone and cable television (CATV) systems will be extended to the proposed subdivision from existing systems maintained by the respective utility companies. Refer to Appendix A. Maui Electric Company's existing transmission lines within the 70-foot wide electrical easement which traverses the project site will continue to remain overhead.

The onsite distribution system for these services will be placed underground along the shoulders of the subdivision streets and designed in accordance with current system standards. Each lot will be provided with service laterals to accommodate these utilities.

The proposed project is not anticipated to adversely impact electrical, telephone and CATV services in the region.

Chapter IV

Relationship to Governmental Plans, Policies and Controls

IV. RELATIONSHIP TO GOVERNMENTAL PLANS, POLICIES AND CONTROLS

A. STATE LAND USE DISTRICTS

Chapter 205, Hawaii Revised Statutes, relating to the Land Use Commission, establishes the four (4) major land use districts in which all lands in the State are placed. These districts are designated "Urban", "Rural", "Agricultural", and "Conservation". The subject parcel is within the "Urban" district. See Figure 7. The proposed action involves the use of the property for a light industrial subdivision and related improvements. The proposed use of the property is consistent with "Urban" district standards.

B. MAUI COUNTY GENERAL PLAN

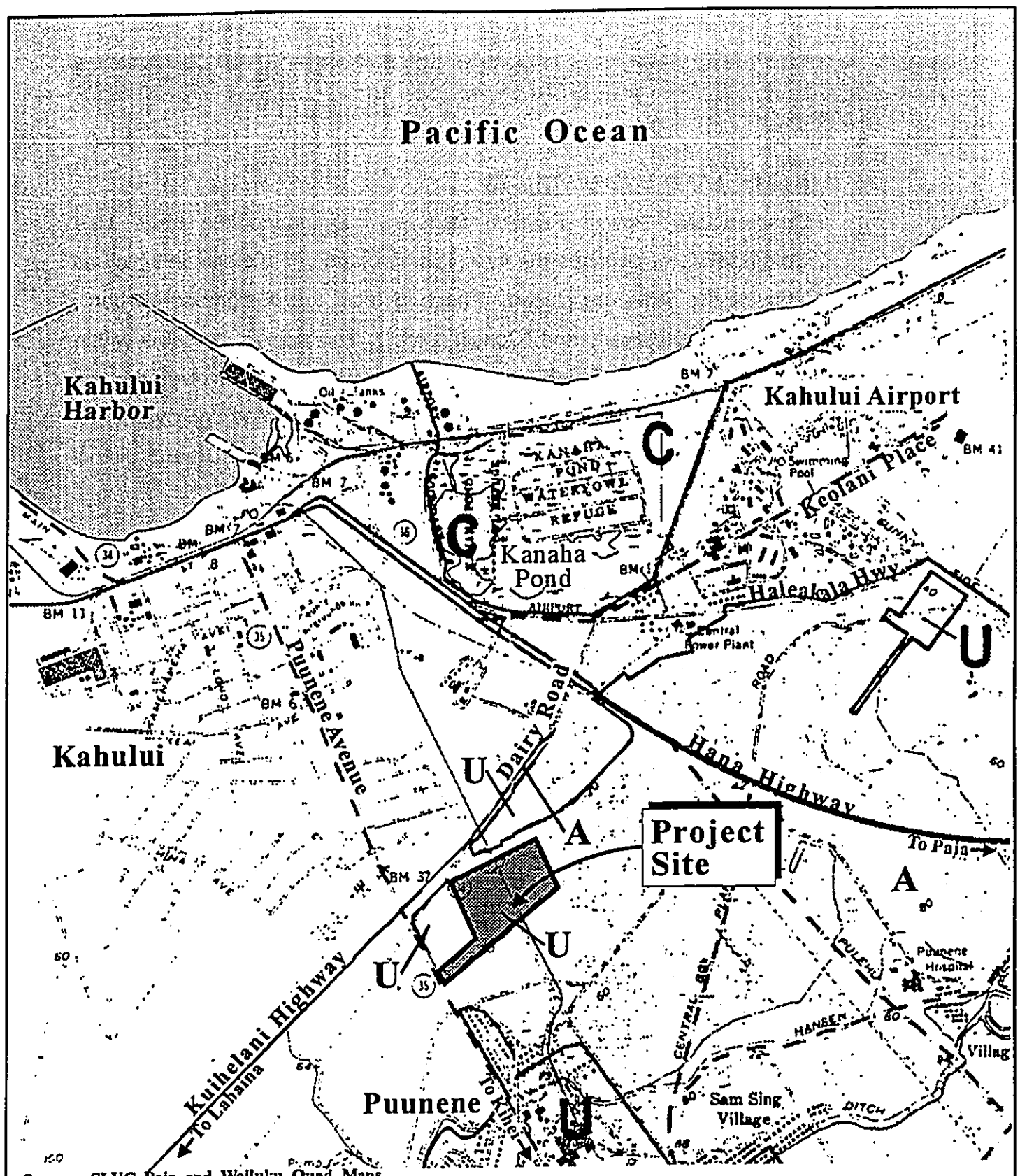
The Maui County General Plan (1990 Update) sets forth broad objectives and policies to help guide the long-range development of the County. As stated in the Maui County Charter, "The purpose of the General Plan is to recognize and state the major problems and opportunities concerning the needs and the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

The proposed project is in keeping with the following General Plan objectives and policies relating to land use and economic activity.

Objectives:

1. To use the land within the County for the social and economic benefit of the County's residents.

2. To provide an economic climate which will encourage controlled expansion and diversification of the County's economic base.



Source: SLUC Paia and Wailuku Quad Maps

Figure 7

Maui Industrial Park, Phase 1B Subdivision

State Land Use District Designations

0 500 1000 2000

MUNEKIYO, ARAKAWA & HIRAGA, INC.

Prepared for: A&B Properties, Inc.

Policies:

a. Maintain a diversified economic environment compatible with acceptable and consistent employment.

b. Support programs, services, and institutions which provide economic diversification.

C. *WAILUKU-KAHULUI COMMUNITY PLAN*

The project site is located in the Wailuku-Kahului Community Plan region which is one (1) of nine (9) Community Plan regions established in the County of Maui. Planning for each region is guided by the respective Community Plans, which are designed to implement the Maui County General Plan. Each Community Plan contains recommendations and standards which guide the sequencing, patterns and characteristics of future development in the region.

Land use guidelines are set forth by the Wailuku-Kahului Community Plan Land Use Map. See Figure 8. The project site is designated for "Light Industrial" use by the Community Plan.

The proposed project complies with the Wailuku-Kahului Community Plan recommendations:

> d. Provide industrial growth opportunities through the expansion of existing industrial centers associated with the airport and harbor, and in Wailuku and Kahului. Encourage the fee-simple ownership of lots provided by private developers. Explore with the State the feasibility of a State Industrial Park on lands in the Kahului Airport District (page 7).
>
> * * *
>
> f. 2) ... infill of light industrial between the Kanaha Pond and Puunene Avenue in Kahului;.... These are logical

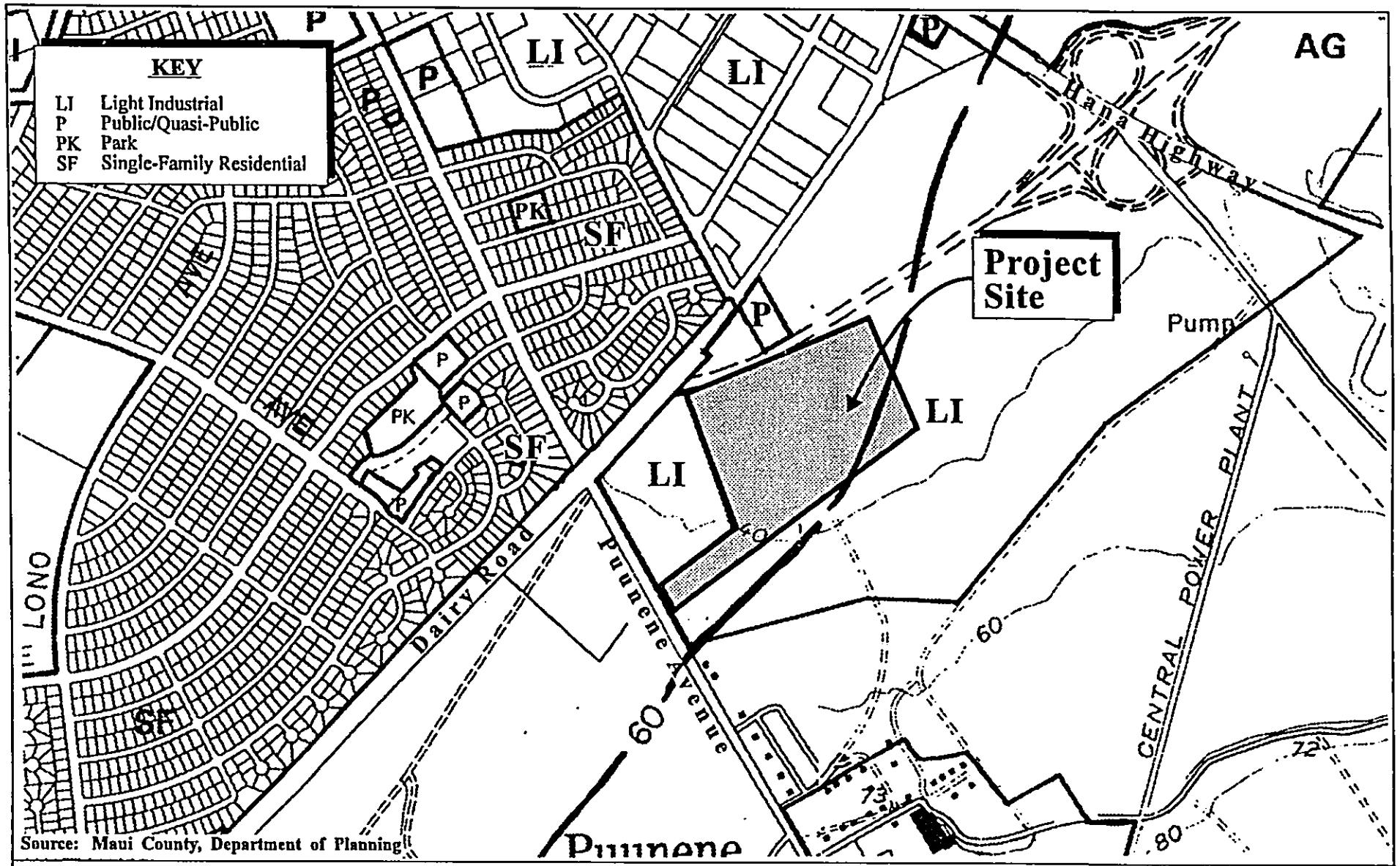


Figure 8

Maui Industrial Park, Phase 1B Subdivision

Wailuku-Kahului Community Plan
Land Use Designation

0 250 500 1000

MUNEKIYO, ARAKAWA & HIRAGA, INC.

Prepared for: A&B Properties, Inc.

extensions of the present pattern of industrial activity and are well related to transportation corridors for access (page 15).

D. ZONING

The project site is zoned for "M-1, Light Industrial" use by Maui County zoning. The conditions established by County Ordinance No. 2237, which established the "M-1, Light Industrial" zoning for the subject property in 1993, have been addressed by the applicant. Permitted uses under "M-1, Light Industrial" zoning generally include warehousing and distribution activities, as well as most compounding, assembly, or treatment of articles or materials with the exception of heavy manufacturing and the processing of raw materials. In addition, light industrial zoning provides for uses permitted under "B-1, Neighborhood Business", "B-2, Community Business", and "B-3, Central Business" zoning.

The proposed subdivision is consistent with the standards of the Maui County Code pertaining to light industrial zoned properties.

E. COASTAL ZONE MANAGEMENT OBJECTIVES AND POLICIES

The Hawaii Coastal Zone Management Program (HCZMP), as formalized in Chapter 205A, HRS, establishes objectives and policies for the preservation, protection, and restoration of natural resources of Hawaii's coastal zone.

As set forth in Chapter 205A, HRS, this section addresses the project's relationship to applicable coastal zone management considerations.

1. Recreational Resources

Objective: Provide coastal recreational resources accessible to the public.

Policies:

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

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

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

(2) 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;

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

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

(5) Ensuring public recreational use of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;

(6) 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;

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

(8) Encouraging reasonable dedication of shoreline areas

with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, county planning commissions, and crediting such dedication against the requirements of section 46-6.

Response: The proposed project is not anticipated to affect existing coastal recreational resources. The project is intended to provide opportunities for M-1, Light Industrial uses which are in consonance with existing land uses in the area. The project itself is not a direct generator of new demand for regional recreational resources.

2. ***Historical/Cultural Resources***

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

Policies:

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.

Response: The archaeological inventory survey prepared for the 1988 District Boundary Amendment addressed the project site. No archaeological sites, features, human burials, or sub-surface deposits were located during the survey. Should human remains be inadvertently discovered during earth moving activities, work shall cease at once in the immediate area of the find, and the find shall be protected from further damage. The State Historic

Preservation Division shall be immediately notified and procedures for the treatment of inadvertently discovered human remains shall be implemented pursuant to Chapter 6E, HRS.

3. ***Scenic and Open Space Resources***

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

Policies:

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

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

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

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

Response: The proposed subdivision will be developed and landscaped to ensure visual compatibility with the surrounding land uses. The proposed improvements are not contrary to the objectives and policies for scenic and open space resources.

4. ***Coastal Ecosystems***

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

Policies:

a. Improve the technical basis for natural resource management;

b. Preserve valuable coastal ecosystems, including reefs, of

significant biological or economic importance;

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

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

Response: The proposed improvements are not expected to adversely impact coastal ecosystems. Two (2) existing retention basins will be utilized to accommodate surface runoff from the proposed subdivision. Drainage improvements shall be designed to ensure that there are no adverse effects to adjacent or downstream properties. Applicable erosion control measures will also be implemented during the construction of the project.

5. ***Economic Uses***

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

Policies:

a. Concentrate coastal dependent development in appropriate areas;

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

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

(1) Use of presently designated locations is not feasible,

(2) Adverse environmental effects are minimized; and

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

Response: The proposed subdivision is situated in an area of existing commercial and light industrial uses and is intended to accommodate the existing demand and future growth requirements for these uses in the region.

6. ***Coastal Hazards***

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

Policies:

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

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

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

d. Prevent coastal flooding from inland projects; and

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

Response: The project site is located within Zone C, which is an area of minimal flooding. No significant adverse drainage impacts to downstream properties are anticipated from the proposed project.

7. ***Managing Development***

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

Policies:

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

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

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

Response: This Environmental Assessment has been prepared for public review in compliance with Chapter 343, Hawaii Revised Statutes, and Chapter 200 of Title 11, Administrative Rules, Environmental Impact Statement Rules.

In addition, applicable State and County requirements will be adhered to in the design and construction of the proposed project.

8. ***Public Participation***

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

Policies:

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

b. Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal-related issues, developments, and government activities; and

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

Response: Public awareness and participation for this project is facilitated through the Chapter 343, HRS environmental review process. The proposed project is not contrary to the objective of public awareness, education and participation.

9. ***Beach Protection***

Objective: Protect beaches for public use and recreation.

Policies:

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

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

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

Response: The proposed project is located approximately 1.25 miles from the shoreline and is not anticipated to impact shoreline activities.

10. ***Marine Resources***

Objective:

Implement the State's ocean resources management plan.

Policies:

(A) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;

(B) Assure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;

(C) Coordinate the management of marine and coastal resources and activities management to improve effectiveness and efficiency;

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

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

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

Response: The proposed subdivision is not anticipated to have adverse effects upon marine and coastal resources in the vicinity. Runoff from the project site will flow into two (2) existing retention basins and is not anticipated to adversely affect marine or coastal resources.

Chapter V

Summary of Adverse Environmental Effects Which Cannot Be Avoided

V. SUMMARY OF ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

The development of the proposed project will result in some construction-related impacts as described in Chapter III, Potential Impacts and Mitigation Measures.

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

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

Chapter VI

Alternatives to the Proposed Action

VI. ALTERNATIVES TO THE PROPOSED ACTION

A. PREFERRED ALTERNATIVE

The preferred alternative represents the proposed action. The availability of appropriate sites for accommodating light industrial and commercial uses in an area of established light industrial activities will be accomplished through the development of the proposed project. The proposed subdivision is in the immediate vicinity of other light industrial uses in the area, such as the Maui Industrial Park, the Dairy Road and Hana Highway Industrial Subdivisions, as well as the Maui Marketplace and the remainder of Phase IA of the Maui Business Park Subdivision (also known as Kahului Industrial Park).

Considering its location, infrastructure, surrounding light industrial uses, economic benefits to the community, and its proximity to air, land, and sea transportation services, the project site provides a suitable location for a light industrial subdivision.

B. NO ACTION ALTERNATIVE

The "no action" alternative calls for retaining the project site in its current condition. The lands underlying the project site have the necessary land use entitlements for the implementation of light industrial uses. In light of these entitlements, and the demand for light industrial properties which provide lot sizes to serve a variety of uses, retaining the project site in its current condition is not considered the highest and best use of the site. Accordingly, the "no action" alternative was deleted from consideration.

C. DEFERRED ACTION ALTERNATIVE

As with the "no action" alternative, the "deferred action" alternative is not deemed appropriate.

D. SUBDIVISION SITE PLAN ALTERNATIVES

During the conceptual planning stage, several subdivision layouts were considered. However, these preliminary plans were discounted due to considerations relating to subdivision access, potential market demand, development costs, and internal traffic circulation.

Although there may be other subdivision layouts which could be examined, the proposed subdivision layout is intended to best accommodate the needs of its tenants by providing a development which provides for convenient access, adequate infrastructure, compatibility with its existing surrounding environs and a sufficient range of lot sizes.

Chapter VII

Irreversible and Irretrievable Commitments of Resources

VII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The proposed action would involve a commitment of fuel, labor, funding and material resources.

Development of the proposed project will involve the commitment of land for a light industrial subdivision which may preclude other land use options for the site. This commitment of land resources, however, is consistent with existing and future land uses in and around the project area.

Chapter VIII

Findings and Conclusions

VIII. FINDINGS AND CONCLUSIONS

The "Significance Criteria", Section 12 of the Administrative Rules, Title 11, Chapter 200, "Environmental Impact Statement Rules", were reviewed and analyzed to determine whether the proposed project will have significant impacts to the environment. The following analysis is provided:

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

   The project will not result in any adverse environmental impacts. There are no known, rare, endangered or threatened species of flora, fauna or avifauna located within the project site.

   The archaeological inventory survey prepared in connection with the 1988 District Boundary Amendment request (which also included the project site) did not locate any cultural artifacts or human remains. Should any artifacts or human remains be encountered during construction, work will stop in the immediate vicinity of the find and the State Historic Preservation Division will be immediately notified to establish an appropriate mitigation strategy.

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

   The proposed project and the commitment of land resources would not curtail the range of beneficial uses of the environment.

3. ***The Proposed Action Does Not Conflict with the State's Long-term Environmental Policies or Goals or Guidelines as Expressed in Chapter 334, Hawaii Revised Statutes***

   The State's Environmental Policy and Guidelines are set forth in Chapter 344, Hawaii Revised Statutes. The proposed action is in consonance with

the following policies and guidelines:

Environmental Policy:

(1) Conserve the natural resources, so that land, water, mineral, visual, air and other natural resources are protected by controlling pollution, by preserving or augmenting natural resources, and by safeguarding the State's unique natural environmental characteristics in a manner which will foster and promote the general welfare, create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of the people of Hawaii.

Guideline:

(2) Land, water, mineral, visual, air and other resources.

(F) Maintain an integrated system of state land use planning which coordinates the State and County general plans.

(5) Economic development.

(A) Encourage industries in Hawaii which would be in harmony with our environment.

* * *

(7) Energy.

(A) Encourage the efficient use of energy resources.

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

The proposed project would have a direct beneficial effect on the local economy during construction. In the long term, the proposed project will support the local economy through the contribution of salaries, wages, and benefits, as well as through the purchases of goods and services from local merchants and service providers.

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

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

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

No significant population changes are anticipated as a result of the proposed project.

From a land use standpoint, the proposed project is an enhancement of existing uses. The project site is situated in an area of existing light industrial development which includes the Maui Industrial Park and the Dairy Road and Hana Highway Industrial Subdivisions, as well as the Maui Marketplace and the remainder of Phase IA of the Maui Business Park Subdivision. The proposed project complements and is compatible with these surrounding light industrial land uses.

The proposed improvements will hookup to existing County water and wastewater systems. No adverse impacts to water and wastewater capacities and facilities are anticipated. Onsite and offsite surface runoff are expected to be accommodated by the proposed drainage system improvements. The project is not expected to significantly impact public services such as police, fire, and medical services. Impacts upon educational, recreational, and solid waste collection and disposal facilities and resources are considered minimal.

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

During the construction phase of the project, there will be short-term air quality and noise impacts as a result of the project. In the long term, effects upon air quality and ambient noise levels should be minimal. The

project is not anticipated to significantly affect the open space and scenic character of the area.

No substantial degradation of environmental quality resulting from the project is anticipated.

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

The proposed subdivision is considered a stand alone project providing twelve (12) lots. It is noted, however, that as part of its 1988 petition for the District Boundary Amendment for the Maui Business Park (also known as Kahului Industrial Park), additional phases of light industrial development are also proposed. Future phases of the Maui Business Park include those areas identified as Phase II and Phase IV, situated to the east and southeast of the Maui Business Park Phase IB. These additional phases encompass approximately 120 acres. The lands underlying the Phase II and Phase IV areas are currently within the State Agricultural District and will require approval of the State Land Use Commission to establish the underlying State Urban designation.

From a long-term master planning standpoint, these additional phases are intended to meet the demands for light industrial lands. As each phase is developed, appropriate infrastructure improvements and upgrades will need to be implemented to ensure that adequate delivery capacities are available.

To ensure proper consideration of long-term planning needs, the project's traffic study (Appendix B) addresses the impacts of these future phases and incorporates recommendations for appropriate roadway system

improvements.

1. For the year 2015, the Puunene Avenue/Project Access Road intersection should be signalized when volumes meet the standards for traffic signal warrants. It is anticipated that the projected traffic volumes for ultimate development of Phases II and IV will meet the traffic signal warrants.

2. At the future Airport Access Road, modify the through lane to become a shared left-turn/through lane to provide a westbound double left turn on the subdivision's Pakaula Road onto the Airport Access Road.

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

There are no rare, threatened or endangered species of flora, fauna, avifauna or their habitats on the subject property.

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

Construction activities will result in short-term air quality and noise impacts. Dust control measures, such as regular watering and sprinkling, will be implemented to minimize wind-blown emissions. Noise impacts will occur primarily from construction-related activities. It is anticipated that construction will be limited to daylight working hours. Water quality is not expected to be affected.

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

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

The project is not located within and would not affect environmentally sensitive areas. The project site is not subject to flooding or tsunami inundation. Soils of the project site are not erosion-prone. There are no geologically hazardous lands, estuaries, or coastal waters within or adjacent to the project site.

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

The project site is not identified as a scenic vista or viewplane. The proposed project will not affect scenic corridors and coastal scenic and open space resources.

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

The proposed project will involve the short-term commitment of fuel for equipment, vehicles, and machinery during construction activities. However, this use is not anticipated to result in a substantial consumption of energy resources. In the long term, the project will create an additional demand for electricity. However, this demand is not deemed substantive or excessive within the context of the region's overall energy consumption.

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

Chapter IX

List of Permits and Approvals

IX. LIST OF PERMITS AND APPROVALS

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

State of Hawaii

1. Community Noise Permit
2. NPDES Permit (for stormwater discharge associated with construction activities)

County of Maui

1. Subdivision Approval
2. Construction Permits (Grubbing, Grading)

Chapter X

Agencies Consulted During the Preparation of the Draft Environmental Assessment; Letters Received and Responses to Substantive Comments

X. AGENCIES CONSULTED DURING THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT; LETTERS RECEIVED AND RESPONSES TO SUBSTANTIVE COMMENTS

The following agencies were consulted during the preparation of the Draft Environmental Assessment. Agency comments and responses to substantive comments are also included in this section.

1. Neal Fujiwara, Soil Conservationist
Natural Resources Conservation Service
U.S. Department of Agriculture
210 Imi Kala Street, Suite 209
Wailuku, Hawaii 96793-2100

2. George Young, Chief
Regulatory Branch
Department of the Army
U.S. Army Engineer District, Hnl.
Bldg. T-1, Room 105
Fort Shafter, Hawaii 96858-5440

3. Robert P. Smith
Pacific Islands Manager
U. S. Fish and Wildlife Service
P.O. Box 50167
Honolulu, Hawaii 96850

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

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

6. Timothy Johns, Director
State of Hawaii
Department of Land and Natural Resources
P. O. Box 621
Honolulu, Hawaii 96809

7. Don Hibbard
State of Hawaii
Department of Land and Natural Resources
State Historic Preservation Division
Kakuhihewa Building, Room 555
601 Kamokila Blvd.
Kapolei, Hawaii 96707

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

9. Floyd Miyazono, Director
County of Maui
Department of Parks and Recreation
1580 C. Kaahumanu Avenue
Wailuku, Hawaii 96793

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

11. Tom Phillips, Chief
County of Maui
Police Department
55 Mahalani Street
Wailuku, Hawaii 96793

12. Charles Jencks, Director
County of Maui
Department of Public Works and Waste Management
200 South High Street
Wailuku, Hawaii 96793

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

Comments

DEPARTMENT OF
PARKS AND RECREATION
COUNTY OF MAUI

1580-C KAAHUMANU AVENUE WAILUKU, HAWAII 96793

JAMES "KIMO" APANA
Mayor

FLOYD S. MIYAZONO
Director

ELIZABETH D. MENOR
Deputy Director

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

December 7, 1999

Michael T. Munekiyo, A.I.C.P.
Project Manager
Munekiyo, Arakawa & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Michael:

SUBJECT: Proposed Maui Business Park 1B Subdivision

We have reviewed the above-referenced project and have no comments.

Thank you for the opportunity to review and comment on the proposed project. Please feel free to contact me or Mr. Patrick Matsui, Chief of Parks Planning and Development, at extension 7387 should you have any other questions.

Sincerely,

Floyd Miyazono

FLOYD S. MIYAZONO
Director

c: Patrick Matsui, Chief of Parks Planning & Development

DEC 16 1999

JAMES "KIMO" APANA
MAYOR

CLAYTON T ISHIKAWA
CHIEF

FRANK E FERNANDEZ, JR
DEPUTY CHIEF

COUNTY OF MAUI
DEPARTMENT OF FIRE CONTROL

200 DAIRY ROAD
KAHULUI, MAUI, HAWAII 96732
(808) 243-7561
FAX (808) 243-7919

December 14, 1999

Mr. Michael T. Munekiyo, A.I.C.P.
Munekiyo, Arakawa & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

RE: Proposed Maui Business Park Phase 1B Subdivision

Dear Mr. Munekiyo,

Thank you for the opportunity to comment on the proposed Maui Business Park Phase 1B subdivision.

The Department of Fire Control has two major areas of concern regarding projects such as this, they are: sufficient and reliable water supply and fire department access roadways. The Department wishes to reserve the right to comment until such time as plans and specifications are submitted for review.

It is apparent from your submittal that your are planning to only subdivide the property and possibly start installing the infrastructure for the subdivision.

Water supply shall be provided at 2000 gallons per minute for a duration of 2 hours with hydrants spaced not more than 250 feet apart.

Fire department access roadways shall be installed with not less than 20 feet unobstructed width with a vertical clearance of 13 feet 6 inches. Fire department access roadways shall have an all-weather surface capable of supporting 30 tons. Turning radii shall be not less than 45 feet.

If you have any further questions, direct them in writing to the Fire Prevention Bureau, 21 Kinipopo Street, Wailuku, HI 96793.

Sincerely,

LEONARD F NIEMCZYK
Captain, Fire Prevention Bureau

DEC 2 0 1999

JAMES "KIMO" APANA
Mayor

JOHN E. MIN
Director

CLAYTON I. YOSHIDA
Deputy Director

COUNTY OF MAUI
DEPARTMENT OF PLANNING

December 15, 1999

Mr. Michael T. Munekiyo, Project Manager
Munekiyo, Arakawa & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Munekiyo:

Re: Preliminary Consultation for the Proposed Maui Business Park Phase IB Subdivision, TMK: 3-8-06:73, Kahului, Island of Maui, Hawaii

The Maui Planning Department (Department) has reviewed the above-referenced subject project and has the following comments:

1. The subject property is identified on the Wailuku-Kahului Community Plan for light industrial use. However, besides the land use map of the community plan, the Draft Environmental Assessment (Draft EA) should also address the goals, objectives and policies of the community plan document.

2. The subject property was zoned M-1 Light Industrial through County Ordinance No. 2237 (conditional zoning) which became effective on April 30, 1993. The Draft EA should address compliance with the conditions of zoning. Also, it should address the conditions that were placed on the property by the Land Use Commission when the property was redistricted into the State Urban District.

3. The subject property fronts two major roadways, Puunene Avenue and Dairy Road. The Draft EA should include a Traffic-Impact Analysis Report that analyzes the existing and future traffic situation for the area. The Draft EA should address the future airport by-pass roadway and both long-term and interim improvements that may be required as traffic-mitigation measures.

4. Besides traffic concerns, the Draft EA should also address impacts on infrastructure (i.e., water, sewers, drainage, utilities, etc.) and identify any proposed mitigation measures.

5. The Draft EA should also include an analysis of any impacts on the nearby Kahului Fire Station that may result with increased industrial development in the area, especially on their ability to provide quick emergency services.

6. The subject property is located outside of the Special Management Area of the Island of Maui.

Thank you for the opportunity to comment during the early consultation phase of the Draft EA process. If additional clarification is required, please contact Ms. Colleen Suyama, Staff Planner, of this office at 270-7735.

Very truly yours,

JOHN E. MIN
Planning Director

JEM:CMS:osy
c: Clayton Yoshida, A.I.C.P., Deputy Planning Director
Colleen Suyama, Staff Planner
Project File (TMK)
General File
(S:\\CMS\buspark1)

DEC 17 1999

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO
ATTENTION OF

December 16, 1999

Regulatory Branch

Mr. Michael T. Munekiyo, A.I,C.P.
Munekiyo, Arakawa & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Munekiyo:

This letter responds to your request for a review of the project summary for the Maui Business Park Phase 1B Subdivision, dated December 1, 1999. The information provided was not sufficiently detailed to determine whether a Department of the Army permit will be required. Please provide this office a copy of the environmental assessment when it is available.

If you have any questions concerning this determination, please contact William Lennan of my staff at 438-6986, and reference File No. 200000044.

Sincerely,

for George P. Young, P.E.
Chief, Regulatory Branch

USDA

DEC 17 1999

United States
Department of
Agriculture

Natural
Resources
Conservation
Service

210 Imi Kala St.
Suite 209
Wailuku, HI 96793

Our People...Our Islands...In Harmony

DATE: December 16, 1999

Mr. Michael T. Munekiyo, A.I.C.P.
Munekiyo, Arakawa & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Munekiyo,

SUBJECT: Proposed Maui Business Park Phase 1B Subdivision

We have no comment on the subject parcel.

Thank you for the opportunity to comment.

Sincerely,

Neal S. Fujiwara
District Conservationist

JAMES "KIMO" APANA
Mayor

CHARLES JENCKS
Director

DAVID C. GOODE
Deputy Director

Telephone: (808) 270-7845
Fax: (808) 270-7955

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS AND WASTE MANAGEMENT
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

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

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

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

BRIAN HASHIRO, P.E.
Highways Division

ANDREW M. HIROSE
Solid Waste Division

December 16, 1999

Mr. Michael Munekiyo, A.I.C.P.
Munekiyo, Arakawa & Hiraga
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Munekiyo:

SUBJECT: EARLY CONSULTATION
MAUI BUSINESS PARK SUBDIVISION
TMK: (2) 3-8-006:073

As the subject consultation for an environmental assessment is due to the proposed use of state lands for access improvements, we have no additional comments to our August 9, 1999 subdivision preliminary approval letter. A copy of that letter is attached.

If you have any questions, please call David Goode at 270-7845.

Sincerely,

CHARLES JENCKS
Director of Public Works
and Waste Management

DG:msc/mt
Attachment
S:\LUCA\CZM\mauibus.wpd

ALAN "KIMO" APANA
Mayor

CHARLES JENCKS
Director

DAVID C. GOODE
Deputy Director

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
AND WASTE MANAGEMENT
LAND USE AND CODES ADMINISTRATION
250 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

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

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

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

ANDREW M. HIROSE
Solid Waste Division

BRIAN HASHIRO, P.E.
Highways Division

August 9, 1999

Mr. Hideo Kawahara, P.E.
A&B PROPERTIES, INC.
P.O. Box 156
Kahului, Hawaii 96733

SUBJECT: KAHULUI INDUSTRIAL PARK - PHASE I-B SUBDIVISION
TMK:(2) 3-8-006:073
LUCA FILE NO. 3.1612

Dear Mr. Kawahara:

Amended preliminary approval was granted to the subject subdivision on August 2, 1999. This amended preliminary approval supersedes our original preliminary approval granted on October 29, 1993. Final approval shall be contingent upon compliance with the following conditions:

1. Comply with requirements/comments from the State of Hawaii, Department of Transportation, Highways Division. For further information, please contact Mr. Paul Chung at 873-3535.

2. Compiy with requirements/comments from the State of Hawaii, Department of Land and Natural Resources, Historic Preservation Division. For further information, please contact Ms. Cathleen Dagher at (808) 692-8023.

3. Comply with requirements/comments from Maui Electric Company. For further information, please contact Mr. Alan Miyazaki at 871-2390

4. Requirements/comments from the Department of Water Supply:

   a. Construct water system improvements in accordance with standards.

b. Provide fire protection in accordance with standards.

c. Provide water service to each lot.

d. Issues concerning water storage and source availability must be resolved. Contact the Department of Water Supply to discuss water system improvements.

Water system development fees will be charged upon application of water meters.

The subdivider should be advised that water for construction and for domestic purposes after construction may not be available until such time as new sources have been developed to service the Central Maui area.

If you have any questions, please contact the Department of Water Supply at 270-7835.

5. Comply with requirements/comments from the Department of Planning. For further information, please contact Mr. Aaron Shinmoto at 270-7253.

6. Comply with requirements/comments from the Department of Public Works and Waste Management, Engineering Division. For further information, please contact Mr. Lloyd Lee at 270-7745.

7. Requirements/comments from the Department of Public Works and Waste Management, Wastewater Reclamation Division:

   a. Provide a sewer system to the proposed lots for connection to the existing County sewer system.

   b. The developer should be informed that the Wastewater Reclamation Division cannot insure that wastewater system capacity will be available for the project.

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

d. Developer shall pay assessment fees for treatment plant expansion costs in accordance with ordinance setting forth such fees. NOTE: At the present time, wastewater assessment fees are only utilized in Kihei and Central Maui. Other areas may be subject to fees at a later time.

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

f. Plans should show the installation of an advance riser at each lot.

If you have any questions, please contact Scott Rollins at 270-7417.

8 In accordance with Section 18.12.030(E)(13.a.) of the Maui County Code (MCC), submit a certificate signed and acknowledged by all persons vested with record title in the land subdivided consenting to the preparation and recording of the plat, provided that no consent is required by any person having any non-governmental easement, lease or license affecting the land subdivided, provided further that the director shall not approve any subdivision that causes any lot to be landlocked on the land subdivided or any adjacent land.

9. In accordance with Section 18.12.040(B) MCC, submit a copy of any deed restrictions or covenants applicable to the subdivision. If there are none, please indicate this in writing.

10. In accordance with Section 18.12.040(C) MCC, submit a tax clearance certificate (issued by Department of Finance, Real Property Tax Division) to show written proof that all taxes and assessments on the tract are paid to date. An "Application for Tax Clearance" form is enclosed for your use. NOTE: The tax clearance certificate shall be valid at the time of final subdivision approval.

11. Improve Lot 13 to the provisions of the subdivision ordinance for roadways within the urban district.

12. In accordance with Section 18.20.040(B.2.) (Existing streets) MCC, improve the adjoining half of roadway Lots 2-C-2 and 2-C-3 lot to the provisions of the subdivision ordinance for roadways within the urban district.

13. In accordance with Section 12.24A.070(D) MCC, submit street tree planting and irrigation plans and a completed "Maui County Arborist Committee Plans Review Form" for review and approval.

14. Complete the improvements which were bonded for LUCA File No. 3.1597 - First Assembly of God. Final subdivision approval for LUCA File No. 3.1597 was granted on November 13, 1995 based upon and "Agreement For Subdivision Approval" and "Subdivision Bond" in the amount of $2,129,850.00.

15. Comply with the applicable conditions set forth in Ordinance No. 2237 - "A Bill For An Ordinance To Establish Conditional M-1 Light Industrial District Zoning For Two Parcels Of Land Located At Kahului, Maui, Hawaii" (effective April 30, 1993).

16. Add the following note on the final plat and construction plan:

> Pursuant to Maui County Code Section 3.44.015(C), the County of Maui is not responsible for any park, roadway, easement (including but not limited to drainage, sewer, access, reclaimed water, or avigation easement), or any other interest in real property shown on this map or shown on these plans, unless the Maui County Council has accepted its dedication by a resolution approved by a majority of Council's members at a regular or special meeting of the Maui County Council.

17. Submit ten (10) sets of the revised construction plans and three (3) sets of a drainage and soil erosion control report for review and approval by the applicable agencies. In accordance with Section 18.24.010(D) MCC, a construction plan review fee ($50/lot) shall be paid upon submission of the revised construction plans.

18. Submit fifteen (15) prints of the final plat in accordance with Chapter 18.12 (Final Plat) MCC. The final plat shall include all revisions addressing the comments noted on the enclosed amended preliminary plat.

Within one (1) year from the date of amended preliminary approval of the subdivision, all requirements shall be completed, unless an extension of time is granted. Applications for extension of time should be made in writing to the Department of Public Works and Waste Management at least fifteen days before the expiration date.

If you have any questions regarding this letter, please call Mr. Glen Ueno of our Land Use and Codes Administration at 270-7252.

Very truly yours,

for CHARLES JENCKS
Director of Public Works
And Waste Management

Enclosures: Preliminary Plat
Application For Tax Clearance

GAU S:\LUCA\ALL\SUBD\LUCASUBDWR\03\3f1612-2.ltr

xc: Engineering Division w/amended preliminary plat
Dept. of Finance, Real Property Tax Div. (unmarked amended preliminary plat only)
Dept. of Finance, Tax Map Div. (unmarked amended preliminary plat only)
Wastewater Reclamation Division
Dept. of Water Supply, SD 93-79
Dept. of Planning
Maui Electric Company
DOT, Highways Division
State Department of Health

JAMES "KIMO" APANA
MAYOR

OUR REFERENCE

YOUR REFERENCE

POLICE DEPARTMENT
COUNTY OF MAUI

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

THOMAS M. PHILLIPS
CHIEF OF POLICE

CHARLES H.P. HALL
DEPUTY CHIEF OF POLICE

December 16, 1999

Mr. Michael T. Munekiyo, A.I.C.P.
Project Manager
Munekiyo, Arakawa & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Munekiyo:

SUBJECT: Proposed Maui Business Park Phase 1B Subdivision

Thank you for your letter of December 1, 1999 requesting comments on the above subject.

We have reviewed the proposed summary and have enclosed our comments and recommendations. Thank you for giving us the opportunity to comment on the proposed project.

Very truly yours,

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

Enclosure

c: John E. Min, Planning Department

TO : THOMAS PHILLIPS, CHIEF OF POLICE

VIA : CHANNELS

FROM : RYAN RODRIGUES, COMMUNITY POLICE OFFICER KAHULUI 12/15/99

SUBJECT : MAUI BUSINESS PARK DEVELOPMENT

Sir, on December 9th 1999, I was assigned to review the Maui Business Park Development plan. This plan calls for the development of 34 acres of land into a light industrial park.

After reviewing the proposal and visiting the location for this development, I can find no reason to stop this project from continuing. However, I would like to have more information on the development of the highway fronting this project site. I am concerned with the impact on traffic along Dairy Road and Puunene Avenue. Some insight on the development plans will help to relive concerns related to it's Impact on traffic in these areas. Though the attached memo indicates that the appropriate improvements will be made. More specific information needs to be seen, as well as drawings of the improvements.

Submitted for your information.

Said Concerns That Should be addressed prior To approval.

12-14-99.

THANK YOU

RYAN RODRIGUES, E#0312
12/14/99 1420 HOURS

Concur:

12/14/99

DEC 2 3 1999

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

1949 - 1999 Celebrating 50 Years of Service

December 21, 1999

Mr. Michael T. Munekiyo
Munekiyo, Arakawa & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Maui, Hawaii 96793

SUBJECT: Proposed Maui Business Park Phase 1B Subdivision

Dear Mr. Munekiyo,

Thank you for the opportunity to provide comments in preparation of the environmental assessment (EA).

The EA should include the sources and expected potable and non-potable water usage. Enclosed is a portion of our water system map pertaining to the project area. This project area is served by the Central Maui System, for which the major source of water is the Iao Aquifer. Rolling annual average groundwater withdrawals from the Iao Aquifer as of December 1, 1999 were 18.655 MGD. The regulatory sustainable yield of this aquifer is 20 MGD. On August 13, 1997, the State Commission on Water Resource Management (CWRM) elected not to designate Iao Aquifer as a State Groundwater Management Area. However, if rolling annual average withdrawals exceed 20 mgd, CWRM will designate Iao Aquifer. Two wells in North Waihee, pumping at a combined rate of 1.5 mgd, were brought on-line in July 1997. We anticipate completion of another well to produce about 1 MGD by the first quarter of 2000. The Department is continuing to implement a plan to bring new sources on-line and to mitigate withdrawals. No guarantee of water is granted or implied as a result of these comments. Water availability will be reviewed at the time of application for meter or meter reservation.

Using State standards, total consumption for commercial and light industrial uses would range approximately between 204,000 to 207,000 gallons per day (gpd). Domestic, fire, and irrigation calculations will be reviewed in detail during the development process. Actual fire demand for structures is determined by fire flow calculations performed by a certified engineer. DWS-approved fire flow calculation methods are contained in "Fire Flow" - Hawaii Insurance Bureau, 1991. The applicant are encouraged to contact our engineering division early in the process at 270-7835 with respect to required system improvements, relocation of the existing 8-inch ductile iron water line traversing the subject property and amendment of existing easement. The applicant should be made aware that they may be required to participate in or construct a storage tank to serve the project.

It is required by County Code that water conservation practices be incorporated into project design. As much of the water demand as possible should be delivered from non-potable sources (reclaimed or brackish). Where appropriate, the applicant should consider these measures:

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

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

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

Use Climate-adapted Plants: Native plants adapted to the area, conserve water and further protect the watershed from degradation due to invasive alien species. The project site is located in "Maui County Planting Plan" - Plant Zone 3. Please refer to the attached document "Maui County Planting Plan".

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

The project overlies the Kahului aquifer. The Department of Water Supply strives to protect the integrity of surface water and groundwater resources by encouraging applicants to adopt best management practices (BMPs) relevant to potentially polluting activities. We list a few BMP references here. Additional information can be obtained from the State Department of Health.

"Water Quality Best Management Practices Manual For Commercial and Industrial Business", Prepared for the City of Seattle by Resource Planning Associates, June 30, 1989.

"The Megamanual - Nonpoint Source Management Manual - A Guidance Document for Municipal Officials." Massachusetts Department of Environmental Protection.

"Guidance Specifying Management Measures For Sources of Nonpoint Pollution In Coastal Waters." United States Environmental Protection Agency, Office of Water.

If you have any questions or need additional information, please call our Water Resources and Planning Division anytime at (808) 270-7199.

Sincerely,

David Craddick
Director
emb

cc: engineering division

attachments:
"The Costly Drip"
"Maui County Planting Plan"
Ordinance 2108 - An ordinance amending Chapter 16.20 of the Maui County Code, pertaining to the plumbing code"
"A Checklist for Water Conservation Ideas for Cooling"
"A Checklist for Water Conservation Ideas for Commercial Buildings"

C:\WPdocs\Permcomm\Mauibuspark.wpd

BENJAMIN J. CAYETANO
GOVERNOR

JAN 0 6 2000

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

ALFRED M. ARENSDORF, M.D.
DISTRICT HEALTH OFFICER

STATE OF HAWAII
DEPARTMENT OF HEALTH
MAUI DISTRICT HEALTH OFFICE
54 HIGH STREET
WAILUKU, MAUI, HAWAII 96793

January 4, 2000

Mr. Michael T. Munekiyo, A.I.C.P.
Project Manager
Munekiyo, Arakawa & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

Dear Mr. Munekiyo:

Subject: Proposed Maui Business Park Phase IB Subdivision
TMK: (2) 3-8-06:73

We have no comments to offer at this time; however, we would like to have the opportunity to review and comment on the completed Environmental Assessment on this project.

Should you have any questions, please call me at 984-8230.

Sincerely,

HERBERT S. MATSUBAYASHI
District Environmental Health Program Chief

Responses

MUNEKIYO, ARAKAWA & HIRAGA, INC.

December 20, 1999

Captain Leonard Niemczyk
Department of Fire Control
County of Maui
200 Dairy Road
Kahului, Hawaii 96793

SUBJECT: Proposed Maui Business Park, Phase IB Subdivision

Thank you for your December 14, 1999 letter commenting on the subject project. On behalf of the applicant, A&B Properties, Inc., we would like to note that your comments concerning fire flow requirements, fire hydrant spacing, and fire department access roadways have been incorporated in the project's design plans and specifications.

Thank you for providing us with your comments. Please feel free to call me should you have any questions or require additional information.

Sincerely,

Glenn Tadaki, Planner

GT:to
cc: Rick Stack, A&B Properties, Inc.
Hideo Kawahara, A&B Properties, Inc.
a&b/mbpib/mldltr.001

305 High Street, Suite 104 • Wailuku, Hawaii 96793 • ph: (808)244-2015 • fax: (808)244-8729 • email: mahinc@aloha.net

MUNEKIYO, ARAKAWA & HIRAGA, INC.

December 21, 1999

John E. Min, Director
Department of Planning
County of Maui
250 S. High Street
Wailuku, Hawaii 96793

SUBJECT: Proposed Maui Business Park, Phase IB Subdivision

Dear Mr. Min:

Thank you for your December 15, 1999 letter commenting on the subject project. On behalf of the applicant, A&B Properties, Inc., we would like to note the subject's Draft Environmental Assessment (EA) will examine the project's consistency with the community plan and compliance with the conditions of zoning, as well as impacts to traffic, infrastructure, and the Kahului Fire Station.

Thank you again for providing us with your comments. A copy of the Draft EA will be provided for your review.

Sincerely,

Glenn Tadaki, Planner

GT:to
cc: Rick Stack, A&B Properties, Inc.
Hideo Kawahara, A&B Properties, Inc.
a&b/mbpib/pdltr.001

305 High Street, Suite 104 • Wailuku, Hawaii 96793 • ph: (808)244-2015 • fax: (808)244-8729 • email: mahinc@aloha.net

MUNEKIYO, ARAKAWA & HIRAGA, INC.

December 21, 1999

Thomas M. Phillips, Chief
Police Department
County of Maui
55 Mahalani Street
Wailuku, Hawaii 96793

SUBJECT: Proposed Maui Business Park, Phase IB Subdivision

Dear Mr. Phillips:

Thank you for your department's December 16, 1999 letter commenting on the subject project. On behalf of the applicant, A&B Properties, Inc., we would like to note the subject's Draft Environmental Assessment (EA) will include information that addresses traffic operating conditions on Dairy Road and Puunene Avenue.

Thank you again for providing us with your comments. A copy of the Draft EA will be provided for your review.

Sincerely,

Glenn Tadaki, Planner

GT:to
cc: Rick Stack, A&B Properties, Inc.
Hideo Kawahara, A&B Properties, Inc.
a&b/mbplb/mpdltr.001

305 High Street, Suite 104 • Wailuku, Hawaii 96793 • ph: (808)244-2015 • fax: (808)244-8729 • email: mahinc@aloha.net

MUNEKIYO, ARAKAWA & HIRAGA, INC.

December 23, 1999

Charles Jencks, Director
Department of Public Works and
Waste Management
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

SUBJECT: Proposed Maui Business Park, Phase IB Subdivision

Dear Mr. Jencks:

Thank you for your December 16, 1999 letter commenting on the subject project. On behalf of A&B Properties, Inc., we would like to note that the proposed subdivision will be developed in accordance with the requirements established for its final subdivision approval.

Thank you for providing us with your comments. Please feel free to call me should you have any questions or require additional information.

Very truly yours,

Glenn Tadaki, Planner

GT:lfm
cc: Rick Stack, A&B Properties, Inc.
Hideo Kawahara, A&B Properties, Inc.
a&b\mbpb\dpwmtr.001

305 High Street, Suite 104 • Wailuku, Hawaii 96793 • ph: (808)244-2015 • fax: (808)244-8729 • email: mahinc@aloha.net

Chapter XI

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

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

Pursuant to the requirements of the environmental review process, comments received, as well as responses to substantive comments, are included in this section.

DRAFT ENVIRONMENTAL ASSESSMENT COMMENT LETTERS

DEPARTMENT OF
PARKS AND RECREATION
COUNTY OF MAUI

1580-C KAAHUMANU AVENUE WAILUKU, HAWAII 96793

JAN 2 8 2000

JAMES "KIMO" APANA
Mayor

FLOYD S. MIYAZONO
Director

ELIZABETH D. MENOR
Deputy Director

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

January 26, 2000

Mr. Glenn Tadaki, Planner
Munekiyo, Arakawa & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Tadaki:

SUBJECT: MAUI BUSINESS PARK, PHASE 1B SUBDIVISION

We have reviewed the Draft Environmental Assessment for the subject project and have no comments to offer at this time.

Thank you for the opportunity to review and comment. Please contact me or Mr. Patrick Matsui, Chief of Planning and Development, at 270-7387 should you have any questions.

Sincerely,

FLOYD S. MIYAZONO
Director

c: Patrick Matsui, Chief of Planning and Development

FEB 0 1 2000

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO
ATTENTION OF

January 28, 2000

Regulatory Branch

Mr. Glen Tadaki, Planner
Munekiyo, Arakawa & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Tadaki:

This letter responds to your request for a review of the draft environmental assessment for th Maui Business Park, Phase IB Subdivision, dated January 2000. Based on the information provided I have determined that a Department of the Army permit will not be required.

If you have any questions concerning this determination, please contact William Lennan of my staff at 438-6986, and reference File No. 200000044.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

USDA

FEB 0 2 2000

United States
Department of
Agriculture

Natural
Resources
Conservation
Service

210 Imi Kala St.
Suite 209
Wailuku, HI 96793

Our People...Our Islands...In Harmony

DATE: February 1, 2000

Mr. Glenn Tadaki, Planner
Munekiyo, Arakawa & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Tadaki,

SUBJECT: Maui Business Park, Phase 1B Subdivision
TMK: 3-8-006: 73

We have no comment on the subject Draft Environmental Assessment.

Thank you for the opportunity to comment.

Sincerely,

Neal S. Fujiwara
District Conservationist

JAMES "KIMO" APANA
Mayor

JOHN E. MIN
Director

CLAYTON I. YOSHIDA
Deputy Director

FEB 0 3 2000

COUNTY OF MAUI
DEPARTMENT OF PLANNING

February 1, 2000

Mr. Glenn Tadaki
Munekiyo, Arakawa & Hiraga, Inc.
305 South High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Tadaki:

Re: Draft Environmental Assessment for Maui Business Park, Phase 1B Subdivision at TMK: 3-8-006:073, Kahului, Maui, Hawaii

The Maui Planning Department (Department) has reviewed the Draft Environmental Assessment (EA) for the above-referenced project and has the following comments:

Section IV, Relationship to Governmental Plans, Policies, and Controls:

1. The Draft EA does not include any information on the State District Boundary Amendment to the Urban District approved by the State Land Use Commission which should be part of the EA document. It also does not include information on the applicant's compliance with the conditions of approval. If compliance was fulfilled during a previous action, then it should be noted in the application.

2. Under the Wailuku-Kahului Community Plan, the EA should expand its discussion on the goals, objectives and policies of the plan which are applicable to the proposed project and how the project complies. It is not enough to state that the "proposed project is consistent with the Wailuku-Kahului Community Plan." There are such recommendations as follows which should be included:

"d. Provide industrial growth opportunities through the expansion of existing industrial centers associated with the airport and harbor, and in Wailuku and Kahului. Encourage the fee-simple ownership of lots provided by private developers. Explore with the State the feasibility of a State Industrial Park on lands in the Kahului Airport District (Page 7)."

3. Under Zoning, the EA should expand its discussion on how the applicant has addressed the conditions of zoning established by Ordinance No. 2237. There were eight conditions attached to the zoning action. Of particular interest are the following:

Condition No. 2 relating to a traffic mitigation plan should the airport access road not be completed prior to completion of the Phase 1A subdivision.

Condition No. 3 regarding the representation to sell 20 percent of the proposed lots for fee simple.

Condition No. 4 required the filing of Environmental Design Standards approved by the Planning Department with the Bureau of Conveyances or Land Court. The EA should address how the project proposes to comply with these standards.

Condition No. 5 regarding the representation that no more than 20 percent of the lots developed in Phase 1B shall be leased for commercial uses.

Condition No. 6 required that an offsite drainage system for the property shall be designed to intercept, store, and handle a one-hour 100-year design storm. We note that the drainage section (Page 20) identifies a 50-year one-hour storm occurrence which is contrary to the zoning condition. Further clarification should be provided.

These issues should be addressed in greater detail than as represented in the Draft EA. If compliance has been fulfilled during the Phase 1A portion of the project, then it should be stated.

Further, information should be provided as to how compliance had been met.

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

Very truly yours,

JOHN E. MIN
Planning Director

JEM:CMS:cmb
c: Clayton Yoshida, AICP, Deputy Planning Director
Department of Public Works and Waste Management
Colleen Suyama, Staff Planner
Project File
General File
(S:\\CMS\buspark2)

FEB 10 2000

BENJAMIN J. CAYETANO
GOVERNOR

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

ALFRED M. ARENSDORF, M.D.
DISTRICT HEALTH OFFICER

STATE OF HAWAII
DEPARTMENT OF HEALTH
MAUI DISTRICT HEALTH OFFICE
54 HIGH STREET
WAILUKU, MAUI, HAWAII 96793

February 8, 2000

Glenn Tadaki
Planner
Munekiyo, Arakawa &
Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawai'I 96793

Dear Mr. Tadaki:

Subject: **Maui Business Park, Phase IB Subdivision**
TMK: (2) 3-8-06:73
Draft Environmental Assessment

Thank you for the opportunity to comment on the Draft Environmental Assessment. We have no comments to offer at this time.

Should you have any questions, please call me at 984-8230.

Sincerely,

Herbert S. Matsubayashi
District Environmental Health Program Chief

JAMES "KIMO" APANA
MAYOR

OUR REFERENCE

YOUR REFERENCE

POLICE DEPARTMENT
COUNTY OF MAUI

55 MAHALANI STREET
WAILUKU, HAWAII 96793
(808) 244-5400
FAX (808) 244-6411

THOMAS M. PHILLIPS
CHIEF OF POLICE

DEPUTY CHIEF OF POLICE

February 14, 2000

Mr. Glenn Tadaki, Planner
Project Manager
Munekiyo, Arakawa & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Tadaki:

SUBJECT: Maui Business Park, Phase 1B Subdivision
TMK: 3-8-06:73

Thank you for your letter of January 21, 2000 requesting comments on the above subject.

We have reviewed the proposed summary and have enclosed our comments and recommendations. Thank you for giving us the opportunity to comment on the proposed project.

Very truly yours,

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

Enclosure

c: John E. Min, Planning Department

TO : THOMAS PHILLIPS, CHIEF OF POLICE, COUNTY OF MAUI

VIA : CHANNELS

FROM : RYAN RODRIGUES, COMMUNITY POLICE OFFICER KAHULUI

SUBJECT : MAUI BUSINESS PARK, PHASE 1B SUBDIVISION
TMK:3-8-06:73

Sir, this communication is in regards to the above mentioned subject matter.

I have reviewed the development plans for the Maui Business Park 1B Subdivision TMK: 3-8-06:73, and have studied the planned improvements near the adjacent State Highways.

In Appendix B page 22,23,24 and 25, two scenarios are mentioned regarding traffic access into the Business Park.

Scenario one suggests the project access road be located off of Puunene Avenue 200' East of First Assembly of Gods driveway. The plan also indicates that no traffic signal is needed until it is warranted for this intersection. It is my recommendation that if scenario one is chosen as the access route for this development, a traffic signal will be needed. I further recommend that if this access point is to close to the Dairy Road intersection to install a traffic signal, then a traffic signal placed at Puunene Avenue and Hanson Road would help to ease potential traffic concerns. The idea would be to time the traffic signal at Hanson Road with the Dairy Road traffic signal, which will create breaks in traffic to allow for a safer access into the development. Hanson Road is a very heavily used access road, and by installing a traffic signal at this intersection you would help to create two safer intersections with the installation of one traffic signal.

The second scenario suggest the project access road be located on Dairy Road 365' South of Hukilike Street. Again, the master development plan states that no traffic signal is need unless warranted at the time of construction. The amount of traffic travelling on Dairy Road is tremendous. If an access road is built on Dairy Road without a traffic signal, it will create a potential hazard to traffic. It is my recommendation that a traffic signal not be decided on at the time of construction, but made part of the development plan from the beginning.

Thank you for allowing the Maui Police Department a chance to review and comment on your Maui Business Park development plans.

Submitted for your information.

NOTED; Sgt (illegible) 2233
02/10/00

OFC. R. RODRIGUES E#0312
2/6/00 0951 HOURS

COMMUNITY POLICE OFFICER
P.O.III

I agree with Officer Rodrigues' concerns with this development. The traffic along Dairy Road, Puunene Avenue, & Hansen Road is already congested, but moreso during lunch hours and the end of the work day.

Sydney N. Kikuchi
02/10/00 1530

BENJAMIN J. CAYETANO
GOVERNOR

NB WHC JY DYY PWH DH
LGS SMK
CM MKV
DY FEB 2 4 2000 DC
MM TSY
RKS CC LNS VR DMS PEE

GENEVIEVE SALMONSON
DIRECTOR

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

February 22, 2000

Mr. Rick Stack
A&B Properties, Inc.
822 Bishop Street
P.O. Box 3440
Honolulu, Hawai'i 96801-3440

Dear Mr. Stack:

We have reviewed the draft environmental assessment for Maui Business Park, Phase 1B Subdivision prepared by Munekiyo, Arakawa and Hiraga, Inc., and submitted to us by the Department of Transportation. We offer the following comments for your consideration and response.

1. **Use of Native Vegetation in Landscaping**: Please consider using native plants common to the area in landscaping.
2. **Use of Glassphalt for Roadway Surfaces**: To promote recycling of glass, please consider using a glass-asphalt aggregate in paving roadway surfaces in and around the proposed subdivision.
3. **Sustainable Building Design**: Please consider using methods discussed in the Environmental Council's sustainable building design guidelines (enclosed).

If there are any questions, please call Leslie Segundo at 586-4185.

Sincerely,

GENEVIEVE SALMONSON
Director

Enclosure

c: Mr. Mike Okumoto, State Department of Transportation
Mr. Michael Munekiyo, Munekiyo, Arakawa & Hiraga, Inc.

DRAFT ENVIRONMENTAL ASSESSMENT RESPONSE LETTERS

MUNEKIYO, ARAKAWA & HIRAGA, INC.

February 11, 2000

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

SUBJECT: Maui Business Park, Phase 1B Subdivision
TMK 3-8-06: 73

Dear Mr. Min:

Thank you for your letter of February 1, 2000 providing comments on the proposed project. On behalf of A&B Properties, Inc., we would like to note the following.

1. On May 17, 1990, the State Land Use Commission approved the reclassification of approximately 76 acres of land from the Agricultural District to the Urban District for Phase 1A and Phase 1B of the Maui Business Park (a.k.a., Kahului Industrial Park). Since the approval, Alexander & Baldwin, Inc. has submitted an annual report to the Commission that addresses its compliance with the conditions of the Commission's Decision and Order. Copies of this annual report have also been provided to the State of Hawaii, Office of Planning and the County of Maui, Department of Planning. Alexander & Baldwin, Inc. has complied, and is continuing to comply with the conditions that were set forth by the Decision and Order.

2. In addition to the recommendation cited in your letter, the proposed project complies with the following Wailuku-Kahului Community Plan land use recommendation:

> f. 2) . . . infill of light industrial between the Kanaha Pond and Puunene Avenue in Kahului; . . . These are logical extensions of the present pattern of industrial activity and are well related to transportation corridors for access (page 15).

These citations will be incorporated in the Final EA.

305 High Street, Suite 104 • Wailuku, Hawaii 96793 • ph: (808)244-2015 • fax: (808)244-8729 • email: mahinc@aloha.net

3. With regard to the following conditions attached to the light-industrial zoning established by Ordinance No. 2237, please note the following:

Condition No. 2 The traffic mitigation plan, which included the widening of Dairy Road from two to four-lanes, was approved by the State of Hawaii, Department of Transportation (DOT) and the County of Maui, Department of Public Works and Waste Management (DPWWM) prior to the issuance of certificates of occupancy for Phase 1A of the Maui Business Park Subdivision.

Condition No. 3 Alexander & Baldwin, Inc. has sold, and is continuing to market all the lots within Phase 1A and Phase 1B of the Maui Business Park, for fee simple.

Condition No. 4 A Declaration of Covenants and Restriction was recorded with the State Bureau of Conveyances on November 27, 1995. This Declaration, among other things, requires occupants to abide by all applicable Federal, State, and County regulations with regard to the handling, storage and/or disposal of hazardous materials.

Condition No. 5 With regard to this condition concerning the leasing of lots for commercial purposes, construction for the widening of Dairy Road to four lanes commenced in April 1996, followed by the DOT's acceptance of the improvements in April 1997. Accordingly, this condition is not applicable as the remaining portion of this condition states, "that this condition (Number 5) shall terminate and have no force and effect upon commencement of construction, that is, notice to proceed, for either the airport access road or the widening of Dairy Road to four lanes".

Condition No. 6 All offsite drainage improvements for the Maui Business Park were designed to accommodate the 100-year storm. See Appendix A of the Draft EA (page 3, section 5.3, Drainage). A master drainage report for the Maui Business Park, was submitted to the County of Maui in January 1994. Subsequently, plans for offsite drainage improvements were completed and submitted to the DOT and DPWWM for review

in July 1994. The plans were approved in July 1995 and the construction of the improvements were completed in January 1996.

Thank you again for providing us with your comments. Please call me should you have any questions.

Sincerely,

Glenn Tadaki, Planner

GT:to
cc: Rick Stack, A&B Properties, Inc.
Hideo Kawahara, A&B Properties, Inc.
Mike Okumoto, Dept. of Transportation, Right-of-Way Branch
a&b/mbplb/plannltr.001

MUNEKIYO, ARAKAWA & HIRAGA, INC.

February 22, 2000

Thomas M. Phillips, Chief
Maui Police Department
County of Maui
55 Mahalani Street
Wailuku, Hawaii 96793

SUBJECT: Maui Business Park, Phase 1B Subdivision
TMK 3-8-06: 73

Dear Mr. Phillips:

Thank you for your letter of February 14, 2000 providing comments on the proposed project. On behalf of A&B Properties, Inc., we would like to note the following.

Based on the accepted standards of the Manual on Uniform Traffic Control Devices, the intersection of the Puunene Avenue/Project Access Road does not presently meet the traffic warrant for the installation of a traffic signal system. It should be noted that the ducting for a traffic signal system at this intersection was installed in connection with the past widening of this segment of Puunene Avenue. This measure will facilitate the installation of a traffic signal system when traffic volume warrants are met.

Appendix B-1 contains two (2) changes to the recommendations contained in the traffic study (Appendix B). These changes include the relocation of the Dairy Road/Interim Access Road intersection to a point approximately 400 feet south of the Hukilike Street/Dairy Road intersection and the installation of a traffic signal system at this intersection. It should be noted that a traffic signal system at this intersection is reflected in the construction plans that have been submitted to the State Department of Transportation for review and approval.

305 High Street, Suite 104 • Wailuku, Hawaii 96793 • ph: (808)244-2015 • fax: (808)244-8729 • email: mahinc@aloha.net

Thank you again for providing us with your comments. Please call me should you have any questions.

Sincerely,

Glenn Tadaki, Planner

GT:to
cc: Rick Stack, A&B Properties, Inc.
Hideo Kawahara, A&B Properties, Inc.
Mike Okumoto, Department of Transportation
Ted Kawahigashi, Austin, Tsutsumi & Associates, Inc.
a&b/mbp/b/mpdltr.003

MUNEKIYO, ARAKAWA & HIRAGA, INC.

February 24, 2000

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

SUBJECT: Maui Business Park, Phase 1B Subdivision
TMK 3-8-06: 73

Dear Ms. Salmonson:

Thank you for your letter of February 22, 2000 providing comments on the proposed project. On behalf of A&B Properties, Inc., we would like to note that the use of native plants for landscaping, the use of glassphalt for roadway surfaces, and methods for sustainable building design will be considered during the detailed design phase of the project.

Thank you again for providing us with your comments. Please call me should you have any questions.

Sincerely,

Glenn Tadaki, Planner

GT:to
cc: Rick Stack and Hideo Kawahara, A&B Properties, Inc.
Mike Okumoto, Department of Transportation
a&b/mpbib/oeqcltr.003

305 High Street, Suite 104 • Wailuku, Hawaii 96793 • ph: (808)244-2015 • fax: (808)244-8729 • email: mahinc@aloha.net

References

References

Case & Lynch, Petition for District Boundary Amendment for Reclassification of Certain Lands Situate at Kahului, Island and County of Maui, State of Hawaii, TMK 3-8-01:portion of 02, 3-8-01:portion of 16, 3-8-06:portion of 04; 3-8-06:64, December 1988.

Community Resources, Inc. Maui County Community Plan Update Program Socio-Economic Forest Report. January 1994.

County of Maui, The General Plan of the County of Maui, September 1990 Update.

County of Maui, Wailuku-Kahului Community Plan, December 1987.

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Appendices

Appendix A

Preliminary Engineering Report

PRELIMINARY ENGINEERING REPORT

For

MAUI BUSINESS PARK –PHASE 1-B SUBDIVISION

Kahului, Maui, Hawaii
TMK: (2) 3-8-06:73

Prepared By:

A&B Properties, Inc.
33 Lono Avenue, Suite 400
Kahului, Hawaii 96793

January 3, 2000

PRELIMINARY ENGINEERING REPORT
FOR
MAUI BUSINESS PARK, PHASE 1-B
TMK: 3-8-06:73

1.0 INTRODUCTION

This report provides a description of the project site and infrastructure that will serve this development. It will also evaluate the existing infrastructure and discuss the improvements that would be required for this project.

2.0 TOPOGRAPHY

The topography of the project site is generally flat and gently slopes in the northerly direction, with a graded swale near the approximate the center of the property. The elevation of the project at Puunene Avenue is about 44-feet and about 23-feet at the northwest corner of the property. The site has been filled and rough graded, with no structures on it. There is an existing overhead electrical system that runs through the site, from Dairy Road to the Puunene sugar mill.

3.0 EXISTING INFRASTRUCTURE

3.1 - Water System:

This area is served by the County of Maui's Department of Water Supply system. An existing 8-inch waterline is located in an easement through the project site, from Dairy Road to Hansen Road in Puunene. The source for this water is the Waihee wells that were developed by the Central Maui Source Joint Venture. The three developed wells currently have a total capacity of 13.5 mgd. A&B Properties, Inc. is a member of this joint venture and has an allocation of 4/19 of the developed capacity. The remaining A&B source credits from these wells will be adequate to supply this project.

The water storage tanks that serve the system for this area are located in Wailuku.

3.2 - Sewer System:

There is no existing sewer system within the project site. There is an existing 10-inch County sewerline that ends in the State's right-of-way for the Kahului Airport Access Road. This 10-inch sewerline is an extension of the existing system that serves Maui Business Park, Phase 1-A, and is connected to a 16-inch sewerline in Dairy Road and Alamaha Street. Sewage from this pipeline gravity flows into the Alamaha Street pump station and an 8-inch force main then takes flows to the Kahului Pump Station. The sewage is pumped from this SPS, through a 20-inch force main, to the Kahului Wastewater Reclamation Facility.

3.3 – Drainage:

Runoff from the undeveloped site flows to a swale that was graded at about the middle of the project site. There are two existing retention basins north of the site, which were excavated earlier for this project. The swale directs storm water flows into the existing west retention basin. Runoff that does not flow towards the swale sheet flows into adjacent HC&S sugar cane fields.

Runoff from the undeveloped site for a 50-year, 1-hour storm is estimated at about 26.72 cubic feet per second (cfs).

3.4 – Roadways:

There are no existing roads within the project site. Access to the site is from Puunene Avenue, which is located southwesterly of the project. The right-of-way for the future Kahului Airport Access Road is the western boundary of this project. Dairy Road is located westerly of the Airport Access Road.

Puunene Avenue is a five-lane roadway at the proposed access to the project, with left turn storage lanes for the First Assembly of God Church and the project's proposed Ho'okele Street. Dairy Road is a five-lane street between Puunene Avenue and Hana Highway.

3.5 – Electrical, Telephone and Cable Television Systems:

The primary electrical, telephone and cable television systems are above ground and located in Dairy Road. There also is an existing overhead telephone system along Puunene Avenue. A 70-feet wide electrical easement exists between Dairy Road and Hansen Road, which bisects the project site. Line extensions to the project site will be made from these existing systems.

4.0 GRADING PLAN

The project site will be subdivided into twelve light industrial lots and one roadway lot. Lot 5 will be graded to provide a building pad and parking areas for a prospective buyer. The remaining lots will be graded so that runoff will flow to the proposed subdivision roads.

5.0 PROPOSED SUBDIVISION IMPROVEMENTS

5.1 - Water System:

Water consumption for this light industrial project with about 32 acres of developable area is estimated to be about 79,300 gallons per day (gpd). This is based on the Interim Water Useage Standard for Central Maui of 2,744 gpd/acre. The source for this project will be from the Waihee wells that were developed by the Central Maui Source Joint Venture and dedicated to the Department of Water Supply. A&B Properties, Inc. is a member of this joint venture and has an allocation of 4/19 of the developed water. Water for this project will be from A&B's allocation.

The existing 8-inch waterline that runs through the project site in an easement will be replaced with a 12-inch line. This new line will be connected to the existing 12-inch waterline in the Airport Access Road right-of-way. This proposed system will provide adequate water to meet domestic and fire flow requirements.

5.2 – Sewer System:

The daily average sewage flow generated by this development is estimated to be about 54,400 gallons per day. The Kahului Wastewater Reclamation Facility has adequate capacity for this flow.

The onsite sewer system will be designed to County of Maui, Department of Public Works and Waste Management standards. A new 8-inch sewerline will be connected to an existing 10-inch sewerline located in the Airport Access Road right-of-way. The existing sewer system runs through Maui Business Park, Phase 1-A into a 16-inch sewerline that directs flows to the Alamaha Street pump station. All of the existing sewerlines were designed to have the capacity to take flows from Phases 1-A and 1-B.

5.3 – Storm Drainage

Runoff generated by the developed project for a 50-year, 1-hour storm is expected to be 167.94 cubic feet per second (cfs). This would be an increase of about 141.22 cfs.

The storm runoff from the developed lots will flow into an onsite drainage system, which will be designed to County standards. Offsite drainlines will take flows to two existing retention basins located north of this project. Although the project area will be less than 100 acres, these retention basins have been designed for 100-year, 24-hour storms. Therefore, the basins have adequate capacity to take all flows from this development.

5.4 – Roadways:

There are two proposed accesses to the project site. One access, Ho'okele Street, will be to Puunene Avenue. The other access, Pakaula Street, will be a connection to the Airport Access Road, which will be constructed by the State in the future. Both streets will have 80-foot wide right-of-ways, with 56-feet (curb to curb) roadways.

An interim road will be constructed so that the project may be accessed from Dairy Road until the State completes the Airport Access Road. The intersection of this interim road with Dairy Road will be signalized. A Traffic Impact Analysis Report for this development has been prepared by Austin, Tsutsumi & Associates, Inc. and is included in Appendix B of the draft Environmental Assessment.

5.5 – Electrical, Telephone and Cable Television Systems:

Electrical, telephone and cable television systems will be extended to this project from existing systems maintained by the respective utility companies and will be designed to current standards. The onsite systems will be underground. However, Maui Electric Company's existing transmission lines in the easement through the site would remain overhead.

6.0 CONCLUSION

This preliminary engineering report concludes that the existing infrastructure has the capacity for this development, and construction of the proposed improvements will mitigate the impact of the new subdivided lots.

Appendix B

Traffic Study
(December 18, 1998)

TRAFFIC STUDY FOR THE PROPOSED MAUI BUSINESS PARK PHASE IB ACCESS ON PROPOSED KAHULUI AIRPORT ACCESS ROAD

Kahului, Maui, Hawaii

December 18, 1998

Prepared for:

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

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

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TRAFFIC STUDY
FOR THE PROPOSED
MAUI BUSINESS PARK PHASE IB
ACCESS ON PROPOSED KAHULUI AIRPORT ACCESS ROAD

I. INTRODUCTION

A. Purpose of Study

This traffic study was conducted by Austin Tsutsumi & Associates, Inc. (ATA) to address one of the items of work described in the State Department of Transportation's (SDOT) letter of October 7, 1998 (HWY-PS, 2.1210), permitting a roadway access connection to the proposed Kahului Airport Access Road, in Kahului, Maui. This traffic study, therefore, does the following:

1. Estimates the potential traffic demand generated by the project for the Base Years 2001, 2004 and 2015.

2. Recommends conceptual intersection geometrics and traffic control strategies to accommodate the future traffic volumes.

Figure 1 shows the location of the development and its proximity to the proposed Kahului Airport Access Road, to Puunene Avenue and to Dairy Road.

In addition, this traffic study investigated the feasibility of constructing an interim roadway connection to existing Dairy Road should the construction of the proposed Airport Access Road be delayed beyond the Year 2001.

This report documents the methodology, findings, conclusions and recommendations of the traffic study.

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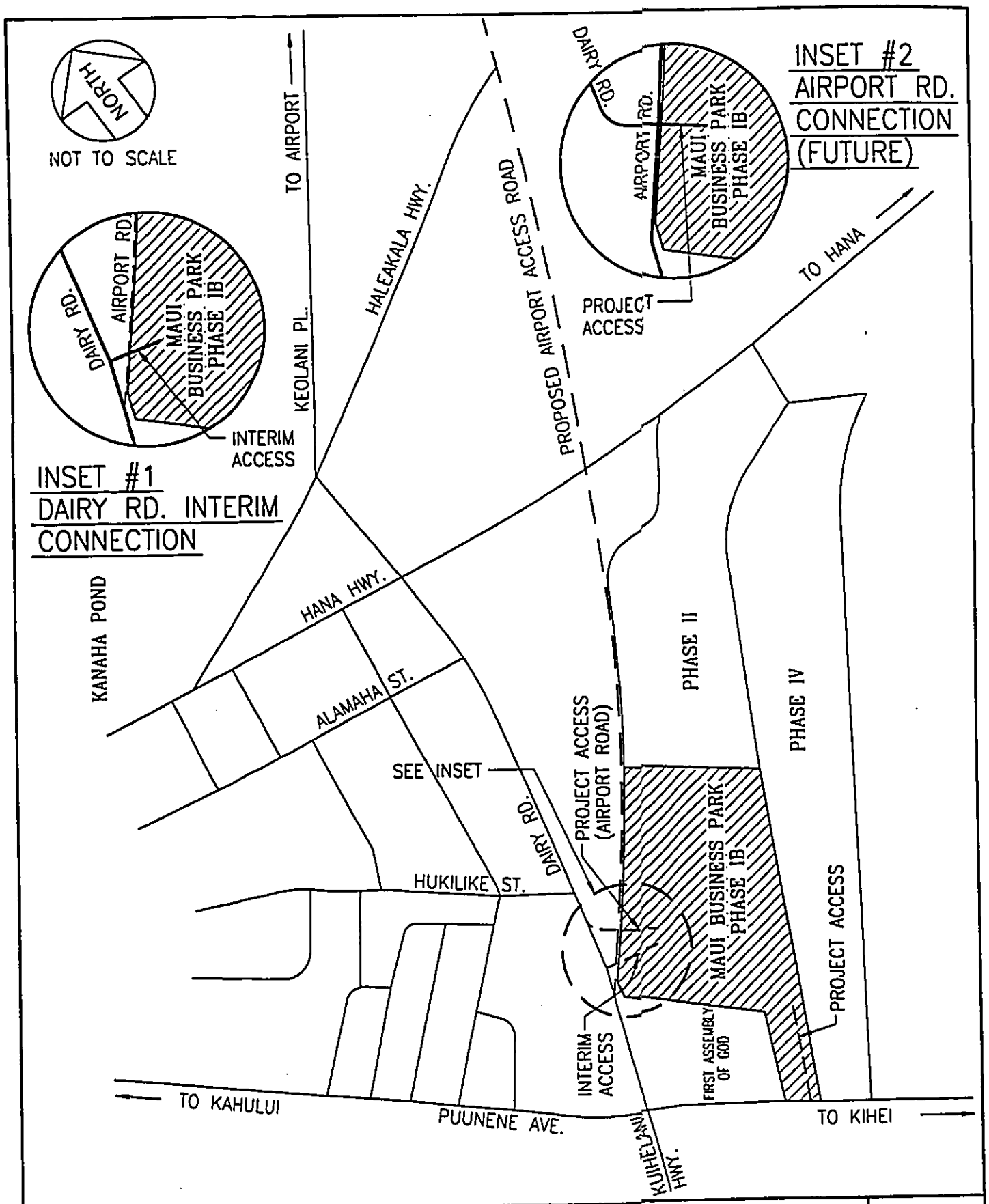


MAUI BUSINESS PARK PHASE 1B	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII LOCATION MAP	FIGURE 1

FN: 9864\Site Plan

B. Project Description

A&B Properties Inc. (A&B), proposes to develop the Maui Business Park Phase IB on 36.8 acres located on the southeastern portion of Kahului, between Hana Highway and Puunene Avenue, and southeast of Dairy Road. Figure 1 shows the location of the development. More specifically, the project site is identified as TMK: 3-8-6:Por 4. The proposed development will consist of light industrial and commercial uses. The Phase IB site has the proper land use designation and zoning approvals. The currently approved access to the Maui Business Park Phase IB development as well as the Phase II and Phase IV developments, is on Puunene Avenue, approximately 1,000 feet east of the Puunene Avenue/Kuihelani Highway/Dairy Road intersection.

A&B's long-range plans also include development of the Phase II and Phase IV areas, which will have similar land uses as in the Phase IB area.

In order to anticipate the ultimate traffic demands at the Project access points on the proposed Airport Access Road and on Puunene Avenue, the Phase II and Phase IV generated traffic were estimated based on gross land use. Table 1 shows the anticipated development schedule and build-out year for each phase of the development.

Table 1
Development Schedule

Year	Phase(s)	Commercial (1,000 SQFT GLA)		Light Industrial (1,000 SQFT GLA)	
		Incremental	Total	Incremental	Total
2001	IB	120.0	120.0	0	0
2004	IB	66.0	186.0	186.0	186.0
2015	IB, II, IV	272.7	458.7	852.3	1038.3

The Kahului Airport expansion plan includes a new Airport Access Road. The proposed Airport Access Road would begin at the present intersection of Puunene Avenue and Kuihelani Highway/Dairy Road, replacing Dairy Road as the fourth leg at this intersection. Figure 1 shows the new alignment of the

proposed Airport Access Road as it veers to the northeast from the original alignment of Dairy Road to intersect with Hana Highway and continues on to Kahului Airport. The Airport Access Road will be a four-lane, divided roadway with controlled access; i.e., no driveway connections along the road alignment.

The southern limit of Dairy Road would be realigned to form a "Tee" intersection with the proposed Airport Access Road, approximately 1,300 feet north of the existing Puunene Avenue/Kuihelani Highway/Dairy Road intersection.

A second access to the Maui Business Park Phase IB development is proposed on the Airport Access Road at the intersection of the Airport Access Road and realigned Dairy Road, thus creating a standard four-legged intersection. The SDOT schedule for construction of the Airport Access Road is for completion in late Year 2001 or early Year 2002. The first increment of the Phase IB development could occur before the completion of the Airport Access Road.

C. Study Methodology

This study addresses the following:

1. Trip generation and traffic assignment characteristics for Phase IB and future developments, Phase II and Phase IV.

2. Traffic demand at the development's two access points at the Airport Access Road/Dairy Road intersection and on Puunene Avenue.

3. Conceptual intersection layouts at the development's two access points.

II. EXISTING CONDITIONS

A. Project Site

The southern boundary of the project site borders the First Assembly of God church property, which occupies the southeast corner formed by the intersection of Puunene Avenue and Kuihelani Highway/Dairy Road. The Phase II and Phase IV sites are located east and south of the Phase IB site, and border

Hana Highway to the east and the proposed Airport Access Road to the north. Figure 1 shows the location of the A&B developments.

B. Roadway System

Dairy Road is a four-lane, two-way, collector roadway, which is generally oriented in the north/south direction. At the south end of the road, it begins at the intersection of Puunene Avenue/Kuihelani Highway as the fourth leg of the intersection, and continues northward toward Kahului Airport and terminates at its intersection with Haleakala Highway and Keolani Place. It forms a major intersection with Hana Highway before its intersection with Haleakala Highway. The posted speed limit on Dairy Road is 30 miles per hour (mph).

Kuihelani Highway is a controlled-access, two-lane, two-way, State arterial highway. It terminates in a "Tee" intersection with Honoapiilani Highway. The posted speed limit on Kuihelani Highway is generally 55 mph. The speed limit on Kuihelani Highway reduces to 35 mph as it approaches the Puunene Avenue/Dairy Road intersection.

Puunene Avenue is a major collector road, generally oriented in the east/west direction. It begins at the HC&S sugar mill at its intersection with Mokulele Highway in Puunene, and continues westward, intersecting with Kuihelani Highway/Dairy Road, into Kahului and ultimately intersects with Kaahumanu Avenue. Fronting the southern limit of the development, Puunene Avenue is a two-lane State highway with a posted speed limit of 45 mph. The Puunene Avenue approaches to the Kuihelani Highway/Dairy Road intersection have two through lanes, a left-turn storage lane and a right-turn lane.

C. Existing Traffic Volumes

In order to estimate the existing demand on Puunene Avenue, Dairy Road, and the roadways which would provide access to the project site, weekday AM and PM peak period traffic counts were obtained on Wednesday, November 4, 1998 and on Thursday, November 5, 1998. From the count data, the AM peak hour of traffic was determined to be between 7:15 and 8:15 AM and the PM peak

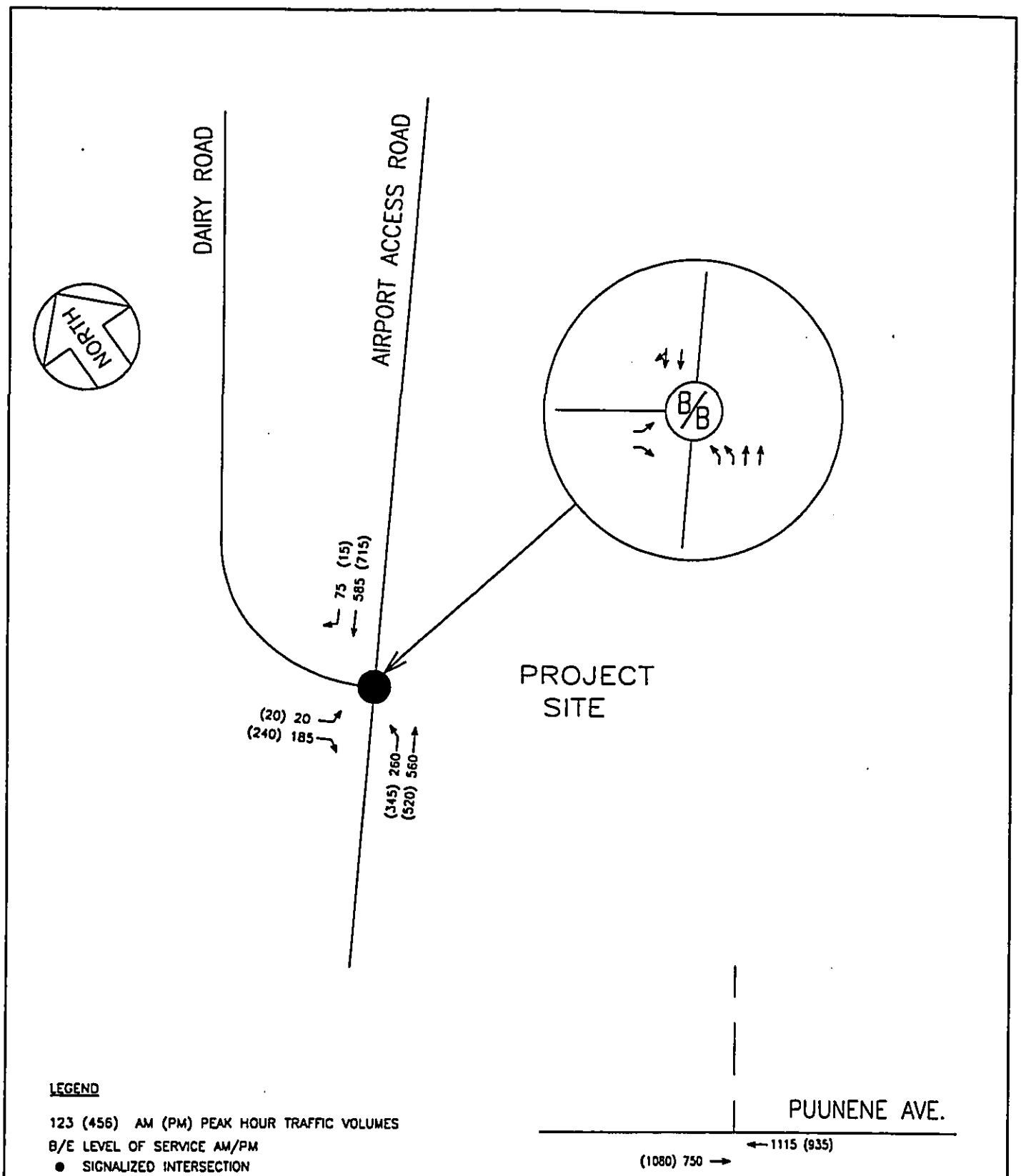
hour of traffic was observed to occur between 4:15 and 5:15 PM. The count data is provided in Appendix A.

III. FUTURE CONDITIONS WITHOUT PROJECT

The *Maui Long-Range Land Transportation Plan*, dated February 1997, estimates a 61% island-wide increase in population and employment from 1990 to 2020. From this estimate, a de facto growth factor of 1.7% per year was derived from the projections and applied to the volumes on Dairy Road and Puunene Avenue to estimate the Base Year traffic for the Years 2001, 2004 and 2015. The Base Years were chosen to coincide with the build-out year for each development scenario.

Turning movements at the new Airport Access Road/Dairy Road intersection and the Dairy Road traffic demand were estimated based on projections contained in the *Year 2020 Traffic Assessment of Kahului Airport Access Road*, dated December 1995. The Base Years 2001, 2004 and 2015 peak hour traffic volumes meet the Warrant for traffic signal system in the Manual on Uniform Traffic Control Devices (MUTCD). The *Year 2020 Traffic Assessment of Kahului Airport Access Road* also indicates that this intersection would be signalized and recommends that two northbound left-turn lanes be provided on the Airport Access Road for the heavy left-turn movement to Dairy Road and that separate lanes for left-turn and right-turn movements be provided on the Dairy Road approach. Figures 2, 3, and 4 show the traffic assignment for Base Years 2001, 2004 and 2015 without the project.

Level of Service (LOS) is a qualitative measure used to describe the conditions of traffic flow ranging from free-flow conditions at LOS A to congested conditions at LOS F. The *1994 Highway Capacity Manual – Special Report 209*, includes methods for calculating volume-to-capacity (v/c) ratios, delays and corresponding levels of service used in this study. LOS and v/c ratio definitions for unsignalized and signalized intersections are provided in Appendix B. Table 2 shows the Base Year LOS for the Airport Access Road/Dairy Road Intersection.



MAUI BUSINESS PARK PHASE 1B	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII FUTURE YEAR 2001 WITHOUT PROJECT	FIGURE 2

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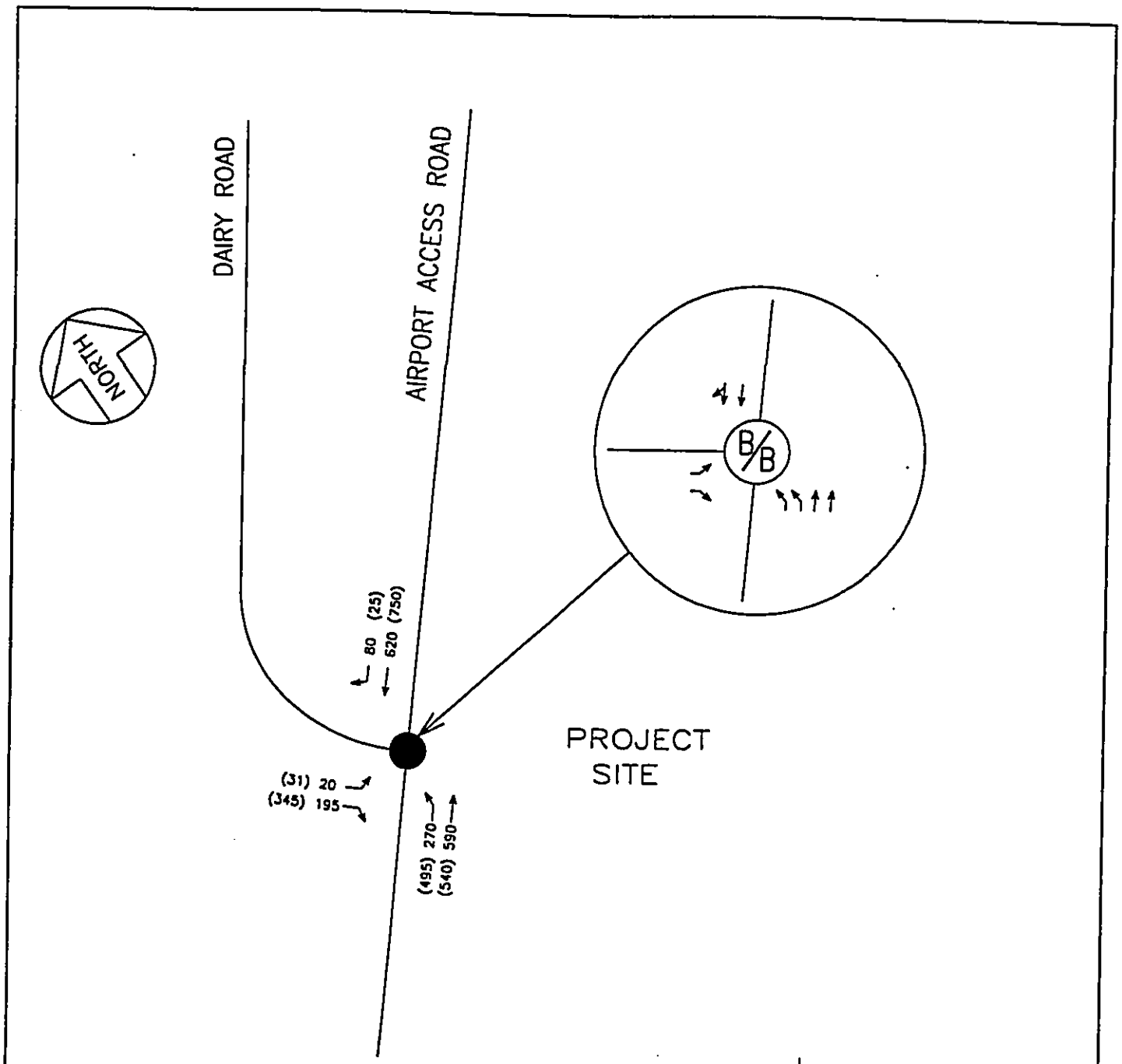

LEGEND

123 (456) AM (PM) PEAK HOUR TRAFFIC VOLUMES
B/E LEVEL OF SERVICE AM/PM
● SIGNALIZED INTERSECTION

MAUI BUSINESS PARK PHASE 1B	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII FUTURE YEAR 2004 WITHOUT PROJECT	FIGURE 3

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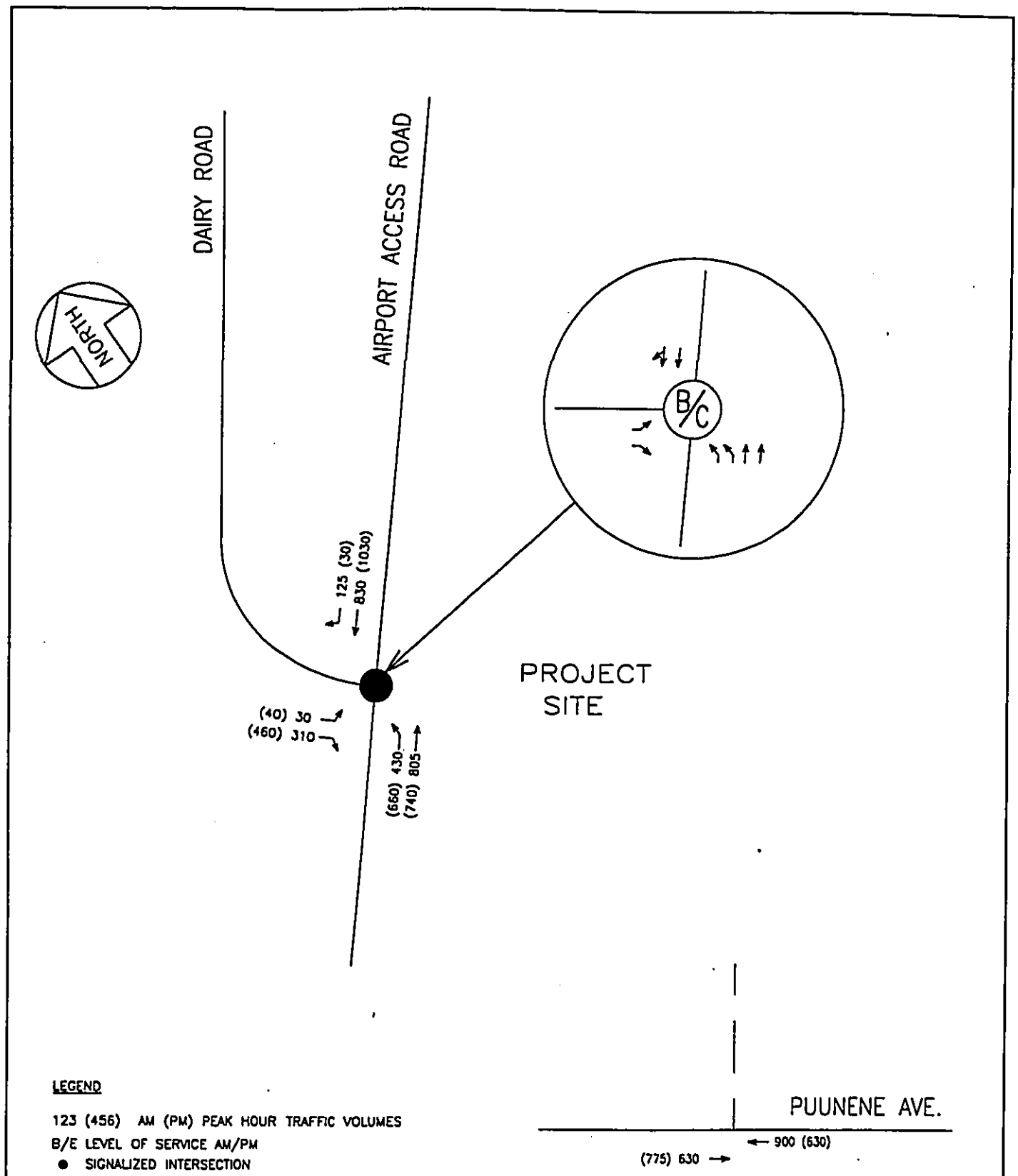


MAUI BUSINESS PARK PHASE 1B	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS,SURVEYORS • HONOLULU,HAWAII FUTURE YEAR 2015 WITHOUT PROJECT	FIGURE 4

FN: 9864\FY2015wop

Table 2
Base Year Without Project
Levels of Service

Intersection	Control	AM Peak Hour			PM Peak Hour		
		level of service	v/c ratio	ave. delay (sec.)	level of service	v/c ratio	ave. delay (sec.)
2001							
Airport Access Rd./Dairy Rd.	Signal	B	0.40	11.5	B	0.45	12.7
Airport SB approach		C	-	15.3	C	-	16.5
Airport NB approach		B	-	8.7	B	-	10.1
Dairy EB approach		B	-	10.1	B	-	10.1
2004							
Airport Access Rd./Dairy Rd.	Signal	B	0.42	11.7	B	0.53	14.0
Airport SB approach		C	-	15.7	C	-	18.4
Airport NB approach		B	-	8.7	B	-	11.9
Dairy EB approach		B	-	10.2	B	-	10.6
2015							
Airport Access Rd./Dairy Rd.	Signal	B	0.59	14.6	C	0.71	19.1
Airport SB approach		C	-	21.0	D	-	27.4
Airport NB approach		B	-	10.0	B	-	14.7
Dairy EB approach		B	-	10.8	B	-	13.2

A. 2001 Base Year

Analysis of the Airport Access Road/Dairy Road intersection revealed that this signalized intersection would operate at LOS B during the AM and PM peak hours of traffic.

B. 2004 Base Year

Analysis of the Airport Access Road/Dairy Road intersection revealed that this intersection would continue to operate at LOS B during the AM and PM peak hours of traffic.

C. 2015 Base Year

Analysis of the Airport Access Road/Dairy Road intersection revealed that this intersection would operate at LOS B during the AM peak hour of traffic and at LOS C during the PM peak hour of traffic.

The *Maui Long-Range Land Transportation Plan* recommends construction of the Puunene Bypass Road between the Years 2006 and 2020. This roadway would divert trips with origins and destinations within the Kihei, Kahului and Wailuku areas from using Puunene Avenue. The 2015 Base Year projection assumes the Puunene Bypass Road is completed and accounts for this diversion based on the traffic projections contained in the *Maui Long-Range Land Transportation Plan*.

IV. PROJECT-GENERATED TRIPS

A. Trip Generation

The project will consist of commercial and general light industrial activities. Trip generation rates contained in *Trip Generation*, 6th Edition, published by the Institute of Transportation Engineers (ITE), were used to estimate the daily, AM peak hour and PM peak hour traffic generated by the project. Table 3 shows the trip generation rates used in the study. Daily traffic is measured in vehicles per day (vpd) while peak hour traffic is measured by vehicles per hour (vph). Studies by ITE indicate that pass-by trips, i.e., traffic

already on the roadway and diverted to the project, can comprise between 15 to 30 percent of trips for shopping centers (commercial) during the PM peak hour of traffic. A pass-by rate of 15 percent was used in the study. Table 4 shows the total vehicular trips generated by the project or the traffic demand to and from the project sites at each intersection.

Table 3
Trip Generation Rates

Per 1,000 SF GLA	Average Weekday	AM Peak Hour		PM Peak Hour	
		Trip Rate	% Enter	Trip Rate	% Enter
Shopping Center	42.92	1.03	61%	3.74	48%
Light Industrial	6.97	0.92	88%	0.98	12%

Table 4
Cumulative Trip Generation by Phase

Phase/Year	Average Weekday (vpd)	AM Peak Hour		PM Peak Hour	
		Enter (vph)	Exit (vph)	Enter (vph)	Exit (vph)
IB (1st Incr.)/2001	5,150	75	48	215	233
IB (total)/2004	9,279	268	96	356	522
IB, II, IV/2015	26,924	1,129	299	945	1,787

B. Trip Distribution

Trips generated by the anticipated development scenario for each Base Year were distributed among the two project access points on Dairy Road (or the Airport Access Road) and on Puunene Avenue. Existing traffic patterns and estimates of population in the Maui Long-Range Land Transportation Plan were used to distribute the project trips onto Puunene Avenue, Airport Access Road, Kuihelani Highway and Dairy Road.

The Airport Access Road intersection and the Puunene Avenue intersection would also serve traffic from the Phase II and IV sites. A third access for the project areas would likely be provided on Pulehu Road with the development of Phases II and IV.

According to recommendations in the Year 2020 Traffic Assessment, the construction of the Airport Access Road Interchange with Hana Highway would necessitate the relocation of the Pulehu Road intersection with Hana Highway to the east of its present location. The preferred plan seeks to consolidate Pulehu Road, Hansen Road and the new Airport Spine Road into a single 4-legged intersection with Hana Highway. This access would provide a direct ingress and egress to/from the development site for project-generated traffic with origins or destinations in East Maui or Upcountry Maui.

C. Traffic Demand Analysis with the Project

Due to the uncertainty of the completion date for the Airport Access Road, two scenarios, one without and one with the Airport Access Road were analyzed for the first increment of Phase IB in Year 2001. Full build out of Phase 1B in Year 2004 and full build out of Phases II and IV were analyzed assuming the Airport Access Road would be completed and in operation. Table 5 summarizes the results of the analysis.

1. Year 2001 Puunene Avenue Access

The Project Access Road would intersect Puunene Avenue, forming the minor stop sign controlled approach in a "Tee" intersection. Analysis of the Puunene Avenue/Project Access Road intersection indicates that the southbound left-turn movements would experience LOS F conditions during the AM and PM peak hours of traffic. All other constrained movements at this intersection would experience LOS B conditions or better.

The addition of separate left- and right-turn lanes on the Project Access Road approach and a median left-turn refuge area on Puunene Avenue would facilitate the southbound left-turn operation at the Puunene Avenue/Project Access Road intersection. The refuge area would allow southbound left-turn traffic from the Project Access Road to execute the turn in two phases: crossing westbound traffic and merging into eastbound traffic on Puunene Avenue. Under these conditions the left-turn movement would improve to LOS D during both peak hours of traffic.

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

Table 5
Future Year With Project With Mitigation
Levels of Service

Intersection	Control	AM Peak Hour			PM Peak Hour		
		level of service	v/c ratio	ave. delay (sec.)	level of service	v/c ratio	ave. delay (sec.)
2001							
Puunene Ave./Project Access Rd.	Unsig.	A	-	0.2	A	-	0.9
Puunene EB Left		B	-	8.7	B	-	7.7
Project Access Rd. SB Left		*F/D	-	25.3**	*F/D	-	26.9**
Project Access Rd. SB Right		A	-	5.1	B	-	9.2
2001 w/o Airport Access Rd							
Dairy Rd./Project Access Rd.	Unsig.	A	-	0.2	A	-	1.3
Dairy SB Left		B	-	6.3	B	-	8.0
Project Access Rd. WB Left		*F/D	-	20.2**	*F/D	-	28.1**
Project Access Rd. WB Right		A	-	4.3	B	-	9.2
2001 with Airport Access Rd.							
Airport Access Rd./Dairy Rd./Project Acc.	Signal	C	0.49	17.3	C	0.48	17.3
Airport SB approach		C	-	17.5	C	-	17.2
Airport NB approach		C	-	17.8	C	-	18.6
Project Access WB approach		B	-	12.5	B	-	12.9
Dairy EB approach		B	-	11.7	B	-	11.6
2004							
Puunene Ave./Project Access Rd.	Unsig.	A	-	0.5	A	-	2.3
Puunene EB Left		C	-	10.8	B	-	8.8
Project Access Rd. SB Left		*F/D	-	29.9**	*F/E	-	44.8**
Project Access Rd. SB Right		B	-	5.5	B	-	4.8
Airport Access Rd./Dairy Rd./Project Acc. Rd.	Signal	C	0.65	24.2	C	0.65	23.2
Airport SB approach		D	-	26.1	C	-	21.9
Airport NB approach		C	-	23.1	D	-	25.8
Project Access WB approach		C	-	15.4	C	-	17.2
Dairy EB approach		C	-	24.2	C	-	24.7
2015							
Puunene Ave./Project Access Rd.	Signal	B	0.46	10.8	B	0.51	13.4
Project Access Rd. SB approach		C	-	15.9	B	-	13.6
Puunene WB approach		B	-	13.4	C	-	16.6
Puunene EB approach		B	-	6.2	B	-	10.3
Airport Access Rd./Dairy Rd./Project Acc. Rd.	Signal	D	0.77	29.1	D	0.83	32.1
Airport SB approach		D	-	32.6	D	-	35.0
Airport NB approach		D	-	26.8	D	-	28.5
Project Access WB approach		C	-	24.0	D	-	37.2
Dairy EB approach		D	-	32.1	D	-	32.7

* = LOS without median left turn refuge area / LOS with median refuge area
** = ave. delay with median refuge area

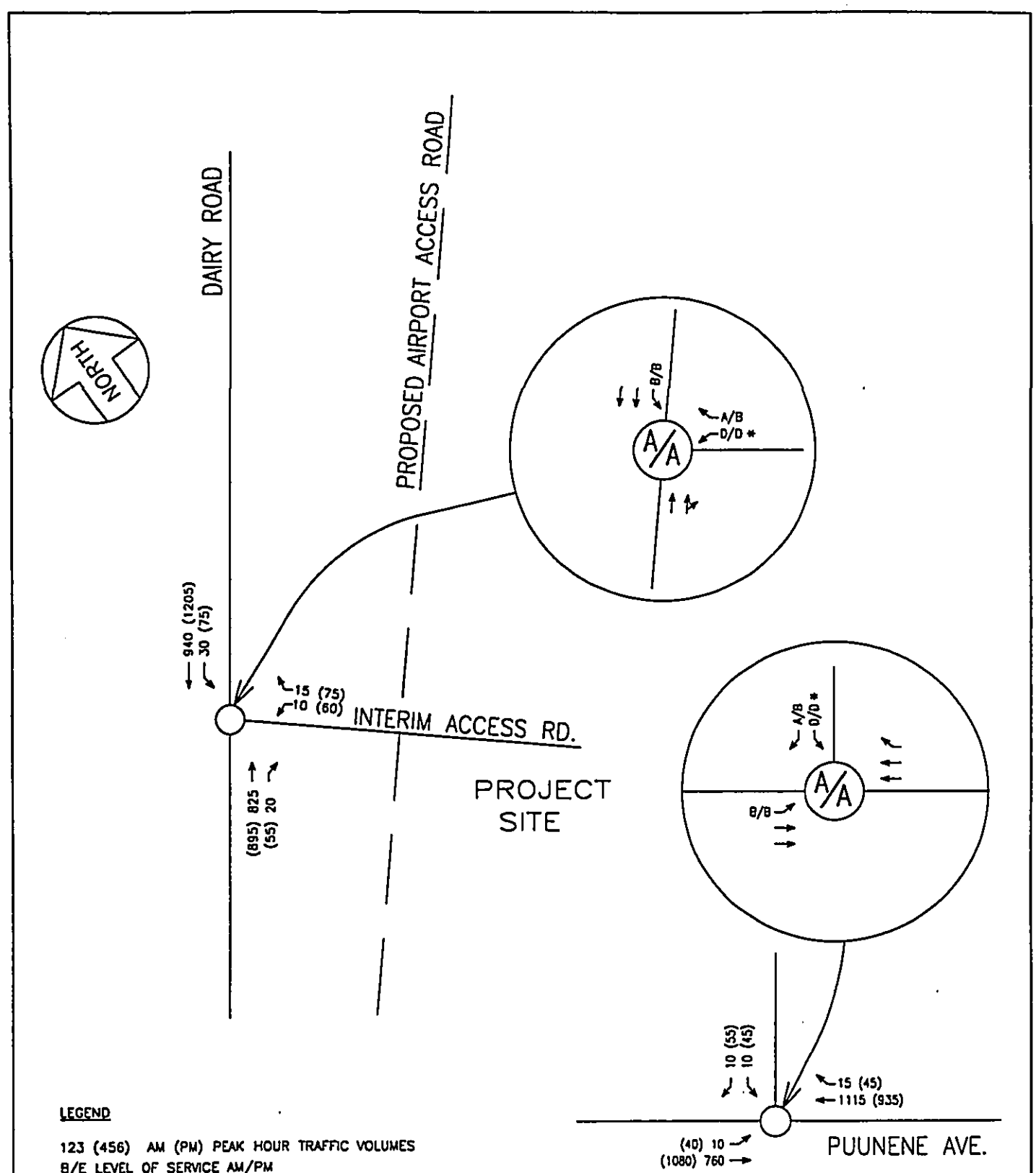
2. Year 2001 – Interim Dairy Road Connection (Without Airport Access Road)

If development of Phase IB occurs before the completion of the Airport Access Road, an interim access road off Dairy Road would be constructed. This interim access road would form a "Tee" intersection with Dairy Road, with the Project Access Road forming the minor or stop sign controlled approach. The Year 2001 traffic volumes and intersection lane assumptions are shown in Figure 5. Analysis of this unsignalized intersection indicates that the westbound left-turn movements on the Project Access Road would experience LOS F conditions during the AM and PM peak hours of traffic. All other constrained movements at this intersection are expected to operate at LOS B or better.

In order to mitigate the left-turn operation, the addition of a median left-turn refuge on Dairy Road and the provision of separate lanes for left- and right-turning traffic on the Project Access Road approach would facilitate and improve the westbound left-turn operation at this intersection to LOS D during both peak hours of traffic.

3. Year 2001 – with Airport Access Road

Base Year 2001 without project conditions requires signalization at the Airport Access Road/Dairy Road intersection. Figure 6 shows the Year 2001 volumes with project and the intersection lane requirements. The Project Access Road will transform this intersection into a signalized, standard, four-legged intersection, which would operate at LOS C during the AM and PM peak hours of traffic. The individual approaches at this intersection would experience LOS C and LOS B conditions.

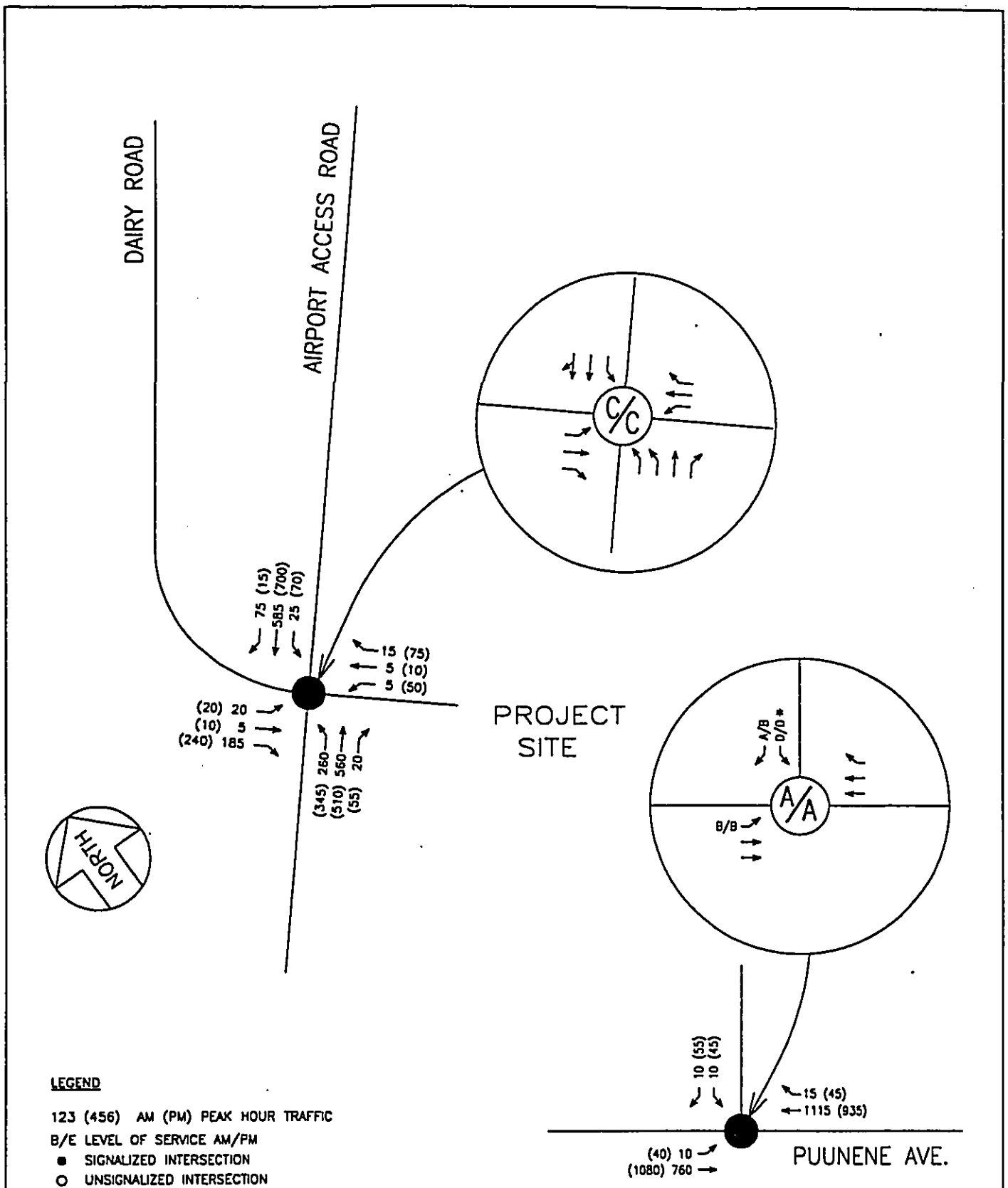


LEGEND

123 (456) AM (PM) PEAK HOUR TRAFFIC VOLUMES
B/E LEVEL OF SERVICE AM/PM
● SIGNALIZED INTERSECTION
O UNSIGNALIZED INTERSECTION
* INCLUDES LEFT TURN REFUGE

MAUI BUSINESS PARK PHASE 1B	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS,SURVEYORS • HONOLULU,HAWAII FUTURE YEAR 2001 WITH PROJECT NO AIRPORT ACCESS ROAD	FIGURE 5

FN: 9864\FY2001w_oprtacc



MAUI BUSINESS PARK PHASE 1B	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII FUTURE YEAR 2001 WITH PROJECT	FIGURE 6

4. Year 2004 with Phase IB

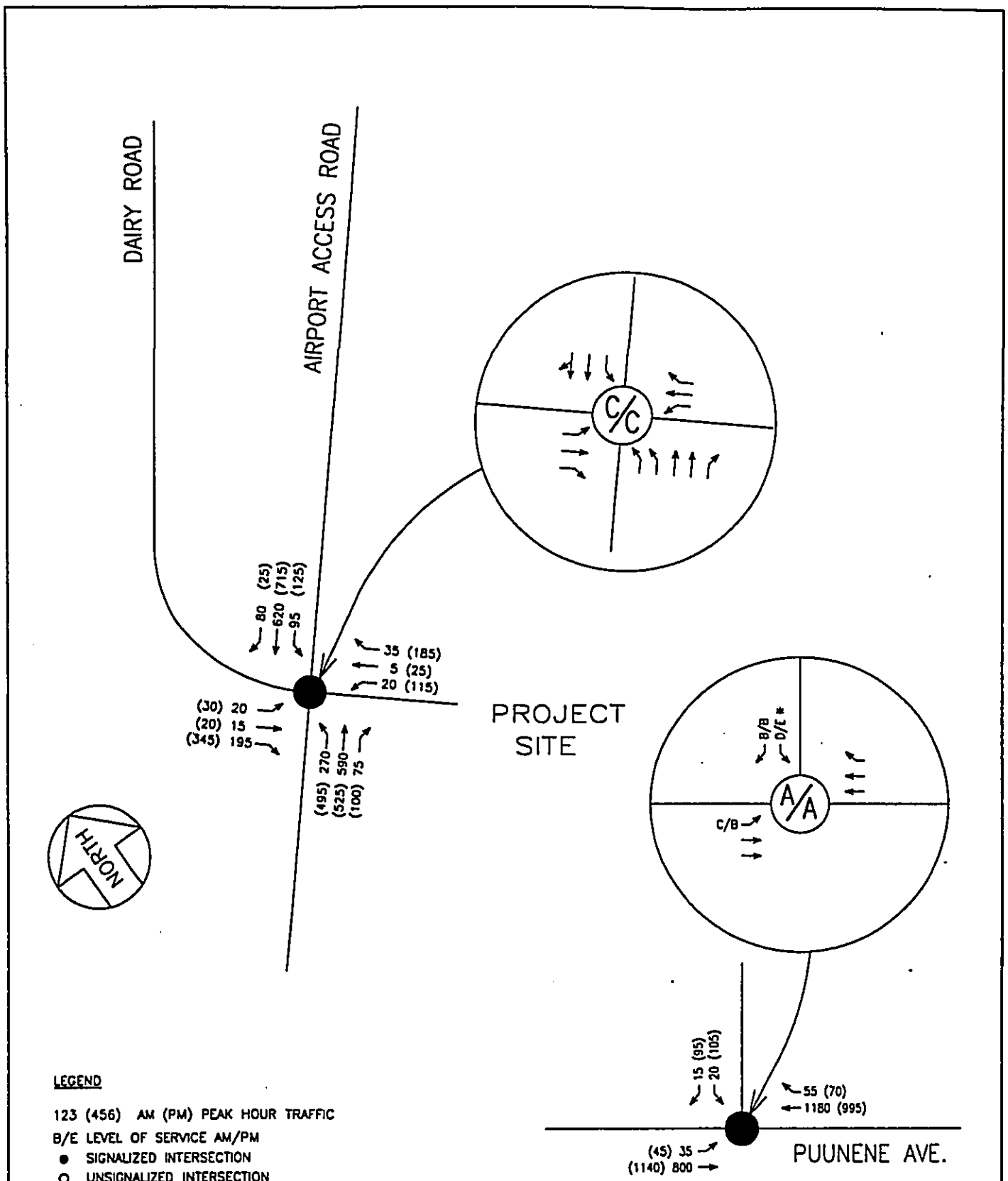
Year 2004 traffic volumes and lane requirements are shown in Figure 7. The southbound left-turn traffic at the unsignalized Puunene Avenue/Project Access Road intersection would experience LOS D conditions during the AM peak hour of traffic and LOS E conditions during the PM peak hour of traffic. All other constrained movements would experience LOS C conditions or better at this intersection.

Airport Access Road/Dairy Road/Project Access Road signalized intersection would operate at LOS C conditions during the AM and PM peak hours of traffic. The individual approaches at this intersection would experience LOS C and LOS D conditions.

5. Year 2015 - Ultimate Development

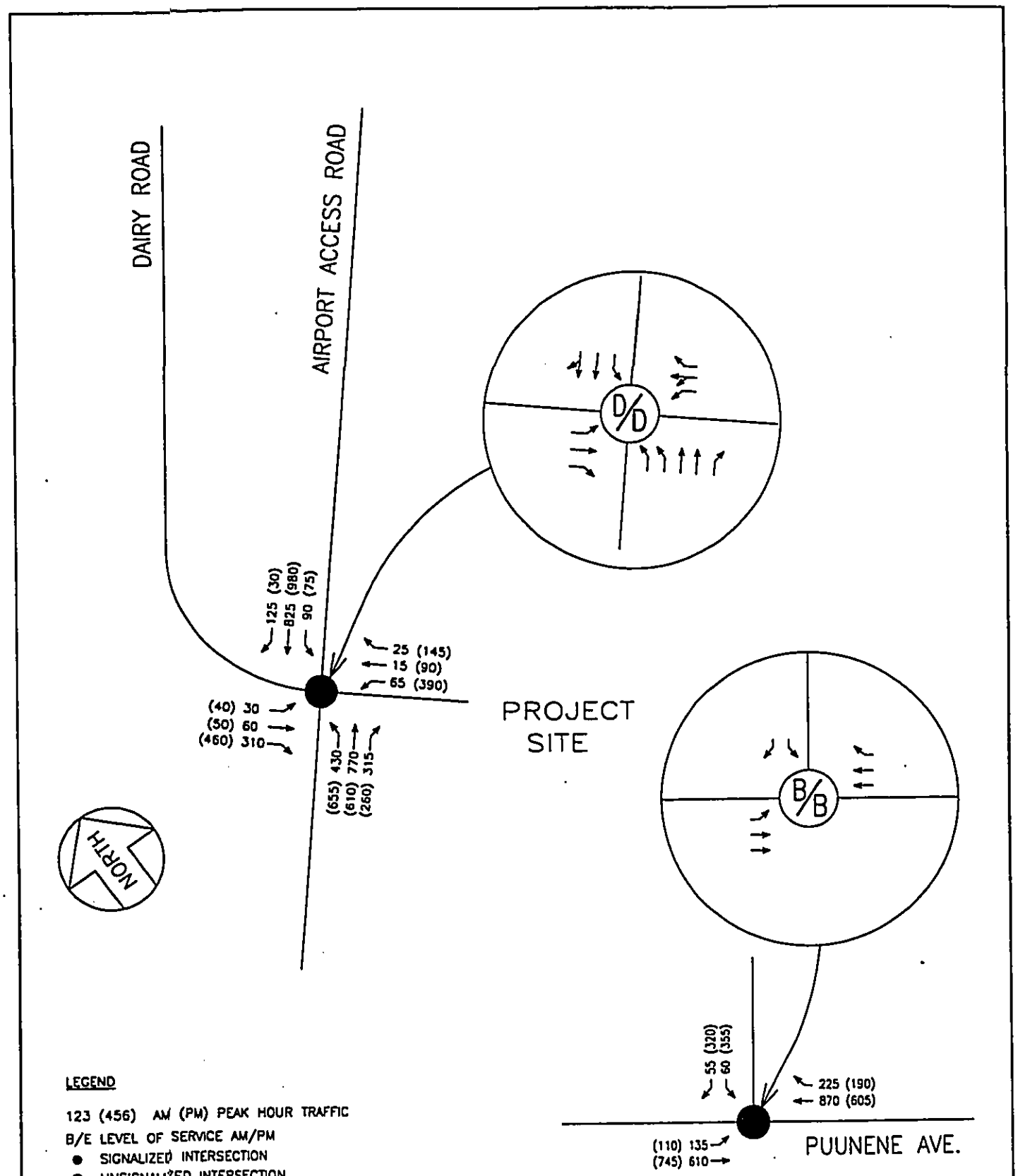
Year 2015 traffic volumes with the project are shown in Figure 8. The Year 2015 projected traffic volumes at the Puunene Avenue/Project Access Road intersection would meet the Peak Hour Warrant for signalization as required in the *Manual on Uniform Traffic Control Devices* (MUTCD). As a signalized intersection, the Puunene Avenue/Project Access Road intersection would operate at LOS B conditions during the AM and PM peak hours of traffic. All other movements would experience LOS C conditions or better.

In order to maintain LOS D or better conditions for all movements at the intersection, the Project Access Road (westbound) approach at the Airport Access Road/Dairy Road/Project Access Road intersection would require modification. By providing a left-turn lane, a shared left-turn/through lane, and a right-turn lane, the overall operating conditions of the intersection would be LOS D during both the AM and PM peak hours of traffic. The individual intersection approaches would experience LOS C and LOS D conditions.



MAUI BUSINESS PARK PHASE 1B	ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII FUTURE YEAR 2004 WITH PROJECT	FIGURE 7

FN: 9864\FY2004wp



MAUI BUSINESS PARK PHASE 1B	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII FUTURE YEAR 2015 WITH PROJECT	FIGURE 8

FN: 9854\FY2015wp

V. CONCLUSION

The following are the conclusions of this traffic report:

1. The second access road into the project site from the proposed Kahului Airport Access Road will significantly reduce the traffic demand at the intersection of Puunene Avenue and Kuihelani Highway.

2. The interim Dairy Road/project Access Road intersection will not require a traffic signal system for the development of increment one of the Maui Business Park Phase 1B. Traffic volumes on the Project Access Road will not meet the MUTCD Traffic Signal Warrants.

3. Similarly, the Puunene Avenue/Project Access Road intersection will not require a traffic signal system for the development of increment one of the Maui Business Park Phase 1B. However, the projected traffic generated by the development of Phases II and IV would require the installation of a traffic signal system at this intersection.

4. With or without the project, the intersection of the Proposed Kahului Airport Access Road and realigned Dairy Road would require a double left-turn lane on the Airport Access Road for left turning vehicles to Dairy Road, and the installation of a traffic signal system.

5. In the future, when the Puunene By-Pass Road is constructed, through traffic on Puunene Avenue is anticipated to decline, as traffic destined to and from Kahului on Mokulele Highway will most likely divert to the By-Pass Road.

6. A third access road into the project site will be required either on Pulehu Road or on Hansen Road in order to service the traffic generated by the ultimate development of the Phase II and Phase IV areas. This access road would serve traffic originating from and/or destined to the East Maui or Upcountry areas, thus reducing the traffic demand on the access intersection on the Kahului Airport Access Road.

V. RECOMMENDATIONS

A. Year 2001

Due to the uncertainty of the completion date for the Airport Access Road, two scenarios, one without and one with the Airport Access Road could occur for Year 2001.

1. Puunene Avenue Access (With or Without Airport Access Road)

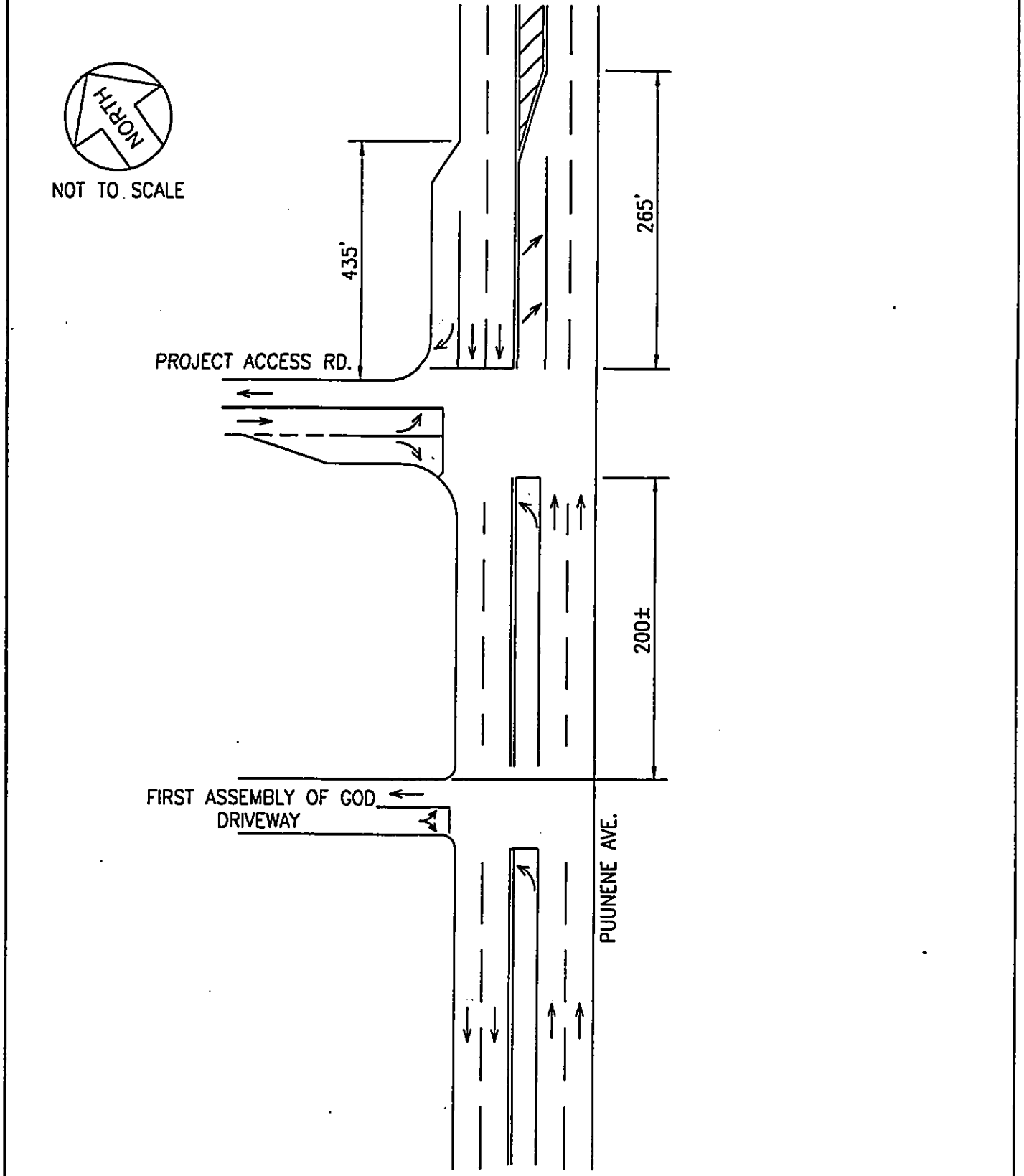
The recommendations for Puunene Avenue/Project Access Road intersection are as follows. Figure 9 shows the conceptual layout for this intersection.

- Provide an eastbound left-turn storage lane and a westbound right-turn deceleration lane on Puunene Avenue.
- Provide a left-turn lane and a right-turn lane on the Project Access Road.
- Provide a median refuge area on Puunene Avenue for left-turning vehicles from the Project Access Road.
- No traffic signal until traffic signal warrants are satisfied.

2. Interim Dairy Road Connection – (Without Airport Access Road)

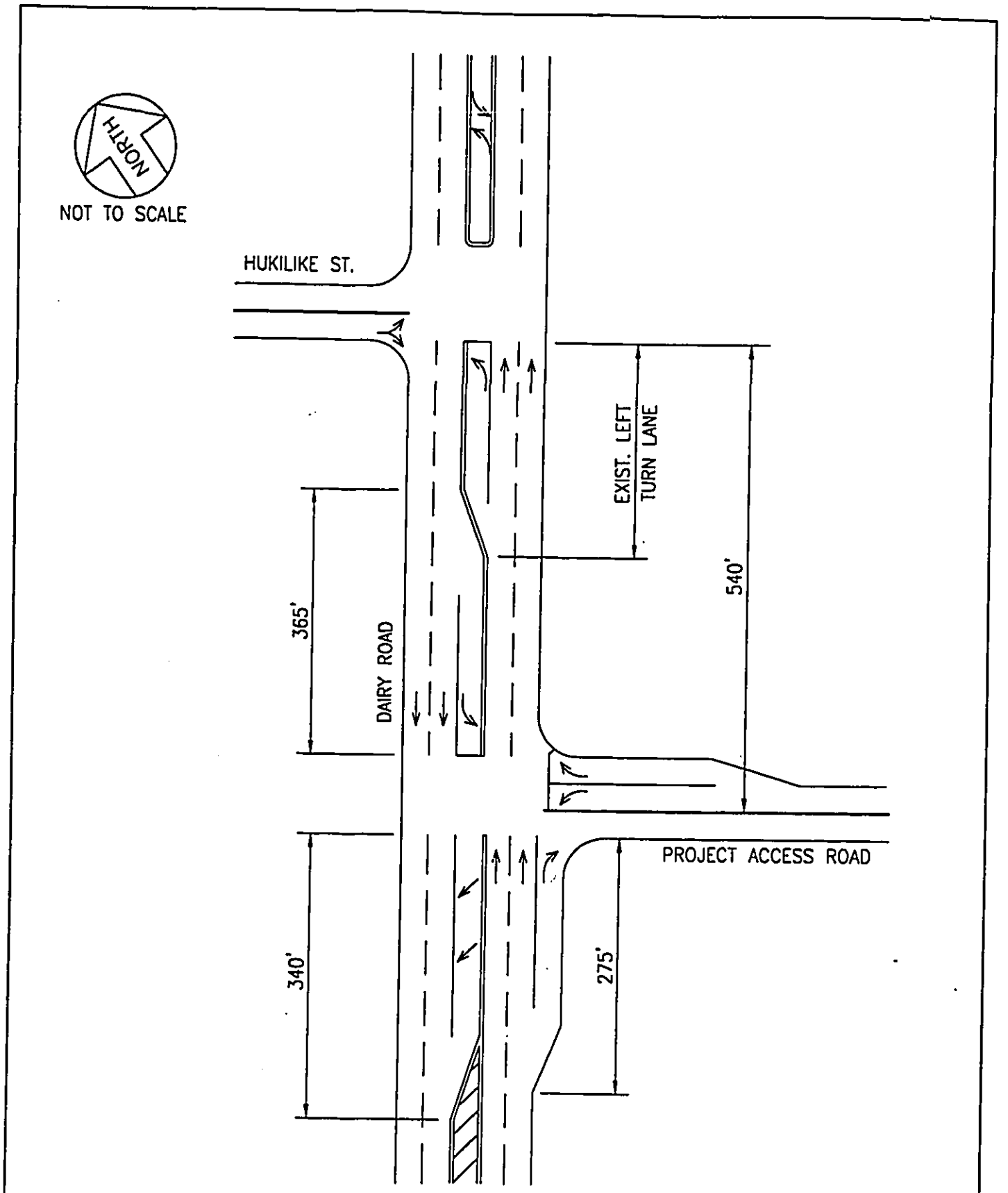
The recommendations for the interim Dairy Road/Project Access Road intersection are as follows. Figure 10 shows the interim conceptual Dairy Road/Project Access Road intersection.

- Locate the intersection approximately 540 feet from the Hukilike Street intersection.
- Provide a southbound left-turn storage lane on Dairy Road.
- Provide a northbound right-turn deceleration lane on Dairy Road.



MAUI BUSINESS PARK PHASE 1B	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII PUUNENE AVENUE ACCESS	FIGURE 9

FN: 9864\Figure9



MAUI BUSINESS PARK PHASE 1B	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII INTERIM ACCESS ON DAIRY ROAD	FIGURE 10

FN: 9864\Figure10

- Provide separate left- and right-turn lanes on the Project Access Road.

- Provide a median refuge area for left turns from the Project Access Road.

- No traffic signal at this intersection, unless warranted at time of construction.

3. **Airport Access Road Connection (With Airport Access Road)**

- Set aside the right-of-way to accommodate the ultimate configuration of the Airport Access Road/Dairy Road/Project Access Road intersection. Figure 11 shows the ultimate conceptual configuration for this intersection.

- Provide separate lanes for left turn, through and right turns on the Project Access Road.

- Coordinate this traffic signal with the traffic signal at the Airport Access Road/Puunene Avenue/Kuihelani Highway intersection to provide smooth progression of traffic on Airport Access Road.

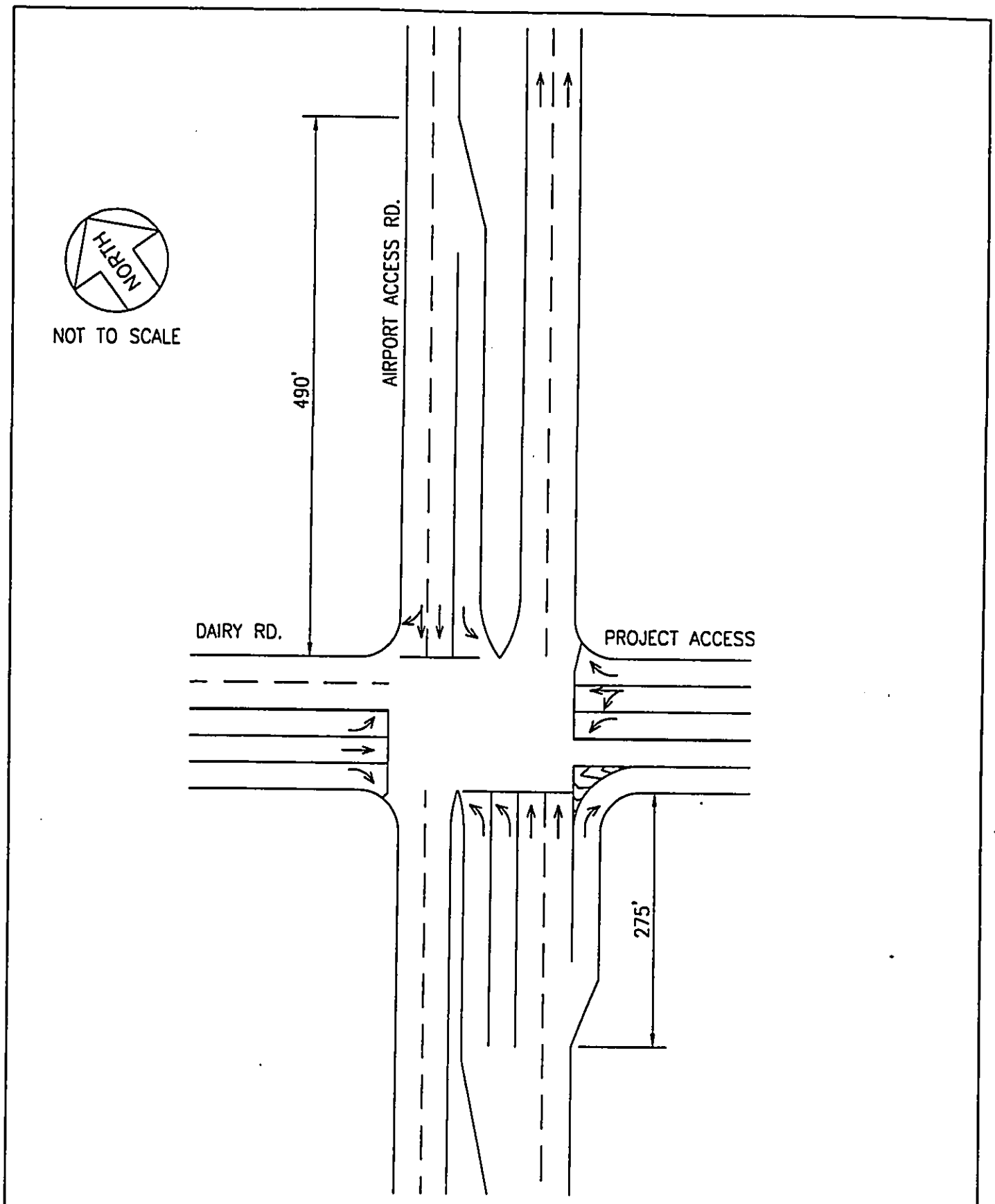
- Provide a southbound left-turn lane on Airport Access Road and a northbound right-turn lane on Airport Access Road for traffic entering the project site.

- Provide a northbound double left-turn lane on Airport Access Road as recommended in *the Year 2020 Traffic Assessment of Kahului Airport Access Road.*

- Provide a separate right-turn lane, a separate through lane and a separate left-turn lane on the Dairy Road approach.

B. Years 2004 and 2015 (With Airport Access Road)

In order to anticipate the ultimate traffic demands at the Project Access Road intersection, Phase II and Phase IV traffic generation was based on gross land



MAUI BUSINESS PARK
PHASE 1B

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

AIRPORT ACCESS
ROAD INTERSECTION

FIGURE
11

FN: 9864\Figure11

use estimates and traffic assignments were superimposed at the two project intersections for Year 2015.

1. Puunene Avenue Access

The Year 2001 recommendations will accommodate the Year 2004 traffic demands at the Puunene Avenue/Project Access Road intersection.

For Year 2015, the Puunene Avenue/Project Access Road intersection should be signalized when volumes meet the MUTCD traffic signal Warrants. It is anticipated that the projected traffic volumes for ultimate development of Phases II and IV will meet the traffic signal Warrants.

2. Airport Road Access

The Year 2001 recommendations will accommodate the Year 2004 traffic demands at the Airport Access Road/ Dairy Road/Project Access Road intersection.

Up to Year 2004, the Project Access Road approach would require separate left-turn, through and right-turn lanes. The following recommendation is made for ultimate development of Phase II and Phase IV in Year 2015.

- Modify the through lane to become a shared left turn/through lane to provide a westbound double left turn on the Project Access Road onto Airport Access Road.

REFERENCES

1. Edward K. Noda and Associates, Inc., *Draft Environmental Impact Statement – Kahului Airport Improvements*, March 1996

2. Institute of Transportation Engineers, *Trip Generation*, 6th Edition, 1997.

3. Kaku Associates and Munekiyo & Arakawa, Inc., *Final Report Maui Long-Range Land Transportation Plan*, February 1997.

4. Transportation Research Board, *Highway Capacity Manual*, Special Report 209, 1994.

5. U.S. Department of Transportation, Federal Highway Administration, *Manual on Uniform Traffic Control Devices for Streets a98-64rp4nd Highways*, 1988 as amended.

6. Wilbur Smith Associates, *Year 2020 Traffic Assessment of Kahului Airport Access Road*, December 1995.

APPENDICES

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

APPENDIX A

TURNING MOVEMENT COUNTS

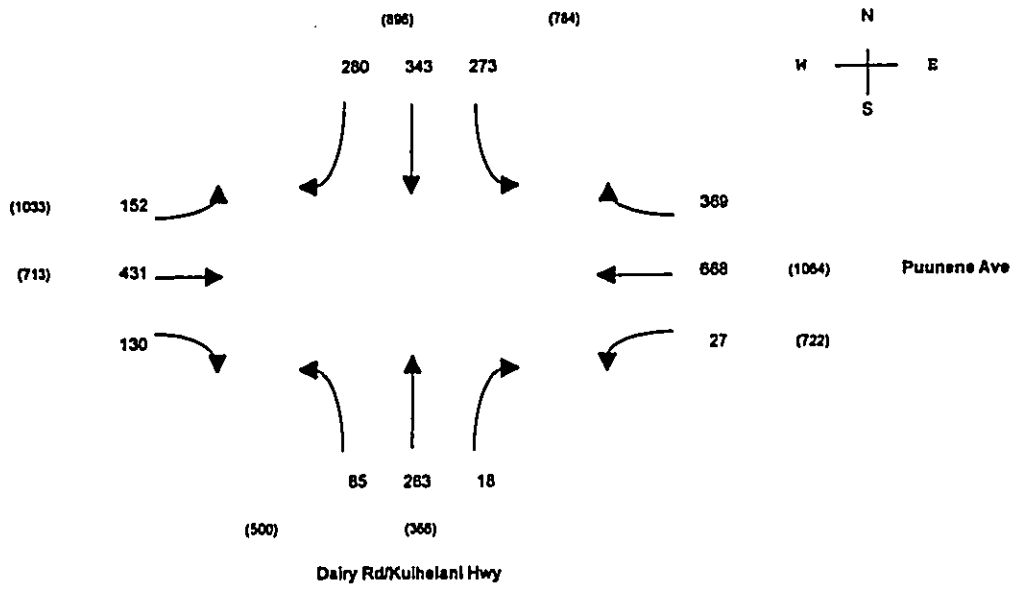
INTERSECTION COUNT SURVEY SUMMARY

North/South Street : Dairy Rd/Kuihelani Hwy
East/West Street : Puunene Ave
Weather : Light Rain

Period: AM
Date: 11/5/98
Day : THURS

15 MINUTE PERIOD	Dairy Rd/Kuihelani Hwy NORTHBOUND LEFT	THRU	RGHT	SOUTHBOUND LEFT	THRU	RGHT	Puunene Ave EASTBOUND LEFT	THRU	RGHT	WESTBOUND LEFT	THRU	RGHT	TOTAL VOLUME 15 MIN	HOURLY
630 - 645	13	39	5	45	60	27	22	105	35	7	77	56	491	
645 - 700	6	49	2	43	70	31	37	94	41	5	103	74	555	
700 - 715	8	77	7	53	71	62	34	84	40	6	127	63	632	
715 - 730	14	72	2	48	82	85	31	119	41	11	163	73	741	2,419
730 - 745	33	61	6	85	95	81	30	113	26	7	220	84	841	2,769
745 - 800	22	64	1	72	55	70	58	121	35	5	193	121	817	3,031
800 - 815	16	66	9	68	111	44	33	78	28	4	92	91	640	3,039
815 - 830	13	110	7	71	98	30	21	70	36	5	113	106	680	2,978
830 - 845	15	76	6	67	76	31	40	68	20	5	106	81	593	2,730
845 - 900	15	68	11	62	69	38	28	59	21	11	137	93	612	2,525
PEAK 15 MINUTE PERIOD:														
730 - 745	33	61	6	85	95	81	30	113	26	7	220	84	841	-
PEAK HOUR PERIOD:														
715 - 815	85	263	18	273	343	280	152	431	130	27	668	369	-	3039
PEAK HOUR FACTOR:														
715 - 815	0.64	0.91	0.50	0.80	0.77	0.82	0.66	0.89	0.79	0.61	0.76	0.76		
		0.92			0.86			0.83			0.83			

AM PEAK HOUR TURNING MOVEMENT DIAGRAM



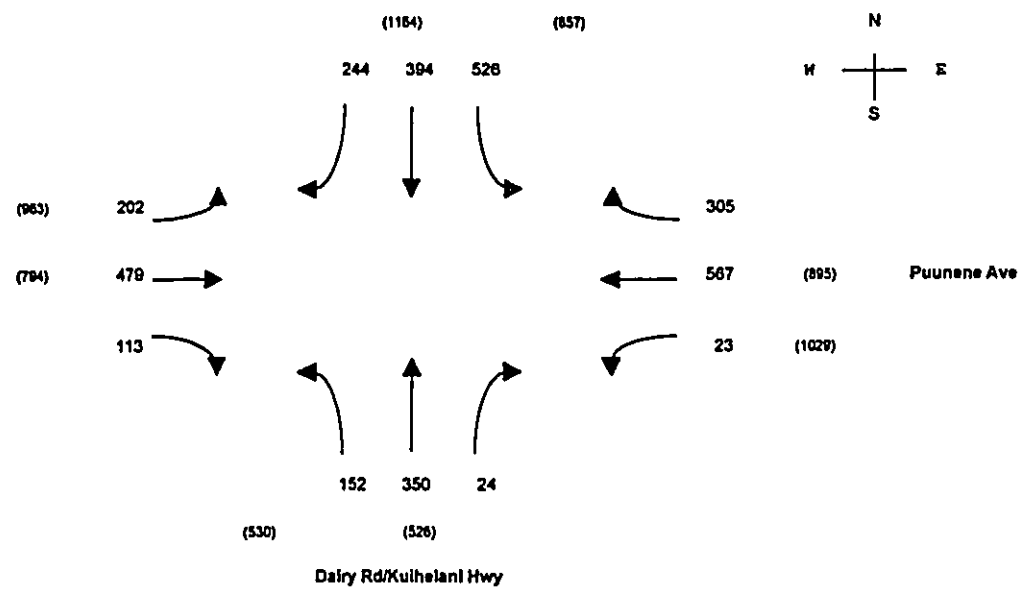
INTERSECTION COUNT SURVEY SUMMARY

North/South Street : Dairy Rd/Kuihelani Hwy
East/West Street : Puunene Ave
Weather : Light Rain

Period: PM
Date: 3/31/98
Day : TUES

15 MINUTE PERIOD	Dairy Rd/Kuihelani Hwy NORTHBOUND LEFT	THRU	RGHT	SOUTHBOUND LEFT	THRU	RGHT	Puunene Ave EASTBOUND LEFT	THRU	RGHT	WESTBOUND LEFT	THRU	RGHT	TOTAL VOLUME 15 MIN	HOURLY
1445 - 1500	32	71	8	118	106	46	38	83	24	5	148	100	777	
1500 - 1515	19	68	6	106	111	66	49	122	25	7	127	96	802	
1515 - 1530	15	52	14	132	134	65	42	99	22	5	107	66	753	
1530 - 1545	36	80	8	124	107	56	50	120	26	6	155	76	844	3,176
1545 - 1600	27	74	7	160	107	63	41	89	28	5	143	60	804	3,203
1600 - 1615	32	64	10	165	114	65	44	130	38	8	115	70	855	3,256
1615 - 1630	30	84	8	121	108	53	45	114	27	8	125	69	792	3,295
1630 - 1645	39	74	3	141	75	60	64	117	30	8	165	76	852	3,303
1645 - 1700	41	101	4	134	96	65	50	122	31	6	145	85	880	3,379
1700 - 1715	42	91	9	130	115	66	43	126	25	1	132	75	855	3,379
1715 - 1730	36	80	1	113	82	41	66	131	26	5	119	55	755	3,342
PEAK 15 MINUTE PERIOD:														
1645 - 1700	41	101	4	134	96	65	50	122	31	6	145	85	880	-
PEAK HOUR PERIOD:														
1615 - 1715	152	350	24	526	394	244	202	479	113	23	567	305	-	3379
PEAK HOUR FACTOR:														
1615 - 1715	0.90	0.87	0.67	0.93	0.86	0.92	0.79	0.95	0.91	0.72	0.86	0.90		
		0.90			0.94			0.94			0.90			

PM PEAK HOUR TURNING MOVEMENT DIAGRAM



APPENDIX B

LEVEL OF SERVICE DESCRIPTIONS

LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS (HCM 1994)

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

While the criteria for level of service for two-way stop-controlled (TWSC) and all-way stop-controlled (AWSC) intersections are the same, procedures to calculate the average total delay may differ.

Level of Service Criteria for TWSC Intersections

Level of Service	Average Total Delay (sec/veh)
A	≤ 5
B	>5 - ≤ 10
C	>10 - ≤ 20
D	>20 - ≤ 30
E	>30 - ≤ 45
F	> 45

LEVEL OF SERVICE OF SIGNALIZED INTERSECTIONS

Level of service for signalized intersections is defined in terms of **delay**, which is a measure of driver discomfort, frustration, fuel consumption and lost travel time. Specifically, level-of-service criteria are stated in terms of the average stopped delay per vehicle for a 15-minute analysis period. The criteria are given in Table A-1.

Level-of Service Criteria for
Signalized Intersections

Level of Service	Stopped Delay per Vehicle (sec.)
A	≤ 5.0
B	>5.0 and ≤15.0
C	>15.0 and ≤25.0
D	>25.0 and ≤40.0
E	>40.0 and ≤60.0
F	> 60.0

Delay is a complex measure, and is dependent on a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group or approach in question.

Level-of-service A describes operations with very low delay, up to 5.0 seconds per vehicle. This level of service occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

Level-of-service B describes operations with delay greater than 5.0 and up to 15.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.

Level-of-service C describes operations with delay greater than15.0 and up to 25.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.

Level-of-service D describes operations with delay greater than 25.0 and up to 40.0 seconds per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

Level-of-service E describes operations with delay greater than 40.0 and up to 60.0 seconds per vehicle. This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths and high v/c ratios. Individual cycle failures are frequent occurrences.

Level-of-service F describes operations with delay in excess of 60.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with oversaturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high v/c ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

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

BASE YEAR 2001
WITHOUT PROJECT

Maui Business Park Phase 1B 12/14/98
Future Year 2001 without Project AM Peak Hour 16:33:00
WB 1 LT, 1 TH, 1 RT

SIGNAL94/TEAPAC[V1 L1.4] - Summary of Parameter Values

Intersection Parameters for Int # 1 -

METROAREA		CBD
LOSTTIME		3.0
LEVELOFSERVICE	C	S
NODELOCATION	0	0

Approach Parameters

APPLABELS	SB	WB	NB	EB
GRADES	.0	.0	.0	.0
PEDLEVELS	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	75	585	0	0	0	0	0	560	260	185	0	20
WIDTHS	.0	24.0	.0	.0	.0	.0	.0	24.0	24.0	12.0	.0	12.0
LANES	0	2	0	0	0	0	0	2	2	1	0	1
UTILIZATIONS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	NO	YES	NO	NO	YES	NO	NO	YES	NO	NO	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
SATURATIONFLOWS	0	3296	0	0	0	0	0	3353	3185	1425	0	1593

Phasing Parameters

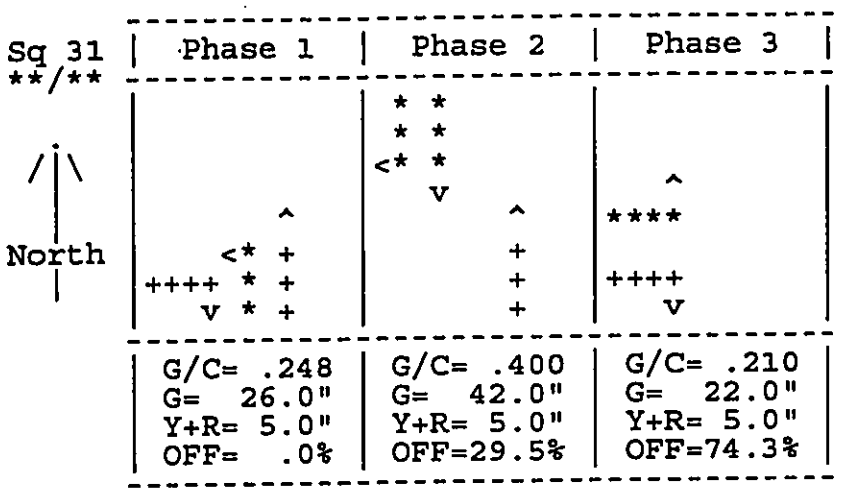
SEQUENCES	31					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	.00 1
CYCLES	105	180	5		PEDTIME	.0 0
GREENTIMES	26.00	42.00	22.00			
YELLOWTIMES	5.00	5.00	5.00			
CRITICALS	9	2	12			
EXCESS	0					

Maui Business Park Phase 1B
Future Year 2001 without Project AM Peak Hour
WB 1 LT, 1 TH, 1 RT

12/14/98
16:33:30

SIGNAL94/TEAPAC[V1 L1.4] - Capacity Analysis Summary

Intersection Averages for Int # 1 -
Degree of Saturation (v/c) .40 Vehicle Delay 11.5 Level of Service B



C=105 sec G= 90.0 sec = 85.7% Y=15.0 sec = 14.3% Ped= .0 sec = .0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	L S	90% Max Queue
SB Approach								15.3	C+	
TH+RT	24/2	.296	.419	1254	1381	770	.558	15.3	*C+	330 ft
NB Approach								8.7	B+	
TH	24/2	.265	.714	2395	2395	653	.273	3.5	A	138 ft
LT	24/2	.191	.267	624	849	298	.351	20.2	*C	161 ft
EB Approach								10.1	B	
RT	12/1	.240	.524	675	746	206	.276	9.0	B+	145 ft
LT	12/1	.147	.229	212	361	22	.060	20.5	*C	25 ft

Maui Business Park Phase 1B 12/14/98
Future Year 2001 without Project PM Peak Hour 16:34:02
WB 1 LT, 1 TH, 1 RT

SIGNAL94/TEAPAC[V1 L1.4] - Summary of Parameter Values

Intersection Parameters for Int # 1 -

METROAREA		CBD
LOSTTIME		3.0
LEVELOFSERVICE	C	S
NODELOCATION	0	0

Approach Parameters

APPLABELS	SB	WB	NB	EB
GRADES	.0	.0	.0	.0
PEDLEVELS	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	15	715	0	0	0	0	0	520	345	240	0	20
WIDTHS	.0	24.0	.0	.0	.0	.0	.0	24.0	24.0	12.0	.0	12.0
LANES	0	2	0	0	0	0	0	2	2	1	0	1
UTILIZATIONS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	NO	YES	NO	NO	YES	NO	NO	YES	NO	NO	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
SATURATIONFLOWS	0	3342	0	0	0	0	0	3353	3185	1425	0	1593

Phasing Parameters

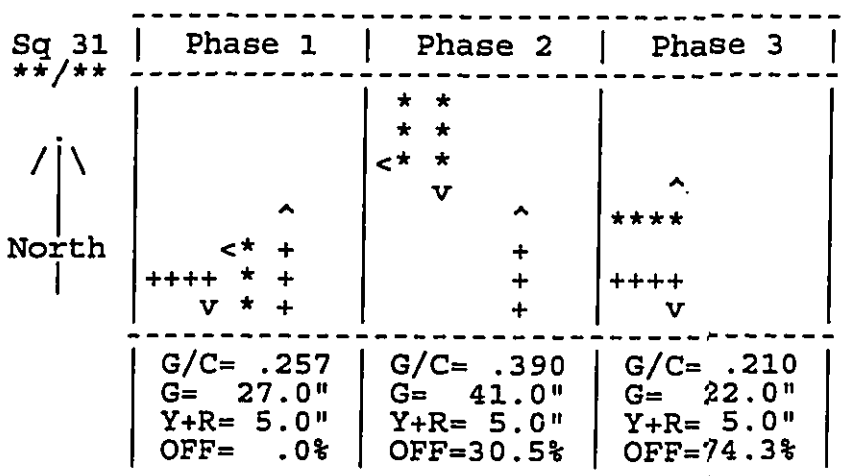
SEQUENCES	31						
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	.00	1
CYCLES	105	180	5		PEDTIME	.0	0
GREENTIMES	27.00	41.00	22.00				
YELLOWTIMES	5.00	5.00	5.00				
CRITICALS	9	2	12				
EXCESS	0						

Maui Business Park Phase 1B
Future Year 2001 without Project PM Peak Hour
WB 1 LT, 1 TH, 1 RT

12/14/98
16:34:21

SIGNAL94/TEAPAC[V1 L1.4] - Capacity Analysis Summary

Intersection Averages for Int # 1 -
Degree of Saturation (v/c) .45 Vehicle Delay 12.7 Level of Service B



C=105 sec G= 90.0 sec = 85.7% Y=15.0 sec = 14.3% Ped= .0 sec = .0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	LOS	90% Max Queue
SB Approach								16.5	C+	
TH+RT	24/2	.313	.410	1237	1369	852	.622	16.5	*C+	371 ft
NB Approach								10.1	B	
TH	24/2	.254	.714	2395	2395	607	.253	3.4	A	128 ft
LT	24/2	.212	.276	663	880	394	.448	20.5	*C	210 ft
EB Approach								10.1	B	
RT	12/1	.277	.533	691	760	267	.351	9.2	B+	184 ft
LT	12/1	.147	.229	212	361	22	.060	20.5	*C	25 ft

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CIVIL ENGINEERS • SURVEYORS

BASE YEAR 2004
WITHOUT PROJECT

Maui Business Park Phase 1B 12/14/98
Future Year 2004 without Project AM Peak Hour 16:29:38
WB 1 LT, 1 TH, 1 RT

SIGNAL94/TEAPAC[V1 L1.4] - Summary of Parameter Values

Intersection Parameters for Int # 1 -

METROAREA		CBD
LOSTTIME		3.0
LEVELOFSERVICE	C	S
NODELOCATION	0	0

Approach Parameters

APPLABELS	SB	WB	NB	EB
GRADES	.0	.0	.0	.0
PEDLEVELS	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	80	620	0	0	0	0	0	590	270	195	0	20
WIDTHS	.0	24.0	.0	.0	.0	.0	.0	24.0	24.0	12.0	.0	12.0
LANES	0	2	0	0	0	0	0	2	2	1	0	1
UTILIZATIONS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	NO	YES	NO	NO	YES	NO	NO	YES	NO	NO	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
SATURATIONFLOWS	0	3295	0	0	0	0	0	3353	3185	1425	0	1593

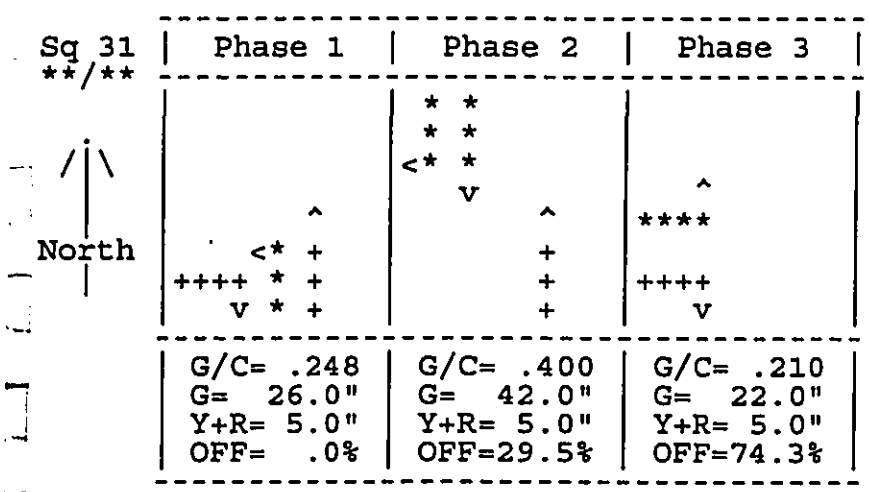
Phasing Parameters

SEQUENCES	31					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	.00 1
CYCLES	105	180	5		PEDTIME	.0 0
GREENTIMES	26.00	42.00	22.00			
YELLOWTIMES	5.00	5.00	5.00			
CRITICALS	9	2	12			
EXCESS	0					

Maui Business Park Phase 1B 12/14/98
Future Year 2004 without Project AM Peak Hour 16:29:58
WB 1 LT, 1 TH, 1 RT

SIGNAL94/TEAPAC[V1 L1.4] - Capacity Analysis Summary

Intersection Averages for Int # 1 -
Degree of Saturation (v/c) .42 Vehicle Delay 11.7 Level of Service B



C=105 sec G= 90.0 sec = 85.7% Y=15.0 sec = 14.3% Ped= .0 sec = .0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	LOS	90% Max Queue
SB Approach								15.7	C+	
TH+RT	24/2	.308	.419	1254	1381	817	.592	15.7	*C+	350 ft
NB Approach								8.7	B+	
TH	24/2	.273	.714	2395	2395	689	.288	3.5	A	145 ft
LT	24/2	.193	.267	624	849	309	.364	20.3	*C	167 ft
EB Approach								10.2	B	
RT	12/1	.247	.524	675	746	217	.291	9.1	B+	153 ft
LT	12/1	.147	.229	212	361	22	.060	20.5	*C	25 ft

Maui Business Park Phase 1B 12/14/98
Future Year 2004 without Project PM Peak Hour 16:30:27
WB 1 LT, 1 TH, 1 RT

SIGNAL94/TEAPAC[V1 L1.4] - Summary of Parameter Values

Intersection Parameters for Int # 1 -

METROAREA	CBD	
LOSTTIME	3.0	
LEVELOFSERVICE	C	S
NODELOCATION	0	0

Approach Parameters

APPLABELS	SB	WB	NB	EB
GRADES	.0	.0	.0	.0
PEDLEVELS	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	25	750	0	0	0	0	0	540	495	345	0	30
WIDTHS	.0	24.0	.0	.0	.0	.0	.0	24.0	24.0	12.0	.0	12.0
LANES	0	2	0	0	0	0	0	2	2	1	0	1
UTILIZATIONS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	NO	YES	NO	NO	YES	NO	NO	YES	NO	NO	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
SATURATIONFLOWS	0	3337	0	0	0	0	0	3353	3185	1425	0	1593

Phasing Parameters

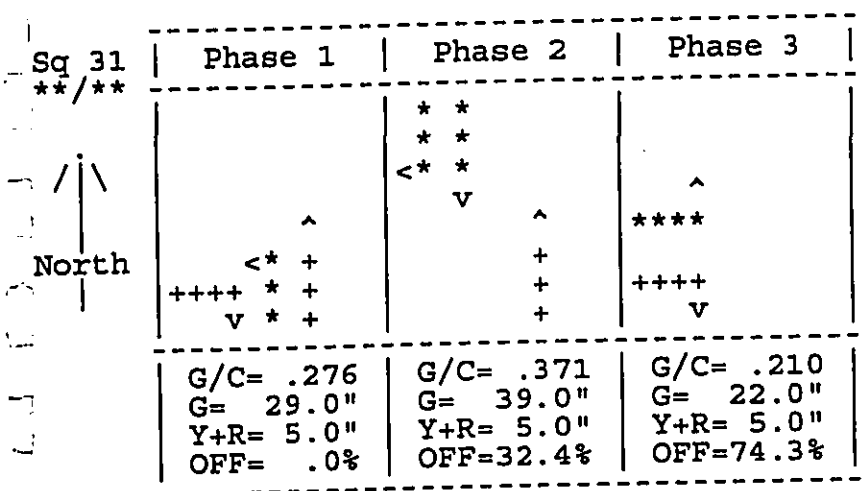
SEQUENCES	31						
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	.00	1
CYCLES	105	180	5		PEDTIME	.0	0
GREENTIMES	29.00	39.00	22.00				
YELLOWTIMES	5.00	5.00	5.00				
CRITICALS	9	2	12				
EXCESS	0						

Maui Business Park Phase 1B
Future Year 2004 without Project PM Peak Hour
WB 1 LT, 1 TH, 1 RT

12/14/98
16:30:48

SIGNAL94/TEAPAC[V1 L1.4] - Capacity Analysis Summary

Intersection Averages for Int # 1 -
Degree of Saturation (v/c) .53 Vehicle Delay 14.0 Level of Service B



C=105 sec G= 90.0 sec = 85.7% Y=15.0 sec = 14.3% Ped= .0 sec = .0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	LOS	90% Max Queue
SB Approach								18.4	C+	
TH+RT	24/2	.327	.390	1160	1303	904	.694	18.4	*C+	407 ft
NB Approach								11.9	B	
TH	24/2	.260	.714	2395	2395	630	.263	3.4	A	133 ft
LT	24/2	.253	.295	738	940	566	.602	21.3	*C	294 ft
EB Approach								10.6	B	
RT	12/1	.347	.552	723	787	383	.487	9.7	B+	253 ft
LT	12/1	.151	.229	212	361	33	.091	20.6	*C	38 ft

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CIVIL ENGINEERS • SURVEYORS

BASE YEAR 2015
WITHOUT PROJECT

SIGNAL94/TEAPAC[V1 L1.4] - Summary of Parameter Values

Intersection Parameters for Int # 1 -

METROAREA		CBD
LOSTTIME		3.0
LEVELOFSERVICE	C	S
MODELOCATION	0	0

Approach Parameters

APPLABELS	SB	WB	NB	EB
GRADES	.0	.0	.0	.0
PEDLEVELS	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	200

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	125	830	0	0	0	0	0	805	430	310	0	30
WIDTHS	.0	24.0	.0	.0	.0	.0	.0	24.0	24.0	12.0	.0	12.0
LANES	0	2	0	0	0	0	0	2	2	1	0	1
UTILIZATIONS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	NO	YES	NO	NO	YES	NO	NO	YES	NO	NO	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
SATURATIONFLOWS	0	3287	0	0	0	0	0	3353	3185	1425	0	1593

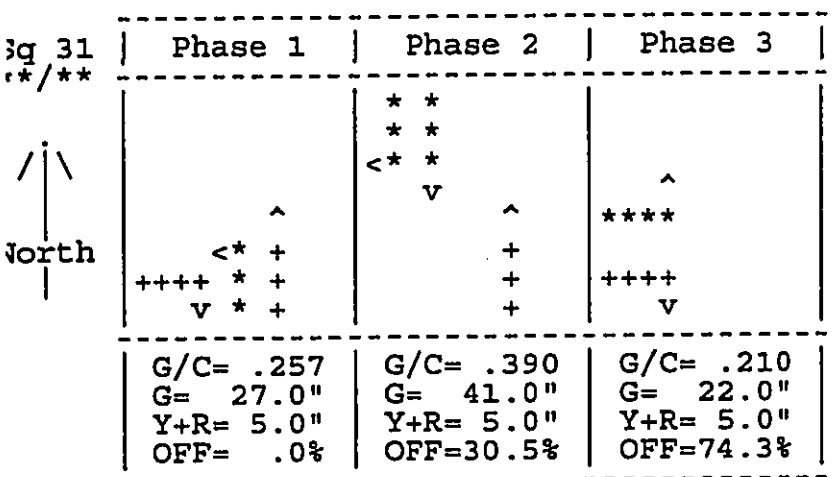
Phasing Parameters

SEQUENCES	31					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	.00 1
CYCLES	105	180	5		PEDTIME	.0 0
GREENTIMES	27.00	41.00	22.00			
YELLOWTIMES	5.00	5.00	5.00			
CRITICALS	9	2	12			
EXCESS	0					

laui Business Park Phase 1B - WOPROJAM 12/14/98
'uture Year 2015 without Project AM Peak Hour Airport/Access 16:28:18
/B 1 LT, 1 TH, 1 RT

;IGNAL94/TEAPAC[V1 L1.4] - Capacity Analysis Summary

:ntersection Averages for Int # 1 -
Degree of Saturation (v/c) .59 Vehicle Delay 14.6 Level of Service B



C=105 sec G= 90.0 sec = 85.7% Y=15.0 sec = 14.3% Ped= .0 sec = .0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	LOS	90% Max Queue
SB Approach								21.0	C	
TH+RT	24/2	.384	.410	1214	1346	1114	.828	21.0	*C	485 ft
NB Approach								10.0	B+	
TH	24/2	.334	.714	2395	2395	939	.392	3.9	A	198 ft
LT	24/2	.235	.276	663	880	492	.559	21.6	*C	263 ft
EB Approach								10.8	B	
RT	12/1	.192	.533	691	760	122	.161	8.1	B+	84 ft
LT	12/1	.151	.229	212	361	33	.091	20.6	*C	38 ft

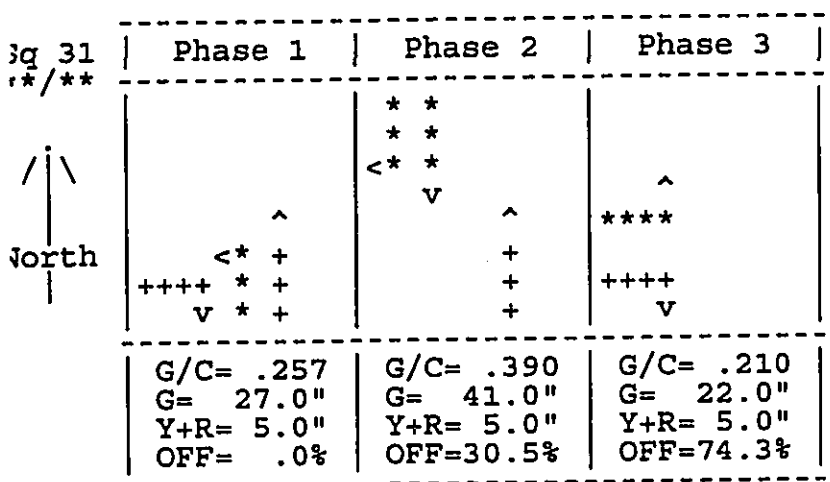
CORRECTION

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

laui Business Park Phase 1B - WOPROJAM 12/14/98
'uture Year 2015 without Project AM Peak Hour Airport/Access 16:28:18
/B 1 LT, 1 TH, 1 RT

;IGNAL94/TEAPAC[V1 L1.4] - Capacity Analysis Summary

:ntersection Averages for Int # 1 -
Degree of Saturation (v/c) .59 Vehicle Delay 14.6 Level of Service B



C=105 sec G= 90.0 sec = 85.7% Y=15.0 sec = 14.3% Ped= .0 sec = .0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	LOS	90% Max Queue
SB Approach								21.0	C	
TH+RT	24/2	.384	.410	1214	1346	1114	.828	21.0	*C	485 ft
NB Approach								10.0	B+	
TH	24/2	.334	.714	2395	2395	939	.392	3.9	A	198 ft
LT	24/2	.235	.276	663	880	492	.559	21.6	*C	263 ft
EB Approach								10.8	B	
RT	12/1	.192	.533	691	760	122	.161	8.1	B+	84 ft
LT	12/1	.151	.229	212	361	33	.091	20.6	*C	38 ft

IGNAL94/TEAPAC[V1 L1.4] - Summary of Parameter Values

Intersection Parameters for Int # 1 -

ETROAREA	CBD	
OSTTIME	3.0	
EVELOFSERVICE	C	S
ODELOCATION	0	0

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	.0	.0	.0	.0
PEDLEVELS	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0

Movement Parameters

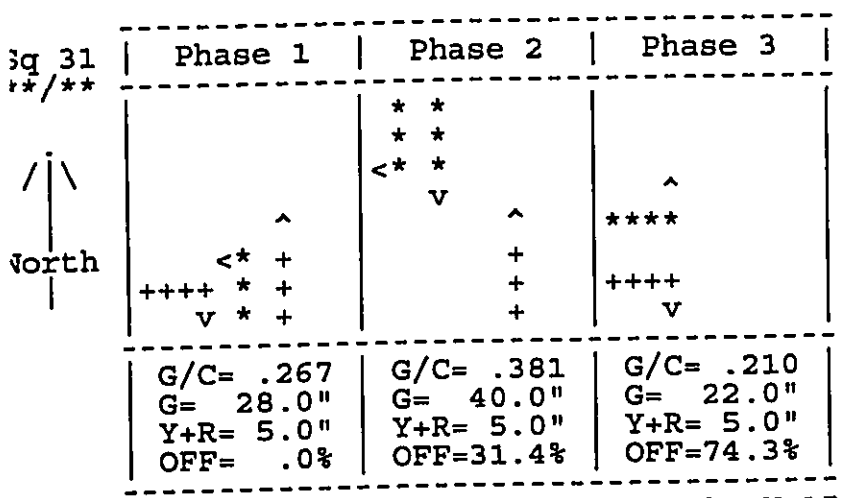
MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	30	1030	0	0	0	0	0	740	660	460	0	40
WIDTHS	.0	24.0	.0	.0	.0	.0	.0	24.0	24.0	12.0	.0	12.0
LANES	0	2	0	0	0	0	0	2	2	1	0	1
UTILIZATIONS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	NO	YES	NO	NO	YES	NO	NO	YES	NO	NO	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
SATURATIONFLOWS	0	3339	0	0	0	0	0	3353	3185	1425	0	1593

Phasing Parameters

SEQUENCES	31					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	.00 1
CYCLES	105	180	5		PEDTIME	.0 0
GREENTIMES	28.00	40.00	22.00			
YELLOWTIMES	5.00	5.00	5.00			
CRITICALS	9	2	12			
EXCESS	0					

IGNAL94/TEAPAC[V1 L1.4] - Capacity Analysis Summary

ntersection Averages for Int # 1 -
Degree of Saturation (v/c) .71 Vehicle Delay 19.1 Level of Service C+



C=105 sec G= 90.0 sec = 85.7% Y=15.0 sec = 14.3% Ped= .0 sec = .0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	L S	90% Max Queue
SB Approach								27.4	D+	
TH+RT	24/2	.410	.400	1198	1336	1236	.925	27.4	*D+	547 ft
NB Approach								14.7	B	
TH	24/2	.315	.714	2395	2395	863	.360	3.8	A	182 ft
LT	24/2	.300	.286	700	910	755	.830	27.3	*D+	398 ft
EB Approach								13.2	B	
RT	12/1	.424	.543	707	774	511	.660	12.5	B	345 ft
LT	12/1	.154	.229	212	361	44	.121	20.8	*C	50 ft

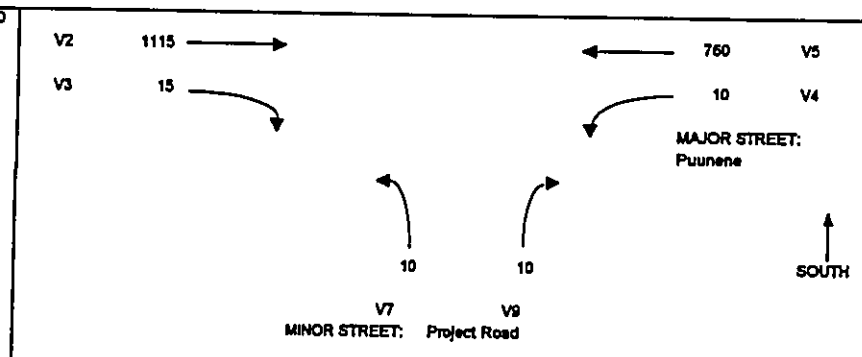
AUSTIN, TSUTSUMI & ASSOCIATES, INC.
CIVIL ENGINEERS • SURVEYORS

FUTURE YEAR 2001
WITH PROJECT

ATA Inc. STOP CONTROLLED T-INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street:	Puunene	Print Date:	17-Nov
Minor Street:	Project Road	Analyst:	NHK
Peak Hour:	AM	File Name:	puu-acc
Scenario:	Future 2001 WITH PROJECT	Intersection:	

Peak Hour Factor:	1.00
——MAJOR STREET——	
Num of Lanes - V2:	2
Excl RT - V3 (Y/N):	N
Stop/Yield - V3 (Y/N):	N
% Grade - V2,V3:	0
Num of Lanes - V5:	2
Excl LT - V4 (Y/N):	Y
% Grade - V4,V5:	0
——MINOR STREET——	
Num of Lanes - V7,V9:	2
Shared Lane (Y/N):	N
% Grade - V7&V9:	0



VOLUME ADJUSTMENTS

MOVEMENT NO.	2	3	4	5	7	9
VOLUME, V (vph)	1115	15	10	760	10	10
VOLUME, v (pcph)	1115	15	11	760	11	11

STEP 1: RT FROM MINOR STREET - V9

Conflicting Flows:	Vc,9 = 1/2*V3+V2 =	8	+	558	=	565 vph
Potential Capacity:	Cp,9 =					715 pcph
Movement Capacity:	Cm,p = Cp,9 =					715 pcph

STEP 2: LT FROM MAJOR STREET - V4

Conflicting Flows:	Vc,4 = V3+V2 =	15	+	1115	=	1130 vph
Potential Capacity:	Cp,4 =					424 pcph
Movement Capacity:	Cm,4 = Cp,4 =					424 pcph
Prob. of Queue-free State:	po,4 = 1-v4/Cm,4 =					0.97
Major Left Shared Lane Prob. of Queue-free State:	p*o,4 =					NA

STEP 3: LT FROM MINOR STREET - V7

Conflicting Flows:	Vc,7 = 1/2V3+V2+V5+V4 =	1893	vph
Potential Capacity:	Cp,7 =	65	pcph
Capacity Adjustment Factor Due To Impeding Movements:	f7=po,4=	0.97	
Movement Capacity:	Cm,7 = Cp,7 =	64	pcph

DELAY AND LEVEL OF SERVICE SUMMARY

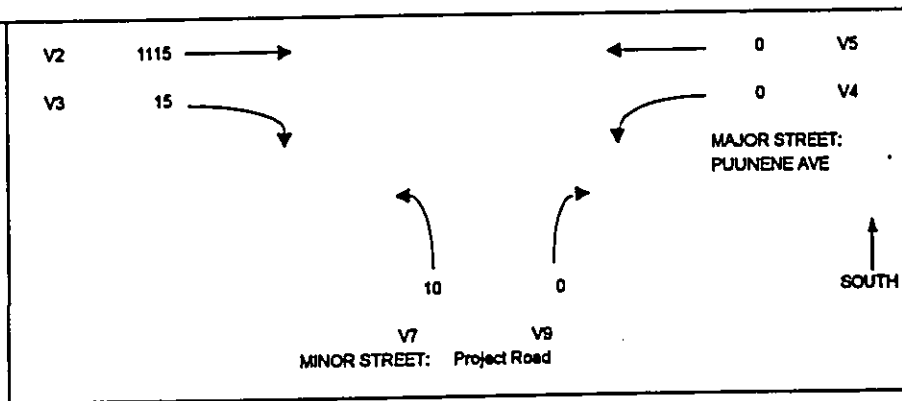
Movement	v(vcph)	cm(pcph)	csh (pcph)	AVG TOTAL DELAY	LOS
MINOR LEFT TURN (7)	11	64	--NA--	58.1	F
MINOR RIGHT TURN (9)	11	715	--NA--	5.1	A
MAJOR LEFT TURN (4)	11	424	——	8.7	B

AVERAGE MINOR APPROACH DELAY =	36.6	sec/veh	
LEVEL OF SERVICE =	E		
AVERAGE TOTAL INTERSECTION DELAY =	0.5	sec/veh	
LEVEL OF SERVICE =	A		

ATA Inc. STOP CONTROLLED T-INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street:	PUUNENE AVE	Print Date:	17-Nov
Minor Street:	Project Road	Analyst:	NHK
Peak Hour:	AM	File Name:	DPC-REF
Scenario:	FUTURE 2001 WITH PROJECT	Intersection:	

Peak Hour Factor:	1.00
——MAJOR STREET——	
Num of Lanes - V2:	2
Excl RT - V3 (Y/N):	N
Stop/Yield - V3 (Y/N):	N
% Grade - V2,V3:	0
Num of Lanes - V5:	2
Excl LT - V4 (Y/N):	Y
% Grade - V4,V5:	0
——MINOR STREET——	
Num of Lanes - V7,V9:	1
Shared Lane (Y/N):	N
% Grade - V7&V9:	0



VOLUME ADJUSTMENTS						
MOVEMENT NO.	2	3	4	5	7	9
VOLUME, V (vph)	1115	15	0	0	10	0
VOLUME, v (pcph)	1115	15	0	0	11	0

STEP 1: RT FROM MINOR STREET - V9						
Conflicting Flows:	Vc,9 = 1/2*V3+V2 =	8	+	558	=	565 vph
Potential Capacity:	Cp,9 =					716 pcph
Movement Capacity:	Cm,p = Cp,9 =					716 pcph

STEP 2: LT FROM MAJOR STREET - V4						
Conflicting Flows:	Vc,4 = V3+V2 =	15	+	1115	=	1130 vph
Potential Capacity:	Cp,4 =					424 pcph
Movement Capacity:	Cm,4 = Cp,4 =					424 pcph
Prob. of Queue-free State:	po,4 = 1-v4/Cm,4 =					1.00
Major Left Shared Lane Prob. of Queue-free State:	p*o,4 =					NA

STEP 3: LT FROM MINOR STREET - V7			
Conflicting Flows:	Vc,7 = 1/2V3+V2+V5+V4 =		1123 vph
Potential Capacity:	Cp,7 =		203 pcph
Capacity Adjustment Factor Due To Impeding Movements:	f7=po,4=		1.00
Movement Capacity:	Cm,7 = Cp,7 =		203 pcph

DELAY AND LEVEL OF SERVICE SUMMARY Movement	v(vcph)	cm(pcph)	csh (pcph)	AVG TOTAL DELAY	LOS
MINOR LEFT TURN (7)	11	203	--NA--	18.8	C
MINOR RIGHT TURN (9)	0	716	--NA--	5.0	A
MAJOR LEFT TURN (4)	0	424	———	8.5	B

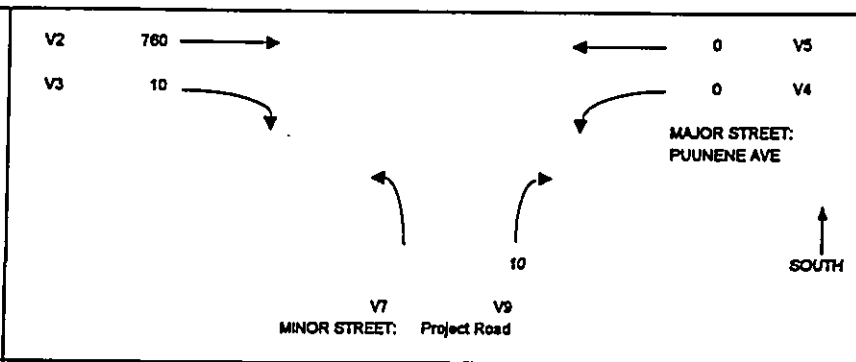
AVERAGE MINOR APPROACH DELAY =	18.8 sec/veh	AVERAGE TOTAL INTERSECTION DELAY =	0.2 sec/veh
LEVEL OF SERVICE =	C	LEVEL OF SERVICE =	A

LEFT TURN DELAY =	18.8	+	6.5	= 25.3

ATA Inc. STOP CONTROLLED T-INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street:	PUUNENE AVE	Print Date:	17-Nov
Minor Street:	Project Road	Analyst:	NHK
Peak Hour:	AM	File Name:	DPC-REF
Scenario:	FUTURE 2001 WITH PROJECT	Intersection:	

Peak Hour Factor:	1
——MAJOR STREET——	
Num of Lanes - V2:	2
Excl RT - V3 (Y/N):	N
Stop/Yield - V3 (Y/N):	N
% Grade - V2,V3:	0
Num of Lanes - V5:	2
Excl LT - V4 (Y/N):	Y
% Grade - V4,V5:	0
——MINOR STREET——	
Num of Lanes - V7,V9:	1
Shared Lane (Y/N):	N
% Grade - V7&V9:	0



VOLUME ADJUSTMENTS						
MOVEMENT NO.	2	3	4	5	7	9
VOLUME, V (vph)	760	10	0	0		10
VOLUME, v (pcph)	760	10	0	0	0	11

STEP 1: RT FROM MINOR STREET - V9						
Conflicting Flows:	Vc,9 = 1/2*V3+V2 =		5	+ 760	= 765	vph
Potential Capacity:	Cp,9 =				567	pcph
Movement Capacity:	Cm,p = Cp,9 =				567	pcph
STEP 2: LT FROM MAJOR STREET - V4						
Conflicting Flows:	Vc,4 = V3+V2 =		10	+ 760	= 770	vph
Potential Capacity:	Cp,4 =				562	pcph
Movement Capacity:	Cm,4 = Cp,4 =				562	pcph
Prob. of Queue-free State:	po,4 = 1-v4/Cm,4 =				1.00	
Major Left Shared Lane Prob. of Queue-free State:	p*o,4 =				NA	
STEP 3: LT FROM MINOR STREET - V7						
Conflicting Flows:	Vc,7 = 1/2V3+V2+V5+V4 =				765	vph
Potential Capacity:	Cp,7 =				343	pcph
Capacity Adjustment Factor Due To Impeding Movements:	f7=po,4=				1.00	
Movement Capacity:	Cm,7 = Cp,7 =				343	pcph

DELAY AND LEVEL OF SERVICE SUMMARY

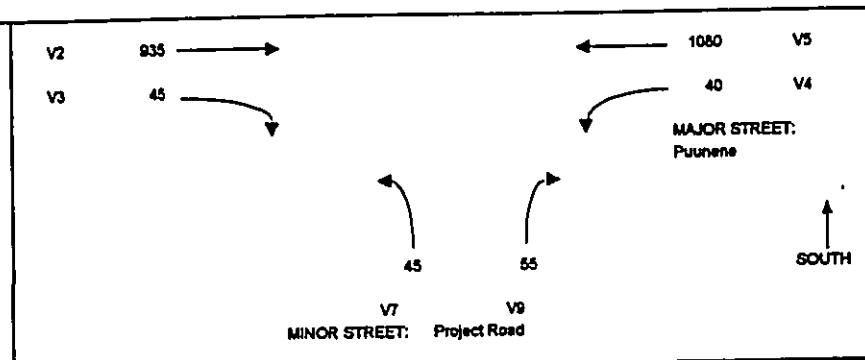
Movement	v(vcph)	cm(pcph)	csh (pcph)	AVG TOTAL DELAY	LOS
MINOR LEFT TURN (7)	0	343	--NA--	10.5	--C
MINOR RIGHT TURN (9)	11	567	--NA--	6.5	B
MAJOR LEFT TURN (4)	0	562	----	5.4	--A

AVERAGE MINOR APPROACH DELAY =	6.6 sec/veh	AVERAGE TOTAL INTERSECTION DELAY =	0.1 sec/veh
LEVEL OF SERVICE =	--B	LEVEL OF SERVICE =	--A

ATA Inc. STOP CONTROLLED T-INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street:	Puunene	Print Date:	17-Nov
Minor Street:	Project Road	Analyst:	NHK
Peak Hour:	PM	File Name:	puu-acc
Scenario:	Future 2001 WITH PROJECT	Intersection:	

Peak Hour Factor:	1
——MAJOR STREET——	
Num of Lanes - V2:	2
Excl RT - V3 (Y/N):	N
Stop/Yield - V3 (Y/N):	N
% Grade - V2,V3:	0
Num of Lanes - V5:	2
Excl LT - V4 (Y/N):	Y
% Grade - V4,V5:	0
——MINOR STREET——	
Num of Lanes - V7,V9:	2
Shared Lane (Y/N):	N
% Grade - V7&V9:	0



VOLUME ADJUSTMENTS						
MOVEMENT NO.	2	3	4	5	7	9
VOLUME, V (vph)	935	45	40	1080	45	55
VOLUME, v (pcph)	935	45	44	1080	50	61

STEP 1: RT FROM MINOR STREET - V9						
Conflicting Flows:	Vc,9 = 1/2*V3+V2 =	23	+	935	=	958 vph
Potential Capacity:	Cp,9 =					453 pcph
Movement Capacity:	Cm,p = Cp,9 =					453 pcph
STEP 2: LT FROM MAJOR STREET - V4						
Conflicting Flows:	Vc,4 = V3+V2 =	45	+	935	=	980 vph
Potential Capacity:	Cp,4 =					610 pcph
Movement Capacity:	Cm,4 = Cp,4 =					610 pcph
Prob. of Queue-free State:	po,4 = 1-v4/Cm,4 =					0.91
Major Left Shared Lane Prob. of Queue-free State:	p*o,4 =					NA
STEP 3: LT FROM MINOR STREET - V7						
Conflicting Flows:	Vc,7 = 1/2V3+V2+V5+V4 =					2078 vph
Potential Capacity:	Cp,7 =					50 pcph
Capacity Adjustment Factor Due To Impeding Movements:	f7=po,4=					0.91
Movement Capacity:	Cm,7 = Cp,7 =					45 pcph

DELAY AND LEVEL OF SERVICE SUMMARY

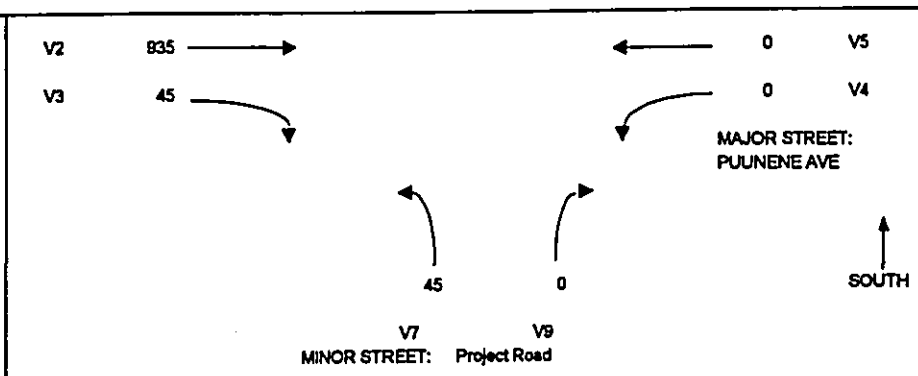
Movement	v(vcph)	cm(pcph)	csh (pcph)	AVG TOTAL DELAY	LOS
MINOR LEFT TURN (7)	50	45	--NA--	297.5	F
MINOR RIGHT TURN (9)	61	453	--NA--	9.2	B
MAJOR LEFT TURN (4)	44	610	----	7.7	B

AVERAGE MINOR APPROACH DELAY =	138.9 sec/veh	AVERAGE TOTAL INTERSECTION DELAY =	7.1 sec/veh
LEVEL OF SERVICE =	F	LEVEL OF SERVICE =	B

ATA Inc. STOP CONTROLLED T-INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street:	PUUNENE AVE	Print Date:	17-Nov
Minor Street:	Project Road	Analyst:	NHK
Peak Hour:	PM	File Name:	DPC-REF
Scenario:	FUTURE 2001 WITH PROJECT	Intersection:	

Peak Hour Factor:	1.00
------MAJOR STREET------	
Num of Lanes - V2:	2
Excl RT - V3 (Y/N):	N
Stop/Yield - V3 (Y/N):	N
% Grade - V2,V3:	0
Num of Lanes - V5:	2
Excl LT - V4 (Y/N):	Y
% Grade - V4,V5:	0
------MINOR STREET------	
Num of Lanes - V7,V9:	1
Shared Lane (Y/N):	N
% Grade - V7&V9:	0



VOLUME ADJUSTMENTS						
MOVEMENT NO.	2	3	4	5	7	9
VOLUME, V (vph)	935	45	0	0	45	0
VOLUME, v (pcph)	935	45	0	0	50	0

STEP 1: RT FROM MINOR STREET - V9								
Conflicting Flows:	Vc,9 = 1/2*V3+V2 =		23	+	468	=	490	vph
Potential Capacity:	Cp,9 =						782	pcph
Movement Capacity:	Cm,p = Cp,9 =						782	pcph

STEP 2: LT FROM MAJOR STREET - V4							
Conflicting Flows:	Vc,4 = V3+V2 =	45	+	935	=	980	vph
Potential Capacity:	Cp,4 =					510	pcph
Movement Capacity:	Cm,4 = Cp,4 =					510	pcph
Prob. of Queue-free State:	po,4 = 1-v4/Cm,4 =					1.00	
Major Left Shared Lane Prob. of Queue-free State:	p*o,4 =					NA	

STEP 3: LT FROM MINOR STREET - V7			
Conflicting Flows:	Vc,7 = 1/2V3+V2+V5+V4 =	958	vph
Potential Capacity:	Cp,7 =	259	pcph
Capacity Adjustment Factor Due To Impeding Movements:	f7=po,4=	1.00	
Movement Capacity:	Cm,7 = Cp,7 =	259	pcph

DELAY AND LEVEL OF SERVICE SUMMARY			csh	AVG TOTAL	
Movement	v(vcph)	cm(pcph)	(pcph)	DELAY	LOS
MINOR LEFT TURN (7)	50	259	--NA--	17.2	C
MINOR RIGHT TURN (9)	0	782	--NA--	4.6	A
MAJOR LEFT TURN (4)	0	510	----	7.1	B

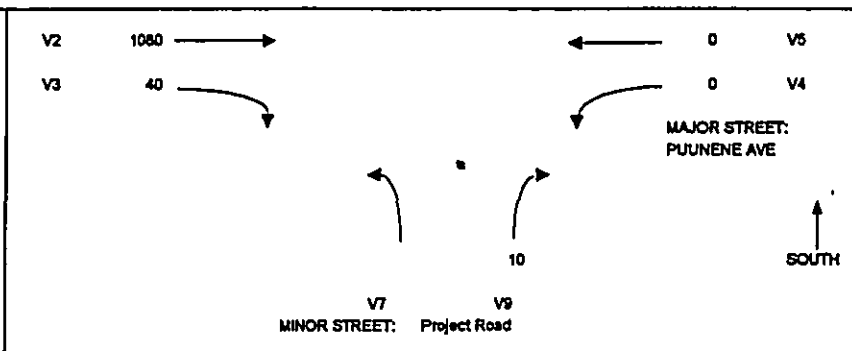
AVERAGE MINOR APPROACH DELAY =	17.2 sec/veh	AVERAGE TOTAL INTERSECTION DELAY =	0.8 sec/veh
LEVEL OF SERVICE =	C	LEVEL OF SERVICE =	A

LEFT TURN DELAY = 17.2 + 9.7 = 26.9

ATA Inc. STOP CONTROLLED T-INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street:	PUUNENE AVE	Print Date:	17-Nov
Minor Street:	Project Road	Analyst:	NHK
Peak Hour:	PM	File Name:	DPC-REF
Scenario:	FUTURE 2001 WITH PROJECT	Intersection:	

Peak Hour Factor:	1
——MAJOR STREET——	
Num of Lanes - V2:	2
Excl RT - V3 (Y/N):	N
Stop/Yield - V3 (Y/N):	N
% Grade - V2,V3:	0
Num of Lanes - V5:	2
Excl LT - V4 (Y/N):	Y
% Grade - V4,V5:	0
——MINOR STREET——	
Num of Lanes - V7,V9:	1
Shared Lane (Y/N):	N
% Grade - V7&V9:	0



VOLUME ADJUSTMENTS						
MOVEMENT NO.	2	3	4	5	7	9
VOLUME, V (vph)	1080	40	0	0		10
VOLUME, v (pcph)	1080	40	0	0	0	11

STEP 1: RT FROM MINOR STREET - V9						
Conflicting Flows:	Vc,9 = 1/2*V3+V2 =	20	+	1080	=	1100 vph
Potential Capacity:	Cp,9 =					384 pcph
Movement Capacity:	Cm,p = Cp,9 =					384 pcph
STEP 2: LT FROM MAJOR STREET - V4						
Conflicting Flows:	Vc,4 = V3+V2 =	40	+	1080	=	1120 vph
Potential Capacity:	Cp,4 =					429 pcph
Movement Capacity:	Cm,4 = Cp,4 =					429 pcph
Prob. of Queue-free State:	po,4 = 1-v4/Cm,4 =					1.00
Major Left Shared Lane Prob. of Queue-free State:	p*o,4 =					NA
STEP 3: LT FROM MINOR STREET - V7						
Conflicting Flows:	Vc,7 = 1/2V3+V2+V5+V4 =					1100 vph
Potential Capacity:	Cp,7 =					210 pcph
Capacity Adjustment Factor Due To Impeding Movements:	f7=po,4=					1.00
Movement Capacity:	Cm,7 = Cp,7 =					210 pcph

DELAY AND LEVEL OF SERVICE SUMMARY

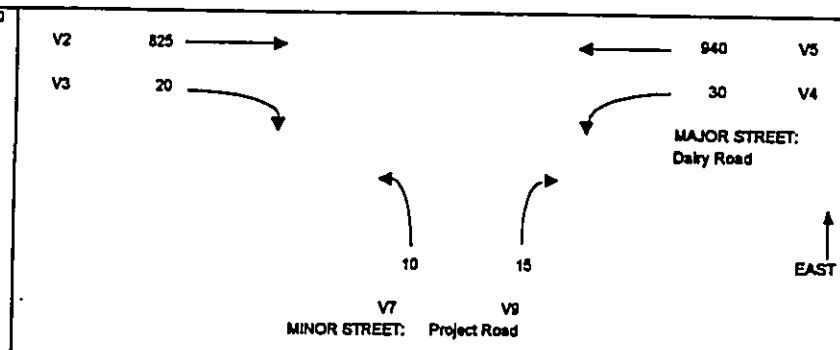
Movement	v(vph)	cm(pcph)	csh (pcph)	AVG TOTAL DELAY	LOS
MINOR LEFT TURN (7)	0	210	—NA—	17.2	—C
MINOR RIGHT TURN (9)	11	384	—NA—	9.7	B
MAJOR LEFT TURN (4)	0	429	——	8.4	—B

AVERAGE MINOR APPROACH DELAY =	9.7 sec/veh	AVERAGE TOTAL INTERSECTION DELAY =	0.1 sec/veh
LEVEL OF SERVICE =	—B	LEVEL OF SERVICE =	—A

ATA Inc. STOP CONTROLLED T-INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street:	Dairy Road	Print Date:	17-Nov
Minor Street:	Project Road	Analyst:	NHK
Peak Hour:	AM	File Name:	DR-ACC
Scenario:	Future 2001 WITH PROJECT (INTERIM CONNECTION)	Intersection:	

Peak Hour Factor:	1.00
——MAJOR STREET——	
Num of Lanes - V2:	2
Excl RT - V3 (Y/N):	N
Stop/Yield - V3 (Y/N):	N
% Grade - V2,V3:	0
Num of Lanes - V5:	2
Excl LT - V4 (Y/N):	Y
% Grade - V4,V5:	0
——MINOR STREET——	
Num of Lanes - V7,V9:	2
Shared Lane (Y/N):	N
% Grade - V7&V9:	0



VOLUME ADJUSTMENTS

MOVEMENT NO.	2	3	4	5	7	9
VOLUME, V (vph)	825	20	30	940	10	15
VOLUME, v (pcph)	825	20	33	940	11	17

STEP 1: RT FROM MINOR STREET - V9

Conflicting Flows:	Vc,9 = 1/2*V3+V2 =	10	+	413	=	423 vph
Potential Capacity:	Cp,9 =					846 pcph
Movement Capacity:	Cm,p = Cp,9 =					846 pcph

STEP 2: LT FROM MAJOR STREET - V4

Conflicting Flows:	Vc,4 = V3+V2 =	20	+	825	=	845 vph
Potential Capacity:	Cp,4 =					603 pcph
Movement Capacity:	Cm,4 = Cp,4 =					603 pcph
Prob. of Queue-free State:	po,4 = 1-v4/Cm,4 =					0.95
Major Left Shared Lane Prob. of Queue-free State:	p*o,4 =					NA

STEP 3: LT FROM MINOR STREET - V7

Conflicting Flows:	Vc,7 = 1/2V3+V2+V5+V4 =	1805	vph
Potential Capacity:	Cp,7 =	74	pcph
Capacity Adjustment Factor Due To Impeding Movements:	f7=po,4=	0.95	
Movement Capacity:	Cm,7 = Cp,7 =	70	pcph

DELAY AND LEVEL OF SERVICE SUMMARY

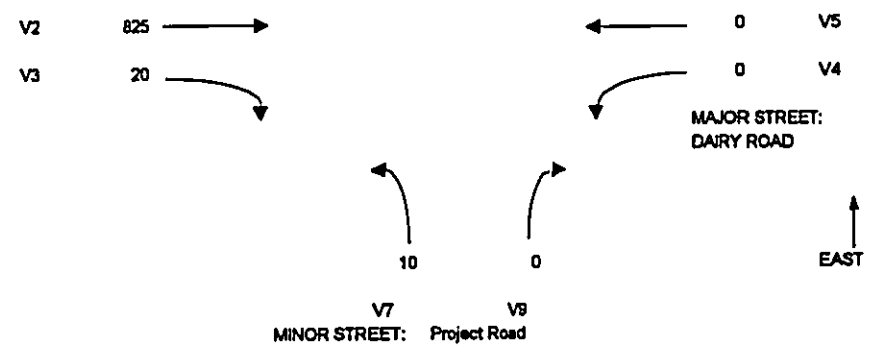
Movement	v(vph)	cm(pcph)	cah (pcph)	AVG TOTAL DELAY	LOS
MINOR LEFT TURN (7)	11	70	--NA--	60.6	F
MINOR RIGHT TURN (9)	17	846	--NA--	4.3	A
MAJOR LEFT TURN (4)	33	603	——	8.3	B

AVERAGE MINOR APPROACH DELAY =	26.8 sec/veh	AVERAGE TOTAL INTERSECTION DELAY =	0.5 sec/veh
LEVEL OF SERVICE =	D	LEVEL OF SERVICE =	A

ATA Inc. STOP CONTROLLED T-INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street:	DAIRY ROAD	Print Data:	17-Nov
Minor Street:	Project Road	Analyst:	NHK
Peak Hour:	AM	File Name:	DAC-REF
Scenario:	FUTURE 2001 WITH PROJECT (INTERIM CONNECTION)	Intersection:	

Peak Hour Factor:	1.00
——MAJOR STREET——	
Num of Lanes - V2:	2
Excl RT - V3 (Y/N):	N
Stop/Yield - V3 (Y/N):	N
% Grade - V2,V3:	0
Num of Lanes - V5:	2
Excl LT - V4 (Y/N):	Y
% Grade - V4,V5:	0
——MINOR STREET——	
Num of Lanes - V7,V9:	2
Shared Lane (Y/N):	N
% Grade - V7&V9:	0



VOLUME ADJUSTMENTS						
MOVEMENT NO.	2	3	4	5	7	9
VOLUME, V (vph)	825	20	0	0	10	0
VOLUME, v (pcph)	825	20	0	0	11	0

STEP 1: RT FROM MINOR STREET - V9						
Conflicting Flows:	Vc,9 = 1/2*V3+V2 =	10	+	413	=	423 vph
Potential Capacity:	Cp,9 =					846 pcph
Movement Capacity:	Cm,p = Cp,9 =					846 pcph
STEP 2: LT FROM MAJOR STREET - V4						
Conflicting Flows:	Vc,4 = V3+V2 =	20	+	825	=	845 vph
Potential Capacity:	Cp,4 =					603 pcph
Movement Capacity:	Cm,4 = Cp,4 =					603 pcph
Prob. of Queue-free State:	po,4 = 1-v4/Cm,4 =					1.00
Major Left Shared Lane Prob. of Queue-free State:	p*o,4 =					NA
STEP 3: LT FROM MINOR STREET - V7						
Conflicting Flows:	Vc,7 = 1/2V3+V2+V5+V4 =					835 vph
Potential Capacity:	Cp,7 =					310 pcph
Capacity Adjustment Factor Due To Impeding Movements:	f7=po,4=					1.00
Movement Capacity:	Cm,7 = Cp,7 =					310 pcph

DELAY AND LEVEL OF SERVICE SUMMARY Movement	v(vcph)	cm(pcph)	csh (pcph)	AVG TOTAL DELAY	LOS
MINOR LEFT TURN (7)	11	310	--NA--	12.1	C
MINOR RIGHT TURN (9)	0	846	--NA--	4.3	A
MAJOR LEFT TURN (4)	0	603	----	8.0	B

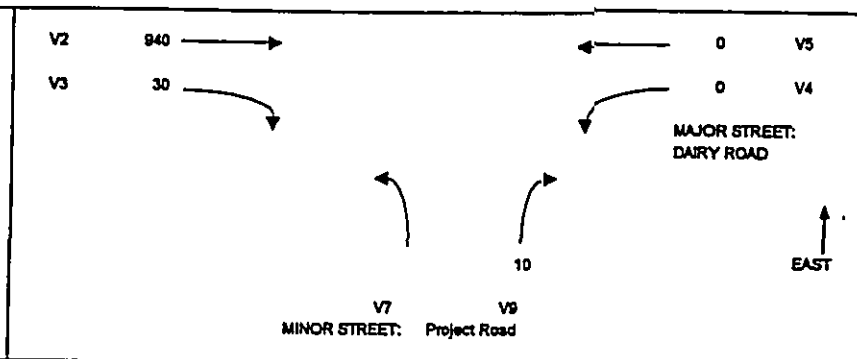
AVERAGE MINOR APPROACH DELAY =	12.1 sec/veh	AVERAGE TOTAL INTERSECTION DELAY =	0.2 sec/veh
LEVEL OF SERVICE =	C	LEVEL OF SERVICE =	A

LEFT TURN DELAY = 12.1 + 8.1 = 20.2

ATA Inc. STOP CONTROLLED T-INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street:	DAIRY ROAD	Print Date:	17-Nov
Minor Street:	Project Road	Analyst:	NHK
Peak Hour:	AM	File Name:	DAC-REF
Scenario:	FUTURE 2001 WITH PROJECT (INTERIM CONNECTION)	Intersection:	

Peak Hour Factor:	1
——MAJOR STREET——	
Num of Lanes - V2:	2
Excl RT - V3 (Y/N):	N
Stop/Yield - V3 (Y/N):	N
% Grade - V2,V3:	0
Num of Lanes - V5:	2
Excl LT - V4 (Y/N):	Y
% Grade - V4,V5:	0
——MINOR STREET——	
Num of Lanes - V7,V9:	2
Shared Lane (Y/N):	N
% Grade - V7&V9:	0



VOLUME ADJUSTMENTS

MOVEMENT NO.	2	3	4	5	7	9
VOLUME, V (vph)	940	30	0	0		10
VOLUME, v (pcph)	940	30	0	0	0	11

STEP 1: RT FROM MINOR STREET - V9

Conflicting Flows:	Vc,9 = 1/2*V3+V2 =		15	+	940	=	955 vph
Potential Capacity:	Cp,9 =						454 pcph
Movement Capacity:	Cm,p = Cp,9 =						454 pcph

STEP 2: LT FROM MAJOR STREET - V4

Conflicting Flows:	Vc,4 = V3+V2 =		30	+	940	=	970 vph
Potential Capacity:	Cp,4 =						517 pcph
Movement Capacity:	Cm,4 = Cp,4 =						517 pcph
Prob. of Queue-free State:	po,4 = 1-v4/Cm,4 =						1.00
Major Left Shared Lane Prob. of Queue-free State:	p*o,4 =						NA

STEP 3: LT FROM MINOR STREET - V7

Conflicting Flows:	Vc,7 = 1/2V3+V2+V5+V4 =						955 vph
Potential Capacity:	Cp,7 =						260 pcph
Capacity Adjustment Factor Due To Impeding Movements:	f7=po,4=						1.00
Movement Capacity:	Cm,7 = Cp,7 =						260 pcph

DELAY AND LEVEL OF SERVICE SUMMARY

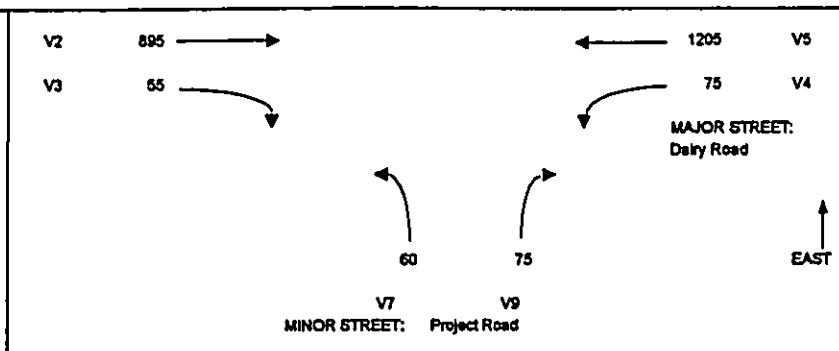
Movement	v(vcph)	cm(pcph)	csh (pcph)	AVG TOTAL DELAY	LOS
MINOR LEFT TURN (7)	0	260	--NA--	23.0	--C
MINOR RIGHT TURN (9)	11	454	--NA--	8.1	B
MAJOR LEFT TURN (4)	0	517	----	7.0	--B

AVERAGE MINOR APPROACH DELAY =	8.1 sec/veh	AVERAGE TOTAL INTERSECTION DELAY =	0.4 sec/veh
LEVEL OF SERVICE =	--B	LEVEL OF SERVICE =	--A

ATA Inc. STOP CONTROLLED T-INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street:	Dairy Road	Print Date:	17-Nov
Minor Street:	Project Road	Analyst:	NHK
Peak Hour:	PM	File Name:	DR-ACC
Scenario:	Future 2001 WITH PROJECT (INTERIM CONNECTION)	Intersection:	

Peak Hour Factor:	1
——MAJOR STREET——	
Num of Lanes - V2:	2
Excl RT - V3 (Y/N):	N
Stop/Yield - V3 (Y/N):	N
% Grade - V2,V3:	0
Num of Lanes - V5:	2
Excl LT - V4 (Y/N):	Y
% Grade - V4,V5:	0
——MINOR STREET——	
Num of Lanes - V7,V9:	2
Shared Lane (Y/N):	N
% Grade - V7&V9:	0



VOLUME ADJUSTMENTS						
MOVEMENT NO.	2	3	4	5	7	9
VOLUME, V (vph)	895	55	75	1205	60	75
VOLUME, v (pcph)	895	55	83	1205	66	83

STEP 1: RT FROM MINOR STREET - V9							
Conflicting Flows:	Vc,9 = 1/2*V3+V2 =		28	+	895	=	923 vph
Potential Capacity:	Cp,9 =						472 pcph
Movement Capacity:	Cm,p = Cp,9 =						472 pcph
STEP 2: LT FROM MAJOR STREET - V4							
Conflicting Flows:	Vc,4 = V3+V2 =		55	+	895	=	950 vph
Potential Capacity:	Cp,4 =						530 pcph
Movement Capacity:	Cm,4 = Cp,4 =						530 pcph
Prob. of Queue-free State:	po,4 = 1-v4/Cm,4 =						0.84
Major Left Shared Lane Prob. of Queue-free State:	p*o,4 =						NA
STEP 3: LT FROM MINOR STREET - V7							
Conflicting Flows:	Vc,7 = 1/2V3+V2+V5+V4 =						2203 vph
Potential Capacity:	Cp,7 =						41 pcph
Capacity Adjustment Factor Due To Impeding Movements:	f7=po,4=						0.84
Movement Capacity:	Cm,7 = Cp,7 =						35 pcph

DELAY AND LEVEL OF SERVICE SUMMARY

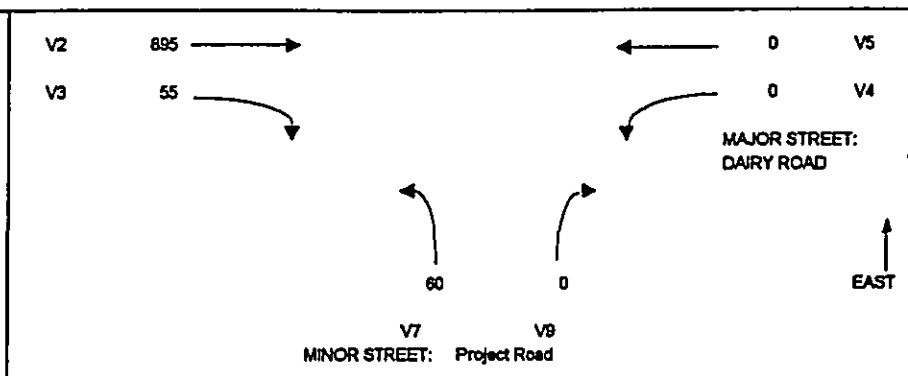
Movement	v(vcph)	cm(pcph)	csh (pcph)	AVG TOTAL DELAY	LOS
MINOR LEFT TURN (7)	66	35	--NA--	660.6	F
MINOR RIGHT TURN (9)	83	472	--NA--	9.2	B
MAJOR LEFT TURN (4)	83	530	----	8.0	B

AVERAGE MINOR APPROACH DELAY =	295.8 sec/veh	AVERAGE TOTAL INTERSECTION DELAY =	18.9 sec/veh
LEVEL OF SERVICE =	F	LEVEL OF SERVICE =	C

ATA Inc. STOP CONTROLLED T-INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street:	DAIRY ROAD	Print Date:	17-Nov
Minor Street:	Project Road	Analyst:	NHK
Peak Hour:	PM	File Name:	DPC-REF
Scenario:	FUTURE 2001	Intersection:	

Peak Hour Factor:	1.00
——MAJOR STREET——	
Num of Lanes - V2:	2
Excl RT - V3 (Y/N):	N
Stop/Yield - V3 (Y/N):	N
% Grade - V2,V3:	0
Num of Lanes - V5:	2
Excl LT - V4 (Y/N):	Y
% Grade - V4,V5:	0
——MINOR STREET——	
Num of Lanes - V7,V9:	1
Shared Lane (Y/N):	N
% Grade - V7&V9:	0



VOLUME ADJUSTMENTS

MOVEMENT NO.	2	3	4	5	7	9
VOLUME, V (vph)	895	55	0	0	60	0
VOLUME, v (pcph)	895	55	0	0	66	0

STEP 1: RT FROM MINOR STREET - V9

Conflicting Flows:	Vc,9 = 1/2*V3+V2 =	28	+	448	=	475	vph
Potential Capacity:	Cp,9 =					796	pcph
Movement Capacity:	Cm,p = Cp,9 =					796	pcph

STEP 2: LT FROM MAJOR STREET - V4

Conflicting Flows:	Vc,4 = V3+V2 =	55	+	895	=	950	vph
Potential Capacity:	Cp,4 =					530	pcph
Movement Capacity:	Cm,4 = Cp,4 =					530	pcph
Prob. of Queue-free State:	po,4 = 1-v4/Cm,4 =					1.00	
Major Left Shared Lane Prob. of Queue-free State:	p*o,4 =					NA	

STEP 3: LT FROM MINOR STREET - V7

Conflicting Flows:	Vc,7 = 1/2V3+V2+V5+V4 =					923	vph
Potential Capacity:	Cp,7 =					272	pcph
Capacity Adjustment Factor Due To Impeding Movements:	f7=po,4=					1.00	
Movement Capacity:	Cm,7 = Cp,7 =					272	pcph

DELAY AND LEVEL OF SERVICE SUMMARY

Movement	v(vcph)	cm(pcph)	csh (pcph)	AVG TOTAL DELAY	LOS
MINOR LEFT TURN (7)	66	272	--NA--	17.4	C
MINOR RIGHT TURN (9)	0	796	--NA--	4.5	A
MAJOR LEFT TURN (4)	0	530	------	6.8	B

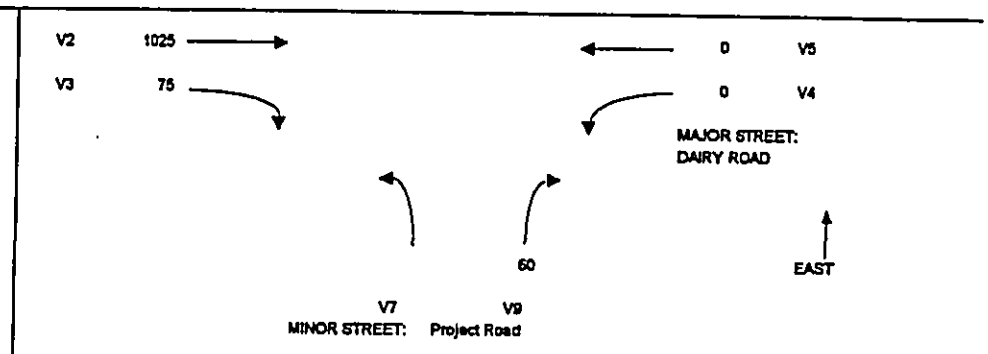
AVERAGE MINOR APPROACH DELAY =	17.4 sec/veh	AVERAGE TOTAL INTERSECTION DELAY =	1.1 sec/veh
LEVEL OF SERVICE =	C	LEVEL OF SERVICE =	A

LEFT TURN DELAY = 17.4 + 10.7 = 28.1

ATA Inc. STOP CONTROLLED T-INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street:	DAIRY ROAD	Print Date:	17-Nov
Minor Street:	Project Road	Analyst:	NHK
Peak Hour:	PM	File Name:	DPC-REF
Scenario:	FUTURE 2001	Intersection:	

Peak Hour Factor:	1
——MAJOR STREET——	
Num of Lanes - V2:	2
Excl RT - V3 (Y/N):	N
Stop/Yield - V3 (Y/N):	N
% Grade - V2,V3:	0
Num of Lanes - V5:	2
Excl LT - V4 (Y/N):	Y
% Grade - V4,V5:	0
——MINOR STREET——	
Num of Lanes - V7,V9:	1
Shared Lane (Y/N):	N
% Grade - V7&V9:	0



VOLUME ADJUSTMENTS

MOVEMENT NO.	2	3	4	5	7	9
VOLUME, V (vph)	1025	75	0	0		60
VOLUME, v (pcph)	1025	75	0	0	0	66

STEP 1: RT FROM MINOR STREET - V9							
Conflicting Flows:	Vc,9 = 1/2*V3+V2 =	38	+	1025	=	1063	vph
Potential Capacity:	Cp,9 =					401	pcph
Movement Capacity:	Cm,p = Cp,9 =					401	pcph
STEP 2: LT FROM MAJOR STREET - V4							
Conflicting Flows:	Vc,4 = V3+V2 =	75	+	1025	=	1100	vph
Potential Capacity:	Cp,4 =					440	pcph
Movement Capacity:	Cm,4 = Cp,4 =					440	pcph
Prob. of Queue-free State:	po,4 = 1-v4/Cm,4 =					1.00	
Major Left Shared Lane Prob. of Queue-free State:	p*o,4 =					NA	
STEP 3: LT FROM MINOR STREET - V7							
Conflicting Flows:	Vc,7 = 1/2V3+V2+V5+V4 =					1063	vph
Potential Capacity:	Cp,7 =					222	pcph
Capacity Adjustment Factor Due To Impeding Movements:	f7=po,4=					1.00	
Movement Capacity:	Cm,7 = Cp,7 =					222	pcph

DELAY AND LEVEL OF SERVICE SUMMARY

Movement	v(vcph)	cm(pcph)	csh (pcph)	AVG TOTAL DELAY	LOS
MINOR LEFT TURN (7)	0	222	--NA--	45.2	--C
MINOR RIGHT TURN (9)	66	401	--NA--	10.7	C
MAJOR LEFT TURN (4)	0	440	----	8.2	--B

AVERAGE MINOR APPROACH DELAY =	10.7 sec/veh	AVERAGE TOTAL INTERSECTION DELAY =	0.6 sec/veh
LEVEL OF SERVICE =	--C	LEVEL OF SERVICE =	--A

SIGNAL94/TEAPAC[V1 L1.4] - Summary of Parameter Values

Intersection Parameters for Int # 1 -

METROAREA		CBD
LOSTTIME		3.0
LEVELOFSERVICE	C	S
NODELOCATION	0	0

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	.0	.0	.0	.0
PEDLEVELS	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	130

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	75	585	25	15	5	5	20	560	260	185	5	20
WIDTHS	.0	24.0	12.0	12.0	12.0	12.0	12.0	24.0	24.0	12.0	12.0	12.0
LANES	0	2	1	1	1	1	1	2	2	1	1	1
UTILIZATIONS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	NO	YES	NO	NO	YES	NO	NO	YES	NO	NO	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
SATURATIONFLOWS	0	3296	1593	1425	1676	1563	1425	3353	3185	1425	1676	1563

Phasing Parameters

SEQUENCES	71						
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	.00	1
CYCLES	105	180	5		PEDTIME	.0	0
GREENTIMES	38.00	34.00	18.00				
YELLOWTIMES	5.00	5.00	5.00				
CRITICALS	2	8	12				
EXCESS	0						

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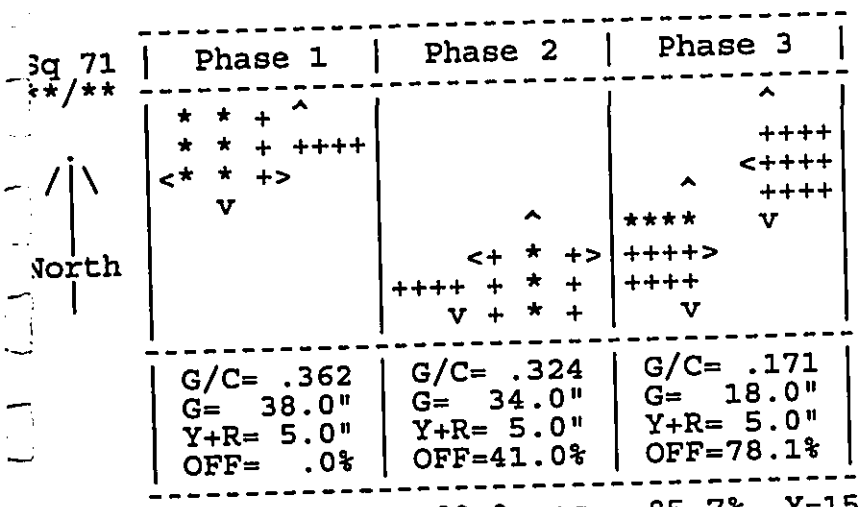
laui Business Park Phase 1B WPAP01AS
uture Year 2001 with Project AM Peak Hour Airport/Access
B 1LT, 1TH, 1RT

IGNAL94/TEAPAC[V1 L1.4] - Capacity Analysis Summary

ntersection Averages for Int # 1 -
Degree of Saturation (v/c) .49 Vehicle Delay 17.3 Level of Service C+



C=105 sec G= 90.0 sec = 85.7% Y=15.0 sec = 14.3% Ped= .0 sec = .0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	LOS	90% Max Queue
SB Approach								17.5	C+	
TH+RT	24/2	.296	.381	1107	1256	770	.613	17.6	*C+	352 ft
LT	12/1	.149	.381	498	607	28	.046	13.2	B	26 ft
NB Approach								17.8	C+	
RT	12/1	.148	.343	377	489	22	.045	14.9	B	25 ft
TH	24/2	.265	.343	976	1150	653	.568	18.7	*C+	317 ft
LT	24/2	.191	.343	922	1092	298	.273	16.2	C+	145 ft
WB Approach								12.5	B	
RT	12/1	.147	.600	801	855	17	.020	5.5	B+	25 ft
TH	12/1	.143	.190	144	312	6	.019	22.3	C	25 ft
LT	12/1	.143	.190	133	290	6	.020	22.3	C	25 ft
EB Approach								11.7	B	
RT	12/1	.162	.562	739	801	61	.076	6.8	B+	39 ft
TH	12/1	.143	.190	144	312	6	.019	22.3	C	25 ft
LT	12/1	.148	.190	133	290	22	.074	22.5	*C	26 ft

SIGNAL94/TEAPAC[V1 L1.4] - Summary of Parameter Values

Intersection Parameters for Int # 1 -

METROAREA		CBD
LOSTTIME		3.0
LEVELOFSERVICE	C	S
NODELOCATION	0	0

Approach Parameters

	SB	WB	NB	EB
APPLABELS	.0	.0	.0	.0
GRADES	0	0	0	0
PEDLEVELS	NONE	NONE	NONE	NONE
PARKINGSIDES	20	20	20	20
PARKVOLUMES	0	0	0	0
BUSVOLUMES	0	0	0	170
RIGHTTURNONREDS				

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	15	700	70	75	10	50	55	510	345	240	10	20
WIDTHS	.0	24.0	12.0	12.0	12.0	12.0	12.0	24.0	24.0	12.0	12.0	12.0
LANES	0	2	1	1	1	1	1	2	2	1	1	1
UTILIZATIONS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	NO	YES	NO	NO	YES	NO	NO	YES	NO	NO	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
SATURATIONFLOWS	0	3342	1593	1425	1676	1536	1425	3353	3185	1425	1676	1536

Phasing Parameters

SEQUENCES	71						
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	.00	1
CYCLES	105	180	5		PEDTIME	.0	0
GREENTIMES	39.00	32.00	19.00				
YELLOWTIMES	5.00	5.00	5.00				
CRITICALS	2	8	6				
EXCESS	0						

aui Business Park Phase 1B - WPAP01PS
uture Year 2001 with Project PM Peak Hour Airport/Access
B 1LT, 1TH, 1RT

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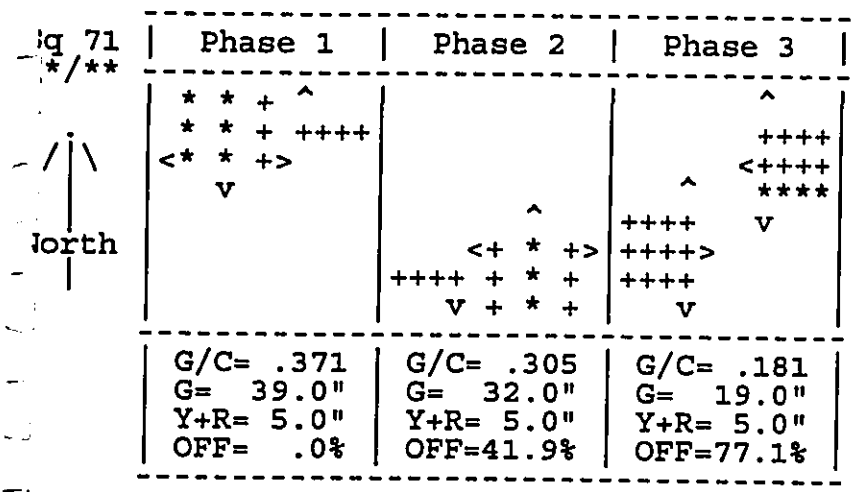
IGNAL94/TEAPAC[V1 L1.4] - Capacity Analysis Summary

ntersection Averages for Int # 1 -
Degree of Saturation (v/c) .48 Vehicle Delay 17.3 Level of Service C+



C=105 sec G= 90.0 sec = 85.7% Y=15.0 sec = 14.3% Ped= .0 sec = .0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	L S	90% Max Queue
SB Approach								17.2	C+	
TH+RT	24/2	.309	.390	1161	1305	835	.640	17.6	*C+	376 ft
LT	12/1	.166	.390	516	622	78	.125	13.3	B	70 ft
NB Approach								18.6	C+	
RT	12/1	.162	.324	345	461	61	.132	16.2	C+	61 ft
TH	24/2	.251	.324	899	1086	595	.548	19.3	*C+	297 ft
LT	24/2	.212	.324	849	1031	394	.382	17.8	C+	197 ft
WB Approach								12.9	B	
RT	12/1	.172	.619	832	882	83	.094	5.2	B+	47 ft
TH	12/1	.144	.200	165	329	11	.033	21.8	C	25 ft
LT	12/1	.159	.200	149	300	56	.182	22.6	*C	66 ft
EB Approach								11.6	B	
RT	12/1	.170	.552	723	787	78	.099	7.2	B+	52 ft
TH	12/1	.144	.200	165	329	11	.033	21.8	C	25 ft
LT	12/1	.148	.200	149	300	22	.072	22.0	C	26 ft

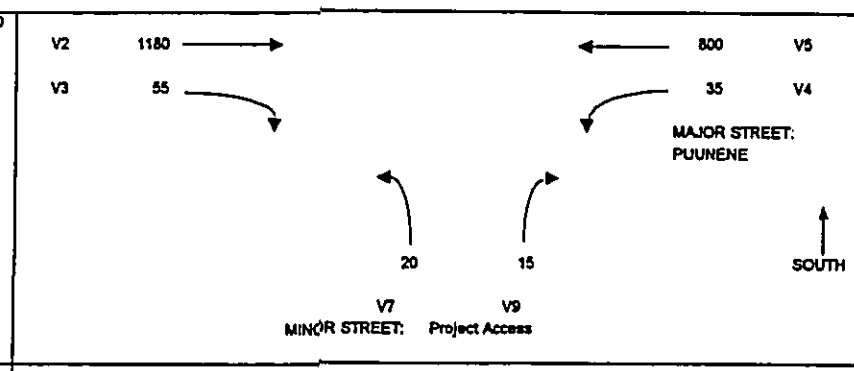
AUSTIN, TSUTSUMI & ASSOCIATES, INC.
CIVIL ENGINEERS • SURVEYORS

FUTURE YEAR 2004
WITH PROJECT

ATA Inc. STOP CONTROLLED T-INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street:	PUUNENE	Print Date:	17-Nov
Minor Street:	Project Access	Analyst:	NHK
Peak Hour:	AM	File Name:	PUU-04
Scenario:	Future 2004 WITH PROJECT	Intersection:	

Peak Hour Factor:	1.00
——MAJOR STREET——	
Num of Lanes - V2:	2
Excl RT - V3 (Y/N):	N
Stop/Yield - V3 (Y/N):	N
% Grade - V2,V3:	0
Num of Lanes - V5:	2
Excl LT - V4 (Y/N):	Y
% Grade - V4,V5:	0
——MINOR STREET——	
Num of Lanes - V7,V9:	2
Shared Lane (Y/N):	N
% Grade - V7&V9:	0



VOLUME ADJUSTMENTS

MOVEMENT NO.	2	3	4	5	7	9
VOLUME, V (vph)	1180	55	35	800	20	15
VOLUME, v (pcph)	1180	55	39	800	22	17

STEP 1: RT FROM MINOR STREET - V9

Conflicting Flows:	Vc,9 = 1/2*V3+V2 =	28	+	590	=	618 vph
Potential Capacity:	Cp,9 =					674 pcph
Movement Capacity:	Cm,p = Cp,9 =					674 pcph

STEP 2: LT FROM MAJOR STREET - V4

Conflicting Flows:	Vc,4 = V3+V2 =	55	+	1180	=	1235 vph
Potential Capacity:	Cp,4 =					372 pcph
Movement Capacity:	Cm,4 = Cp,4 =					372 pcph
Prob. of Queue-free State:	po,4 = 1-v4/Cm,4 =					0.90
Major Left Shared Lane Prob. of Queue-free State:	p*o,4 =					NA

STEP 3: LT FROM MINOR STREET - V7

Conflicting Flows:	Vc,7 = 1/2V3+V2+V5+V4 =	2043	vph
Potential Capacity:	Cp,7 =	52	pcph
Capacity Adjustment Factor Due To Impeding Movements:	f7=po,4=	0.90	
Movement Capacity:	Cm,7 = Cp,7 =	47	pcph

DELAY AND LEVEL OF SERVICE SUMMARY

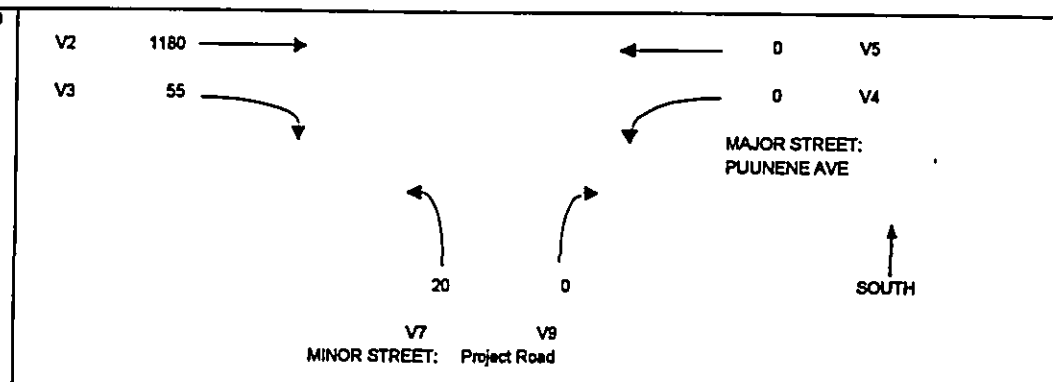
Movement	v(vcph)	cm(pcph)	csh (pcph)	AVG TOTAL DELAY	LOS
MINOR LEFT TURN (7)	22	47	--NA--	131.7	F
MINOR RIGHT TURN (9)	17	674	--NA--	8.5	B
MAJOR LEFT TURN (4)	39	372	——	10.8	C

AVERAGE MINOR APPROACH DELAY =	77.6	sec/veh	
LEVEL OF SERVICE =	F		
AVERAGE TOTAL INTERSECTION DELAY =	1.6	sec/veh	
LEVEL OF SERVICE =	A		

ATA Inc. STOP CONTROLLED T-INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street:	PUUNENE AVE	Print Date:	17-Nov
Minor Street:	Project Road	Analyst:	NHK
Peak Hour:	AM	File Name:	P4A-REF
Scenario:	Future 2004	Intersection:	

Peak Hour Factor:	1.00
-------MAJOR STREET--------	
Num of Lanes - V2:	2
Excl RT - V3 (Y/N):	N
Stop/Yield - V3 (Y/N):	N
% Grade - V2,V3:	0
Num of Lanes - V5:	2
Excl LT - V4 (Y/N):	Y
% Grade - V4,V5:	0
-------MINOR STREET-------	
Num of Lanes - V7,V9:	2
Shared Lane (Y/N):	N
% Grade - V7&V9:	0



VOLUME ADJUSTMENTS

MOVEMENT NO.	2	3	4	5	7	9
VOLUME, V (vph)	1180	55	0	0	20	0
VOLUME, v (pcph)	1180	55	0	0	22	0

STEP 1: RT FROM MINOR STREET - V9

Conflicting Flows:	Vc,9 = 1/2*V3+V2 =	28	+	590	=	618	vph
Potential Capacity:	Cp,9 =					674	pcph
Movement Capacity:	Cm,p = Cp,9 =					674	pcph

STEP 2: LT FROM MAJOR STREET - V4

Conflicting Flows:	Vc,4 = V3+V2 =	55	+	1180	=	1235	vph
Potential Capacity:	Cp,4 =					372	pcph
Movement Capacity:	Cm,4 = Cp,4 =					372	pcph
Prob. of Queue-free State:	po,4 = 1-v4/Cm,4 =					1.00	
Major Left Shared Lane Prob. of Queue-free State:	p*o,4 =					NA	

STEP 3: LT FROM MINOR STREET - V7

Conflicting Flows:	Vc,7 = 1/2V3+V2+V5+V4 =	1208	vph
Potential Capacity:	Cp,7 =	179	pcph
Capacity Adjustment Factor Due To Impeding Movements:	f7=po,4=	1.00	
Movement Capacity:	Cm,7 = Cp,7 =	179	pcph

DELAY AND LEVEL OF SERVICE SUMMARY

Movement	v(vcph)	cm(pcph)	csh (pcph)	AVG TOTAL DELAY	LOS
MINOR LEFT TURN (7)	22	179	--NA--	22.9	D
MINOR RIGHT TURN (9)	0	674	--NA--	5.3	A
MAJOR LEFT TURN (4)	0	372	----	9.7	B

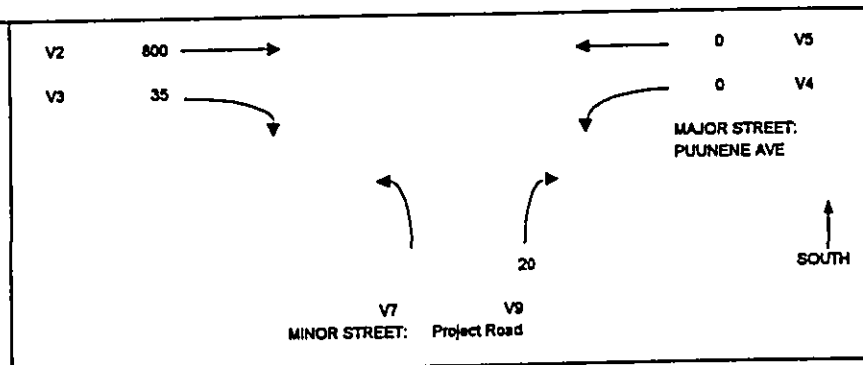
AVERAGE MINOR APPROACH DELAY =	22.9 sec/veh	AVERAGE TOTAL INTERSECTION DELAY =	0.4 sec/veh
LEVEL OF SERVICE =	D	LEVEL OF SERVICE =	A

LEFT TURN DELAY = 22.9 + 7.0 = 29.9

ATA Inc. STOP CONTROLLED T-INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street:	PUUNENE AVE	Print Date:	17-Nov
Minor Street:	Project Road	Analyst:	NHK
Peak Hour:	AM	File Name:	P4A-REF
Scenario:	Future 2004	Intersection:	

Peak Hour Factor:	1
——MAJOR STREET——	
Num of Lanes - V2:	2
Excl RT - V3 (Y/N):	N
Stop/Yield - V3 (Y/N):	N
% Grade - V2,V3:	0
Num of Lanes - V5:	2
Excl LT - V4 (Y/N):	Y
% Grade - V4,V5:	0
——MINOR STREET——	
Num of Lanes - V7,V9:	2
Shared Lane (Y/N):	N
% Grade - V7&V9:	0



VOLUME ADJUSTMENTS						
MOVEMENT NO.	2	3	4	5	7	9
VOLUME, V (vph)	800	35	0	0		20
VOLUME, v (pcph)	800	35	0	0	0	22

STEP 1: RT FROM MINOR STREET - V9						
Conflicting Flows:	Vc,9 = 1/2*V3+V2 =	18	+	800	=	818 vph
Potential Capacity:	Cp,9 =					533 pcph
Movement Capacity:	Cm,p = Cp,9 =					533 pcph

STEP 2: LT FROM MAJOR STREET - V4						
Conflicting Flows:	Vc,4 = V3+V2 =	35	+	800	=	835 vph
Potential Capacity:	Cp,4 =					611 pcph
Movement Capacity:	Cm,4 = Cp,4 =					611 pcph
Prob. of Queue-free State:	po,4 = 1-v4/Cm,4 =					1.00
Major Left Shared Lane Prob. of Queue-free State:	p*o,4 =					NA

STEP 3: LT FROM MINOR STREET - V7			
Conflicting Flows:	Vc,7 = 1/2V3+V2+V5+V4 =	818	vph
Potential Capacity:	Cp,7 =	318	pcph
Capacity Adjustment Factor Due To Impeding Movements:	f7=po,4=	1.00	
Movement Capacity:	Cm,7 = Cp,7 =	318	pcph

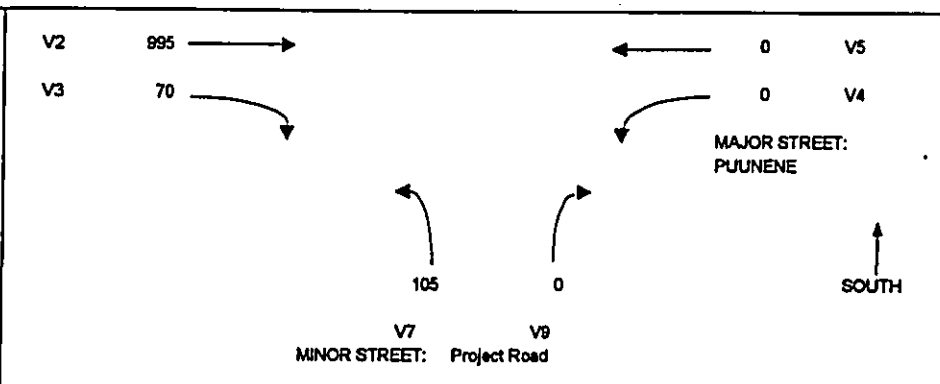
DELAY AND LEVEL OF SERVICE SUMMARY Movement	v(vcph)	cm(pcph)	csh (pcph)	AVG TOTAL DELAY	LOS
MINOR LEFT TURN (7)	0	318	--NA--	11.3	--C
MINOR RIGHT TURN (9)	22	533	--NA--	7.0	B
MAJOR LEFT TURN (4)	0	611	----	8.0	--B

AVERAGE MINOR APPROACH DELAY =	7 sec/veh	AVERAGE TOTAL INTERSECTION DELAY =	0 sec/veh
LEVEL OF SERVICE =	--B	LEVEL OF SERVICE =	--A

ATA Inc. STOP CONTROLLED T-INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street:	PUUNENE	Print Date:	17-Nov
Minor Street:	Project Road	Analyst:	NHK
Peak Hour:	PM	File Name:	P4P-REF
Scenario:	Future 2004	Intersection:	

Peak Hour Factor:	1.00
——MAJOR STREET——	
Num of Lanes - V2:	2
Excl RT - V3 (Y/N):	N
Stop/Yield - V3 (Y/N):	N
% Grade - V2,V3:	0
Num of Lanes - V5:	2
Excl LT - V4 (Y/N):	Y
% Grade - V4,V5:	0
——MINOR STREET——	
Num of Lanes - V7,V9:	2
Shared Lane (Y/N):	N
% Grade - V7&V9:	0



VOLUME ADJUSTMENTS

MOVEMENT NO.	2	3	4	5	7	9
VOLUME, V (vph)	995	70	0	0	105	0
VOLUME, v (pcph)	995	70	0	0	116	0

STEP 1: RT FROM MINOR STREET - V9

Conflicting Flows:	Vc,9 = 1/2*V3+V2 =	35	+	498	=	533 vph
Potential Capacity:	Cp,9 =					744 pcph
Movement Capacity:	Cm,p = Cp,9 =					744 pcph

STEP 2: LT FROM MAJOR STREET - V4

Conflicting Flows:	Vc,4 = V3+V2 =	70	+	995	=	1065 vph
Potential Capacity:	Cp,4 =					460 pcph
Movement Capacity:	Cm,4 = Cp,4 =					460 pcph
Prob. of Queue-free State:	po,4 = 1-v4/Cm,4 =					1.00
Major Left Shared Lane Prob. of Queue-free State:	p*o,4 =					NA

STEP 3: LT FROM MINOR STREET - V7

Conflicting Flows:	Vc,7 = 1/2V3+V2+V5+V4 =	1030	vph
Potential Capacity:	Cp,7 =	232	pcph
Capacity Adjustment Factor Due To Impeding Movements:	f7=po,4=	1.00	
Movement Capacity:	Cm,7 = Cp,7 =	232	pcph

DELAY AND LEVEL OF SERVICE SUMMARY

Movement	v(vcph)	cm(pcph)	csh (pcph)	AVG TOTAL DELAY	LOS
MINOR LEFT TURN (7)	116	232	--NA--	29.9	D
MINOR RIGHT TURN (9)	0	744	--NA--	4.8	A
MAJOR LEFT TURN (4)	0	460	------	7.8	B

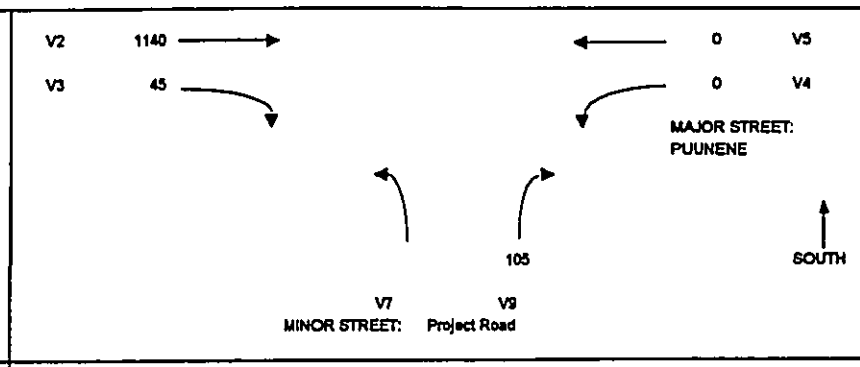
AVERAGE MINOR APPROACH DELAY =	29.9	sec/veh	
LEVEL OF SERVICE =	D		
AVERAGE TOTAL INTERSECTION DELAY =	2.9	sec/veh	
LEVEL OF SERVICE =	A		

LEFT TURN DELAY = 29.9 + 14.9 = 44.8

ATA Inc. STOP CONTROLLED T-INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street:	PUUNENE	Print Date:	17-Nov
Minor Street:	Project Road	Analyst:	NHK
Peak Hour:	PM	File Name:	P4P-REF
Scenario:	Future 2004	Intersection:	

Peak Hour Factor:	1
——MAJOR STREET——	
Num of Lanes - V2:	2
Excl RT - V3 (Y/N):	N
Stop/Yield - V3 (Y/N):	N
% Grade - V2,V3:	0
Num of Lanes - V5:	2
Excl LT - V4 (Y/N):	Y
% Grade - V4,V5:	0
——MINOR STREET——	
Num of Lanes - V7,V9:	2
Shared Lane (Y/N):	N
% Grade - V7&V9:	0



VOLUME ADJUSTMENTS						
MOVEMENT NO.	2	3	4	5	7	9
VOLUME, V (vph)	1140	45	0	0		105
VOLUME, v (pcph)	1140	45	0	0	0	116

STEP 1: RT FROM MINOR STREET - V9						
Conflicting Flows:	Vc,9 = 1/2*V3+V2 =	23	+	1140	=	1163 vph
Potential Capacity:	Cp,9 =					357 pcph
Movement Capacity:	Cm,p = Cp,9 =					357 pcph
STEP 2: LT FROM MAJOR STREET - V4						
Conflicting Flows:	Vc,4 = V3+V2 =	45	+	1140	=	1185 vph
Potential Capacity:	Cp,4 =					396 pcph
Movement Capacity:	Cm,4 = Cp,4 =					396 pcph
Prob. of Queue-free State:	po,4 = 1-v4/Cm,4 =					1.00
Major Left Shared Lane Prob. of Queue-free State:	p*o,4 =					NA
STEP 3: LT FROM MINOR STREET - V7						
Conflicting Flows:	Vc,7 = 1/2V3+V2+V5+V4 =					1163 vph
Potential Capacity:	Cp,7 =					191 pcph
Capacity Adjustment Factor Due To Impeding Movements:	f7=po,4=					1.00
Movement Capacity:	Cm,7 = Cp,7 =					191 pcph

DELAY AND LEVEL OF SERVICE SUMMARY

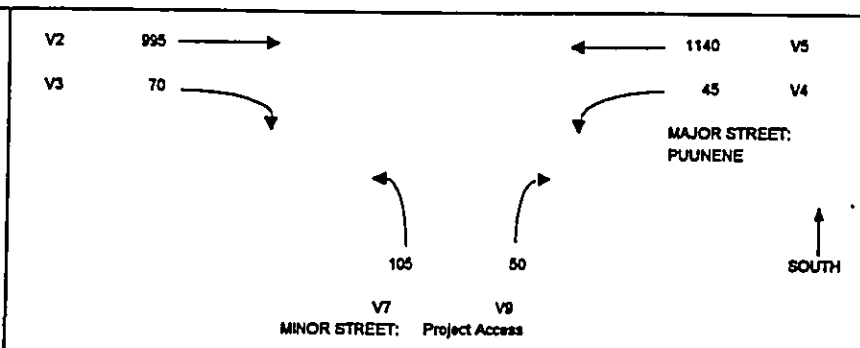
Movement	v(vph)	cm(pcph)	csh (pcph)	AVG TOTAL DELAY	LOS
MINOR LEFT TURN (7)	0	191	--NA--	15.8	--C
MINOR RIGHT TURN (9)	116	357	--NA--	14.9	C
MAJOR LEFT TURN (4)	0	396	----	0.1	--B

AVERAGE MINOR APPROACH DELAY =	14.9 sec/veh	AVERAGE TOTAL INTERSECTION DELAY =	1.3 sec/veh
LEVEL OF SERVICE =	--C	LEVEL OF SERVICE =	--A

ATA Inc. STOP CONTROLLED T-INTERSECTION LEVEL OF SERVICE ANALYSIS 1994 HCM

Major Street:	PUUNENE	Print Date:	17-Nov
Minor Street:	Project Access	Analyst:	NHK
Peak Hour:	PM	File Name:	PUU-04
Scenario:	Future 2004 WITH PROJECT	Intersection:	

Peak Hour Factor:	1
——MAJOR STREET——	
Num of Lanes - V2:	2
Excl RT - V3 (Y/N):	N
Stop/Yield - V3 (Y/N):	N
% Grade - V2,V3:	0
Num of Lanes - V5:	2
Excl LT - V4 (Y/N):	Y
% Grade - V4,V5:	0
——MINOR STREET——	
Num of Lanes - V7,V9:	2
Shared Lane (Y/N):	N
% Grade - V7&V9:	0



VOLUME ADJUSTMENTS

MOVEMENT NO.	2	3	4	5	7	9
VOLUME, V (vph)	995	70	45	1140	105	50
VOLUME, v (pcph)	995	70	50	1140	116	55

STEP 1: RT FROM MINOR STREET - V9

Conflicting Flows:	Vc,9 = 1/2*V3+V2 =		35	+	995	=	1030 vph
Potential Capacity:	Cp,9 =						416 pcph
Movement Capacity:	Cm,p = Cp,9 =						416 pcph

STEP 2: LT FROM MAJOR STREET - V4

Conflicting Flows:	Vc,4 = V3+V2 =		70	+	995	=	1065 vph
Potential Capacity:	Cp,4 =						460 pcph
Movement Capacity:	Cm,4 = Cp,4 =						460 pcph
Prob. of Queue-free State:	po,4 = 1-v4/Cm,4 =						0.89
Major Left Shared Lane Prob. of Queue-free State:	p*o,4 =						NA

STEP 3: LT FROM MINOR STREET - V7

Conflicting Flows:	Vc,7 = 1/2V3+V2+V5+V4 =						2215 vph
Potential Capacity:	Cp,7 =						41 pcph
Capacity Adjustment Factor Due To Impeding Movements:	f7=po,4=						0.89
Movement Capacity:	Cm,7 = Cp,7 =						36 pcph

DELAY AND LEVEL OF SERVICE SUMMARY

Movement	v(vcph)	cm(pcph)	csh (pcph)	AVG TOTAL DELAY	LOS
MINOR LEFT TURN (7)	116	36	--NA--	1211.9	F
MINOR RIGHT TURN (9)	55	416	--NA--	10.0	B
MAJOR LEFT TURN (4)	50	460	----	8.8	B

AVERAGE MINOR APPROACH DELAY =	824.2 sec/veh	AVERAGE TOTAL INTERSECTION DELAY =	58.1 sec/veh
LEVEL OF SERVICE =	F	LEVEL OF SERVICE =	F

IGNAL94/TEAPAC[V1 L1.4] - Summary of Parameter Values

Intersection Parameters for Int # 1 -

ETROAREA	CBD	
OSTTIME	3.0	
EVELOFSERVICE	C	S
ODELOCATION	0	0

Approach Parameters

PPLABELS	SB	WB	NB	EB
RADES	.0	.0	.0	.0
EDLEVELS	0	0	0	0
ARKINGSIDES	NONE	NONE	NONE	NONE
ARKVOLUMES	20	20	20	20
USVOLUMES	0	0	0	0
IGHTTURNONREDS	0	0	0	135

Movement Parameters

OVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
OLUMES	80	620	95	35	5	20	75	590	270	60	15	20
IDTHS	.0	24.0	12.0	12.0	12.0	12.0	12.0	24.0	24.0	12.0	12.0	12.0
ANES	0	2	1	1	1	1	1	2	2	1	1	1
TILIZATIONS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
RUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
EAKHOURFACTORS	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90
RRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
CTUATIONS	NO	NO	YES	NO	NO	YES	NO	NO	YES	NO	NO	YES
EQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
INIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
DEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
ACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
STOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
ATURATIONFLOWS	0	3295	1593	1425	1676	1593	1425	3353	3185	1425	1676	1593

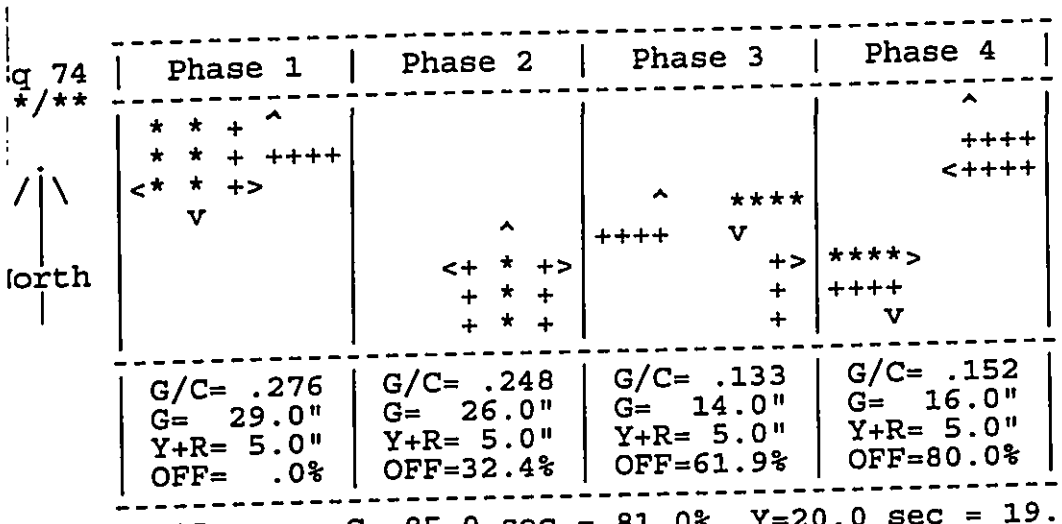
Phasing Parameters

EQUENCES	74						
ERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
VERLAPS	YES	YES	YES	YES	OFFSET	.00	1
YCLES	105	180	5		PEDTIME	.0	0
REENTIMES	29.00	26.00	14.00	16.00			
ELLOWTIMES	5.00	5.00	5.00	5.00			
RITICALS	2	8	6	11			
XCESS	0						

aui Business Park Phase 1B - wpap04as 12/14/98
uture Year 2004 with Project AM Peak Hour Airport/Access 16:26:31
B 1 LT, 1 TH, 1 RT (NB/SB EB/WB Split Phasing)

IGNAL94/TEAPAC[V1 L1.4] - Capacity Analysis Summary

ntersection Averages for Int # 1 -
Degree of Saturation (v/c) .65 Vehicle Delay 24.2 Level of Service C



C=105 sec G= 85.0 sec = 81.0% Y=20.0 sec = 19.0% Ped= .0 sec = .0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	LOS	90% Max Queue
								26.1	D+	
SB Approach										
TH+RT	24/2	.308	.295	766	973	817	.840	27.1	*D+	425 ft
LT	12/1	.177	.295	338	470	106	.226	18.1	C+	110 ft
								23.1	C	
NB Approach										
RT	12/1	.172	.448	550	638	83	.130	11.0	B	68 ft
TH	24/2	.273	.267	661	894	689	.771	25.9	*D+	373 ft
LT	24/2	.193	.267	624	849	309	.364	20.3	C	167 ft
								15.4	C+	
WB Approach										
RT	12/1	.154	.495	629	706	39	.055	8.9	B+	29 ft
TH	12/1	.143	.171	98	277	6	.021	23.4	C	25 ft
LT	12/1	.147	.152	39	231	22	.091	24.7	*C	28 ft
								24.2	C	
EB Approach										
RT	12/1	.142	.171	82	233	1	.004	23.3	C	25 ft
TH	12/1	.146	.171	98	277	17	.059	23.5	*C	25 ft
LT	12/1	.147	.152	39	231	22	.091	24.7	C	28 ft

aui Business Park Phase 1B WPAP04PS
uture Year 2004 with Project PM Peak Hour Airport/Access 12/14/98
B 1 LT, 1 TH, 1 RT 16:27:06

IGNAL94/TEAPAC[V1 L1.4] - Summary of Parameter Values

Intersection Parameters for Int # 1 -

ETROAREA	CBD	
OSTTIME	3.0	
EVELOFSERVICE	C	S
ODELOCATION	0	0

Approach Parameters

PPLABELS	SB	WB	NB	EB
RADES	.0	.0	.0	.0
EDLEVELS	0	0	0	0
ARKINGSIDES	NONE	NONE	NONE	NONE
ARKVOLUMES	20	20	20	20
USVOLUMES	0	0	0	0
IGHTTURNONREDS	0	0	0	245

Movement Parameters

OVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
OLUMES	25	715	125	185	25	115	100	525	495	100	20	30
IDTHS	.0	24.0	12.0	12.0	12.0	12.0	12.0	24.0	24.0	12.0	12.0	12.0
ANES	0	2	1	1	1	1	1	2	2	1	1	1
TILIZATIONS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
RUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
EAKHOURFACTORS	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90
RRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
CTUATIONS	NO	NO	YES	NO	NO	YES	NO	NO	YES	NO	NO	YES
EQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
INIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
DEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
ACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
STOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
ATURATIONFLOWS	0	3336	1593	1425	1676	1593	1425	3353	3185	1425	1676	1593

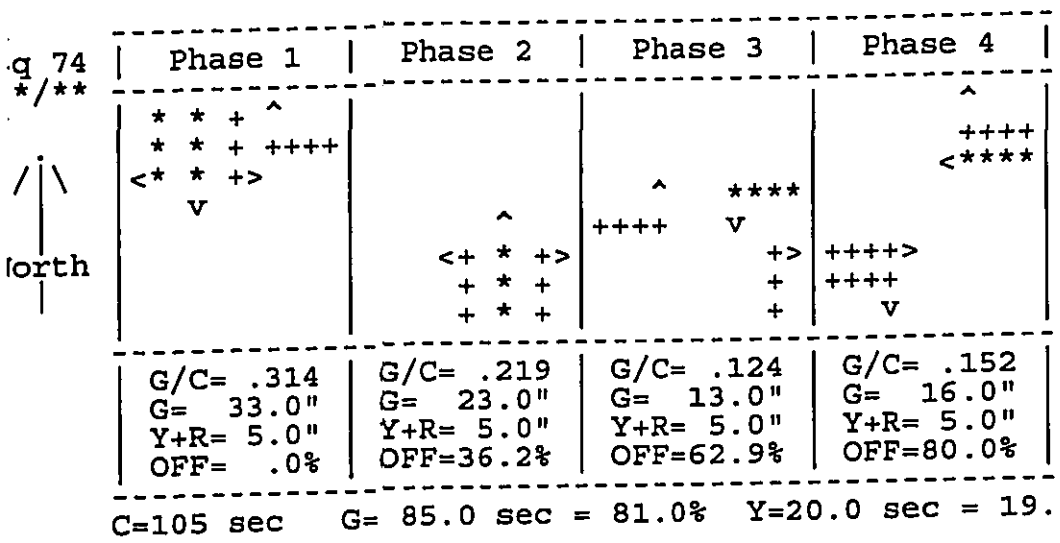
Phasing Parameters

EQUENCES	74						
ERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
VERLAPS	YES	YES	YES	YES	OFFSET	.00	1
YCLES	105	180	5		PEDTIME	.0	0
REENTIMES	33.00	23.00	13.00	16.00			
ELLOWTIMES	5.00	5.00	5.00	5.00			
RITICALS	2	8	6	5			
XCESS	0						

aui Business Park Phase 1B WPAP04PS 12/14/98
uture Year 2004 with Project PM Peak Hour Airport/Access 16:27:22
B 1 LT, 1 TH, 1 RT

IGNAL94/TEAPAC[V1 L1.4] - Capacity Analysis Summary

ntersection Averages for Int # 1 -
Degree of Saturation (v/c) .65 Vehicle Delay 23.2 Level of Service C



C=105 sec G= 85.0 sec = 81.0% Y=20.0 sec = 19.0% Ped= .0 sec = .0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	LOS	90% Max Queue
SB Approach								21.9	C	
TH+RT	24/2	.316	.333	932	1112	863	.776	22.8	*C	425 ft
LT	12/1	.192	.333	410	531	139	.262	16.6	C+	137 ft
NB Approach								25.8	D+	
RT	12/1	.186	.410	488	584	111	.190	12.8	B	97 ft
TH	24/2	.255	.238	537	798	612	.767	27.2	*D+	344 ft
LT	24/2	.253	.238	507	758	566	.747	26.8	D+	318 ft
WB Approach								17.2	C+	
RT	12/1	.240	.533	691	760	206	.271	8.7	B+	142 ft
TH	12/1	.149	.171	98	277	28	.098	23.7	*C	34 ft
LT	12/1	.187	.143	6	215	128	.561	29.4	*D+	162 ft
EB Approach								24.7	C	
RT	12/1	.142	.171	82	233	1	.004	23.3	C	25 ft
TH	12/1	.147	.171	98	277	22	.077	23.6	C	27 ft
LT	12/1	.151	.143	6	215	33	.145	25.5	D+	42 ft

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

FUTURE YEAR 2015
WITH PROJECT

Maui Business Park Phase 1B
Future Year 2015 with Project AM Peak Hour Puunene/Access
WB 1LT, 1LT-TH, 1RT (NB/SB EB/WB Split Phasing)

12/14/98
16:36:57

SIGNAL94/TEAPAC[V1 L1.4] - Summary of Parameter Values

Intersection Parameters for Int # 1 -

METROAREA		CBD
LOSTTIME		3.0
LEVELOFSERVICE	C	S
NODELOCATION	0	0

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	.0	.0	.0	.0
PEDLEVELS	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	55	0	60	225	870	0	0	0	0	0	610	135
WIDTHS	12.0	.0	12.0	12.0	24.0	.0	.0	.0	.0	.0	24.0	12.0
LANES	1	0	1	1	2	0	0	0	0	0	2	1
UTILIZATIONS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	NO	YES	NO	NO	YES	NO	NO	YES	NO	NO	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
SATURATIONFLOWS	1425	0	1593	1425	3353	0	0	0	0	0	3353	1593

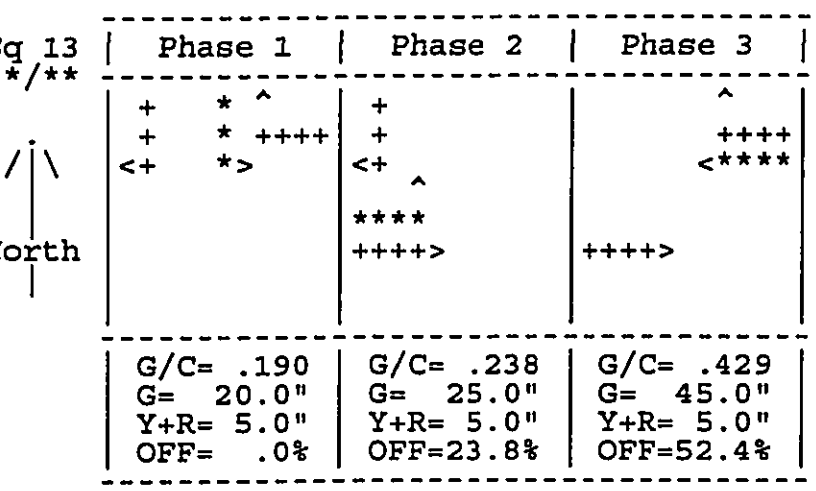
Phasing Parameters

SEQUENCES	13					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	.00 1
CYCLES	105	180	5		PEDTIME	.0 0
GREENTIMES	20.00	25.00	45.00			
YELLOWTIMES	5.00	5.00	5.00			
CRITICALS	3	12	5			
EXCESS	0					

Maui Business Park Phase 1B 12/14/98
Future Year 2015 with Project AM Peak Hour Puunene/Access 16:37:13
WB 1LT, 1LT-TH, 1RT (NB/SB EB/WB Split Phasing)

SIGNAL94/TEAPAC[V1 L1.4] - Capacity Analysis Summary

Intersection Averages for Int # 1 -
Degree of Saturation (v/c) .46 Vehicle Delay 10.8 Level of Service B



C=105 sec G= 90.0 sec = 85.7% Y=15.0 sec = 14.3% Ped= .0 sec = .0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	90% Max Queue
SB Approach								15.9	C+	
RT	12/1	.162	.495	629	706	61	.086	9.0	B+	45 ft
LT	12/1	.162	.210	175	329	67	.201	22.2	*C	78 ft
WB Approach								13.4	B	
RT	12/1	.266	.686	942	977	250	.256	4.1	A	116 ft
TH	24/2	.353	.448	1389	1501	1015	.676	15.7	*C+	414 ft
EB Approach								6.2	B+	
TH	24/2	.279	.733	2459	2459	712	.290	3.1	A	140 ft
LT	12/1	.197	.257	267	410	150	.366	20.9	*C	164 ft

Maui Business Park Phase 1B - WPUU15P2 12/14/98
Future Year 2015 with Project PM Peak Hour Puunene/Access 16:37:30
2 EB TH LANES

SIGNAL94/TEAPAC[V1 L1.4] - Summary of Parameter Values

Intersection Parameters for Int # 1 -

METROAREA	CBD	
LOSTTIME	3.0	
LEVELOFSERVICE	C	S
NODELOCATION	0	0

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	.0	.0	.0	.0
PEDLEVELS	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	320	0	355	190	605	0	0	0	0	0	745	110
WIDTHS	12.0	.0	12.0	12.0	24.0	.0	.0	.0	.0	.0	24.0	12.0
LANES	1	0	1	1	2	0	0	0	0	0	2	1
UTILIZATIONS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	NO	YES	NO	NO	YES	NO	NO	YES	NO	NO	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
SATURATIONFLOWS	1425	0	1593	1425	3353	0	0	0	0	0	3353	1593

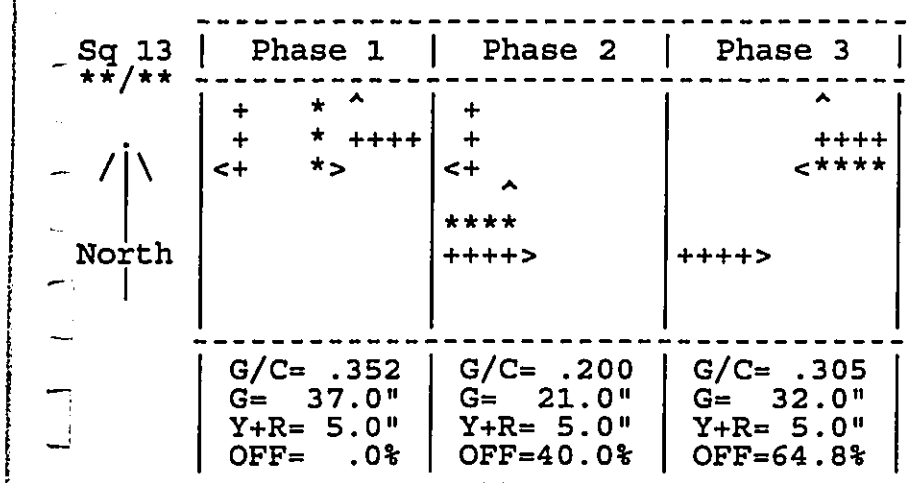
Phasing Parameters

SEQUENCES	13					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	.00 1
CYCLES	105	180	5		PEDTIME	.0 0
GREENTIMES	37.00	21.00	32.00			.
YELLOWTIMES	5.00	5.00	5.00			
CRITICALS	3	12	5			
EXCESS	0					

Maui Business Park Phase 1B - WPUU15P2 12/14/98
Future Year 2015 with Project PM Peak Hour Puunene/Access 16:37:49
2 EB TH LANES

SIGNAL94/TEAPAC[V1 L1.4] - Capacity Analysis Summary

Intersection Averages for Int # 1 -
Degree of Saturation (v/c) .51 Vehicle Delay 13.4 Level of Service B



C=105 sec G= 90.0 sec = 85.7% Y=15.0 sec = 14.3% Ped= .0 sec = .0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	LOS	90% Max Queue
SB Approach								13.6	B	
RT	12/1	.330	.619	832	882	356	.404	6.7	B+	200 ft
LT	12/1	.325	.371	481	592	394	.666	19.8	*C+	366 ft
WB Approach								16.6	C+	
RT	12/1	.243	.724	1004	1031	211	.205	3.1	A	86 ft
TH	24/2	.277	.324	899	1086	706	.650	20.6	*C	352 ft
EB Approach								10.3	B	
TH	24/2	.317	.571	1865	1916	869	.454	8.5	B+	275 ft
LT	12/1	.184	.219	194	345	122	.350	22.7	*C	141 ft

Maui Business Park Phase 1B - WPAP15AS 12/14/98
Future Year 2015 with Project AM Peak Hour Airport/Access 16:35:13
1 LT, 1 LT-TH, 1 RT (NB/SB EB/WB Split Phasing)

SIGNAL94/TEAPAC[V1 L1.4] - Summary of Parameter Values

Intersection Parameters for Int # 1 -

METROAREA		CBD
LOSTTIME		3.0
LEVELOFSERVICE	C	S
NODELOCATION	0	0

Approach Parameters

APPLABELS	SB	WB	NB	EB
GRADES	.0	.0	.0	.0
PEDLEVELS	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	200	0	200

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	125	825	90	25	15	65	315	770	430	110	60	30
WIDTHS	.0	24.0	12.0	12.0	12.0	12.0	12.0	24.0	24.0	12.0	12.0	12.0
LANES	0	2	1	1	1	1	1	2	2	1	1	1
UTILIZATIONS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	NO	YES	NO	NO	YES	NO	NO	YES	NO	NO	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	DOPT	NORM	NORM	NORM	NORM	NORM	NORM
SATURATIONFLOWS	0	3287	1593	1425	1625	1593	1425	3353	3185	1425	1676	1593

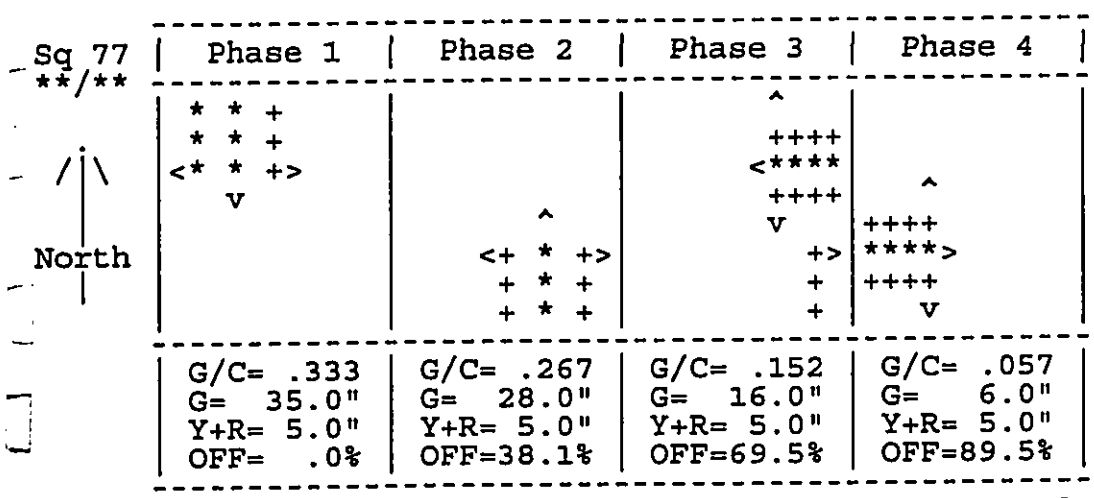
Phasing Parameters

SEQUENCES	77						
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	.00	1
CYCLES	105	180	5		PEDTIME	.0	0
GREENTIMES	35.00	28.00	16.00	6.00			
YELLOWTIMES	5.00	5.00	5.00	5.00			
CRITICALS	2	8	5	11			
EXCESS	0						

Maui Business Park Phase 1B - WPAP15AS 12/14/98
Future Year 2015 with Project AM Peak Hour Airport/Access 16:35:33
1 LT, 1 LT-TH, 1 RT (NB/SB EB/WB Split Phasing)

SIGNAL94/TEAPAC[V1 L1.4] - Capacity Analysis Summary

Intersection Averages for Int # 1 -
Degree of Saturation (v/c) .77 Vehicle Delay 29.1 Level of Service D+



C=105 sec G= 85.0 sec = 81.0% Y=20.0 sec = 19.0% Ped= .0 sec = .0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	90% Max Queue
SB Approach								32.6	D	
TH+RT	24/2	.382	.352	992	1158	1109	.958	34.2	*D	530 ft
LT	12/1	.175	.352	445	561	100	.178	15.2	C+	96 ft
NB Approach								26.8	D+	
RT	12/1	.327	.486	613	692	350	.506	12.4	B	266 ft
TH	24/2	.324	.286	742	958	899	.938	35.5	*D	474 ft
LT	24/2	.235	.286	700	910	492	.541	21.0	C	259 ft
WB Approach								24.0	C	
RT	12/1	.142	.171	82	233	1	.004	23.3	C	25 ft
TH	12/1-	.154	.171	95	269	46	.165	24.0	*C	56 ft
LT	12/1+	.154	.171	92	263	43	.158	24.0	C	53 ft
EB Approach								32.1	D+	
RT	12/1	.142	.076	1	93	1	.009	29.0	D+	25 ft
TH	12/1	.161	.076	1	112	67	.523	33.2	*D	91 ft
LT	12/1	.151	.076	1	105	33	.273	29.9	D+	45 ft

Maui Business Park Phase 1B - WPAP15PS 12/14/98
Future Year 2015 with Project PM Peak Hour Airport/Access 16:36:10
WB 1LT, 1LT-TH, 1RT (NB/SB EB/WB Split Phasing)

SIGNAL94/TEAPAC[V1 L1.4] - Summary of Parameter Values

Intersection Parameters for Int # 1 -

METROAREA		CBD
LOSTTIME		3.0
LEVELOFSERVICE	C	S
NODELOCATION	0	0

Approach Parameters

APPLABELS	SB	WB	NB	EB
GRADES	.0	.0	.0	.0
PEDLEVELS	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	300	0	300

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT*	TH	LT
VOLUMES	30	980	75	145	90	390	265	610	655	160	50	40
WIDTHS	.0	24.0	12.0	12.0	12.0	12.0	12.0	24.0	24.0	12.0	12.0	12.0
LANES	0	2	1	1	1	1	1	2	2	1	1	1
UTILIZATIONS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	DOPT	NORM	NORM	NORM	NORM	NORM	NORM
SATURATIONFLOWS	0	3338	1593	1425	1625	1593	1425	3353	3185	1425	1676	1593

* RTOR

Phasing Parameters

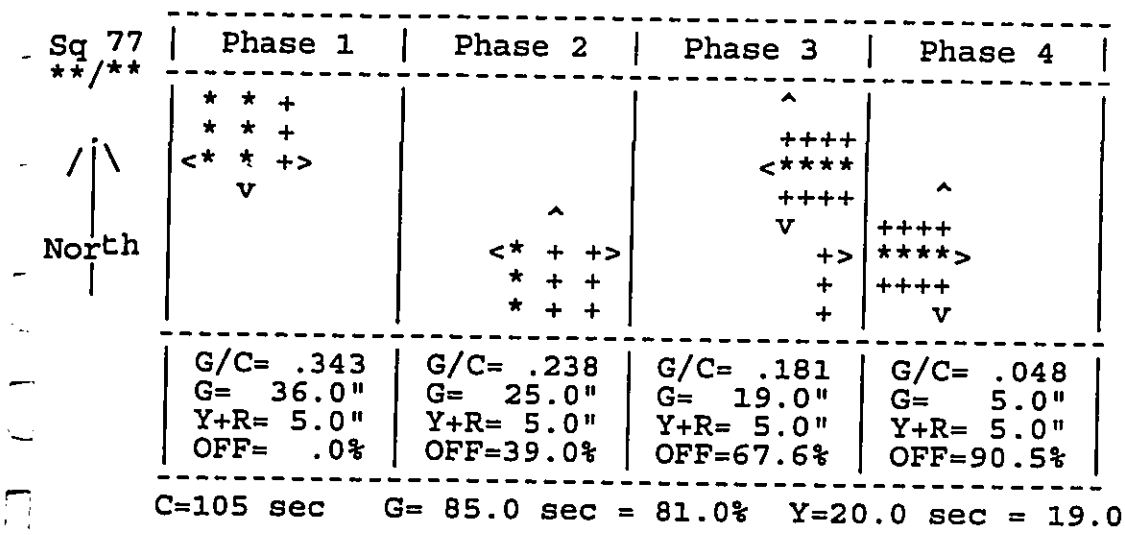
SEQUENCES	77						
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	.00	1
CYCLES	105	180	5		PEDTIME	.0	0
GREENTIMES	36.00	25.00	19.00	5.00			
YELLOWTIMES	5.00	5.00	5.00	5.00			
CRITICALS	2	9	5	11			
EXCESS	0						

Maui Business Park Phase 1B - WPAP15PS
Future Year 2015 with Project PM Peak Hour Airport/Access
WB 1LT, 1LT-TH, 1RT (NB/SB EB/WB Split Phasing)

12/14/98
16:36:32

SIGNAL94/TEAPAC[V1 L1.4] - Capacity Analysis Summary

Intersection Averages for Int # 1 -
Degree of Saturation (v/c) .83 Vehicle Delay 32.1 Level of Service D+



C=105 sec G= 85.0 sec = 81.0% Y=20.0 sec = 19.0% Ped= .0 sec = .0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	L S	90% Max Queue
SB Approach								35.0	D	
TH+RT	24/2	.395	.362	1047	1208	1178	.975	36.4	*D	555 ft
LT	12/1	.168	.362	462	576	83	.144	14.6	B	78 ft
NB Approach								28.5	D+	
RT	12/1	.293	.486	613	692	294	.425	11.6	B	223 ft
TH	24/2	.279	.257	620	862	712	.826	28.4	D+	390 ft
LT	24/2	.298	.257	586	819	750	.916	35.2	*D	411 ft
WB Approach								37.2	D	
RT	12/1	.142	.200	137	277	1	.004	21.7	C	25 ft
TH	12/1-	.258	.200	159	319	273	.840	38.1	*D	322 ft
LT	12/1+	.254	.200	156	312	260	.815	36.2	D	307 ft
EB Approach								32.7	D	
RT	12/1	.142	.067	1	79	1	.011	29.6	D+	25 ft
TH	12/1	.157	.067	1	96	56	.500	33.5	*D	77 ft
LT	12/1	.154	.067	1	90	44	.415	31.9	D+	61 ft

Appendix B-1

Amendments to Traffic Study Recommendations (December 13, 1999)

DEC 1 3 1999

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

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

#98-064.2

December 13, 1999

Mr. Robert Sasaki, President
A&B Properties, Inc.
P.O. Box 3440
Honolulu, Hawaii 96801-3440

Subject: Maui Business Park, Phase 1B
Interim Access Road to Dairy Road

This letter is to amend the recommendations contained in Austin, Tsutsumi and Associates, Inc.'s (ATA) *Traffic Study for the Proposed Maui Business Park Phase 1B Access on Proposed Kahului Airport Access Road,* dated December 18, 1998.

As a result of further study and discussions with the State Department of Transportation Highways Division, Traffic Branch, two changes to the recommendations contained in the above-referenced report are proposed:

1. The intersection of the proposed Interim Access Road from Maui Business Park, Phase 1B to dairy Road be relocated approximately 400 feet south of Hukilike Street intersection, without significantly impacting the left-turn storage lane on Dairy Road at the Hukilike Street intersection. This can be accomplished by widening Dairy Road between Hukilike Street and a point approximately 360 feet south of Hukilike Street to continue the two (2) southbound through lanes on Dairy Road.

2. A traffic signal system be installed at this intersection. Based upon recent development information from A&B, the vehicular trips generated by the Maui Business park, Phase 1B would meet the traffic signal warrants as contained in the Manual on Uniform Traffic Control Devices for Streets and Highways.* A pole and span-wire system is proposed for the traffic signal system because of the temporary nature of the road system.

The proposed location of the Dairy Road/Interim Access Road intersection and its associated traffic signal system will have the following effects:

1. Reduces the length of the Interim Access Road by having a straight alignment from Maui Business Park to Dairy Road. This will also facilitate the implementation of traffic detouring operations during the construction of the Kahului Airport Access Road.

2. Increases the distance between the proposed intersection and the high volume Puunene Avenue/Kuihelani Highway/Dairy Road intersection.

*Letter report prepared by Traffic Management Consultants for Home Depot, dated July 16, 1999.

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

OFFICES IN:
HONOLULU, HAWAII
WAILUKU, MAUI, HAWAII

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

Mr. Robert Sasaki, President
A&B Properties, Inc.

December 13, 1999

3. Improves traffic safety for ingress and egress at the Dairy Road/Interim Access Road intersection.

Should you require clarifications on the above-recommended changes to the location of the Dairy Road/Interim Access Road and for the installation of a traffic signal system at the intersection, please do not hesitate to call me.

Very truly yours,

AUSTIN, TSUTSUMI & ASSOCIATES, INC.

By Ted S. Kawahigashi
TED S. KAWAHIGASHI, P.E., FACEC
President

TSK:meb

cc: Munekiyo, Arakawa & Hiraga, Inc.
Dept. of Transportation - Traffic Branch
Dept. of Transportation - Planning Branch

Z:\home\everyone\1998\98-064.2\BobSlntanmRd.doc

Appendix C

Drainage and Erosion Control Report

DRAINAGE AND EROSION CONTROL REPORT

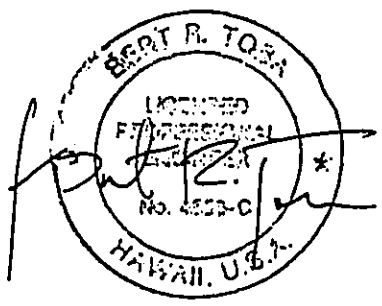
FOR

KAHULUI INDUSTRIAL PARK, PHASE 1B

AT

KAHULUI, MAUI, HAWAII

TMK: 3-8-06: 4 (POR.)
LUCA FILE #3.1612



PREPARED FOR:

A & B PROPERTIES, INC.

PREPARED BY:

SATO & ASSOCIATES, INC.
CONSULTING ENGINEERS
2115 WELLS STREET
WAILUKU, MAUI, HAWAII 96793

SEPTEMBER 1999
REVISED DECEMBER 1999

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V. DEVELOPED STORM RUNOFF CONDITIONS

VI. SOIL EROSION CONTROL

VII. CONCLUSION

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APPENDIX B - HYDROLOGIC AND HYDRAULIC CALCULATIONS DEVELOPED CONDITIONS

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X. EXHIBITS

1. PROJECT LOCATION
2. SITE LOCATION MAP
3. OFF-SITE DRAINAGE CONDITIONS
4. FLOOD INSURANCE MAP
5. SITE DRAINAGE PLAN

I. PROJECT LOCATION

The project site is located in Kahului on the Island of Maui. The proposed subdivision abuts the south side of the proposed Airport Access Road, approximately 1,200 feet east of the Kuihelani Highway and Puunene Avenue Intersection, refer to Exhibits 1 and 2. The site can further be identified by Tax Map Key No. 3-8-06: Portion 4.

II. PROJECT DESCRIPTION

Kahului Industrial Park, Phase 1B will consist of twelve (12) industrial lots, refer to Exhibit 5. Lots will range in size from 17,990 square feet to 12.5 acres and will be in accordance with light industrial zoning. Other improvements will include paved roadways, underground utilities, and roadside landscaping.

III. FLOOD HAZARD

According to the Flood Insurance Rate Map (FIRM), for the County of Maui, the project is located on land designated as Zone "C". Zone "C" designates areas of minimal flooding, (Reference 3 and Exhibit 4).

IV. EXISTING STORM RUNOFF CONDITIONS

A. Runoff From Off-Site Lands

Runoff from Lot 1-A (First Assembly of God) located west of the project does not enter the site. Surface runoff from Lot 1-A is being retained on the north corner of its site. The runoff from Lot 2-C-1C which is located southeast of the project will not enter the project site because Hookele Street will be constructed higher than existing conditions. Instead, the runoff is directed to the cane field area south of Hookele Street via various existing ditches. The runoff then ponds and eventually percolates into the ground. The ditches were contructed by the HC&S plantation.

B. **Runoff From The Project Site**

Presently the subdivision site is fallow agricultural land. Elevations on the site range from approximately 20 to 44 feet above main sea level with an average slope through the project of 1.0 percent. Under these conditions, the site produces runoff at a rate of 26.72 cfs.

Surface runoff from the site flows in a north easterly direction and ponds behind the existing Maui Business Park where it eventually percolates into the ground.

V. DEVELOPED STORM RUNOFF CONDITIONS

Based on a 1-hour, 50-year storm, the project once completed will produce runoff at a rate of 167.94 cfs. The 141.22 cfs increase is due to the project's various improvements as shown in Exhibit 3.

Concrete catch basins will be used to collect storm runoff from the new subdivision. The runoff will then be piped to two(2) existing retention basins, see Exhibit 3 & 5. The basins which were constructed during the construction of the Maui Business Park were designed by Norman Saito Engineering Consultants, Inc. Refer to their Off-Site Drainage Master Plan for Phase 1 of the Kahului Industrial Park Development.

VI. SOIL EROSION CONTROL

According to the U.S. Department of Agriculture (Reference 5), soil within the project site is classified as Pulehu Clay 0 to 3 percent slopes (PsA) and EWA Silty Clay Loam, 0 to 3 percent slopes (EaA).

Calculations show that grading of the entire site will result in a total soil loss during construction of 10 tons/acre/year with a severity number of 5,520. The allowable erosion rate is 91 tons/acre/year and present standards allow for a maximum severity number of 50,000. Therefore, normal erosion control measures implemented during construction should be adequate to control soil

normal erosion control measures implemented during construction should be adequate to control soil loss from the project site. The contractor shall also implement all of measures called for in the erosion control plans shown in the project's construction plans.

Estimated soil loss was calculated using the universal soil loss equation in accordance with the County of Maui's Grading Ordinance.

VII. *CONCLUSION*

Development of Phase 1B of the Kahului Industrial Park for A & B Properties, Inc., is not expected to cause any adverse effects to adjacent developments. Storm runoff from the site will be collected and routed to retention basins. Finally, soil loss during construction is below the County's allowable rate therefore erosion during construction is not expected to be a problem.

VIII. REFERENCE

1. R.M. Towill Corporation, "Drainage Master Plan for the County of Maui", Honolulu, Hawaii, October 1971.

2. U.S. Department of Agriculture, Soil Conservation Service, "Erosion and Sediment Control Guide for Hawaii", Honolulu, Hawaii, March 1981.

3. Federal Emergency Management Agency, Federal Insurance Administration, "Flood Insurance Rate Map", Maui County, Hawaii, effective date: June 1, 1981.

4. U.S. Weather Bureau, "Rainfall Frequency Atlas of the Hawaiian Islands for Areas to 200 Square Miles, Durations to 24 Hours, and Return Periods for 1 to 100 Years", Technical Paper No. 43, Washington, D.C., 1962.

5. U.S. Department of Agriculture, Soil Conservation Service, "Soil Survey of Island of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii", Washington, D.C., August 1972.

6. Department of Public Works, City and County of Honolulu, Division of Engineering, "Storm Drainage Standards", March 1986.

7. U.S. Department of Transportation, "Urban Drainage Design Participant Notebook". Publication No. FHWA H1-89-035, Revised July 1993.

8. R.M. Towill Corporation, "Engineering Design Report for Kahului Flood Control Study (Kahana Pond)", March 1973.

IX. APPENDICES

A - HYDROLOGIC CALCULATIONS - EXISTING CONDITIONS

B - HYDROLOGIC AND HYDRAULIC CALCULATIONS - DEVELOPED CONDITIONS

C - EROSION CONTROL CALCULATIONS

APPENDIX A

HYDROLOGIC CALCULATIONS - EXISTING CONDITIONS

Hydrologic calculations for existing on-site runoff were done using the Rational Method. Factors used in the calculations were taken from the County of Maui's Drainage Master Plan.

The following factors were used:

A. Recurrence Interval:
   10-Year, 1-Hour Storm I=2.0" (Plate III)
   50-Year, 1-Hour Storm I=2.5" (Plate III)

B. Time of Concentration:
   Tc - Determined from Plate 3

C. Rainfall Intensity:
   i - Determined from Plate 4

D. Runoff Coefficient:
   c - Determined from Table 1, as follows:

Infiltration	0.07	(Medium)
Relief	0.00	(Flat)
Vegetal Cover	0.00	(High)
Dev. Type	0.15	(Agriculture)
c =	0.22	

Existing runoff conditions and quantities are shown in Appendix B under Runoff Summary.

APPENDIX B

HYDROLOGIC AND HYDRAULIC CALCULATIONS DEVELOPED CONDITIONS

Hydrologic calculations for developed on-site runoff were done using the Rational Method. Factors used in the calculations were taken from the County of Maui's Drainage Master Plan

The following factors were used:

A. Recurrence Interval:
   i) 10-Year, 1-Hour Storm I=2.0" (Plate III)
   ii) 50-Year, 1-Hour Storm I=2.5" (Plate III)

B. Time of Concentration:
   Tc - Determined from Plate 3

C. Rainfall Intensity:
   i - Determined from Plate 4

D. Runoff Coefficient:
   c - Determined from Table 1, as follows:

   i) Lots & Roadway

Infiltration	0.14 (Slow)
Relief	0.00 (Flat)
Vegetal Cover	0.05 (Poor)
Dev. Type	0.55 (Industrial)
c =	0.74

   ii) Roadway

Infiltration	0.20 (Negligible)
Relief	0.00 (Flat)
Vegetal Cover	0.07 (None)
Dev. Type	0.55 (Industrial)
c =	0.82

Developed runoff conditions and quantities are shown in the Runoff Summary Chart.

RUNOFF SUMMARY

Project: Kahului Industrial Park Phase IB (Revised) Project No.: M9902-01 Date: 7/22/99

Prepared By: D Miyamoto Sheet 1 of 1 Sheets

Area No.	Area (Acres)	Tm 10 Yr.	Tm 50 Yr.	Tc (Mins)	C	1-Hr Rainfall 10 Yr.	1-Hr Rainfall 50 Yr.	Conver. Factor	Intensity (In./Hr.) 10 Yr.	Intensity (In./Hr.) 50 Yr.	Q (c,f,s,) 10 Yr.	Q (c,f,s,) 50 Yr.	To Struct. No.
EXISTING	ON-SITE	CONDITION											
	36.80	X	X	35	0.22	2.0	2.5		2.75	3.30	22.26	26.72	

RUNOFF SUMMARY

Project: Kahului Industrial Park Phase IB (Revised) Project No.: M9902-01 Date: 7/22/99

Prepared By: D. Miyasato Sheet 1 of 2 Sheets

Area No.	Area (Acres)	Tm 10 Yr.	Tm 50 Yr.	Tc (Mins)	C	1-Hr Rainfall 10 Yr.	1-Hr Rainfall 50 Yr.	Conver. Factor	Intensity (In./Hr.) 10 Yr.	Intensity (In./Hr.) 50 Yr.	Q (c,f,s,) 10 Yr.	Q (c,f,s,) 50 Yr.	To Struct. No.
DEVELOPED		ONSITE		CONDITION									
1	1.02	X	X	7.3	0.75	2.0	2.5						
2	0.35			8	0.80				4.65	5.8	3.56	4.44	CB B/A-1
3	0.87			7.1	0.75				4.5	5.6	1.26	1.57	CB B/A-3
4	0.83			7.1	0.75				4.7	5.85	3.07	3.82	CB B/A-2
5	0.33			8.1	0.80				4.7	5.85	2.92	3.64	CB B/A-4
6	1.02			7.3	0.75				4.5	5.6	1.19	1.48	CB B/A-6
7	1.05			7.3	0.75				4.65	5.8	3.56	4.44	CB B/A-5
8	1.04			7.3	0.75				4.65	5.8	3.66	4.57	CB B/A-8
9	0.28			7.8	0.80				4.65	5.8	3.63	4.52	CB B/A-10
10	0.20			7.6	0.80				4.55	5.65	1.02	1.26	CB B/A-9
11A	0.76			7.0	0.75				4.6	5.75	0.74	0.92	CB B/A-13
11B	0.52			5.0	0.80				4.7	5.85	2.68	3.33	CB B/A-12
12	0.69			6.0	0.75				5.15	6.4	2.14	2.66	CB B/A-18
13	4.12			10.0	0.75				4.9	6.1	2.53	3.16	CB B/A-16
14	0.85			7.1	0.75				4.2	5.2	12.98	16.07	CB B/A-17
15	5.13			10.0	0.75				4.7	5.85	3.00	3.73	CB B/A-17
16	0.22			7.6	0.80				4.2	5.2	16.16	20.01	SDMH B/B-3
17	1.10			7.3	0.75				4.6	5.75	0.81	1.01	CB B/B-2
18	0.17			7.5	0.80				4.65	5.8	3.84	4.78	CB B/B-1
19	0.69			6.0	0.75				4.65	5.8	0.63	0.79	CB B/B-4
20	3.06			9.3	0.75				4.9	6.1	2.53	3.16	CB B/B-5
21	0.18			7.5	0.80				4.3	5.3	9.87	12.16	CB B/B-6
22	0.81	↓	↓	7.1	0.75	↓	↓		4.65	5.8	0.67	0.83	CB B/B-6
									4.7	5.85	2.85	3.55	CB B/B-7

RUNOFF SUMMARY

Project: Kahului Industrial Park Phase 1B (Revised) Project No.: M9902-01 Date: 7/22/99

Prepared By: D. Miyasato Sheet 2 of 2 Sheets

Area No.	Area (Acres)	Tm		Tc (Mins)	C	1-Hr Rainfall		Conver. Factor	Intensity (In./Hr.)		Q (c,f,s,)		To Struct. No.
		10 Yr.	50 Yr.			10 Yr.	50 Yr.		10 Yr.	50 Yr.	10 Yr.	50 Yr.	
23	7.90			7.3	0.75	2.0	2.5		4.65	5.8	27.55	34.37	SDMH B/B-10
24	6.36			7.3	0.75	2.0	2.5		4.65	5.8	22.18	27.67	SDMH B/A-15

HYDRAULIC GRADIENT CALCULATIONS

Project: Kahului Industrial Park, Ph. 1B-R Project No.: M9902-01 Date: 8/9/99

Drainline: A By: Sht. 1 Of 5 Shts.

Structure No.	Size Pipe	Q TOTAL	Slope	Length	V FULL	INV.	DN	SF	HF	Down-Stream Elev.	Manhole losses A	B	C	D	Ent. Cont.	Up-Stream Elev.	Elev. Top Pipe	Control'g Elev.	Qinc
OUTLET						17.00										20.5	20.5		
	42	87.28	.0035	284	9.07		FULL	.007	1.99										
SDMH B/A-15						18.00				22.49	.24	1.39-.60 0.69	.24x2 .48	.13	~~5.08~~	24.03		25.5	27.67
	42	59.61	.004	210	6.20		FULL	.003	0.63										
SDMH B/A-14						18.84				24.66	.11	—	.11x.67 .07	—	~~3.71~~	24.84		27.0	
	42	59.61	.004	246	6.20		FULL	.003	0.75										
CB B/A-13						19.82		.		25.59	.11	.60-.40 .20	.11x2 .22	.13	~~3.71~~	26.25		29.5	25.62 0.92
	36	33.07	.0079	86	4.68		FULL	.003	0.25										
SDMH B/A-11						20.50				26.50	.07	.40-.27 .13	.07x.67 .05	.04	~~2.85~~	26.79		30.3	3.33
	36	29.74	.008	193	4.21		FULL	.002	0.39										
CB B/A-9						22.04 22.54				27.18	.07	0	.07x.67 .05	.05	~~2.58~~	27.35		32.0	1.26 4.52
	30	23.96	.008	235	4.88		FULL	.0035	0.82										
SDMH B/A-7						24.42				28.17	.14	.37-.25 .12	.07x.67 .05	.04	~~2.53~~	28.52		33.8	4.57
	30	19.39	.008	172	3.95		FULL	.002	0.34										
CB B/A-6						25.80				28.86	.09	.25-.20 .05	.04x1 .04	.01	~~2.23~~	29.05		35.2	1.48
	30	17.91	.010	85	3.65		FULL	.002	0.17										
CB B/A-5						26.65 27.15				29.22	.11	0	.05x1 .05	.03	~~2.10~~	29.41		35.7	4.44
	24	13.47	.010	238	4.29		1.1	—	—										
CB B/A-4						29.53				30.63	~~.11~~	~~.29-.15 .14~~	.05x.67 .03	.02	1.97	31.55		38.0	3.64
	24	9.83	.010	175	3.13		0.95	—	—										
CB B/A-2						31.28				32.23	~~.05~~	~~.15-.03 .12~~	.01x2 .02	0	1.63	32.93		39.7	3.82 1.57
	24	4.44	.010	200	1.41		0.60	—	—										
CB B/A-1						33.28				33.88	~~.01~~	~~.03-0 .03~~	0	0	1.04	34.32		41.7	4.44

HYDRAULIC GRADIENT CALCULATIONS

Project: Kahului Industrial Park, Ph. 1B-R Project No.: M9902-01 Date: 8/12/99

Drainline: A By: Sht. 2 Of 5 Shts.

Structure No.	Size Pipe	Q TOTAL	Slope	Length	V FULL	INV.	DN	SF	HF	Down-Stream Elev.	Manhole losses A	B	C	D	Ent. Cont.	Up-Stream Elev.	Elev. Top Pipe	Control'g Elev.	Qinc
CB B/A-13						19.84 21.00										26.25		29.5	0.92
	30	25.62	.0157	79	5.22		FULL	.003	0.29										
CB B/A-16						22.49				26.54	.15	.42-.25 .17	.08+2 .16	.07	~~2.44~~	27.09		30.5	2.66 3.16
	30	19.80	.0157	176	4.03		FULL	.0025	0.40										
CB B/A-17						25.00				27.49	.09	.25-0 .25	.04+2 .08	—	~~2.23~~	27.91		34.0	16.07 3.73
SDMH B/A-11						20.50 21.50										26.79		30.3	
	24	3.33	.010	50	1.06		FULL	.0007	0.04										
CB B/A-12						22.00				26.83	.01	.02-0 .02	—	—	~~0.80~~	26.86		30.3	3.33
CB B/A-9						22.04 23.04										27.35		32.0	1.26
	24	4.52	.010	50	1.44		FULL	.0004	0.02										
CB B/A-10						23.54				27.37	.01	.03-0 .03	—	—	~~0.80~~	27.41		32.0	4.52
SDMH B/A-7						24.42 24.92										28.52		33.8	
	24	4.57	.010	50	1.46		FULL	.0004	0.02										
CB B/A-8						25.42				28.54	.01	.03-0 .03	—	—	~~0.80~~	28.58		33.8	4.57

HYDRAULIC GRADIENT CALCULATIONS

Project: Kahului Industrial Park, Ph. 1B-R Project No.: M9902-01 Date: 8/12/99

Drainline: A By: Sht. 3 Of 5 Shts.

Structure No.	Size Pipe	Q TOTAL	Slope	Length	V FULL	INV.	DN	SF	HF	Down-Stream Elev.	Manhole losses A	B	C	D	Ent. Cont.	Up-Stream Elev.	Elev. Top Pipe	Control'g Elev.	Qinc
CB 5/A-2						31.28		.								32.93		39.7	3.82
	24	1.57	.010	50	0.50		FULL	.0001	0.01										
CB 2/A-3						31.78				32.93	—	.01	—	—	—	32.94		39.7	1.57
CB B/A-16						22.24										27.09		30.0	
	18	2.66	.010	58	1.50		FULL	.0006	0.03										
CB 1/A-18						22.82				27.12	.01	.03-0 .03	—	—	~~0.84~~	27.25		30.0	2.66

HYDRAULIC GRADIENT CALCULATIONS

Project: Kahului Industrial Park, Ph. 1B-2 Project No.: M9902-01 Date: 8/12/99

Drainline: B By: Sht. 4 Of 5 Shts.

Structure No.	Size Pipe	Q TOTAL	Slope	Length	V FULL	INV.	DN	SF	HF	Down-Stream Elev.	Manhole losses A	B	C	D	Ent. Cont.	Up-Stream Elev.	Elev. Top Pipe	Control'g Elev.	Qinc
OUTLET						6.45										14.4	10.45		
	48	80.66	.002	128	6.42		FULL	.003	0.38										
SDMH B/B-12						6.70 11.47				14.78	.11	0	.11x2 .22	0	~~4.12~~	15.11		20.0	
	48	80.66	.0045	340	6.42		2.7	—	—										
SDMH B/B-11						13.00				15.70	~~.11~~	~~0~~	.11x2 .22	0	4.12	17.34		20.2	
	48	80.66	.0045	500	6.42		2.7	—	—										
SDMH B/B-10						15.25				17.95	~~.11~~	~~0~~	.11x.67 .07	.28	4.12	19.72		25.0	34.37
	36	46.29	.0045	300	6.55		FULL	.003	0.90										
SDMH B/B-9						16.60				20.62	.12	0	.12x.67 .08	0	~~3.43~~	20.82		26.5	
	36	46.29	.0206	215	6.55		1.5	—	—										
SDMH B/B-8						21.03				22.53	~~.12~~	~~0~~	.12x2 .24	0	3.43	24.70		31.0	
	36	46.29	.008	53	6.55		FULL	.003	0.16										
CB B/B-6						21.45				24.86	.12	.68-.27 .41	.12x2 .24	.06	~~3.43~~	25.69		31.4	3.55 12.99
	36	29.75	.008	198	4.21		FULL	.002	0.40										
CB B/B-4						23.04				26.09	.05	.27-.20 .07	.05x2 .10	.01	~~2.58~~	26.32		33.0	3.16 0.79
	36	25.80	.008	148	3.65		FULL	.0015	0.22										
SDMH B/B-3						24.22 25.22				26.54	.03	.21-.05 .16	.03x2 .06	.10	~~2.34~~	26.89		34.1	20.01
	24	5.79	.008	35	1.84		FULL	.0006	0.02										
CB B/B-2						25.50				26.91	.02	.05-.03 .02	—	—	~~1.18~~	26.95		34.3	1.01
	24	4.78	.010	50	1.52		FULL	.0004	0.02										
CB B/B-1						26.00				26.97	~~.01~~	~~.03~~	—	—	1.06	27.06		34.3	4.78

HYDRAULIC GRADIENT CALCULATIONS

Project: Kahului Industrial Park, Ph IB-12 Project No.: M9902 Date: 8/12/99

Drainline: B By: Sht. 5 Of 5 Shts.

Structure No.	Size Pipe	Q TOTAL	Slope	Length	V FULL	INV.	DN	SF	HF	Down-Stream Elev.	Manhole losses A	B	C	D	Ent. Cont.	Up-Stream Elev.	Elev. Top Pipe	Control'g Elev.	Qinc
CB B/B-6						21.45 22.45										25.69		31.4	12.16 0.83
	24	3.55	.010	50	1.13		FULL	.00025	0.01										
CB B/B-7						22.95				25.70	—	.02	—	—	~~1.04~~	25.72		31.4	3.55
CB B/B-4						23.04 24.04										26.32		33.0	0.79
	24	3.16	.010	50	1.01		FULL	.00015	0.01										
CB B/B-5						24.54				26.33	—	.02	—	—	~~0.93~~	26.35		33.0	3.16

APPENDIX C

EROSION CONTROL CALCULATIONS

A. SITE CONDITIONS

According to the "Soil Survey of Island of Kauai, Oahu, Maui, Molokai and Lanai", State of Hawaii, August 1972, soils within the project site are classified as Pulehu Clay Loam, 0 to 3 percent slopes (PsA) and Ewa Silty Clay Loam, 0 to 3 percent slopes (EaA). Characteristics of these soils are:

1. PsA - Moderate permeability. Slow runoff with erosion hazzard no more than slight.

2. EaA - Runoff for this type of soil is very slow and the erosion hazard is no more than slight.

B. ESTIMATED SOIL LOSS

The equation used for estimating soil loss, as set forth by the County of Maui's Grading Ordinance is as follows:

$$E = R\ K\ Ls\ C\ P$$

Where:

E = Soil Loss in Tons/Acre/Year
R = Rainfall Factor = 180 Tons/Acre/Year
K = Soil Erodibility Factor = 0.17
(Both Soil Types)
Ls = Topographic Factor = 0.34
Slope Length (L) = 2,500
Average Slope (S) = 1.0%
C = Cover Factor = 1.0 (Bare Soil)
P = Erosion Control Practice Factor 1.0
(For Non-Agricultural Lands)
E = 180 x 0.17 x 0.34 x 1 x 1 =
10 Tons/Acre/Year

C. ALLOWABLE SOIL LOSS

Coastal Water Hazard (D) = 1 (Class "B" Water)
Downstream Hazard (F) = 4
Time Duration of Project (T) = 1 1/2 Years
Maximum Allowable Construction Area x Erosion Rate = 3,333 Tons/Acre
Area of Disturbance (A) = 36.8 Acres
Maximum Allowable Erosion Rate = 3,333/36.8 = 91 Tons/Acre/Year

D. SEVERITY RATING

ALLOWABLE RATING = 50,000

CALCULATED SEVERITY RATING (H) = (2FT + 3D)AE

WHERE:

Downstream Hazard (F) = 4
Time Duration of Project (T) = 1 1/2 Year
Potential Sediment Damage (D) = 1 (Class "B" Water)
Area of Disturbance (A) = 36.8
Annual Soil Loss (E) = 10 Tons/Acre/Year

H = (2 x 4 x 1 1/2 + 3 x 1) (36.8) (10) =
5,520 < 50,000 allowable rating

E. EROSION CONTROL MEASURES

The following procedures should be implemented during construction of the project.

1. Leave natural vegetation undisturbed in areas not needed for immediate construction.

2. Use waterwagons and/or sprinklers to control dust.

3. Water down graded areas after construction activity has ceased for the day and during weekend and holidays.

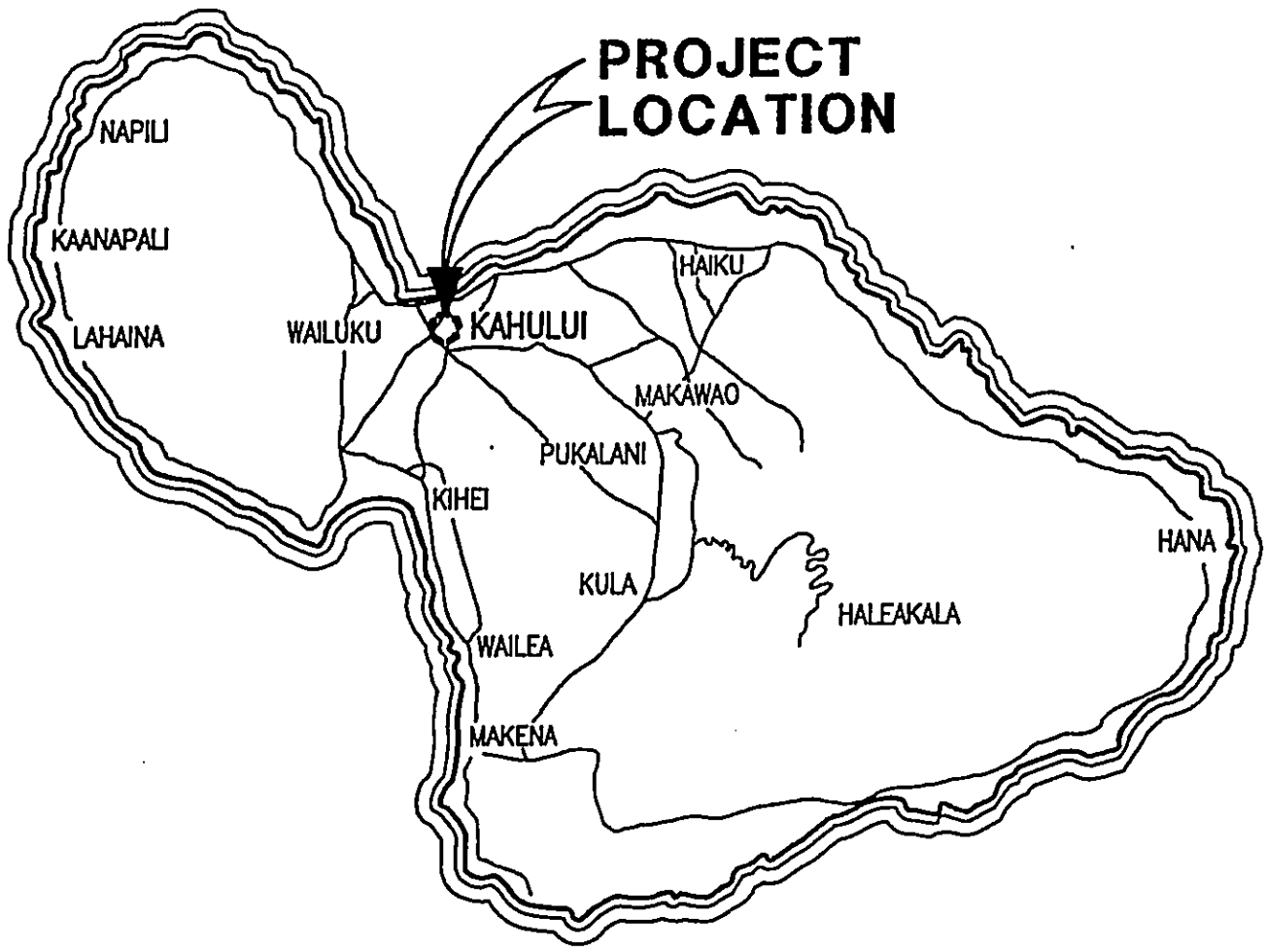
4. Construct drainage improvements as soon as possible.

5. Grass or landscape exposed areas immediately after grading work is finished.

6. Implement erosion control measures shown on the construction plans.

X. EXHIBITS

1 - PROJECT LOCATION
2 - SITE LOCATION MAP
3 - OFF-SITE DRAINAGE CONDITIONS
4 - FLOOD INSURANCE MAP
5 - SITE DRAINAGE PLAN



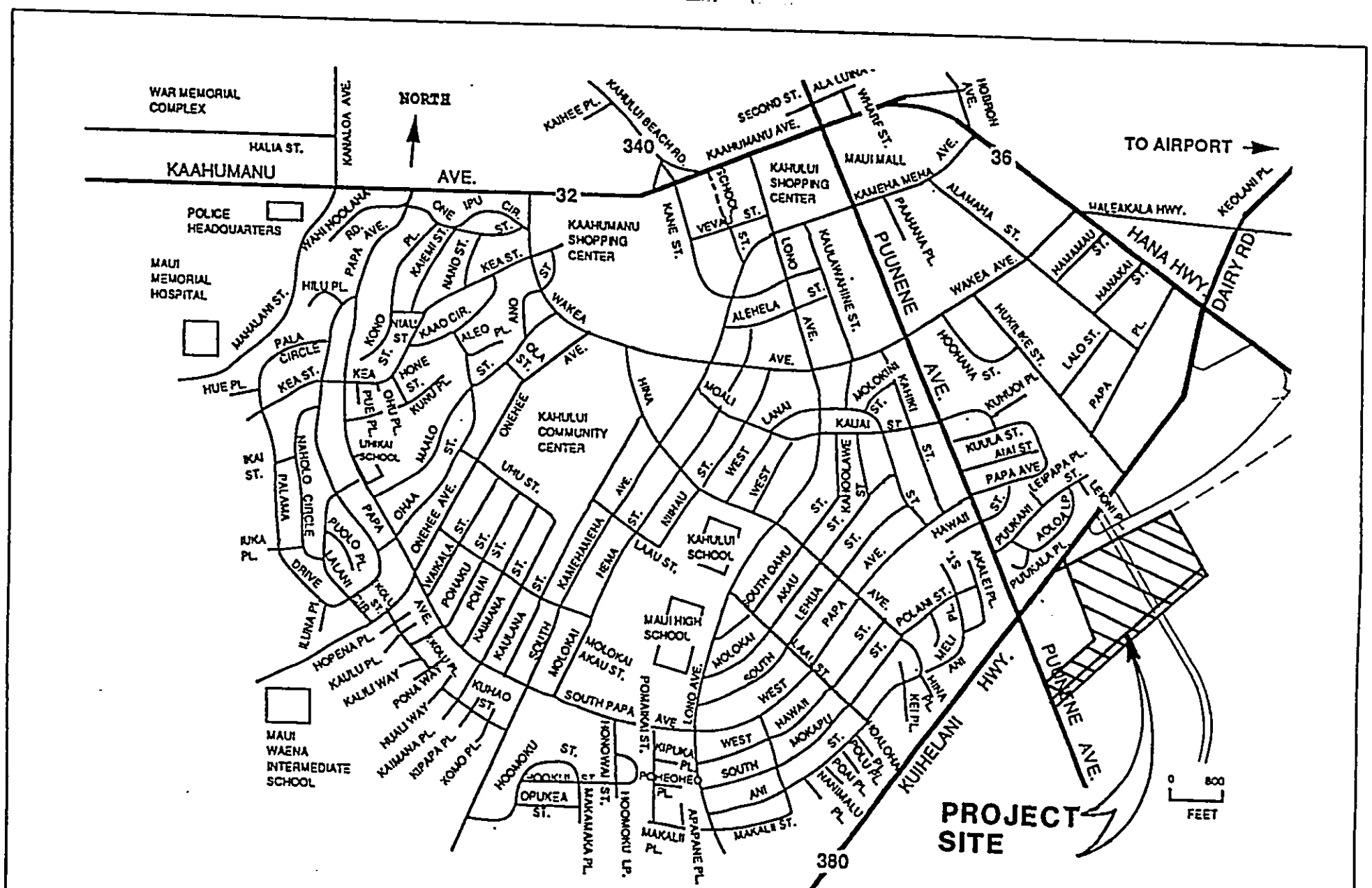
NORTH

ISLAND OF MAUI

N.T.S.

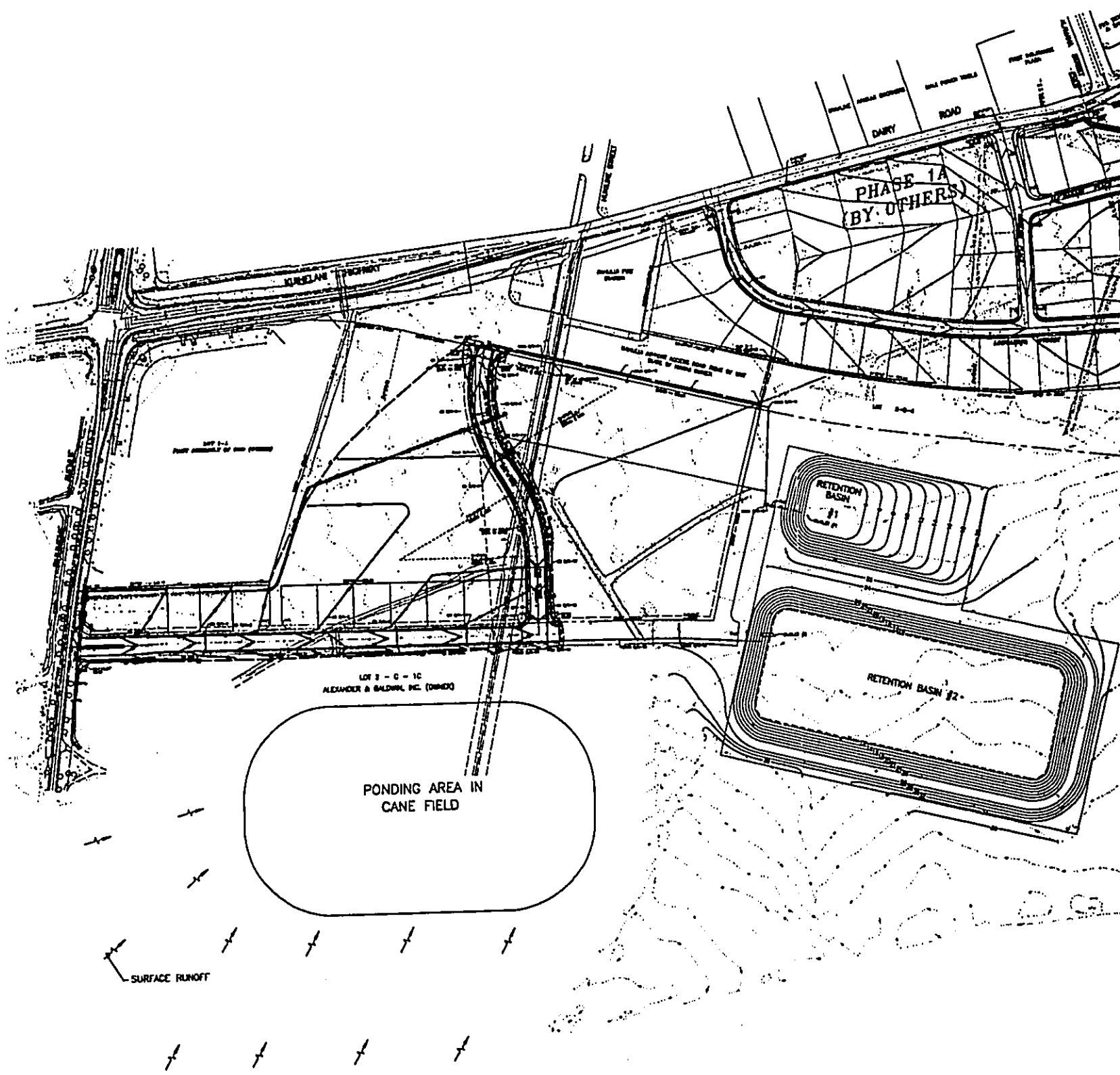
EXHIBIT 1

PROJECT LOCATION MAP



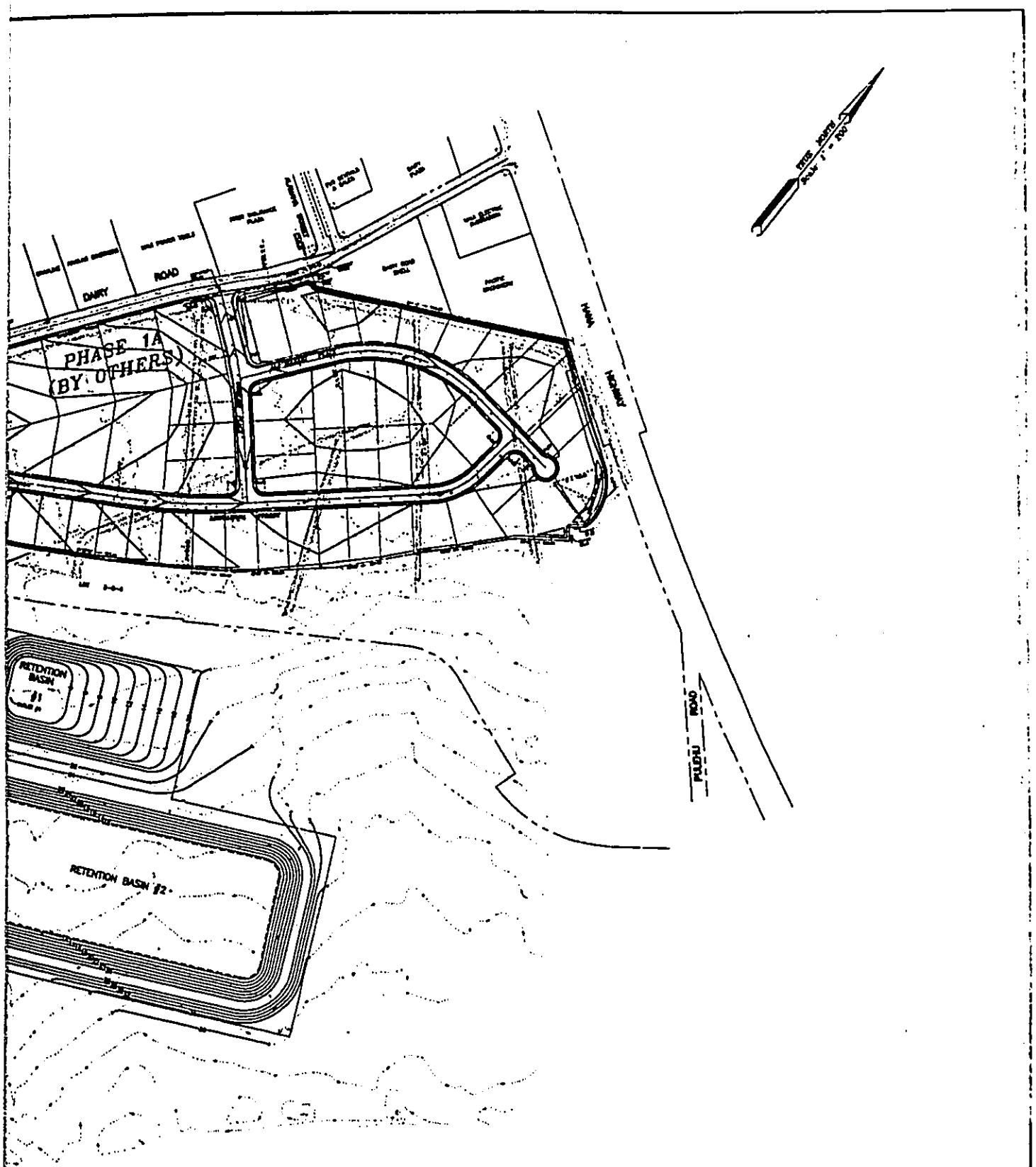
LOCATION MAP
NTS

EXHIBIT 2
SITE LOCATION MAP



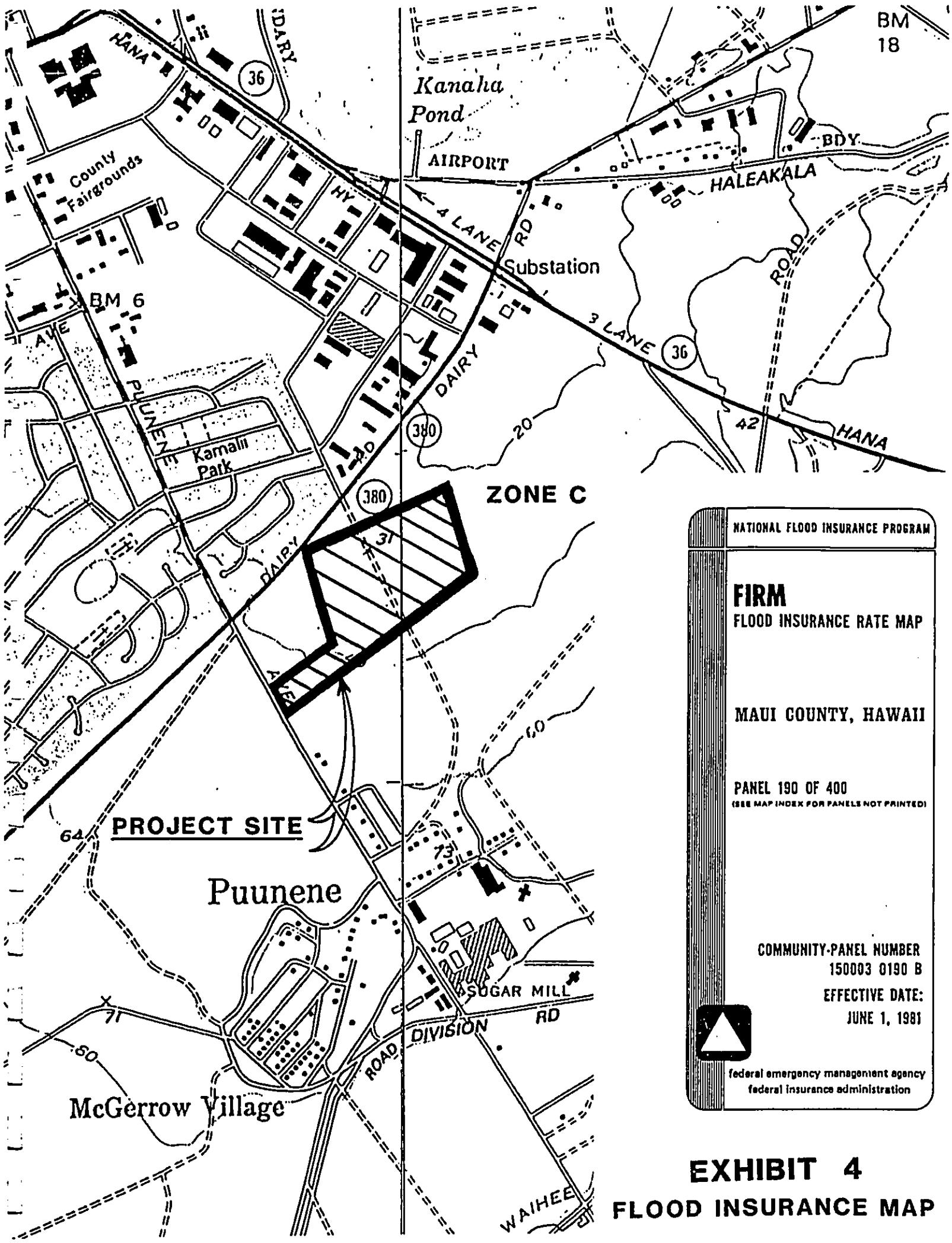
OFFSITE DRAINAGE CONDITIONS

SCALE: 1"=200'



NDITIONS

EXHIBIT 3
OFFSITE DRAINAGE CONDITIONS



NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MAUI COUNTY, HAWAII

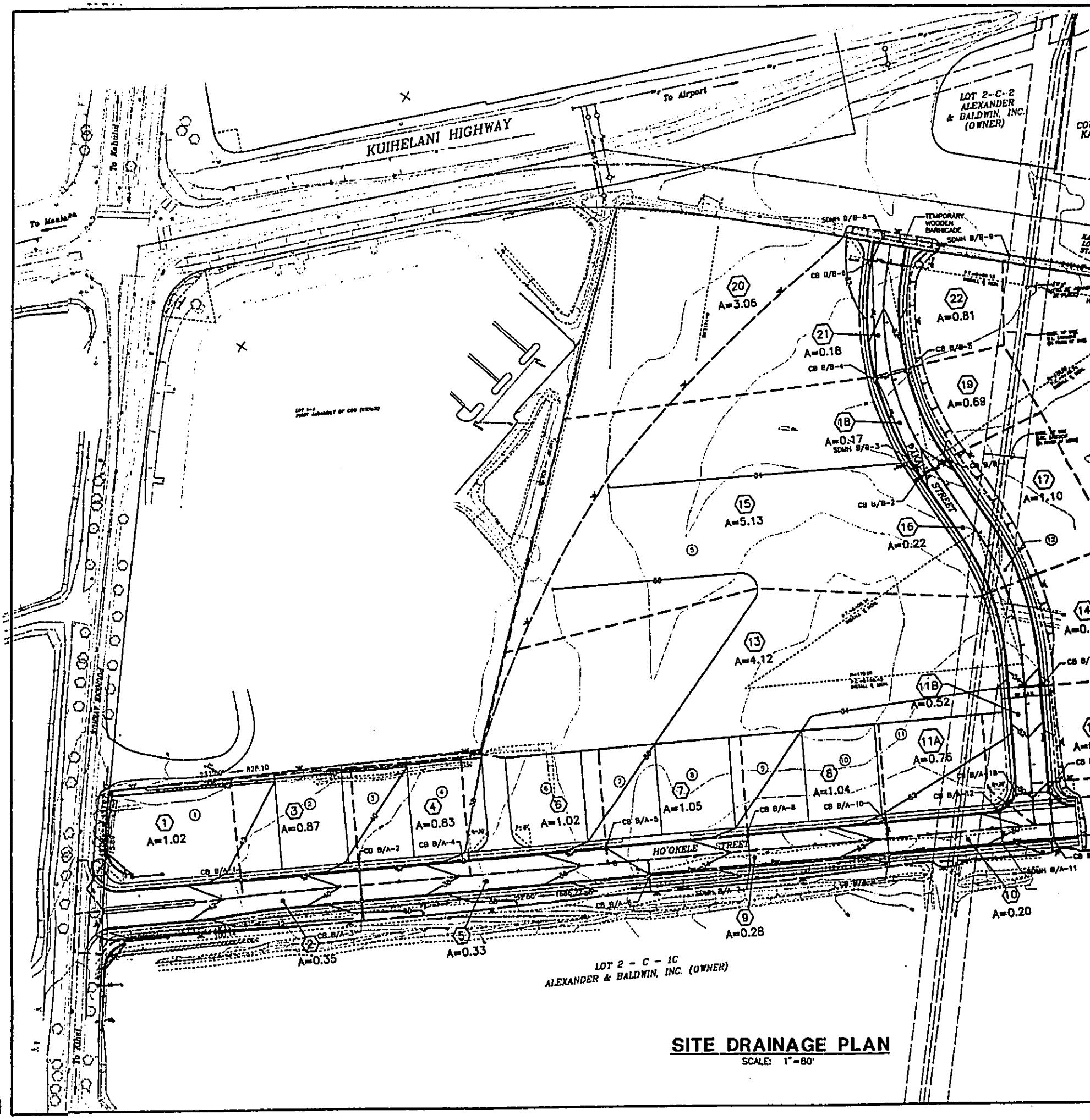
PANEL 190 OF 400
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
150003 0190 B

EFFECTIVE DATE:
JUNE 1, 1981

federal emergency management agency
federal insurance administration

EXHIBIT 4
FLOOD INSURANCE MAP



SITE DRAINAGE PLAN

SCALE: 1"=80'

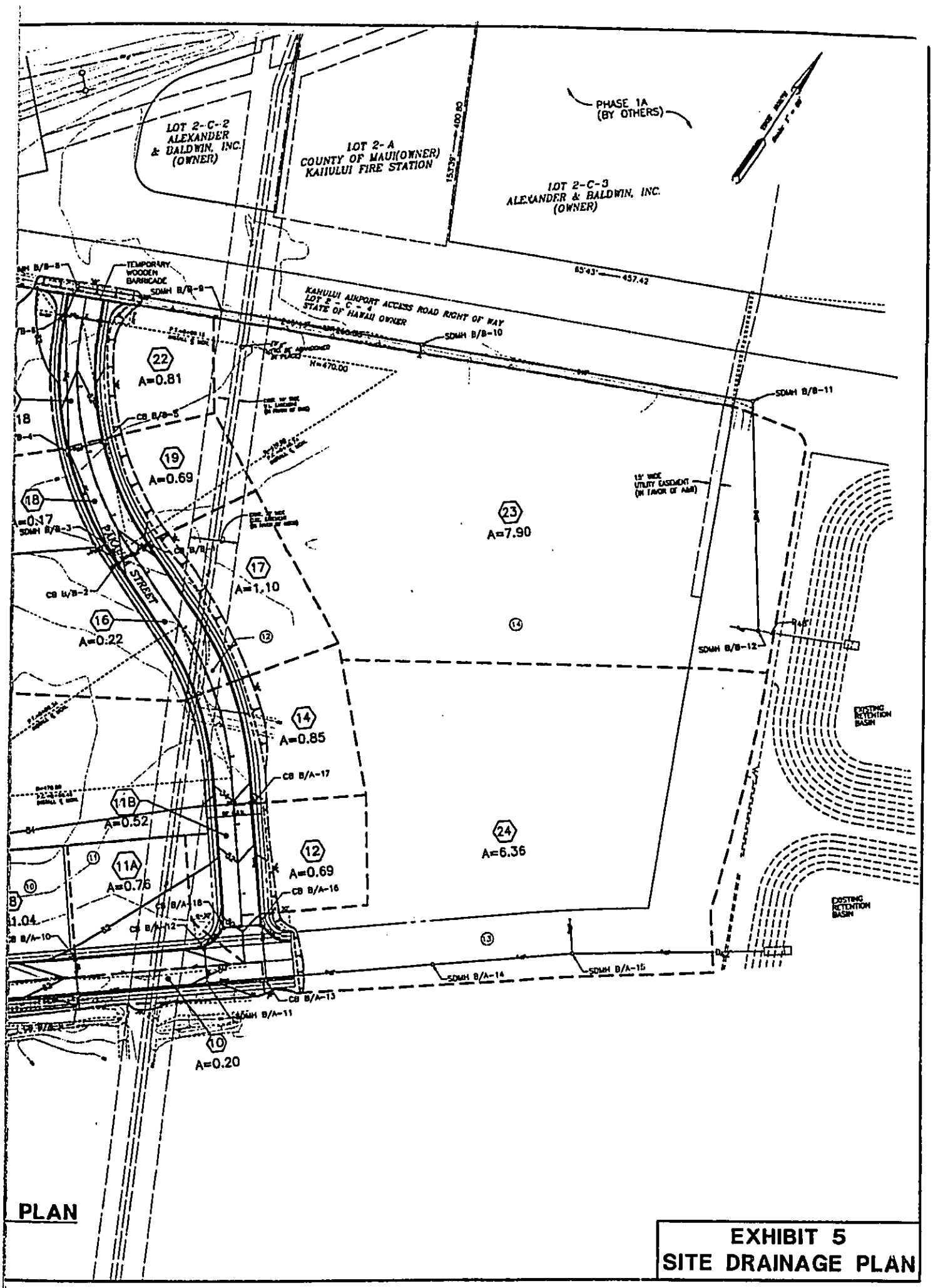


EXHIBIT 5
SITE DRAINAGE PLAN