DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813 • (808) 523-4432

FRANK F. FASI
MAYOR

DONALD A. CLEGG
DIRECTOR

LORETTA K.C. CHEE
DEPUTY DIRECTOR

92/SMA-92(DT)

RECEIVED

December 9, 1992

'92 DEC 11 P12:05

OFC. OF ENVIRON. QUALITY CONT.

Mr. Brian J. J. Choy, Director
Office of Environmental Quality Control
(OEQC)
220 S. King Street, 4th Floor
Honolulu, Hawaii 96813

Dear Mr. Choy:

SPECIAL MANAGEMENT AREA ORDINANCE
CHAPTER 25, ROH
Environmental Assessment/Determination
Negative Declaration

Recorded Owner	:	Nanakuli Investments Co., Ltd.
Applicant	:	Nanakuli Investments Co., Ltd.
Agent	:	R. M. Towill Corp./Colette Sakoda
Location	:	Off Farrington Highway on the Ewa side of Lualualei Naval Road, Nanakuli, Oahu
Tax Map Key	:	8-7-8: 11, 65 and 75
Request	:	To construct buildings for neighborhood commercial uses including offices, retailers, a savings and loan institution, flower vendor, bakery, eateries and a country style farmers' market
Determination	:	A Negative Declaration Is Issued

Attached and incorporated by reference is the environmental assessment prepared by the applicant for the project.

Approved Donald Clegg
DONALD A. CLEGG
Director of Land Utilization

DAC:ct
Enclosure(s)

218

1992-12-23-OA-FEA-Nanakuli Town Center (SMA)

DEC 23 1992

DRAFT

Special Management Area Use Permit Application

Nanakuli Town Center
Nanakuli, Oahu

October 1992

PREPARED FOR
Nanakuli Investment Company, Ltd.

RMTC
R.M. TOWILL CORPORATION
420 Waiakamilo Rd. S.411
Honolulu, HI 96817-4941
(808)842-1133 FAX 842-1937

CITY AND COUNTY OF HONOLULU
DEPARTMENT OF LAND UTILIZATION
650 South King Street, 7th Floor
Honolulu, Hawaii 96813

DLU MASTER APPLICATION FORM

Additional data, drawing/plans, and fee requirements are listed on a separate sheet titled "Instructions for Filing." *PLEASE ASK FOR THESE INSTRUCTIONS.*

All specified materials and fees must accompany this form; incomplete applications could delay processing. You are encouraged to consult with department staff in completing the application. Please call the appropriate phone number given in the "Instructions for Filing" sheet.
Please print legibly or type the required information.

PERMIT REQUESTED (Check one or more as appropriate)

Clusters:
- ☐ Agricultural Cluster
- ☐ Cluster Housing
- ☐ Country Cluster

Conditional Use Permits:
- ☐ Type 1 ☐ Type 2
- ☐ Existing Use
- ☐ Flood Hazard Variance
- ☐ Park Dedication
- ☐ Plan Review Use
- ☐ Planned Development-Housing
- ☐ Shoreline Setback Variance
- ☐ Site Plan Review
- ☐ Site Development Plan
- ☐ Special District _____ (Indicate District)
- XX Special Management Area Permit, Assessment
- ☐ State Special Use Permit
- ☐ Subdivision
- ☐ Sunlight Reflection
- ☐ Variance from LUO Sec (s) _____
- ☐ Waiver (public uses/utilities)
- ☐ Zero Lot Line
- ☐ Zone Change, From _____ to _____
- ☐ Zoning Adjustment, LUO Sec (s) _____

TAX MAP KEY(S): 8-7-08: 11, 65, & 75
LOT AREA: 152,103.8 sf or 3.49 acs.
ZONING DISTRICT: B-2 **STATE LAND USE DISTRICT:** Urban

STREET ADDRESS/LOCATION OF PROPERTY: Farrington Highway between Helelua Street and Lualualei Naval Road

RECORDED FEE OWNER:
Name: James Aki
Mailing Address: 84-339 Ikuone Place, Waianae, HI 96792
Phone Number: 695-8645
Signature: James Aki

APPLICANT:
Name: Nanakuli Investment Co., Ltd.
Mailing Address: 84-339 Ikuone Place, Waianae, HI 96792
Phone Number: 695-8645
Signature: James Aki

PRESENT USE OF PROPERTY/BUILDING: Partially developed

PROJECT NAME (if any): Nanakuli Town Center Commercial Development

AUTHORIZED AGENT/CONTACT PERSON:
Name: R. M. Towill Corp., Colette Sakoda
Mailing Address: 420 Waiakamilo Road, Ste. 411, Hon., HI 96817
Phone Number: 842-1133
Signature: Colette Sakoda

PROJECT PROPOSAL (Briefly describe the proposed activity or project):
A neighborhood commercial town center is proposed to be constructed with approximately 23, 215 sq. ft. of retail and business space.

FOR DEPARTMENT USE ONLY FILE NO. _____
Submitted Fee Amount: $ _____
Date Application Accepted: _____ Accepted By _____
Date of Public Hearing: _____
- ☐ Approved
- ☐ Approved with conditions indicated below
- ☐ Denied for reason(s) given below
- ☐ Exempt project.

THIS COPY, WHEN SIGNED BELOW, IS NOTIFICATION OF THE ACTION TAKEN.

Signature _____ Title _____ Date _____

The above approval does not constitute approval of any other required permits, such as building permits.

DLU 150 (REV. 2/87)

SUPPLEMENTAL INFORMATION TO THE

SPECIAL MANAGEMENT AREA USE PERMIT

APPLICATION

TABLE OF CONTENTS

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SECTION 1
INTRODUCTION

The purpose of this document is to supplement the Special Management Area (SMA) Permit Application for the proposed Nanakuli Town Center commercial development by Nanakuli Investment Company, Ltd. The following sections cover general information on the project, a description of the anticipated impacts of the project on the SMA, and a discussion of the project in relation to the objectives and policies as provided by Chapter 205A, HRS, and the SMA guidelines. An environmental assessment of the proposed action is included as part of this document to further detail the proposed action and potential environmental impacts associated with the project.

SECTION 2
GENERAL INFORMATION

2.1 APPLICANT:

Nanakuli Investment Company, Ltd.
84-339 Ikuone Place
Waianae, Hawaii 96792
Contact: James Aki
(808) 695-8645

2.2 RECORDED FEE OWNER

Nanakuli Investment Company, Ltd.
84-339 Ikuone Place
Waianae, Hawaii 96792
(808) 695-8645

2.3 AGENT

R.M. Towill Corporation
420 Waiakamilo Road, Suite 411
Honolulu, Hawaii 96817-4941
(808) 842-1133
Contact: Colette Sakoda

2.4 TAX MAP KEY: 8-7-08: 11, 65 & 75

2.5 LOT AREA: 152,103.8 sf (or 3.49 acs.)

2.6 AGENCIES CONSULTED PREPARING THIS ASSESSMENT

State

Department of Land and Natural Resources
Forestry & Wildlife Division
Historic Preservation Division

County
Board of Water Supply
Department of Public Works
Department of Transportation Services
Building Department
Department of Land Utilization

SECTION 3
DESCRIPTION OF PROJECT AND STATEMENT OF OBJECTIVES

3.1 DESCRIPTION OF PROJECT

A mixed use commercial center is proposed for development in Nanakuli town by Nanakuli Investment Company, Ltd. The project site (Tax Map Key Nos. 8-7-08: 11, 65 and 75) is located along Farrington Highway, north (mauka) of the Ulehawa Beach Park and Nanakuli Beach between the Helelua Street-Farrington Highway and Lualualei Naval Road-Farrington Highway intersections (see Figures 1, 2, and 3 Project Location, Vicinity and Tax Map Key parcel Maps).

The Nanakuli Town Center commercial development is envisioned as a blend of old and new Hawaii by serving the local community's retailing needs as well as the visitor market. It will offer approximately 11,690 square feet of gross leasable area (GLA) and 11,525 square feet of gross floor area (GFA) in a mix of neighborhood commercial uses including offices, retailers, a savings and loan institution, flower vendor, bakery, eateries and a country style farmers' market fronting Farrington Highway (see Figure 4, Site Plan). This development will also feature an open air assembly area designed for social gatherings such as luaus and community forums with a stage for performances and a landscaped garden in the center of the project. The project site is accessible from Farrington Highway, and ample bus and private vehicle parking will be available on site.

Project site access will be provided by an existing easement through a property that fronts Farrington Highway, and a road connecting to Helelua Street mauka of and parallel with Farrington Highway. A traffic impact analysis report has been prepared as part of this environmental assessment and is included in its entirety as an appendix.

Parcels 11, 65 and 75 are located within the Special Management Area (SMA) (see Figure 5) as defined by the City and County of Honolulu. The purpose of the SMA is to "preserve, protect and, where possible, restore the natural, cultural and recreational resources of the coastal zone of Oahu." This supplement to the SMA permit application thus contains a discussion of the impacts on recreational and archaeological resources,

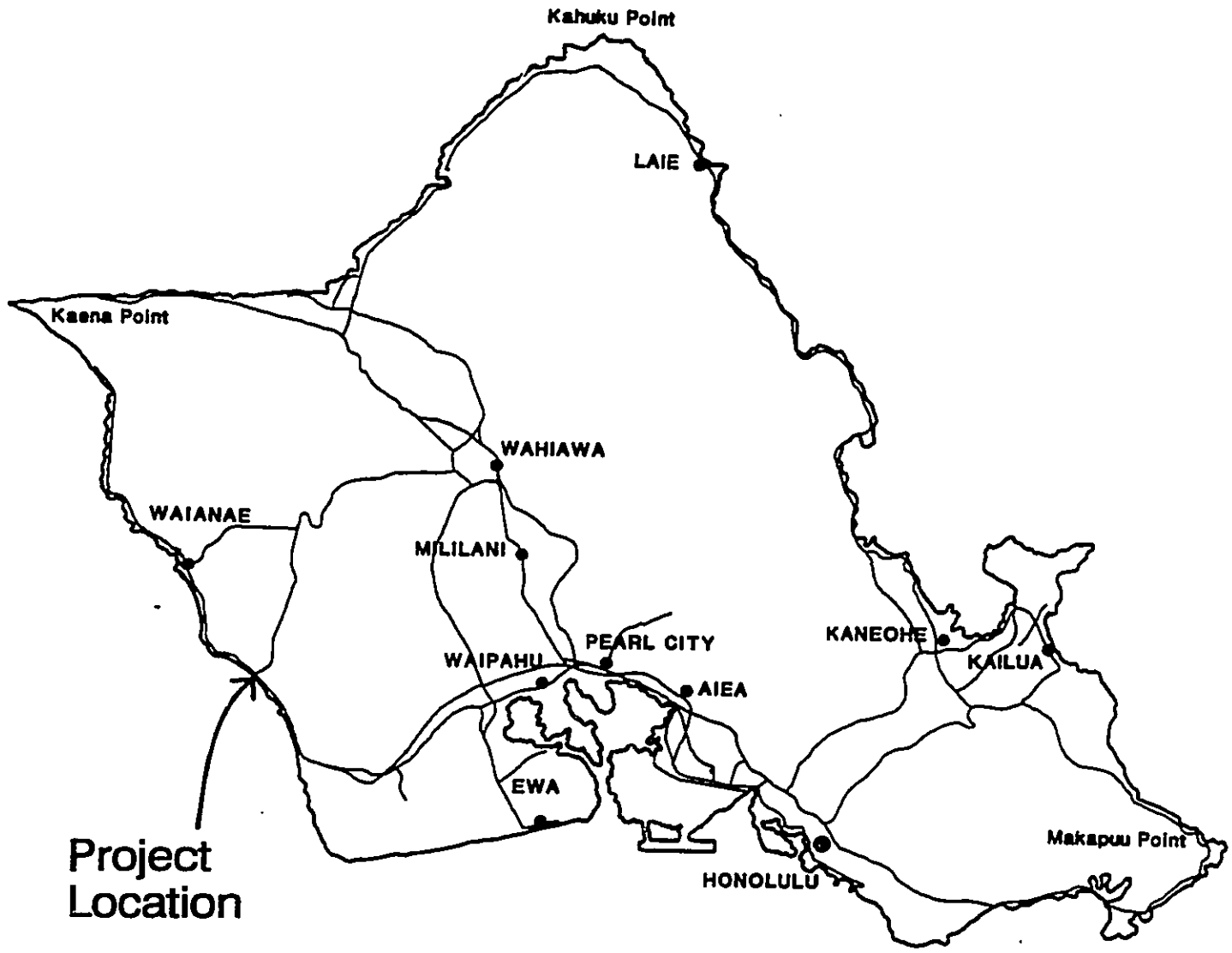


Figure 1
LOCATION MAP
Nanakuli Town Center
Nanakuli Investment Company, Ltd.

0 6 12
MILES

R. M. TOWILL CORPORATION
SEPTEMBER 1992

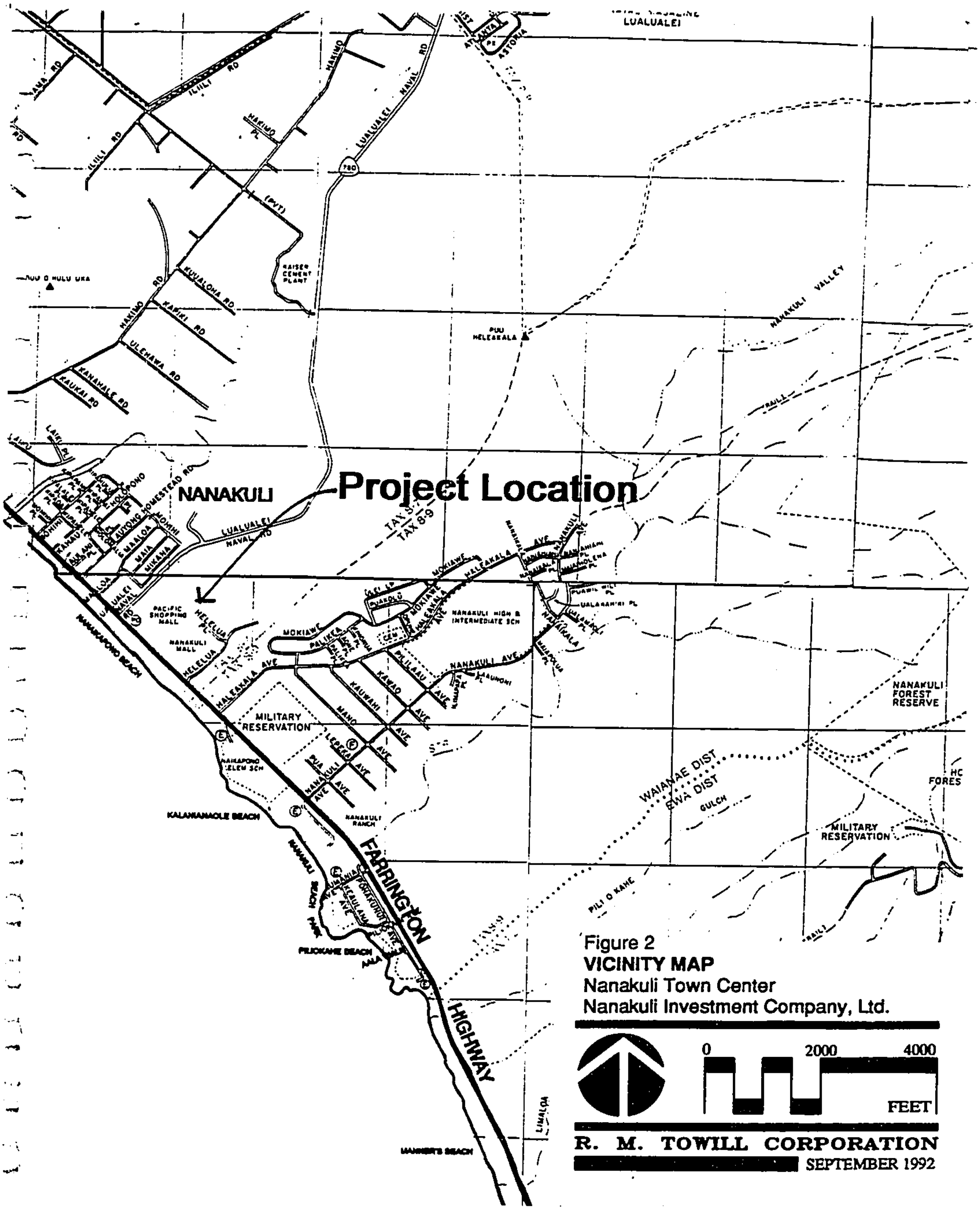


Figure 2
VICINITY MAP
Nanakuli Town Center
Nanakuli Investment Company, Ltd.

R. M. TOWILL CORPORATION
SEPTEMBER 1992

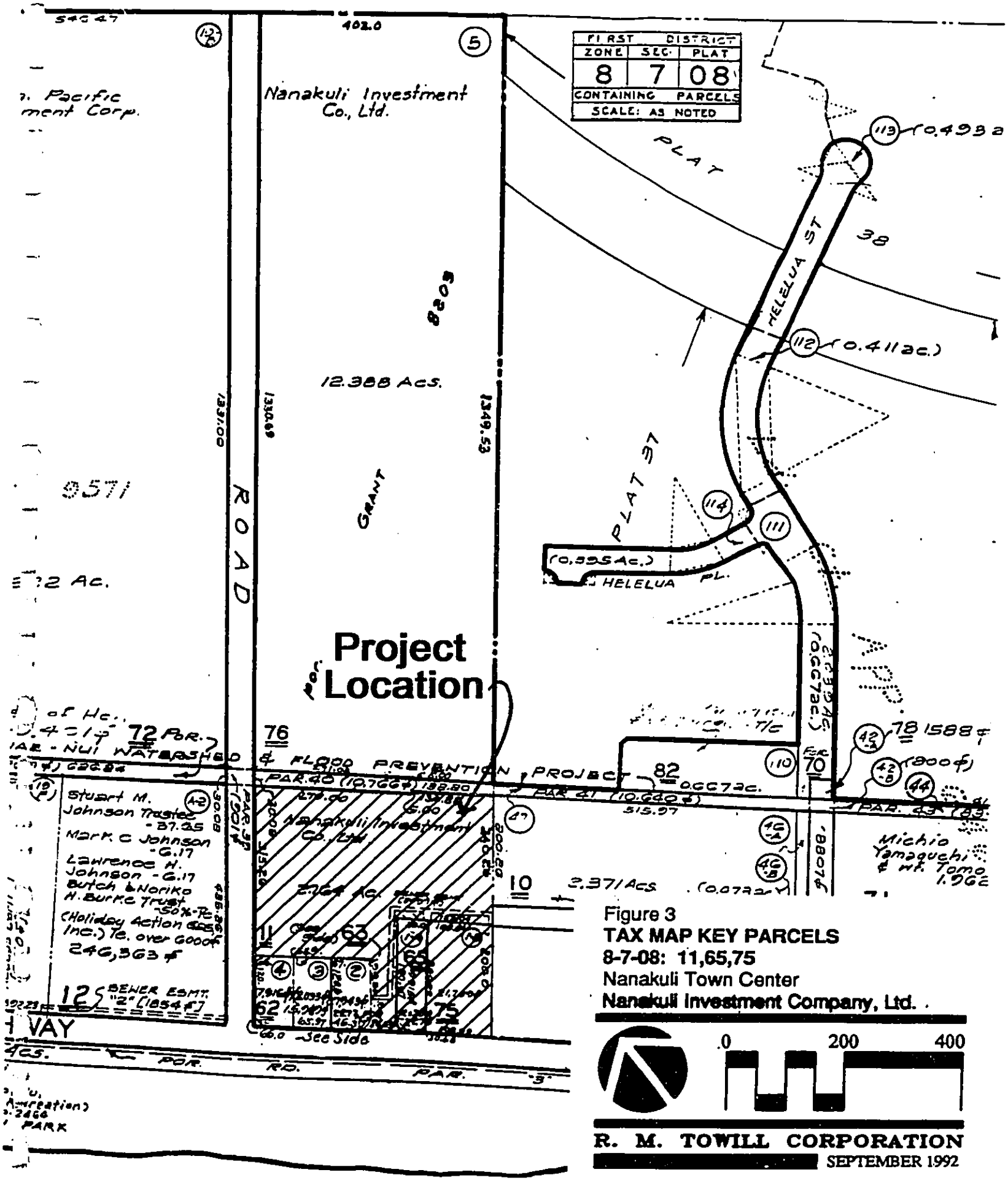
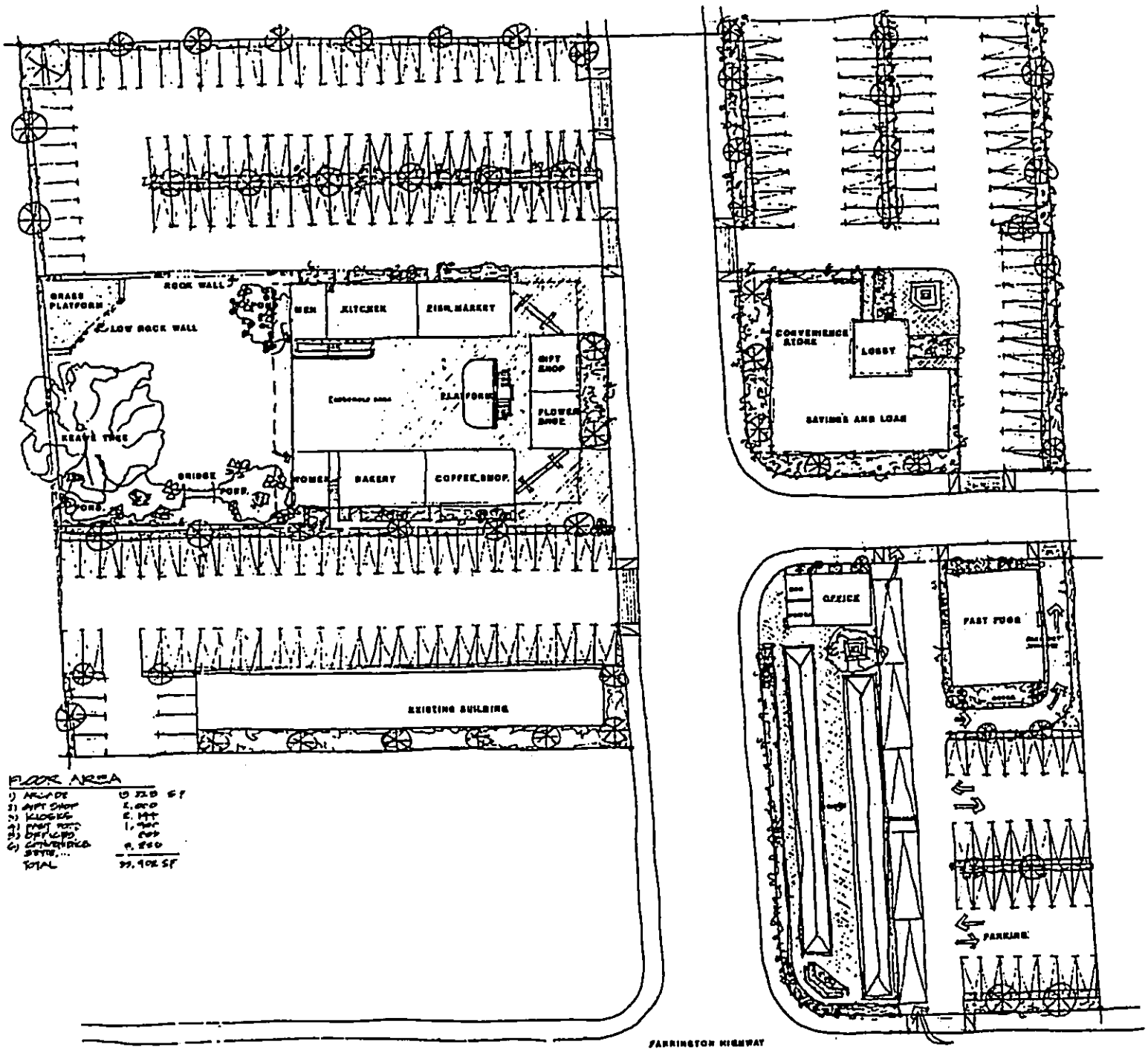


Figure 3
TAX MAP KEY PARCELS
8-7-08: 11,65,75
Nanakuli Town Center
Nanakuli Investment Company, Ltd.

0 200 400

R. M. TOWILL CORPORATION
SEPTEMBER 1992



FLOOR AREA

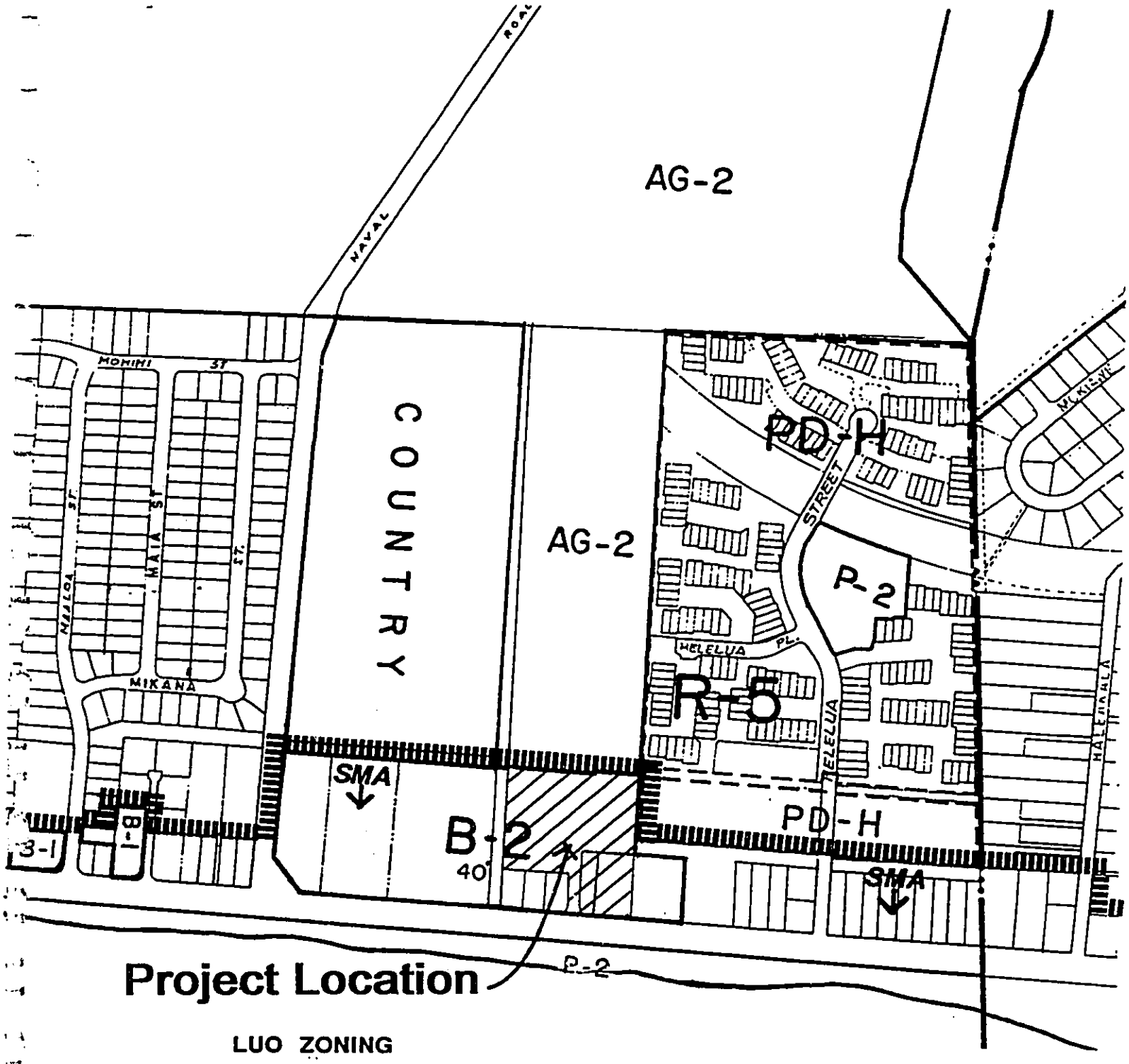
1) ARCADE	12,220 SF
2) GIFT SHOP	2,000
3) KIOSKS	2,400
4) FAST FOOD	1,200
5) OFFICES	600
6) CONVENIENCE STORE, ...	9,850
TOTAL	28,270 SF

Source: Paul Osumi, AIA

Figure 4
SITE DEVELOPMENT PLAN
Nanakuli Town Center
Nanakuli Investment Company, Ltd.

0 60 120
FEET

R. M. TOWILL CORPORATION
SEPTEMBER 1992



LUO ZONING

P-2	General Preservation
R-5	Residential
B-1	Neighborhood Business
B-2	Community Business
AG-2	General Agriculture
PD-H	Planned Development Housing
Country	Country

SLUC=URBAN
DP=BUSINESS

Figure 5
LAND USE DESIGNATIONS and SMA
Nanakuli Town Center
Nanakuli Investment Company, Ltd.

0 400 800

R. M. TOWILL CORPORATION
SEPTEMBER 1992

wetlands and natural ecosystems, drainage and wastewater teatment, and coastal views.

State Land Use Map designation for the site is Urban; and the City and County Development Plan designation is Business, while zoning is B-2, Community Business.

3.2 Statement of Objectives

The objective of the proposed commercial development is to optimally develop the project site within the allowed zoning parameters without endangering the environmental resources in and around the site.

SECTION 4
DESCRIPTION OF THE AFFECTED ENVIRONMENT AND PROPOSED MITIGATION MEASURES

4.1 PHYSICAL ENVIRONMENT

4.1.1 Climate

The climate of the Nanakuli area is sub-tropical. The project site generally receives abundant sunshine during most of the year. The northeasterly tradewinds are the prevailing winds during most of the year. The average annual rainfall for Oahu is approximately 24 inches while the average annual rainfall for the Nanakuli-Waianae area is 20 inches. The average daily temperature ranges between the high 70's to the high 80's. The project is not expected to alter the existing climatic conditions.

4.1.2 Topography, Geology and Soils

The project site is relatively level with a gentle slope downward from the north property line toward Farrington Highway.

The geology of the proposed project site consists of post-erosional lavas and coral reef deposits. Soils of the project area are generally categorized as Lualualei-Fill land-Ewa association. This association consists of well-drained, fine textured and moderately fine textured soils on fans and in drainageways on the southern and western coastal plains on Oahu. The soils are nearly level to moderately sloping, and are formed in alluvium. Elevation ranges from sea level to 400 feet. Annual rainfall is 15 to 30 inches in most places. The mean annual soil temperature is between 73 degrees and 75 degrees Fahrenheit. The natural vegetation is kiawe, koa haole, and fingergrass.

4.1.3 Hydrology

No known groundwater sources exist in the vicinity of the project site. Thus, the proposed project is not expected to adversely impact the underlying groundwater sources of Oahu. Further, no drilling for wells is proposed for the project. It appears that existing Board of Water Supply water mains and lines in Farrington Highway will be the utilized to meet the

project's potable water requirements.

4.1.4 Flora and Fauna

The project site has for the most part been void of native vegetation for many years as it has been somewhat developed with an auto repair shop, tavern, and neighborhood market on the adjacent parcel. A few small palm trees, grass, and kiawe bushes and trees are scattered about the site. The site is probably inhabitated by rodents, cats, and mongoose given its proximity to undeveloped lands located mauka, and the drainage channel that forms the mauka boundary of the site.

According to the Forestry and Wildlife Division of the State Department of Land and Natural Resources, no known rare Hawaiian plants or endangered wildlife exist on the project site. However, rare Hawaiian plants may exist on steeper slopes in the vicinity. There are no wildlife preserves either on the site or in the immediate vicinity that are affected by the proposed development.

Site development will be coordinated with the State Department of Land and Natural Resources and if any endangered resources are found arrangements will be made to notify that department to do whatever follow up is necessary. However, given the proposed preservation of existing vegetation on site for screening and low cost landscaping, it is not anticipated that there will be any significant impact on botanical resources. Further, because this area has little rainfall during the year, fire prevention will be emphasized in the management agreement.

4.1.5 Scenic and Visual Resources

Exhibits 1, 2 and 3 provide existing views looking makai from the site and Exhibits 4 and 5 indicate the existing views from the southern or makai boundary of the site looking mauka. Makai views include the beach and Farrington Highway. The photo identified as Exhibit 1 was taken while standing in the easement that is proposed to be used as a new project access road. The beach view will be preserved since this corridor will remain open in the completed project. The second makai view is not expected to be altered with the project because the building shown in the photo is not part of the project. However, the

Looking Makai from the project site.

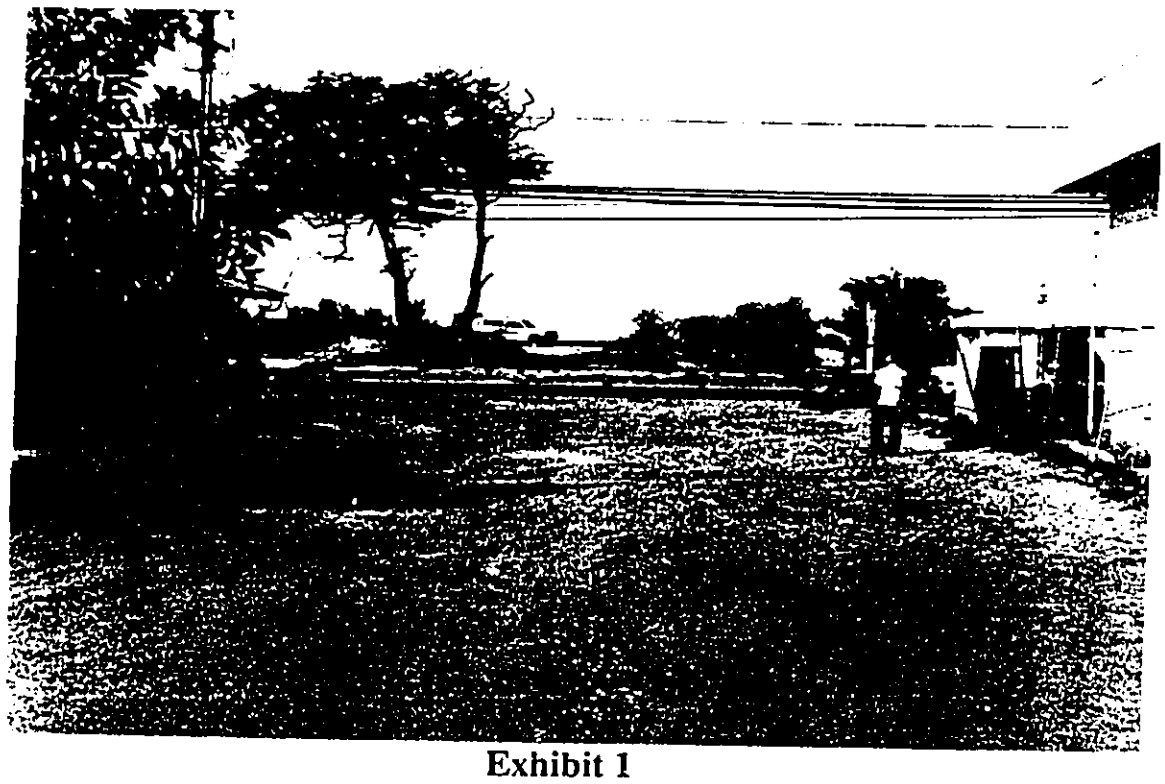


Exhibit 1

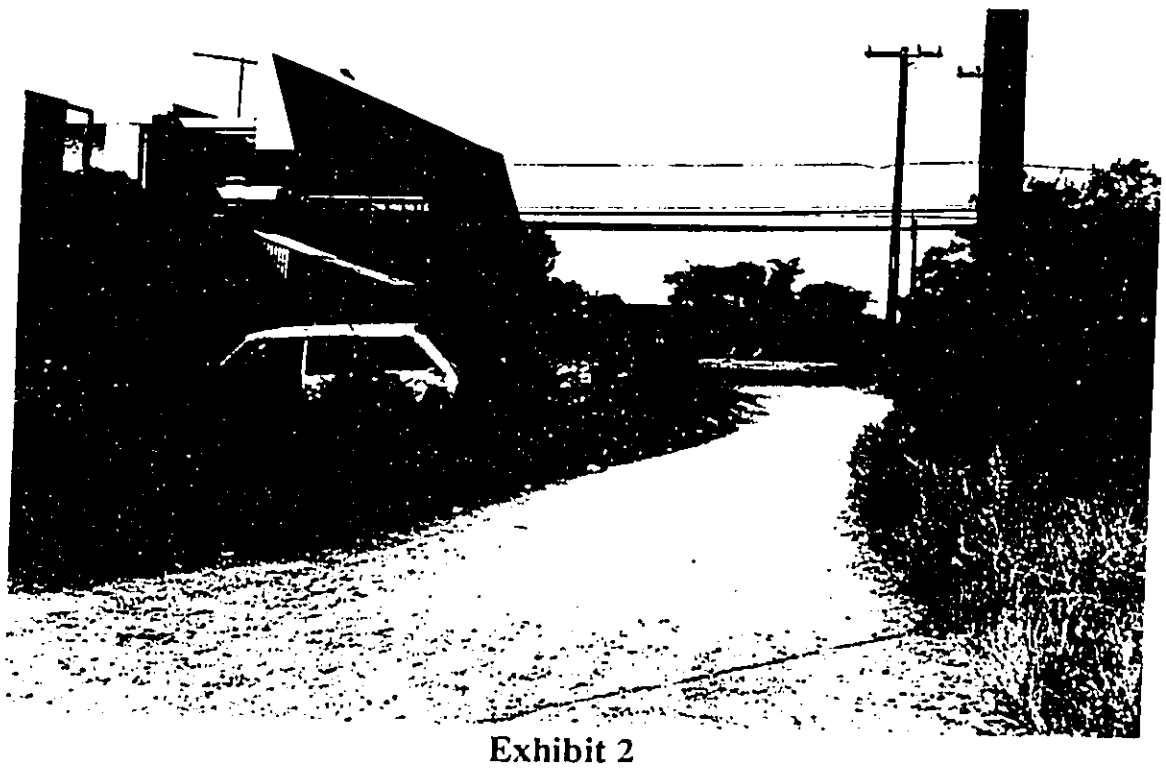


Exhibit 2

Looking Makai from the project site.

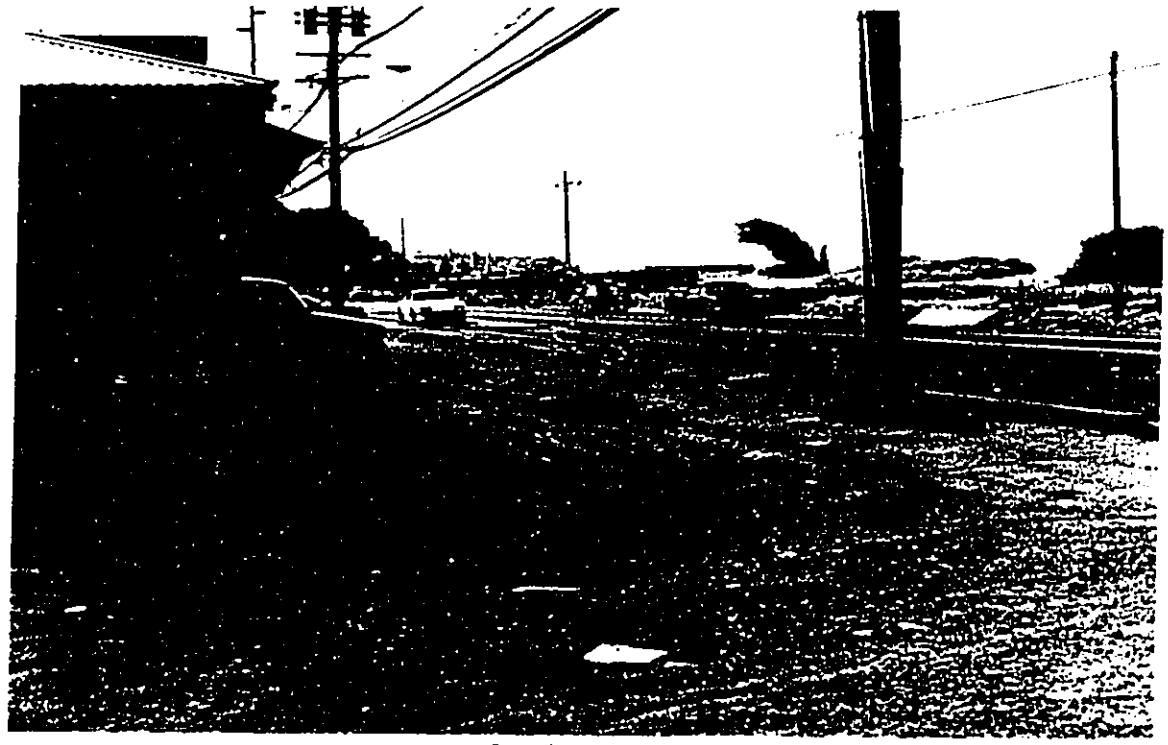


Exhibit 3

introduction of improvements by the project may help clean up the adjacent property of such things as abandoned cars (shown here) and overgrown weeds. The makai view shown in Exhibit 3 will slightly improve with the proposed demolition of the existing buildings. This portion of the site is proposed to have the makai end of kiosks as part of the farmers' market envisioned for the development.

Exhibits 4 and 5 indicate mountain views from inside the site. Mountain range views from the site will not be impeded as the development will consist of single- and two-story buildings with ample open areas between these structures. These views will in fact be enhanced with the demolition and clearing of minimal structures and weeds, bushes and trash.

4.1.6 Historic/Archaeological Resources

Remnants of the original OR & L railroad track are located on the makai side of Farrington Highway across from the project site. While no immediate plans exist to renovate the Nanakuli section of this historic facility, the remnants are to be preserved as such until further notice by the Oahu Railway society. The project site does not encompass this historic site and neither are there any foreseeable impacts on this site resulting from the proposed commercial project.

According to the State Department of Land and Natural Resources Historic Preservation Division, no known historic sites exist at these parcels (letter dated May 19, 1992). None of the parcels has been inventoried for historic sites, however, and sub-surface historic sites might be present at the parcel proposed for residential development.

Thus, during grading and construction on the mauka parcel should any remains of potentially significant historic or archaeological value be unearthed, construction will be halted and the State Historic Preservation Division will be consulted as to proper handling of the discovered remains.

Looking Mauka from the project site.

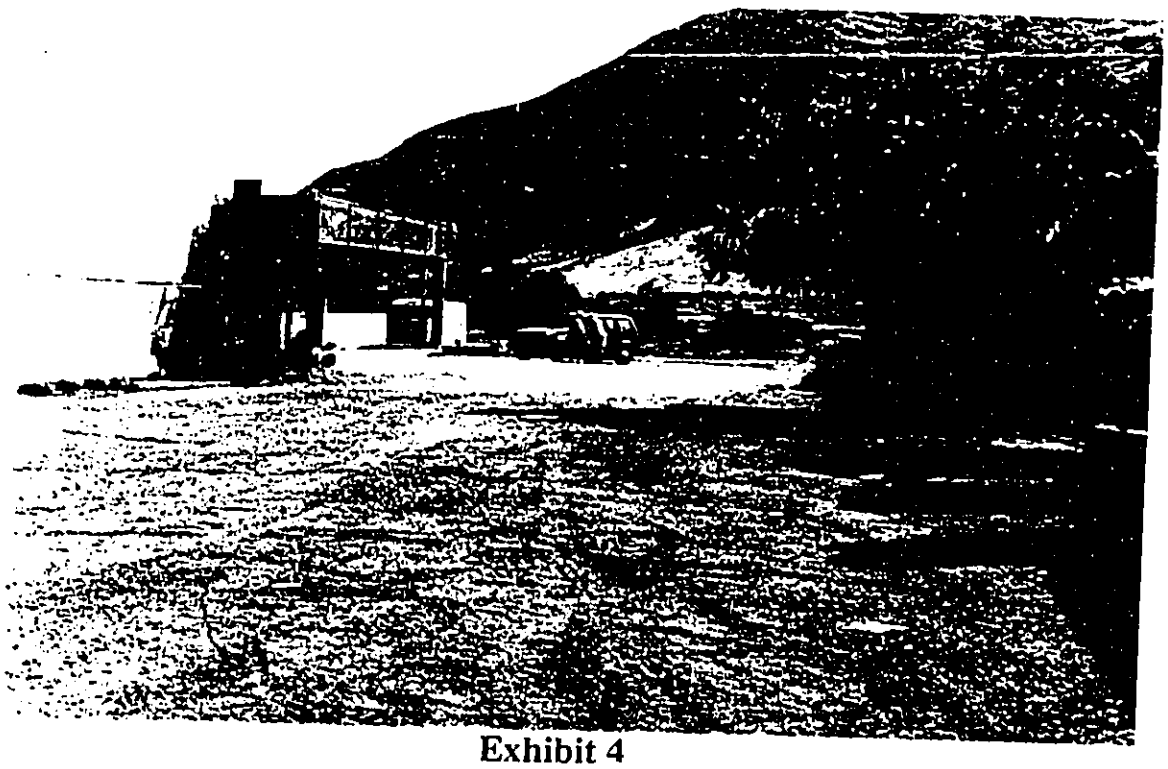


Exhibit 4

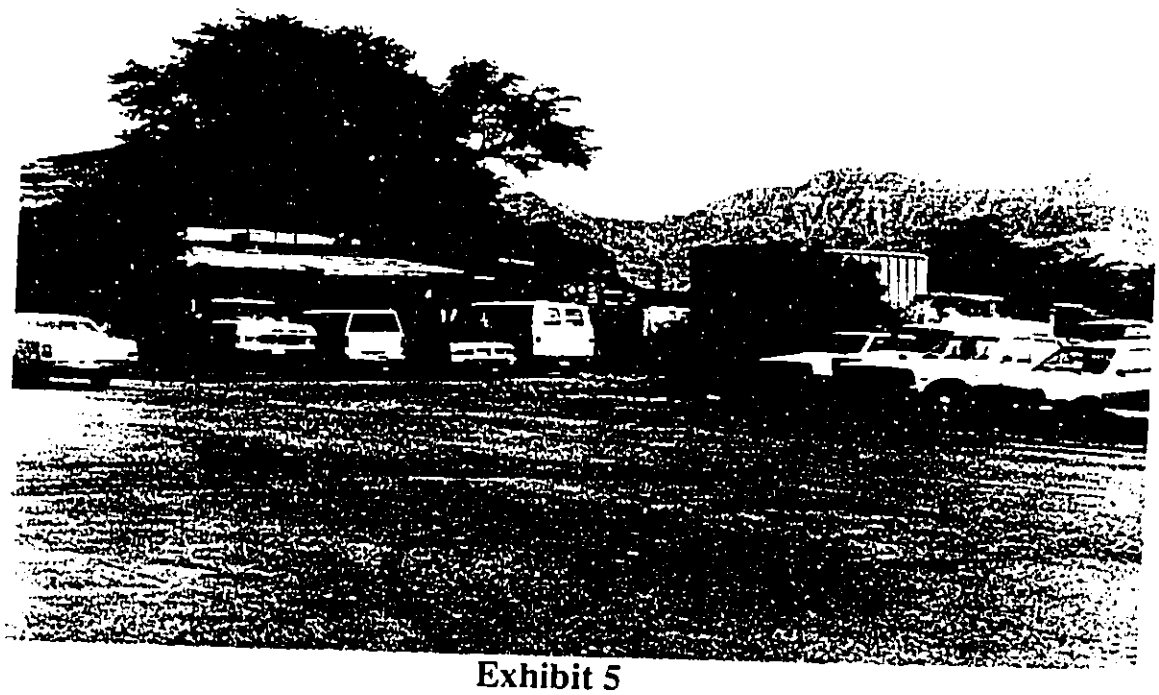


Exhibit 5

4.1.7 Wetlands/Natural Ecosystems

No known wetlands or natural ecosystems exist on or near the project site. Thus, no project impacts are anticipated on such environments.

4.2 SOCIO-ECONOMIC ENVIRONMENT

4.2.1 Population

According to the State of Hawaii Data Book (1991) the Waianae district experienced a nearly 31 percent increase in resident population between 1970 and 1980 (from 24,077 to 31,487 persons), and a nearly 19 percent increase between 1980 and 1990 (from 31,487 to 37,411 persons). Like the remaining six residential districts on the island of Oahu, Waianae will probably to continue to experience steady growth into the future. Because of this, the proposed development will provide much needed neighborhood shopping and business service opportunities to the Nanakuli residents. This development as envisioned will provide a gathering place for residents for leisurely shopping or social/community meetings in the central courtyard throughout the week.

4.2.2 Surrounding Land Uses

The mauka portion of the project site (parcel 11) is undeveloped with the exception of a portable wooden framed building that houses a dental office. It is generally covered with grass, weeds, few trees, and kiawe bushes. Two single-story concrete tile block structures exist on parcels 65 and 75 and are currently fronting and accessible from Farrington Highway.

An improved drainage channel exists along the length of the eastern property line. A channelized easement (identified as a portion of the "Waianae-Nui Watershed and Flood Prevention project") exists between the mauka edge of parcel 11 and parcel 76. The channel connects to the Ulehawa Channel for storm water dispursement.

The project site is owned by Nanakuli Investment Company, Ltd. The property located east of the site contains a Faststop convenience store, and the property to the west of the project site contains a gas station and movie theater. A supermarket and associated parking lot occupy parcel 62 which is located at the southwestern corner of the subject property at the

corner of Farrington Highway and the proposed new access road. Ulehawa and Nanakuli Beaches, owned and maintained by the City and County of Honolulu, are located south of the project site, makai of Farrington Highway.

A proposed residential development would be located on the parcel mauka (tax map no. 8-7-08:76) of the proposed Nanakuli commercial development. The proposed residential development would include 143 multi-family dwelling units. This residential project is expected to be developed by Inter-Pac Development, Inc. and build out may be by yar 1995.

4.3 PUBLIC FACILITIES AND SERVICES

4.3.1 Transportation Facilities

Farrington Highway is a four lane, two way roadway in the vicinity of the project site and has a posted speed limit in the project vicinity of 35 miles per hour (mph). Farrington Highway serves as the primary access to communites located on the west coast of Oahu such as Waianae and Makaha. Project site access will be provided by a new access road on Farrington Highway located between Helelua Street and Lualualei Naval Road. A road connecting the new project access road and Helelua Street, located mauka of Farrington Highway, would provide an additional site access. Helelua Street and Lualualei Naval Road intersect Farrington Highway as signalized intersections.

In analyzing the project's traffic impacts on existing intersections to determine additional improvement requirements, the traffic forecast in the study conducted for this EA/SMA application includes vehicle trips generated by the proposed residential development located directly mauka of and adjacent to the Nanakuli Town Center commercial project site.

The project site generated traffic represents a 4% increase in total traffic on Farrington Highway south of Helelua Street by the year 1998, which is when the project is expected to be built out. The total traffic on the four lane, undivided Farrington Highway, south of Helelua Street, represents a 3% increase over projected conditions without the proposed project.

The results of the traffic impact analysis have been summarized as follows:

The proposed Nanakuli Commercial Development would not adversely affect project peak hour traffic conditions. The trips generated by the proposed project would not significantly change the level of service of the individual movements at the intersections of Farrington Highway with Helelua Street, and Farrington Highway with Lualualei Naval Road. Exclusive left turn lanes are warranted at the study intersections under existing operating conditions. Roadway widening would require additional right-of-way that is limited by a railroad easement on the makai side and residential development on the mauka side of Farrington Highway. The installation of traffic signals are also warranted for projected traffic conditions and should increase safety and improve traffic operations in the project vicinity. The traffic signals should be synchronized with traffic signals at adjacent intersections to maximize through traffic movement. Restricting the intersection of Farrington Highway and the project access road to right-turn-in and right-turn-out movements would increase the number of vehicles on Helelua Street. South bound site traffic, diverted to Helelua Street, would lower the level of service of the intersection, however the operating level of service would still remain within acceptable standards.

4.3.2 Recreational Facilities

Nanakuli Beach Park, located south of the project site and makai of Farrington Highway, is owned and maintained by the City and County of Honolulu. Another public park owned and maintained by the City and County of Honolulu is Ulehawa Beach Park which is located on the western side of the project site opposite the Ulehawa Channel. Both public facilities are utilized by residents for swimming, surfing, and picnicking. Waters along this stretch of the Oahu shore is classified "A" by the State Department of Health. This class of waters is intended to be primarily used for and maintained as recreational purposes. For these reasons, the project under review is expected to be designed such that the receiving waters will not be receiving waters from any discharge until it has received the best degree of control or treatment.

Surface runoff is expected to partially filter through grassed and unimproved surfaces before flowing into the storm drain channel that borders the northern end of the project site. The small size of the project is expected to have minimal effect on the drainage system which contributes to the Ulehawa Channel. Because of this, the project is not expected to

adversely impact the existing offshore beach recreational opportunities. Neither beach park is expected to be impacted by the proposed project in the short or long term.

4.3.3 Drainage and Wastewater Treatment Facilities

The Ulehawa Channel located just west of the project site is the existing storm drainage facility for the area. The surface runoff is expected to sheet flow across the project site with storm water partially percolating through the grassed/landscaped areas and unimproved surfaces before flowing into the flood control drainage channel mauka of the project site. This channel connects to the Ulehawa Channel. The small scale of the proposed commercial center is not expected to adversely impact the existing drainage facility or the receiving offshore waters.

SECTION 5

RELATION TO COUNTY DEVELOPMENT PLAN AND ZONING CODE

5.1 County General Plan and Development Plan

5.1.1 County General Plan

The objectives and policies of the General Plan identify actions and directives for City and County government to take in order to benefit the people of Oahu as growth and development occur on the island. The proposed project is consistent with the General Plan in the areas concerning the,

> '(encouragement of) the establishment of mixed use districts with appropriate design and development controls to insure an attractive living environment and compatibility with surrounding land uses;'

> '(encouragement of) distinctive community identities for both new and existing districts and neighborhoods.'

The project site is designated Business on the Development Plan Land Use map. Because of this the proposed development is consistent with the intended land use for this site.

5.1.2 County Development Plan

The Development Plans help to implement the General Plan by providing relatively detailed schemes for implementing and accomplishing the objectives and policies of the General Plan for geographical regions of the island. The Development Plan maps depict land use patterns that are consistent with the objectives and policies of the General Plan.

The project site is designated Business on the Development Plan Land Use map. Because of this the proposed development is consistent with the intended land use for this site.

5.2 Land Use Ordinance (LUO)

The purpose of the Land Use Ordinance (LUO) is to regulate land use in a manner that will encourage orderly development in accordance with adopted land use policies.

The Land Use Ordinance (LUO) map designates the project site as B-2 or Community Business. Thus, the proposed development is consistent with the zoning for this property.

SECTION 6
PROBABLE ADVERSE ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED

6.1 Short-term Impacts

6.1.1 Noise from Construction Activity

Temporary adverse noise impacts on adjacent commercial and residential properties will also occur during the construction of the proposed project. Noise impacts created by construction equipment such as backhoes and dump trucks will be reduced through the use of mitigative measures approved by the State Department of Health. These may include the use of mufflers and other noise reduction devices. Further, construction activities will be limited to daytime hours so as to avoid inconveniences to residents along Helelua Street.

6.1.2 Air Quality

Temporary adverse impacts on air quality will occur during the utility system improvements construction period. Heavy construction equipment that will be used during the construction phase will emit exhaust and airborne particulates. The construction work will also produce dust. These impacts will be reduced through the use of adequate dust control measures such as water sprinkling by the contractor. Other mitigative measures recommended or approved by the State Department of Health and City and County of Honolulu will be strictly adhered to by the contractor. Construction equipment will have to be properly maintained to minimize emissions. Prevailing tradewinds will also help in dispersing airborne particles.

6.1.3 Aesthetic Impacts

Mauka and makai views will be temporarily altered during construction as the existing buildings will be razed and cleared off the site. Heavy construction equipment will disrupt existing views. However, the proposed project will improve views onto the site as well as through the site in the mauka and makai directions. Further, because the proposed commercial complex is low-rise (single- and two-story structures) and will be of low density, the views onto the site will be substantially improved over the existing conditions.

6.2 Long-term Impacts

The ambient air quality will be slightly degraded during periods of peak activity when the various commercial and retail shops are being visited and the parking lots on site are in heavy use. However, due to the low-key nature of the proposed commercial uses, and the potential walk-in pedestrian traffic at the convenience store, fish market, bakery and flower shop, vehicle-generated air pollution will not be significant. Thus, no signficant adverse impacts on ambient air quality are anticipated for the occupancy phase.

Traffic-induced noise will result from the project due to the increase in commercial, retail, and social activities on the project site. The proposed commercial development would generate a total of 247 vehicles per hour (vph) during the morning peak hour, 124 vph entering and 123 exiting the project site. During the afternoon peak hour, the proposed project would generate 235 vph, 122 vph entering and 113 vph exiting the site (Traffic Management Consultant, draft traffic impact analysis, September 1992). However, due to the probability that heaviest vehicular activity will be occurring during the day, noise impacts on surrounding the residential neighborhood will be minimal.

The ambient air quality will be slightly degraded during periods of peak activity when the various commercial and retail shops are being visited and the parking lots on site are in heavy use. However, due to the low-key nature of the proposed commercial uses, and the potential walk-in pedestrian traffic at the convenience store, fish market, bakery and flower shop, vehicle-generated air pollution will not be significant. Thus, no signficant adverse impacts on ambient air quality are anticipated for the occupancy phase.

The long-term economic impacts will be positive to the Nanakuli community by providing much-needed shopping and neighborhood business opportunities to the residents of the surrounding area. The added business activity will provide new job opportunities to the residents of the Nanakuli and Maili communities.

SECTION 7
ALTERNATIVES TO THE PROPOSED ACTION

7.1 No Action Alternative

The "no action" alternative would mean that the existing businesses would remain in a status quo condition, and the remainder of the site would go undeveloped. Construction-related impacts would be avoided. This alternative would not provide an active neighborhood commercial complex that would otherwise meet the range of convenience shopping needs that Nanakuli town residents have been lacking.

This scenario would essentially mean that positive impacts such as increasing the inventory of office space and much-needed neighborhood shopping and business services in Nanakuli would not be achieved. The "no action" alternative will allow this parcel to go underutilized thereby resulting in a probable loss of economic benefits to residents in the way of services, and to government by way of property and income taxes.

7.2 Alternative Densities/Mixes

A development consisting of a higher density and mix of commercial uses was considered by the developer in the concept development process. One scenario included a restaurant and a building in the makai section of the project site. However, the inclusion of a significant structure within the makai portion of the site was determined unfeasible due to this portion's vulnerability to flooding. Therefore, the use of the southeastern portion of the site was redesigned to include a farmers' market that required a "break-away" structure consisting basically of a tent-like kiosk structure.

7.3 Alternative Traffic/Intersection Improvements

7.3.1 Traffic signalization

The heavy traffic volumes entering the intersection of Farrington Highway and the project access road during the AM and PM peak hours of traffic (based on minor street traffic volumes relative to major street traffic) would warrant a new traffic signal at this location. The projected approach volumes on the project access road are 193 vph and 150 vph during the cumulative AM and PM peak hours of traffic, respectively. However, there are traffic signals at the intersections to the immediate east and to the west of the project site.

Because of this, a new traffic signal at this new intersection may not be allowed by the State Department of Transportation due mainly to the concern that the close proximity of the signals may cause undue queing along Farrington Highway during periods of heavy traffic.

A possible scenario would be the relocation of the Helelua Street traffic signal to the project access road intersection. However, this would require further analysis by the developer and detailed discussions and ultimate authorization by the appropriate transportation and public works agencies.

7.3.2 Exclusive South-bound Left-Turn Lanes

Based on existing traffic volumes, exclusive south bound left turn lanes on Farrington Highway are warranted and should be constructed at the intersections with Helelua Street and Lualualei Naval Road. However, Farrington Highway, north of Helelua Street, has limited right-of-way for roadway widening. On the makai side of Farrington Highway, roadway widening is restricted by a railroad easement aligned parallel to Farrington Highway. On the mauka side of Farrington Highway, the existing residential homes restrict roadway widening. However, left turn lanes should improve existing operating conditions at the study intersections.

7.3.3 Right-turn-in and Right-turn-out Movements Only

As an alternative to traffic signals, the intersection of Farrington Highway and the project access road could be restricted to right-turn-in and right-turn-out movements only. South bound site traffic would be diverted to the Helelua Street traffic signals on Farrington Highway. The existing dirt road between Helelua Street and the project access road would require upgrading to City and County of Honolulu standards. South bound site traffic, diverted to Helelua Street, would lower the level of service of the intersection, however, the operating level of service would still remain within acceptable standards.

7.4 Recommended Action

The site development plan that is offering a mix of commercial and retail uses for both residents and visitors is determined to be the most appropriate and feasible from the standpoint of providing optimal site development to the widest variety of people without jeopardizing the existing neighborhood character and environmental conditions.

The most appropriate traffic improvement alternative is the diversion of south bound site traffic to the Helelua Street traffic signals on Farrington Highway. The existing dirt road between Helelua Street and the project access road would require upgrading to City and County standards. Approximate cost to improve the dirt road would be $250,000 (assuming a length of 750 feet with 24' roadway width, with curbs, gutters and sidewalks). While level of service of this intersection would be lowered, the operating level of service would still remain within acceptable standards.

SECTION 8

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Implementation of the proposed project will result in the commitment of the necessary construction materials and human resources (in the form of planning, designing, engineering, construction labor, landscaping, and personnel for the management, services, offices and maintenance functions). The people providing the necessary labor to implement and complete the project will be compensated during the different stages by the developer, construction and related businesses, and the City and State governments.

The appearance of the project site will be altered from its present minimally improved state to that of an active commercial-retail and social gathering center. The development will be visually prominent but complementary to the surrounding areas.

The air and noise environment will be affected by the proposed project, however these impacts are typical of small commercial developments. While ambient air quality and noise levels in the area are relatively good, the proposed development result in a slightly increased number of vehicles going to and from the project site, resulting in increased vehicular emissions. Compliance with existing State Air and Noise Quality standards and Federal Air and Noise Quality standards should not be affected. Relative to Air Quality standards, the Federal requirement to use unleaded fuel, has resulted in "improved" automobile emission levels.

The project will result in a use commitment of the land for a long-term period. Once the optimal commercial use is established, it is unlikely that the land would revert to a lower use except over a long term. Commitment of land for these purposes will foreclose certain use options for the land, such as open space.

The commercial uses provided by the project will benefit the neighborhood in terms of shopping and business services conveniences in the short- and long-term. Furthermore, its contribution to the inventory of jobs and additional revenues to the government by way of

income and general excise taxes will potentially benefit all of Oahu's and the State's people.

SECTION 9

RELATIONSHIP OF THE PROPOSED PROJECT TO THE GOALS AND OBJECTIVES OF THE COASTAL ZONE MANAGEMENT LAW CHAPTER 205A, HRS, AND THE SPECIAL MANAGEMENT AREA GUIDELINES

9.1 Coastal Zone Management Law

Chapter 205A, Hawaii Revised Statutes (HRS) designates the entire State of Hawaii as being within the Coastal Zone Management Area. Goals and objectives of the Coastal Zone Management program include providing coastal recreational opportunities and public or private improvements important to the State's economy, preserving historic and scenic resources, protecting coastal ecosystems, reducing coastal hazards, and improving the development review process.

All of the project site lies within the Special Management Area. The proposed improvements will not impact the coastal resources of the area, nor will the proposed development foreclose public access to recreational resources.

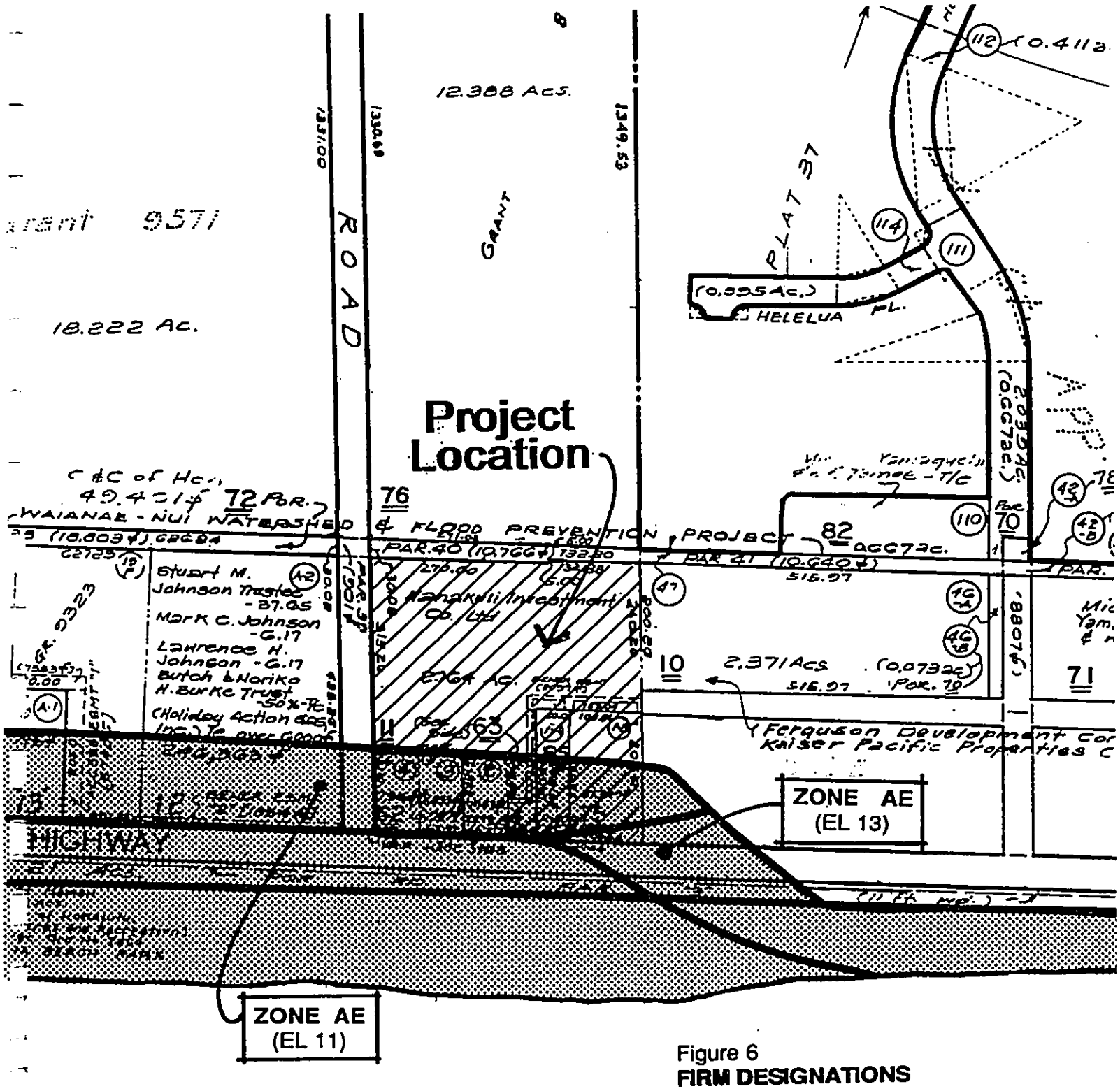
Makai portions of the project site are located within the tsunami inundation and flood runup zones (as shown in Figure 6, FIRM Designations). The types of improvements in this vulnerable section of the site will be restricted to kiosks for vendors at the farmers' market and parking for this use.

9.2 Special Management Area Guidelines

The proposed project will respect the Special Management Area Guidelines for reviewing projects with the Special Management Area as follows:

1. The proposed project will not impede access to or adversely impact the recreational resources of the Nanakuli shoreline.

2. According to the State Department of Land and Natural Resources, no known archaeological resources exist in the project area and on site. None of the parcels have been inventoried for historic sites, however, and subsurface historic sites might be present at the parcel proposed for residential development located mauka of the



LEGEND

Special Flood Hazard Areas Inundated by 100-Year Flood.

ZONE AE — Base flood elevations determined.

Source: FEMA, Sept. 1990
Panel 100 of 135

Figure 6
FIRM DESIGNATIONS
Nanakuli Town Center
Nanakuli Investment Company, Ltd.

0 200 400

R. M. TOWILL CORPORATION
SEPTEMBER 1992

project site. During grading and construction, should any remains of potentially significant historic or archaeological significance be unearthed, construction will be halted and the State Historic Preservation Division will be consulted as to proper handling of the discovered remains.

3. The project site and shoreline environment do not contain any wetlands or natural ecosystems and therefore no impacts on such environments are anticipated by the proposed development.

4. The proposed drainage system for the project is to allow surface runoff to sheetflow across the site, percolate partially into the landscaped and grassed lawn areas within the development (luau grounds), and to allow the remainder to flow into the flood prevention channel that borders the mauka boundary. This drainage easement connects with the Ulehawa Channel just west of the project site. The small scale of the proposed development is not anticipated to have significant impacts on the existing drainage system for the area.

5. As discussed in the earlier sections, coastal views from the project site are of the Nanakuli and Ulehawa Beach Parks seaward. These views will not be impeded by the project particularly because the buildings will be one- and two-story structures and of low density.

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DRAFT

ENVIRONMENTAL ASSESSMENT

FOR

NANAKULI TOWN CENTER DEVELOPMENT

NANAKULI, ISLAND OF OAHU

ENVIRONMENTAL ASSESSMENT

FOR

NANAKULI TOWN CENTER DEVELOPMENT

NANAKULI

ISLAND OF OAHU, HAWAII

TAX MAP KEY NO. 1-8-7-08: 11, 65, & 75

This document was prepared pursuant to Chapter 343, HRS
and Rules and Regulations of the OEQC

Prepared For:
Nanakuli Investment Company, Ltd.

Prepared by:
R. M. Towill Corporation

October 1992

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(Continued)

LIST OF FIGURES

SUMMARY INFORMATION

Project:	Nanakuli Town Center Commercial Development Nanakuli, Oahu
Applicant:	Nanakuli Investment Company, Ltd. 84-339 Ikuone Place Waianae, Hawaii 96792 Contact: James Aki
Accepting Authority:	Department of Land Utilization City and County of Honolulu
Tax Map Key Nos. and Areas:	8-7-08: 11 120,399.8 sf 8-7-08: 65 9,915.0 sf 8-7-08: 75 21,789.0 sf

Land Use Designations:

	SLUC	City/County DP	Zoning
Parcel 11	Urban	B-2	Business
Parcel 65	Urban	B-2	Business
Parcel 75	Urban	B-2	Business

Existing Use(s) Parcel 11 is undeveloped, while parcels 65 and 75 contain one story structures.

SECTION 1
BACKGROUND AND PROJECT DESCRIPTION

1.1 Location

A mixed use commercial center is proposed for development in Nanakuli town by Nanakuli Investment Company, Ltd. The project site (Tax Map Key Nos. 8-7-08: 11, 65 and 75) is located along Farrington Highway, north (mauka) of the Ulehawa Beach Park and Nanakuli Beach between the Helelua Street-Farrington Highway and Lualualei Naval Road-Farrington Highway intersections (see Figures 1, 2, and 3, Project Location, Vicinity and Tax Map Key Parcel Maps).

1.2 Project Description

The Nanakuli Town Center Commercial Development is envisioned as a blend of old and new Hawaii by serving the local community's retailing needs as well as the visitor market. It will offer approximately 11,690 square feet of gross leasable area (GLA) and 11,525 square feet of gross floor area (GFA) in a mix of neighborhood commercial uses including offices, retailers, a savings and loan institution, flower vendor, bakery, eateries and a country style farmers' market fronting Farrington Highway (see Figure 4, Site Development Plan). This development will also feature an open air assembly area designed for social gatherings such as luaus and community forums with a stage for performances and a landscaped garden in the center of the project. The project site is accessible from Farrington Highway, and ample bus and private vehicle parking will be available on site.

Project site access will be provided by an existing easement through a property that fronts Farrington Highway, and a road connecting to Helelua Street mauka of and parallel with Farrington Highway. A traffic impact analysis report has been prepared as part of this environmental assessment and is included in its entirety as an appendix.

Parcels 11, 65 and 75 are located within the Special Management Area (SMA) as defined by the City and County of Honolulu. The purpose of the SMA is to "preserve, protect and, where possible, restore the natural, cultural and recreational resources of the coastal zone of Oahu." Thus, an Special Management Area Use permit is being sought and this

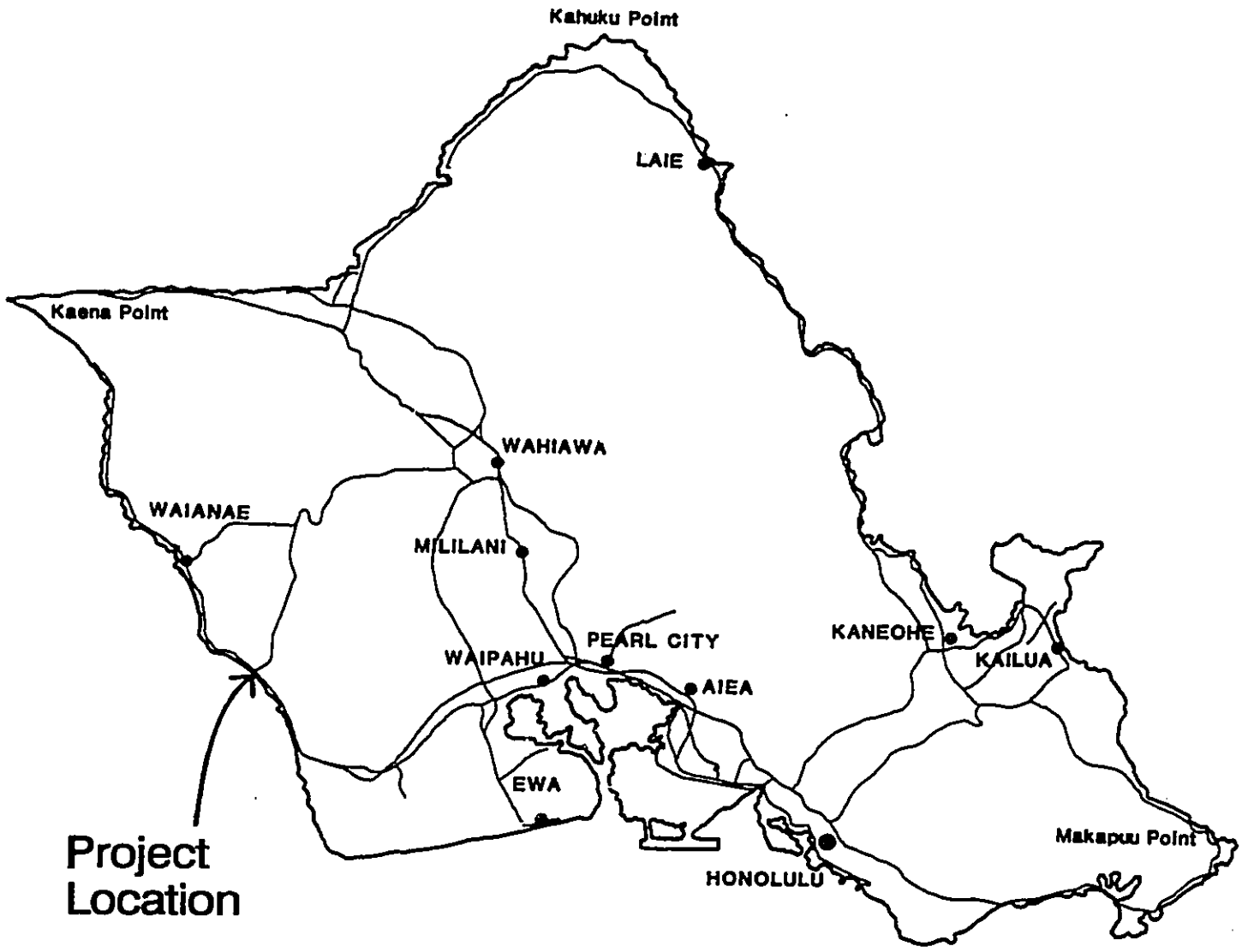

Figure 1
LOCATION MAP
Nanakuli Town Center
Nanakuli Investment Company, Ltd.

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MILES

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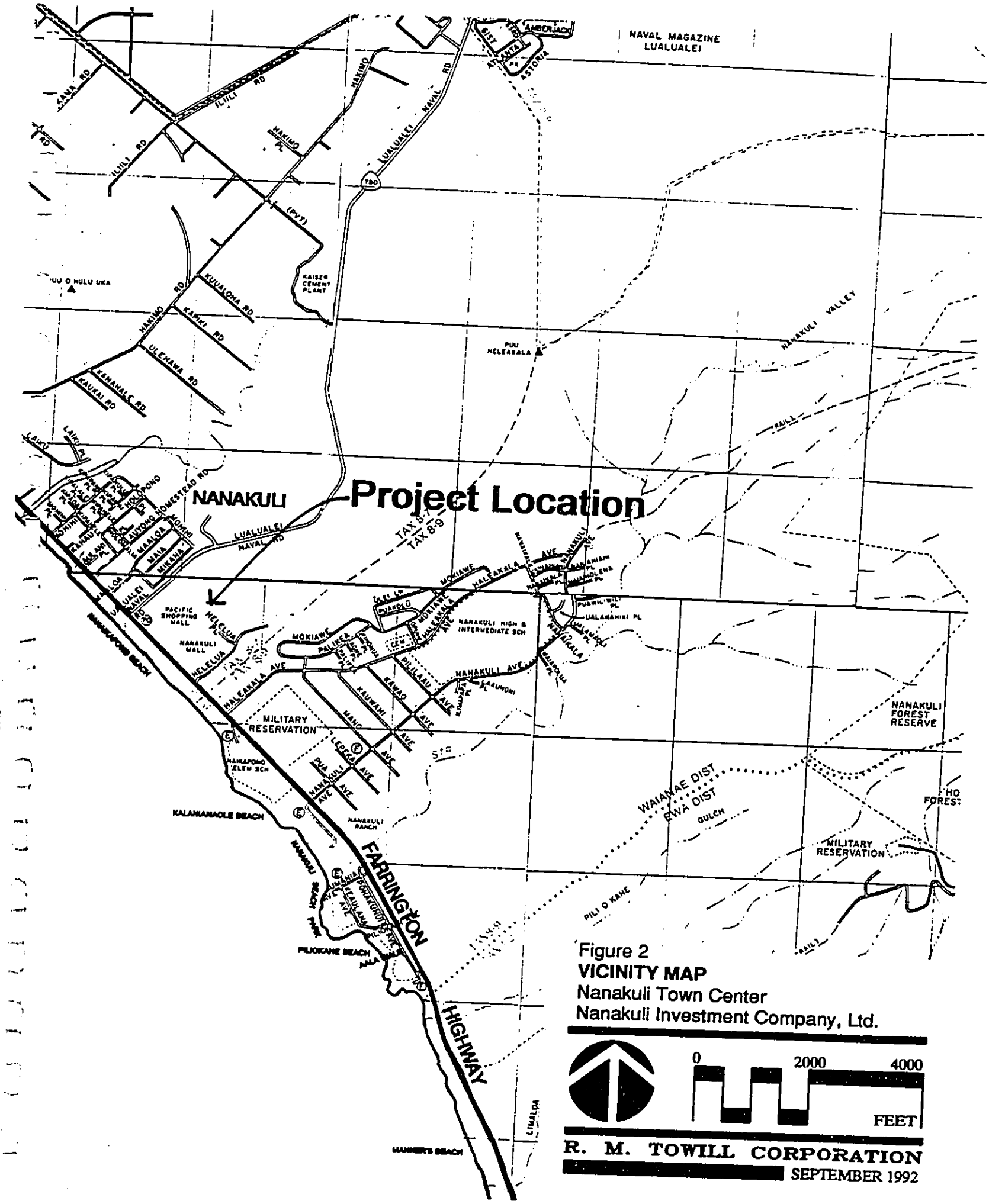

Figure 2
VICINITY MAP
Nanakuli Town Center
Nanakuli Investment Company, Ltd.

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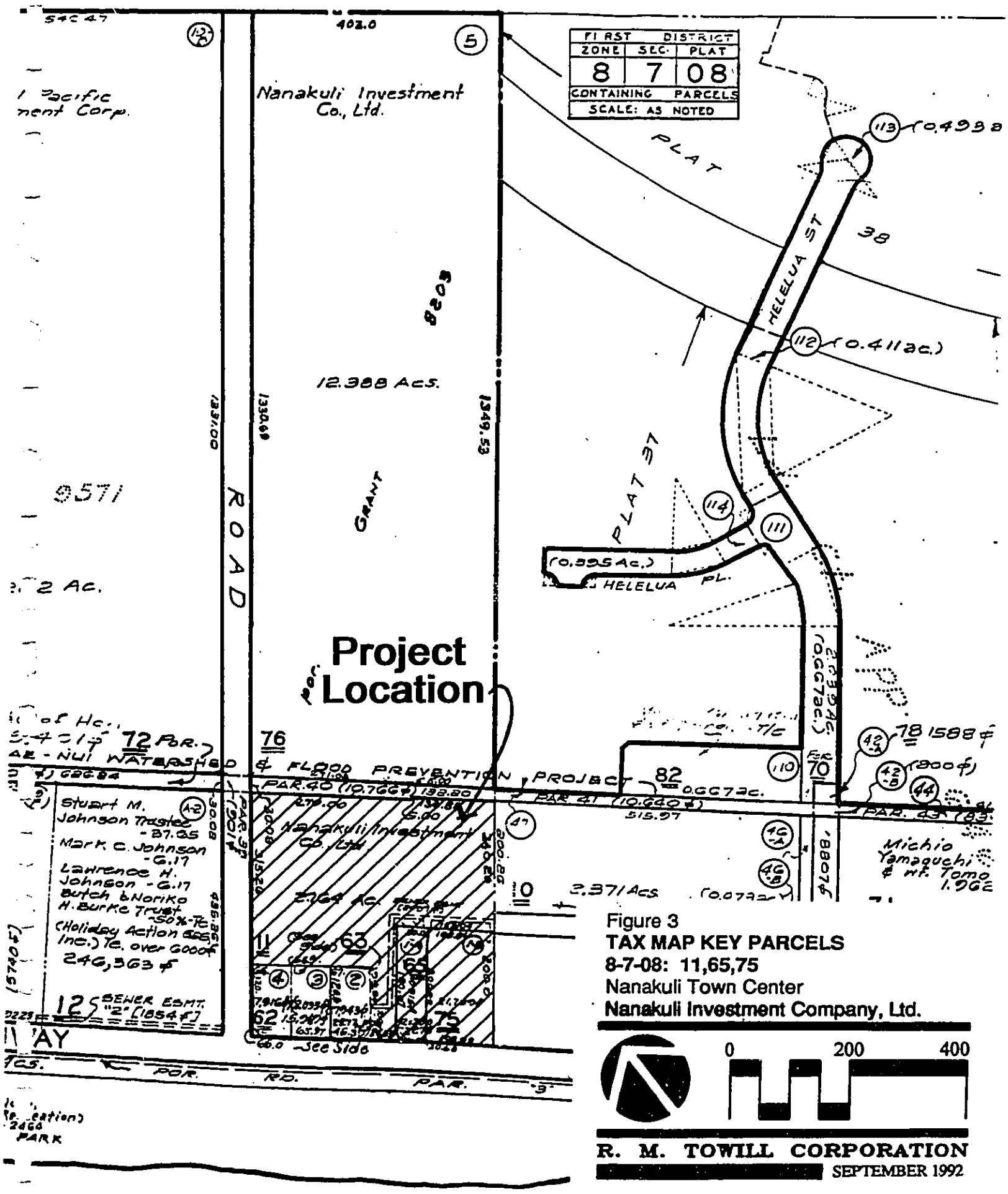

Figure 3
TAX MAP KEY PARCELS
8-7-08: 11,65,75
Nanakuli Town Center
Nanakuli Investment Company, Ltd.

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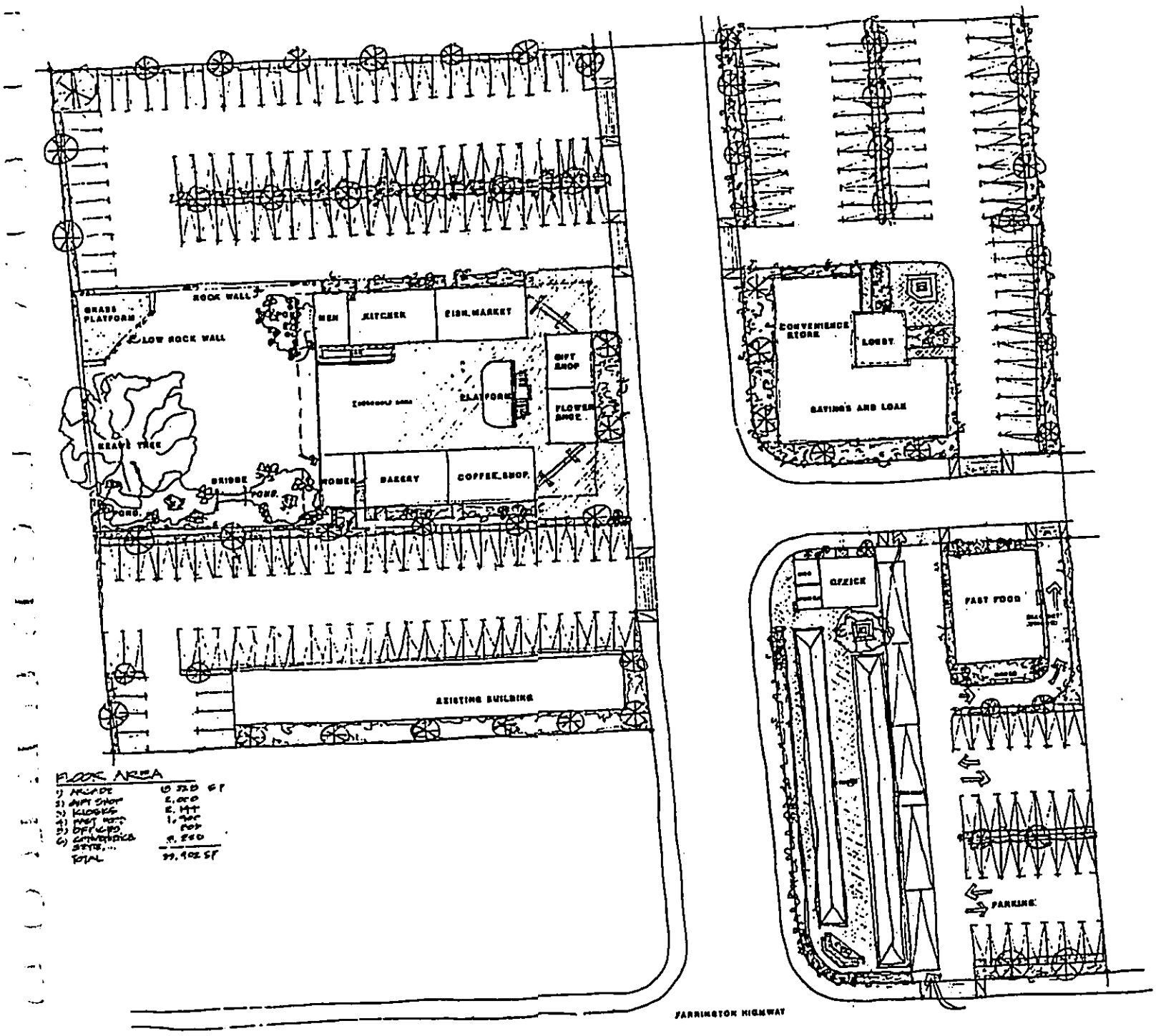

FLOOR AREA

1) ARCADE	10,320 SF
2) ART SHOP	2,000
3) KIOSKS	2,400
4) FAST FOOD	1,200
5) DEPT. STORE	60,000
6) CONVENIENCE STORE, ...	3,240
TOTAL	99,400 SF

Figure 4
SITE DEVELOPMENT PLAN
Nanakuli Town Center
Nanakuli Investment Company, Ltd.

0 60 120
FEET

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SEPTEMBER 1992

Source: Paul Osumi, AIA

environmental assessment (EA) which supplements the permit application has been prepared to provide information about the proposed action, the environment in which this action is occurring, the project's potential environmental and socio-economic impacts, and appropriate mitigation measures.

This EA has been prepared in accordance with Chapter 343, Hawaii Revised Statutes (HRS), and the rules and regulations of the Office of Environmental Quality Control (OEQC).

1.3 Development Schedule

Start of construction is expected around mid-1993 with build out to occur in three phases within a five year period.

1.4 Project Costs

Total construction cost of the Town Center is estimated at $1.9 million per phase (or $5.7 million for the three phases). The cost includes on-site construction, parking lot construction/improvements, and landscaping.

SECTION 2
ENVIRONMENTAL CONDITIONS, PROJECT IMPACTS AND MITIGATION MEASURES

2.1 Existing, Surrounding Uses, and Ownership

The mauka portion of the project site (parcel 11) is undeveloped with the exception of a portable wooden framed building that houses a dental office. It is generally covered with grass, weeds, few trees, and kiawe bushes. Two single-story concrete tile block structures exist on parcels 65 and 75 and are currently fronting and accessible from Farrington Highway.

An improved drainage channel exists along the length of the eastern property line. A channelized easement (identified as a portion of the "Waianae-Nui Watershed and Flood Prevention project") exists between the mauka edge of parcel 11 and parcel 76. The channel connects to the Ulehawa Channel for storm water dispursement.

The project site is owned by Nanakuli Investment Company, Ltd. The property located east of the site contains a Faststop convenience store, and the property to the west of the project site contains a gas station and movie theater. A supermarket and associated parking lot occupy parcel 62 which is located at the southwestern corner of the subject property at the corner of Farrington Highway and the proposed new access road. Ulehawa and Nanakuli Beach Parks, owned and maintained by the City and County of Honolulu, are located south of the project site, makai of Farrington Highway.

A proposed residential development would be located on the parcel mauka (tax map no. 8-7-08:76) of the proposed Nanakuli commercial development. The proposed residential development would include 143 multi-family dwelling units. This residential project is expected to be developed by Inter-Pac Development, Inc. and build out may be by yar 1995.

2.2 Physiography

The project site is situated in Nanakuli fronting the Farrington Highway corridor and is

flanked by mountains (Mount Kaala to the north) and ridges (Paheehee and Kamaileunu) to the east, north and west. It is a relatively level site with a gentle slope downward from the north property line toward Farrington Highway.

The makai portion of the project site that front Farrington Highway is located within the tsunami zone and within flood zone AE (within elevation 11) (See Figure 5, FIRM designations). To mitigate this vulnerable section of the site, the area will have to be filled if buildings were to be constructed in this portion. Finished floor elevations of these structures will clear the flood runup levels. Thus, the proposed project will alter the physiography of the land in this section of the project site since the site will be graded and filled to raise the finished floor of the commercial spaces above the flood elevation. The proposed project will involve trenching for utilities connections, but only finished grades within the mauka section of the project site will be close to the original grades.

2.3 Climate

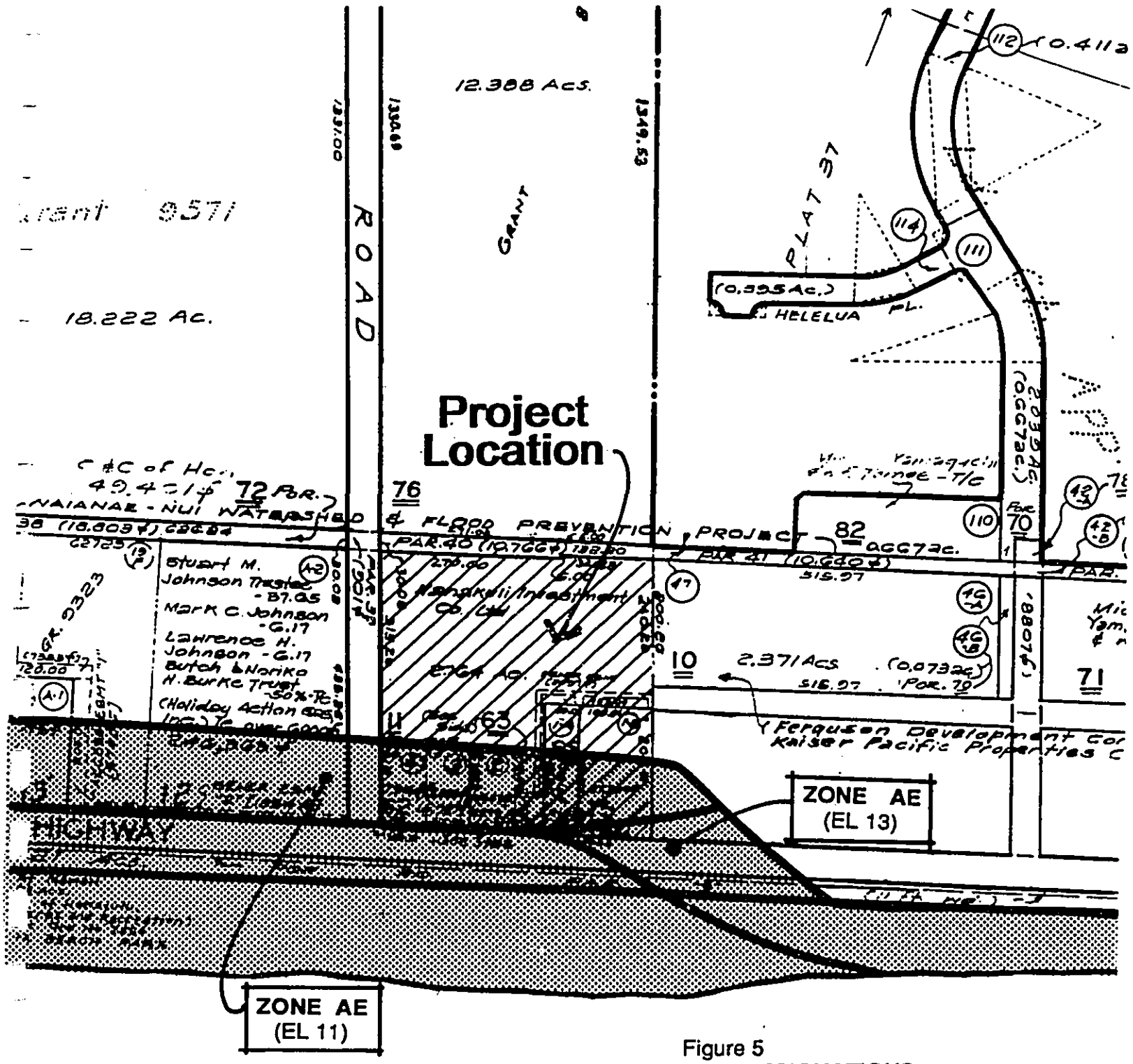
The climate of the Nanakuli area is sub-tropical. The project site generally receives abundant sunshine during most of the year. The northeasterly tradewinds are the prevailing winds during most of the year. The average annual rainfall for Oahu is approximately 24 inches while the average annual rainfall for the Nanakuli-Waianae area is 20 inches. The average daily temperature ranges between the high 70's to the high 80's. The project is not expected to alter the existing climatic conditions.

2.4 Topography, Soils and Geology

2.4.1 Topography

The project site is relatively level with a gentle slope downward from the north property line toward Farrington Highway.

The makai portion of the project site that fronts Farrington Highway is located within the tsunami zone and within flood zone AE (within elevation 11). To mitigate this vulnerable section of the site, the area will have to be filled to raise the finish floor elevations of the development. Thus, the proposed project will alter the physiography of the land since the site will be graded and filled to raise the finish floor of the commercial spaces above the



LEGEND

ZONE AE	Special Flood Hazard Areas Inundated by 100-Year Flood. Base flood elevations determined.

Source: FEMA, Sept. 1990
Panel 100 of 135

Figure 5
FIRM DESIGNATIONS
Nanakuli Town Center
Nanakuli Investment Company, Ltd.

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R. M. TOWILL CORPORATION
SEPTEMBER 1992

flood elevation. The proposed project will involve trenching for utilities connections.

2.4.2 Geology and Soils

The geology of the proposed project site consists of post-erosional lavas and coral reef deposits. Soils of the project area are generally categorized as Lualualei-Fill land-Ewa association. This association consists of well-drained, fine textured and moderately fine textured soils on fans and in drainageways on the southern and western coastal plains on Oahu. The soils are nearly level to moderately sloping, and are formed in alluvium. Elevation ranges from sea level to 400 feet. Annual rainfall is 15 to 30 inches in most places. The mean annual soil temperature is between 73 degrees and 75 degrees Fahrenheit. The natural vegetation is kiawe, koa haole, and fingergrass.

Lualualei soils make up about 20 percent of the association, Fill land about 20 percent, and Ewa soils 15 percent. Honouliuli, Jaucas, Kawaihapai, Makalapa, Mamala, and Pulehu soils make up the rest. Lualualei soils have a surface layer of very dark grayish-brown, very sticky and very plastic clay that cracks widely upon drying. They are underlain by coral, gravel, sand, or clay at a depth below 40 inches. Fill land consists of various kinds of fill material. Ewa soils have a surface layer and subsoil of dark reddish-brown, friable silty clay loam. The substratum is gravelly alluvium or coral limestone. This association is used for, among other things, urban development.

The project site consists of the Coral outcrop (CR) and Mamala stony silty clay loam (MnC) soils series. Coral outcrop consists of coral or cemented calcareous sand on Oahu. The coral reefs formed in shallow ocean water during the time the ocean stand was at a higher level. Small areas of coral outcrop are exposed on the ocean shore, on the coastal plains, and at the foot of the uplands. Elevations range from sea level to approximately 100 feet.

Mamala stony silty clay loam (MnC) series occurs in 0 to 12 percent slopes. Stones, mostly coral rock fragments, are common in the surface layer and in the profile. Profile of the surface layer is dark reddish-brown stony silty clay loam about 8 inches thick. The subsoil is dark reddish brown silty clay loam about 11 inches thick. The soil is underlain by coral limestone and consolidated calcareous sand at depths of 8 to 20 inches. This soil is neutral

to mildly alkaline.

The makai portion of the development fronting Farrington Highway may require additional fill to raise the floor elevations of new structures above the base flood elevations. Soils used for fill should come from nearby areas.

2.5 Surface Water and Drainage

Surface flows are currently handled as sheet flows into the Ulehawa Channel (also known as Waianae-Nui Watershed and Flood Prevention Project) located near and forms the mauka boundary of the project site. The site will be graded and finished to accommodate surface sheet flows to gutters along the proposed road easement and into existing Ulehawa Channel storm drainage facilities.

The paved parking areas of the proposed project will increase the amount of imperious surface areas on the project site thereby resulting in increased storm water runoff through the site as opposed to current surface waters partially infiltrating unimproved unpaved surfaces. The project site's storm runoff will then place a greater demand for accommodation by the Ulehawa Channel as the receiving facility for the area's drainage facility. However, due to the relatively small scale of the proposed project (approximately 3.5 acres), the overall impact on the existing drainage facility is not expected to be significant.

2.6 Natural Hazards

Flood The makai-most portion of the project site is located in Flood Zone "AE" (elevation 11), and the mauka portion of the site is located in zone D (undetermined). The makai portions of the site that are vulnerable to flooding will be graded and filled so that commercial structure floor elevations will be raised above the flood elevation.

Tsunami The property is located within a vulnerable inundation area (Map 16, GTE Hawaiian Tel, March 1992-93). Proper precautions such as siting buildings on the mauka

portions of the site (having higher elevation thus less vulnerable to inundation) and the location of uses such as parking facilities and kiosks for the farmers market vendors that will not require finished floors in the makai-most sections will be done. By so doing, buildings and substantial structures will be located in sections of the parcels that are less prone to wave runup. The siting of the various structures and uses will be decided in the final design of the development.

Earthquake All of the island of Oahu is rated as seismic Zone 2A, according to standards established in the 1988 Uniform Building Code (UBC). There are four zones (1 through 4) in this range, with Zone 1 as the rating given to areas least prone and Zone 4 as the most prone to earthquake hazards.

The proposed project is not expected to be susceptible to earthquakes.

2.7 Hydrology

No known groundwater sources exist in the vicinity of the project site. Thus, the proposed project is not expected to adversely impact the underlying groundwater sources of Oahu. Further, no drilling for wells is proposed for the project. It appears that existing Board of Water Supply water mains and lines in Farrington Highway will be the utilized to meet the project's potable water requirements.

2.8 Visual Character

At present the portion of the project site that is visible from Farrington Highway is that of an underutilized property that is lacking regular maintenance. The mauka portion of the site is undeveloped except for the existence of grass, weeds, haole koa and castor bean bushes. The views from parcels 11, 65 and 75 include Puuhele Akala/Kahe Kai, a multifamily development constructed in 1974 to the east; Farrington Highway to the south; and a supermarket and open grassland to the west. To the north the Waianae mountain range can be viewed from all parcels.

The proposed two-story mixed use commercial development will change the existing views in this neighborhood. In fact, the low-rise neighborhood shopping arcade will add a vibrant character to the views onto the sight with the increased density, activity and people-orientation. More residents and visitors will be able to take advantage of the views of the Waianae mountains and ocean views from this site once the development is in place. The assembly area for luaus and other community gatherings as well as the farmers market close to the Farrington Highway boundary will make for a more active and interesting environment for the surrounding Nanakuli community and the Waianae coast.

2.9 Air Quality

Temporary adverse impacts on air quality will occur during the utility system improvements construction period. Heavy construction equipment that will be used during the construction phase will emit exhaust and airborne particulates. The construction work will also produce dust. These impacts will be reduced through the use of approved mitigative measures discussed in Section 7.

The ambient air quality will be slightly degraded during periods of peak activity when the various commercial and retail shops are being visited and the parking lots on site are in heavy use. However, due to the low-key nature of the proposed commercial uses, and the potential walk-in pedestrian traffic at the convenience store, fish market, bakery and flower shop, vehicle-generated air pollution will not be significant. Thus, no signficant adverse impacts on ambient air quality are anticipated for the occupancy phase.

2.10 Noise Impacts

Temporary adverse noise impacts on adjacent commercial and residential properties will also occur during the construction of the proposed project. Noise impacts created by construction equipment such as backhoes and dump trucks will be reduced through the use of approved mitigative measures discussed in Section 7. Further, construction activities will be limited to daytime hours so as to avoid inconveniences to residents along Helelua Street.

Traffic-induced noise will result from the project due to the increase in commercial, retail,

and social activities on the project site. The proposed commercial development would generate a total of 247 vehicles per hour (vph) during the morning peak hour, 124 vph entering and 123 exiting the project site. During the afternoon peak hour, the proposed project would generate 235 vph, 122 vph entering and 113 vph exiting the site (Traffic Management Consultant, draft traffic impact analysis, September 1992). However, due to the probability that heaviest vehicular activity will be occurring during the day, noise impacts on surrounding the residential neighborhood will be minimal.

2.11 Flora and Fauna

The project site has for the most part been void of native vegetation for many years as it has been somewhat developed with an auto repair shop, tavern, and neighborhood market on the adjacent parcel. A few small palm trees, grass, and kiawe bushes and trees are scattered about the site. The site is probably inhabitated by rodents, cats, and mongoose given its proximity to undeveloped lands located mauka, and the drainage channel that forms the mauka boundary of the site.

According to the Forestry and Wildlife Division of the State Department of Land and Natural Resources, no known rare Hawaiian plants or endangered wildlife exist on the project site. However, rare Hawaiian plants may exist on steeper slopes in the vicinity. There are no wildlife preserves either on the site or in the immediate vicinity that are affected by the proposed development.

Site development will be coordinated with the State Department of Land and Natural Resources and if any endangered resources are found arrangements will be made to notify that department to do whatever follow up is necessary. However, given the proposed preservation of existing vegetation on site for screening and low cost landscaping, it is not anticipated that there will be any significant impact on botanical resources. Further, because this area has little rainfall during the year, fire prevention will be emphasized in the management agreement.

2.12 Historic, Cultural and Archaeological Resources

Remnants of the original OR & L railroad track are located on the makai side of Farrington Highway across from the project site. While no immediate plans exist to renovate the Nanakuli section of this historic facility, the remnants are to be preserved as such until further notice by the Oahu Railway society. The project site does not encompass this historic site and neither are there any foreseeable impacts on this site resulting from the proposed commercial project.

According to the State Department of Land and Natural Resources Historic Preservation Division, no known historic sites exist at these parcels (letter dated May 19, 1992). None of the parcels has been inventoried for historic sites, however, and sub-surface historic sites might be present at the parcel proposed for residential development, located mauka of the project site.

Thus, during grading and construction on the parcel should any remains of potentially significant historic or archaeological value be unearthed, construction will be halted and the State Historic Preservation Division will be consulted as to proper handling of the discovered remains.

SECTION 3
PUBLIC FACILITIES AND SERVICES AND PROJECT IMPACTS

3.1 Sewer System

A six-foot sewer easement exists within parcel 11, and a sewer line is located along Farrington Highway. The existing easement in parcel 11 will have to be relocated for the project. The development will be assessed a Wastewater Facility charge based on the size of the project. A determination as to whether existing facilities have the capacity to accommodate the proposed commercial development will be made upon submittal of a written request.

3.2 Water System

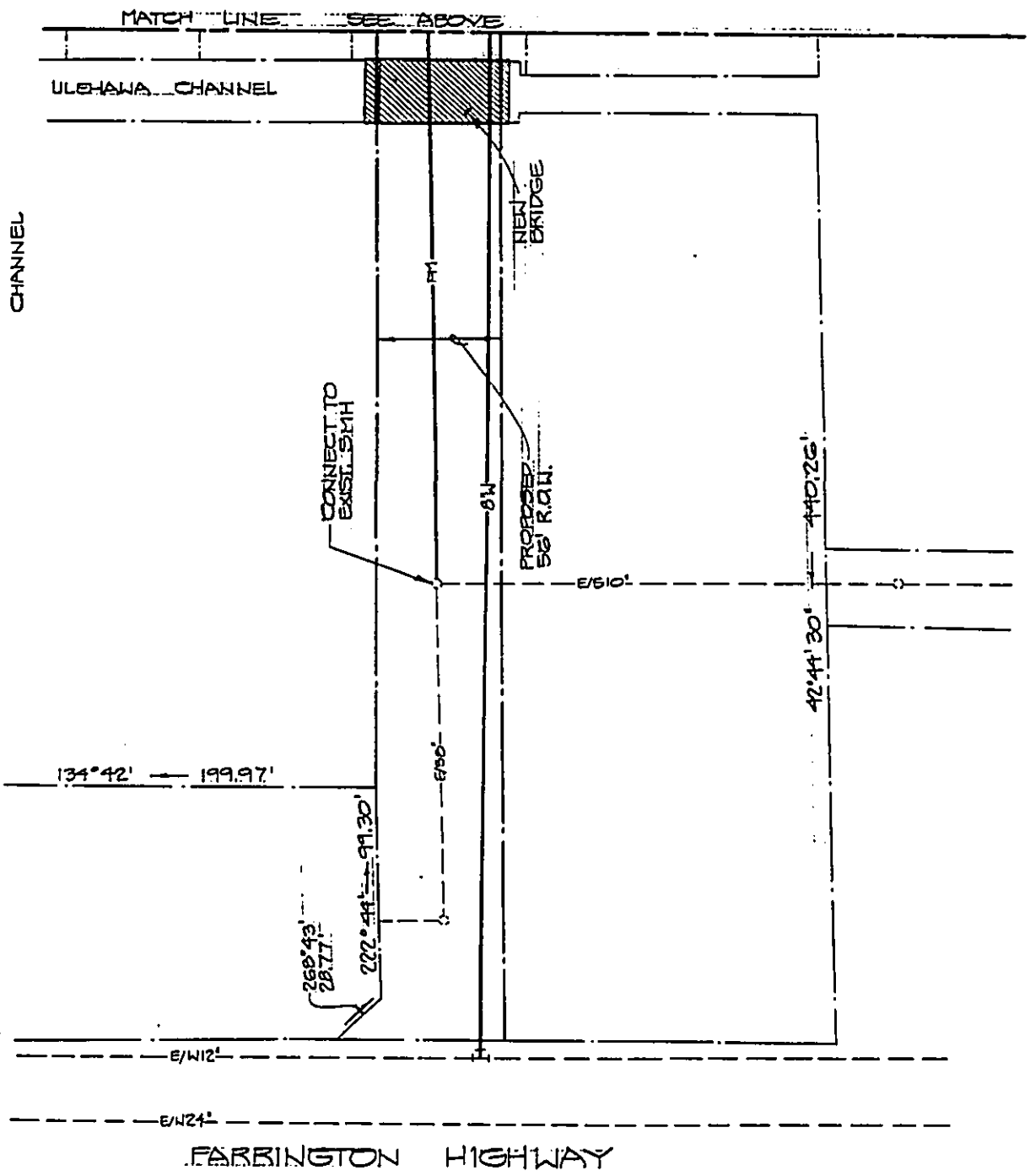
Six-inch and 12-inch Board of Water Supply (BWS) water mains and lines exist along Farrington Highway. The 12-inch line currently serves the project site. BWS has preliminarily determined that the existing water system is presently adequate to accommodate the proposed development. There are three existing water meters currently servicing the project site.

The availability of additional water will be confirmed when the building permit is submitted for BWS review and approval. A water system facilities charge and any applicable meter installation charges will be paid when the building permit is submitted for review and approval. Any additional requirements will be addressed at that time.

If a three-inch or larger meter is required for the proposed project, the construction drawings showing the installation of the meter will be submitted for BWS review and approval. BWS approved reduced pressure principle backflow prevention assemblies will be installed on each domestic water line after the property valves are installed and prior to any branch piping. See Figure 6, Existing Infrastructure Systems.

3.3 Drainage System

A drainage easement currently runs along the northern or mauka boundary of parcel 11 and



LEGEND

E/W: Existing Water Line
E/S: Existing Sewer Line

Source: R.M. Towill Corporation

Figure 6
EXISTING INFRASTRUCTURE SYSTEMS
Nanakuli Town Center
Nanakuli Investment Company, Ltd.

NOT TO SCALE

R. M. TOWILL CORPORATION
SEPTEMBER 1992

directs surface flows into the Ulehawa Channel nearby. The proposed development drainage requirements will be met by directing surface runoff into the existing facility.

3.4 Circulation

Farrington Highway is a four lane, two way roadway in the vicinity of the project site and has a posted speed limit in the project vicinity of 35 miles per hour (mph). Farrington Highway serves as the primary access to communites located on the west coast of Oahu such as Waianae and Makaha. Project site access will be provided by a new access road on Farrington Highway located between Helelua Street and Lualualei Naval Road. A road connecting the new project access road and Helelua Street, located mauka of Farrington Highway, would provide an additional site access. Helelua Street and Lualualei Naval Road intersect Farrington Highway as signalized intersections.

In analyzing the project's traffic impacts on existing intersections to determine additional improvement requirements, the traffic forecast in the study conducted for this EA/SMA application includes vehicle trips generated by the proposed residential development located directly mauka of and adjacent to the Nanakuli Town Center commercial project site.

The project site generated traffic represents a 4% increase in total traffic on Farrington Highway south of Helelua Street by the year 1998, which is when the project is expected to be built out. The total traffic on the four lane, undivided Farrington Highway, south of Helelua Street, represents a 3% increase over projected conditions without the proposed project.

The results of the traffic impact analysis have been summarized as follows:

> The proposed Nanakuli Town Center Development would not adversely affect project peak hour traffic conditions. The trips generated by the proposed project would not significantly change the level of service of the individual movements at the intersections of Farrington Highway with Helelua Street, and Farrington Highway with Lualualei Naval Road. Exclusive left turn lanes are warranted at the study intersections under existing operating conditions. Roadway widening would require

additional right-of-way that is limited by a railroad easement on the makai side and residential development on the mauka side of Farrington Highway. The installation of traffic signals are also warranted for projected traffic conditions and should increase safety and improve traffic operations in the project vicinity. The traffic signals should be synchronized with traffic signals at adjacent intersections to maximize through traffic movement. Restricting the intersection of Farrington Highway and the project access road to right-turn-in and right-turn-out movements would increase the number of vehicles on Helelua Street. South bound site traffic, diverted to Helelua Street, would lower the level of service of the intersection, however the operating level of service would still remain within acceptable standards.

3.5 Power and Communication Systems

The site is currently served by existing Hawaiian Electric Company and GTE Hawaiian Telephone lines that run along Farrington Highway fronting the property. The proposed project will be served by the same facilities.

3.6 Solid Waste

Refuse collection service will be provided by the City and County of Honolulu.

3.7 Police and Fire Protection

The City and County of Honolulu Police Department will provide police protection services to the development. Adequate lighting and other design features that will enhance security will be taken into consideration in the final design stages.

Adequate fire protection for the development will be furnished by way of development of water facilities including hydrants and fire hoses.

3.8 Hospitals

Public and private health care services available to residents are Waianae Coast Comprehensive Health Care Center and St. Francis Medical Center West. These facilities will be able to service the tenants and visitors at this commercial center.

SECTION 4
SOCIO-ECONOMIC CONDITIONS AND PROJECT IMPACTS

4.1 Social Considerations

According to the State of Hawaii Data Book (1991) the Waianae district experienced a nearly 31 percent increase in resident population between 1970 and 1980 (from 24,077 to 31,487 persons), and a nearly 19 percent increase between 1980 and 1990 (from 31,487 to 37,411 persons). Like the remaining six residential districts on the island of Oahu, Waianae will probably to continue to experience steady growth into the future. Because of this, the proposed development will provide much needed neighborhood shopping and business service opportunities to the Nanakuli residents. This development as envisioned will provide a gathering place for residents for leisurely shopping or social/community meetings in the central courtyard throughout the week.

4.2 Economic Considerations

The project will help attract new businesses including retail and business services to the Nanakuli neighborhood that can result in an increase in the economic investment in the community. This will be achieved through the creation of a number of new jobs and job opportunities for the residents in the area, and increase in consumer spending as residents begin to purchase services in the community. The development will also increase the property values in the Nanakuli and surrounding areas. There will be a resulting economic and physical revitalization in the community.

SECTION 5
LAND USE POLICIES

5.1 State Land Use

The project site in designated Urban on the State Land Use map. Thus, the proposed commercial development is consistent with the land use designation.

5.2 State Plan and Functional Plans

The Hawaii State Plan (Chapter 226, HRS) functions as a general guide for development and activities within the State. The Plan embodies the desired goals, objectives and policies by which projects and development are generally directed to be consistent with.

The proposed project is consistent with the aims and objectives of the State of Hawaii's policies regarding a balanced promotion of economic growth activities. The "Urban" State Land Use designation provides the public incentives that will enable the developer to attract reasonable and sound private investment and activities that will generate employment and economic revitalization in the area.

5.2.1 State Functional Plans

In conjunction with County general plans, State functional plans are the primary guideposts for implementing the Hawaii State Plan. While the Hawaii State Plan establishes long-term objectives for Hawaii, the functional plans delineate specific policies and priority actions that need to be addressed in the short term.

The major focus of the physical function plans is on the promotion of a balanced growth approach in the use of limited resources. This recognizes the need for economic development while preserving the environment and multi-cultural lifestyles throughout the state.

The proposed development is generally consistent with the plans and policies of the functional plans in that the project proposes a variety of business opportunities on a parcel that is underutilized at present while maintaining a local community environment.

5.3 City and County of Honolulu

5.3.1 Development Plan

The project site is designated Business on the Development Plan Land Use map. Because of this the proposed development is consistent with the intended land use for this site.

5.3.2 Zoning

The Land Use Ordinance (LUO) map designates the project site as B-2 or Community Business. Thus, the proposed development is consistent with the zoning for this property.

5.3.3 Special Management Area

The site is located within the Special Management Area as defined by Chapter 205A, Hawaii Revised Statutes. The purpose of the SMA is to "preserve, protect and, where possible, restore the natural, cultural and recreational resources of the Coastal Zone of Oahu (LUO, 1991)." Hence, an SMA permit is being sought for the proposed development.

See Figure 7, Land Use Designations and SMA.

All in all, it has been determined that the proposed Nanakuli Town Center will not impede access to or adversely impact the recreational resources of the Nanakuli-Maili shoreline; will have no affect on any archaeological or historic resources on site because none are known to exist according to the State Historic Preservation Division; will have no affect on any wetlands or natural ecosystems; has preliminarily been determined to have access to adequate public utility facilities such as drainage, potable water and sewer facilities; and will have no adverse impact on coastal views.

5.4 Summary of Required Land Use Permits and Approvals

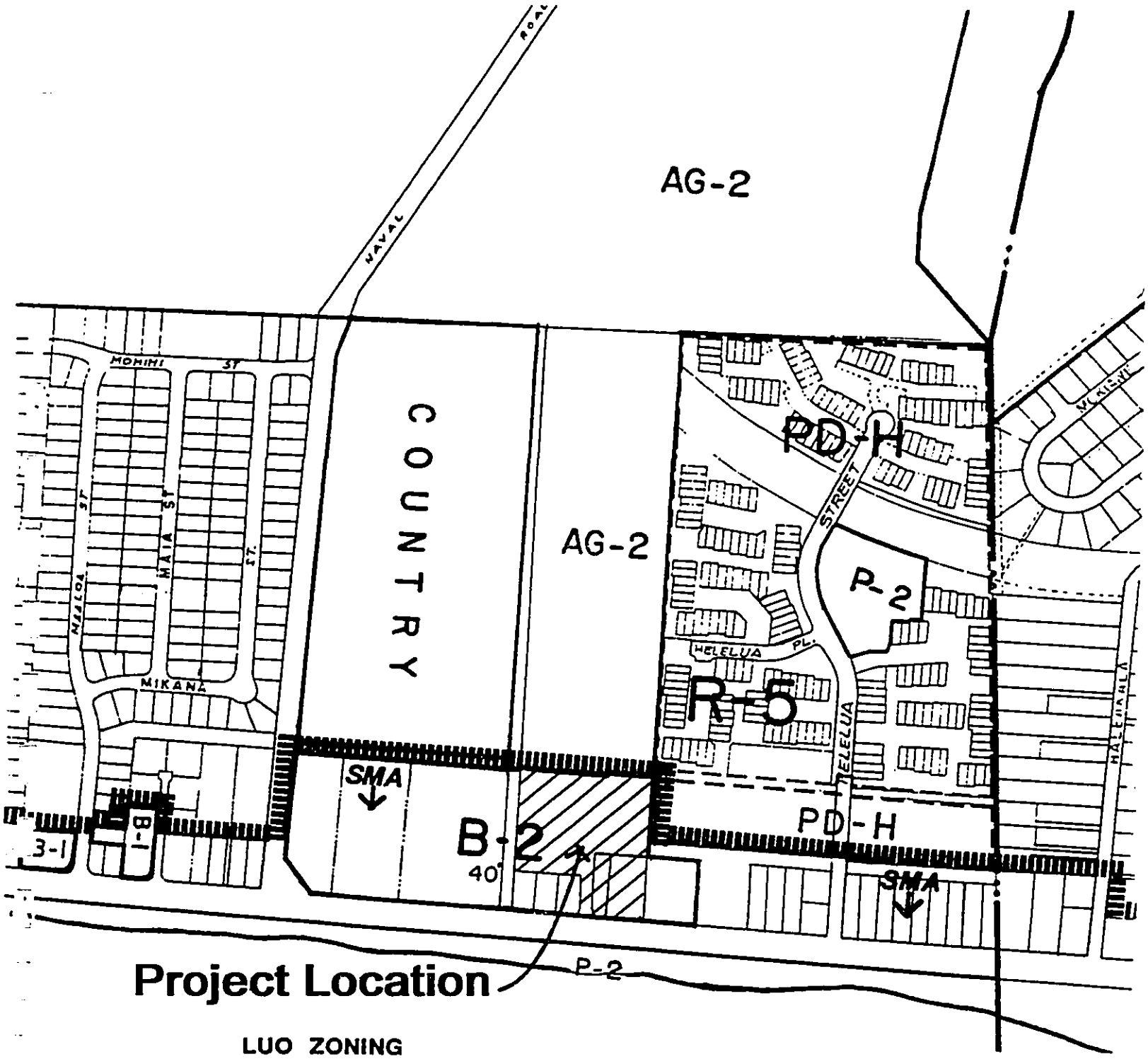
City and County of Honolulu

Department of Land Utilization

Special Management Area Permit

Building Department

Building Permit



LUO ZONING

P-2	General Preservation
R-5	Residential
B-1	Neighborhood Business
B-2	Community Business
AG-2	General Agriculture
PD-H	Planned Development Housing
Country	Country

SLUC=URBAN
DP=BUSINESS

Figure 7
LAND USE DESIGNATIONS and SMA
Nanakuli Town Center
Nanakuli Investment Company, Ltd.

0 400 800

R. M. TOWILL CORPORATION
SEPTEMBER 1992

SECTION 6
ALTERNATIVES

6.1 No Action

This alternative would not provide an active neighborhood commercial complex that would otherwise meet the range of convenience shopping needs that Nanakuli town residents have been lacking. The "no action" alternative would mean that the existing businesses would remain in a status quo condition, and the remainder of the site would go undeveloped. Construction-related impacts would be avoided. However, positive impacts such as increasing the inventory of office space and much-needed neighborhood shopping and business services in Nanakuli would not be achieved. The "no action" alternative will allow this parcel to go underutilized thereby resulting in a probable loss of economic benefits to residents in the way of services, and to government by way of property and income taxes.

6.2 Alternative Concepts

A development consisting of a higher density and mix of commercial uses was considered by the developer in the concept development process. One scenario included a restaurant and a building in the makai section of the project site. However, the inclusion of a significant structure within the makai portion of the site was determined unfeasible due to this portion's vulnerability to flooding. Therefore, the use of the southeastern portion of the site was redesigned to include a farmers' market that required a "break-away" structure consisting basically of a tent-like kiosk structure.

6.3 Alternative Traffic/Intersection Improvements

6.3.1 Traffic signalization

The heavy traffic volumes entering the intersection of Farrington Highway and the project access road during the AM and PM peak hours of traffic (based on minor street traffic volumes relative to major street traffic) would warrant a new traffic signal at this location. The projected approach volumes on the project access road are 193 vph and 150 vph during the cumulative AM and PM peak hours of traffic, respectively. However, there are traffic signals at the intersections to the immediate east and to the west of the project site. Because of this, a new traffic signal at this new intersection may not be allowed by the State

Department of Transportation due mainly to the concern that the close proximity of the signals may cause undue queing along Farrington Highway during periods of heavy traffic.

A possible scenario would be the relocation of the Helelua Street traffic signal to the project access road intersection. However, this would require further analysis by the developer and detailed discussions and ultimate authorization by the appropriate transportation and public works agencies.

6.3.2 Exclusive South-bound Left-Turn Lanes

Based on existing traffic volumes, exclusive south bound left turn lanes on Farrington Highway are warranted and should be constructed at the intersections with Helelua Street and Lualualei Naval Road. However, Farrington Highway, north of Helelua Street, has limited right-of-way for roadway widening. On the makai side of Farrington Highway, roadway widening is restricted by a railroad easement aligned parallel to Farrington Highway. On the mauka side of Farrington Highway, the existing residential homes restrict roadway widening. However, left turn lanes should improve existing operating conditions at the study intersections.

6.3.3 Right-turn-in and Right-turn-out Movements Only

As an alternative to traffic signals, the intersection of Farrington Highway and the project access road could be restricted to right-turn-in and right-turn-out movements only. South bound site traffic would be diverted to the Helelua Street traffic signals on Farrington Highway. The existing dirt road between Helelua Street and the project access road would require upgrading to City and County of Honolulu standards. South bound site traffic, diverted to Helelua Street, would lower the level of service of the intersection, however, the operating level of service would still remain within acceptable standards.

6.4 Recommended Action

The site development plan that is offering a mix of commercial and retail uses for both residents and visitors is determined to be the most appropriate and feasible from the standpoint of providing optimal site development to the widest variety of people without jeopardizing the existing neighborhood character and environmental conditions.

The most appropriate traffic improvement alternative is the diversion of south bound site traffic to the Helelua Street traffic signals on Farrington Highway. The existing dirt road between Helelua Street and the project access road would require upgrading to City and County standards. Approximate cost of the improvement to the dirt road would be $250,000 (assuming a length of about 750 feet, 24' roadway width with curbs, gutters and sidewalks). While level of service of this intersection would be lowered, the operating level of service would still remain within acceptable standards.

SECTION 7
DETERMINATION

7.1 Determination

The proposed mixed use neighborhood commercial development has been selected as the project. This assessment indicates that the proposed Nanakuli project will have no significant adverse impact on the environment and an Environmental Impact Statement is not required. Therefore, in accordance with the provisions of Chapter 343, HRS, a Negative Declaration is determined to be in order.

7.2 Findings and Reasons Supporting Determination

The impacts generated by construction of the proposed project are temporary. These impacts are minor in scale and will cause some inconvenience to the neighborhood during the period of construction. The use of mitigative measures will reduce or eliminate these impacts.

Adequate dust control measures will be utilized during construction to minimize airborne particles. Adherence to approved erosion control plans and the use of mitigative measures such as water sprinkling will reduce the potential for adverse impact on air quality.

Construction equipment will emit some air pollutants in the form of engine exhausts. With proper maintenance, emissions from these equipment will be minimized. Prevailing tradewinds will also help in dispersing the airborne pollutants.

Utilities improvement and building construction activities will create a temporary increase in noise levels. Heavy equipment used for excavation will be source of noise. Mitigating measures such as the use of mufflers and limiting construction to daylight hours will be employed. Noise levels will comply with the State Department of Health noise regulations.

Traffic on the streets surrounding the project site will be temporarily disrupted. A traffic control plan that will be approved by the City and County of Honolulu will be used to minimize impact on traffic circulation.

PRECONSULTATION DOCUMENTATION:

AGENCIES/PARTIES CONSULTED DURING

PREPARATION OF THE ENVIRONMENTAL ASSESSMENT

AND

RESPONSE LETTERS

The following is a list that indicates the agencies/organizations that were consulted during the pre-consultation period in the preparation of the environmental assessment and those that responded to the requests for comments. The list is followed by copies of response letters from agencies.

AGENCIES/ORGANIZATIONS

State

Dept. of Land & Natural Resources

-Forestry and Wildlife

-Historic Preservation

City & County

Board of Water Supply

Building Dept.

Land Utilization

Public Works

Transportation Services

Other

Neighborhood Board No. 24

JOHN WAIHEE
GOVERNOR OF HAWAII

RMT			
DK		KTS	
RYK		SBK	
REC'D MAY 2 5 1992 RMTC			
RDE			
GSY			
DKM			

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES

JOHN P. KEPPELER, II
DONA L. HANAIKE

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION DIVISION
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

May 19, 1992

Ms. Colette Sakoda
R.M. Towill Corporation
420 Waiakamilo Road, Suite 411
Honolulu, HI 96817

LOG NO: 5365
DOC NO: 0746t

Dear Ms. Sakoda:

SUBJECT: Proposed Commercial Development
Nanakuli, Wai'anae, O'ahu
TMK: 8-7-8: 11, 65, 75

A review of our records shows that there are no known historic sites at these parcels. None of the parcels has been inventoried for historic sites, and sub-surface historic sites might be present, especially at the mauka parcel, which appears to be undeveloped. This area is transitional from beach sands to soil, so without more detailed information we cannot rule out the possibility that human burials are located at the proposed project area.

If you have any questions please call Tom Dye at 587-0014.

Sincerely,

DON HIBBARD, Administrator
State Historic Preservation Division

TD:amk

BUILDING DEPARTMENT

CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

HERBERT K. MURAOKA
DIRECTOR AND BUILDING SUPERINTENDENT

PB 92-867

September 3, 1992

Colette Sakoda, Project Manager
R. M. Towill Corporation
420 Waiakamilo Road, Suite 411
Honolulu, Hawaii 96817

Dear Ms. Sakoda:

Subject: Pre-Assessment Consultation for a Proposed Commercial Development
TMK 8-7-08:11, 65 and 75
Nanakuli, Oahu

This is in response to your letter dated August 27, 1992 relative to the subject matter.

We have no comments to offer.

Very truly yours,

HERBERT K. MURAOKA
Director and Building Superintendent

cc: J. Harada

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

JOSEPH M. MAGALDI, JR.
DIRECTOR

AMAR SAPPAL
DEPUTY DIRECTOR

TE-3762
PL92.1.315

September 10, 1992

Ms. Colette Sakoda, Project Planner
R. M. Towill Corporation
420 Waiakamilo Road, Suite 411
Honolulu, Hawaii 96817

Dear Ms. Sakoda:

Subject: Nanakuli Commercial Development
Preliminary Review and Comments
TMK: 8-7-08: 11, 65, and 75

This is in response to your letter of August 27, 1992 requesting our comments on the subject project.

We understand that the access points for the proposed development will be off of Farrington Highway, which is a State Department of Transportation facility. This being the case, we have no comments to offer at this time. However, we may have more specific concerns after reviewing the traffic study which we understand will be prepared with the environmental assessment.

Should you have any questions, please contact Lance Watanabe of my staff at 523-4199.

Sincerely,

JOSEPH M. MAGALDI, JR.
Director

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813 • (808) 523-4432

FRANK F. FASI
MAYOR

DONALD A. CLEGG
DIRECTOR

LORETTA K.C. CHEE
DEPUTY DIRECTOR

92-02731(AC)

September 17, 1992

Ms. Colette Sakoda
R.M. Towill Corporation
420 Waiakamilo Road, Suite 411
Honolulu, Hawaii 96817

Dear Ms. Sakoda:

Proposed Commercial Development
Nanakuli, Oahu
Tax Map Key: 8-7-8: 11, 65 & 75

Thank you for the opportunity to review the pre-assessment for the above-referenced project. As described in the pre-assessment, the proposed commercial development is within the Special Management Area (SMA). As information pertinent to SMA objectives is not contained in the pre-assessment letter, we are unable to provide additional comments related to this project. The environmental assessment (EA) should contain information regarding impacts to the following:

(1) Recreational resources;
(2) Archaeological resources;
(3) Wetlands and natural ecosystems;
(4) Drainage and wastewater treatment; and
(5) Coastal views.

Should you have any questions, please call Art Challacombe of our staff at 523-4107.

Very truly yours,

DONALD A. CLEGG
Director of Land Utilization

DAC:ct

a:sakoda.ac

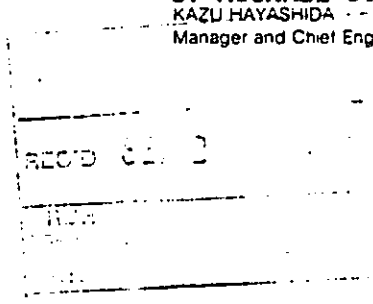
BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU

630 SOUTH BERETANIA STREET

HONOLULU, HAWAII 96843

September 24, 1992



Ms. Colette Sakoda
R. M. Towill Corporation
420 Waiakamilo Road, Suite 411
Honolulu, Hawaii 96817-4941

Dear Ms. Sakoda:

Subject: *Your Letter of August 27, 1992 Regarding the Proposed Commercial Development within the Special Management Area, TMK: 8-7-08: 11, 65 and 75, Farrington Highway, Nanakuli*

Thank you for the opportunity to review and comment on the proposed commercial development. We have the following comments to offer:

1. The existing water system is presently adequate to accommodate the proposed development. There are three water meters currently servicing the project site.

2. The availability of additional water will be confirmed when the building permit is submitted for our review and approval. When additional water is made available, the applicant will be required to pay the prevailing Water System Facilities Charges and any applicable meter installation charges.

3. If a three-inch or larger meter is required, the construction drawings showing the installation of the meter should be submitted for our review and approval.

4. Board of Water Supply reduced pressure principle backflow prevention assemblies should be installed on each domestic water line immediately after the property valves and prior to any branch piping.

If you have any questions, please contact Bert Kuioka at 527-5235.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

DEPARTMENT OF PUBLIC WORKS

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

C. MICHAEL STREET
DIRECTOR AND CHIEF ENGINEER

FELIX B. LIMTIACO
DEPUTY DIRECTOR

ENV 92-239

September 28, 1992

RMT		WES	
DK		KTS	
RYK		SRK	
REC'D SEP 30 1992 RMTC			
RDE			
GSY			
DKM			

Ms. Colette Sakoda, Project Manager
R.M. Towill Corporation
420 Waiakamilo Road, Suite 411
Honolulu, Hawaii 96817

Dear Ms. Sakoda:

Subject: Pre-Environmental Assessment (PEA)
Proposed Commercial Development in Nanakuli
TMK:8-7-8:11, 65 & 75

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

1. For your information, a portion of the proposed project is located in Flood Zone AE.

2. A drainage report should be submitted to the Drainage Section, Division of Engineering, for review and approval.

3. Full frontage improvements will be required, including property set-back.

4. The municipal sewer system is available and adequate to accommodate the proposed project. However, this statement should not be construed as confirmation of sewage capacity reservation.

5. Sewage capacity reservation is contingent upon the submittal and approval of a "Sewer Connection Application" form.

6. Also, a Wastewater System Facility Charge may be applicable to the proposed project and will be determined and payable at the time of the building permit application.

Very truly yours,

for C. MICHAEL STREET
Director and Chief Engineer

APPENDIX

TRAFFIC IMPACT ANALYSIS REPORT

TRAFFIC IMPACT ANALYSIS REPORT
FOR THE PROPOSED

NANAKULI COMMERCIAL DEVELOPMENT

PREPARED FOR

R. M. TOWILL CORPORATION

SEPTEMBER 28, 1992

PREPARED BY

THE TRAFFIC MANAGEMENT CONSULTANT

RANDALL S. OKANEKU, P. E. • PRINCIPAL • 1188 BISHOP STREET • SUITE 1907 • HONOLULU, HAWAII 96813

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TRAFFIC IMPACT ANALYSIS REPORT
FOR THE PROPOSED
NANAKULI COMMERCIAL DEVELOPMENT

I. INTRODUCTION

A. Purpose of Study

The purpose of this study is to analyze the traffic impacts resulting from the proposed Nanakuli Commercial Development in Nanakuli, on the island of Oahu. This report presents the findings and recommendations of the study.

B. Scope of Study

The scope of this study includes:

1. Description of the proposed project.
2. Evaluation of existing roadway and traffic conditions.
3. Analysis of future roadway and projected traffic conditions without the proposed project.
4. Development of trip generation characteristics for the proposed project.
5. Superimposing the site-generated traffic over future traffic conditions.
6. Analysis of project access alternatives.
7. The identification and analysis of traffic impacts resulting from the proposed project.
8. Recommendation of improvements, if appropriate, that would mitigate the traffic impacts resulting from the development of the proposed project.

II. PROJECT DESCRIPTION

A. Location

The project site is located mauka (northeast) of Farrington Highway, between Helelua Street and Lualualei Naval Road in Nanakuli, Oahu. Figure 1 show the project location and vicinity maps.

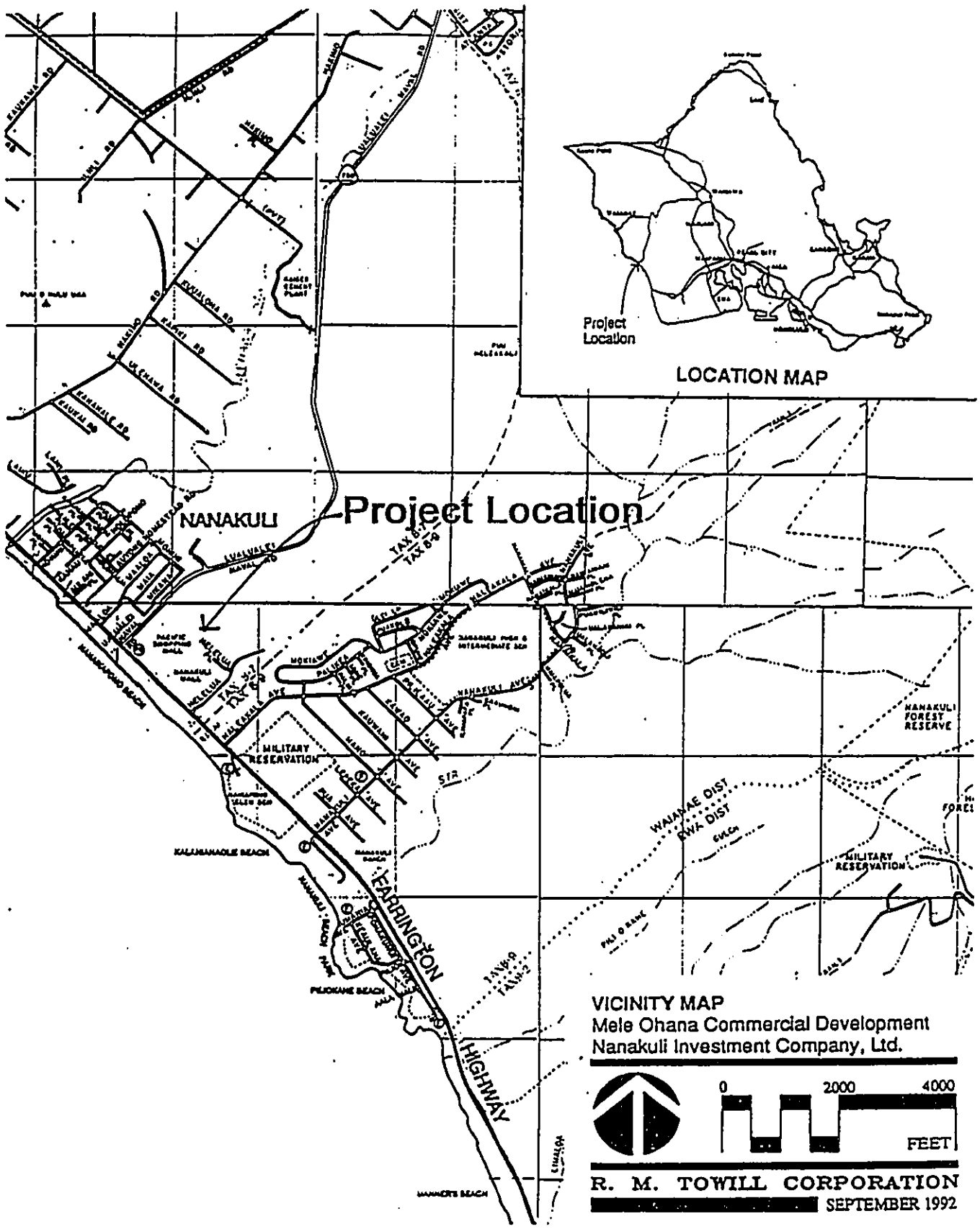


FIGURE 1 - LOCATION AND VICINITY MAPS

B. Site Characteristics

The proposed Nanakuli Commercial Development would consist of approximately 11,690 square feet (SF) of gross leasable retail area (GLA). The proposed development also would include a 1,900 SF gross floor area (GFA) fast food restaurant with drive-through window, a 2,500 SF GFA convenience market, a 6,325 SF GFA walk-in Savings and Loan, and an 800 SF GFA general office area. Project site access would be provided by an existing easement through a property that fronts Farrington Highway, and a road connecting to Helelua Street mauka of Farrington Highway. The site development plan is shown on Figure 2.

C. Other Projects in the Area

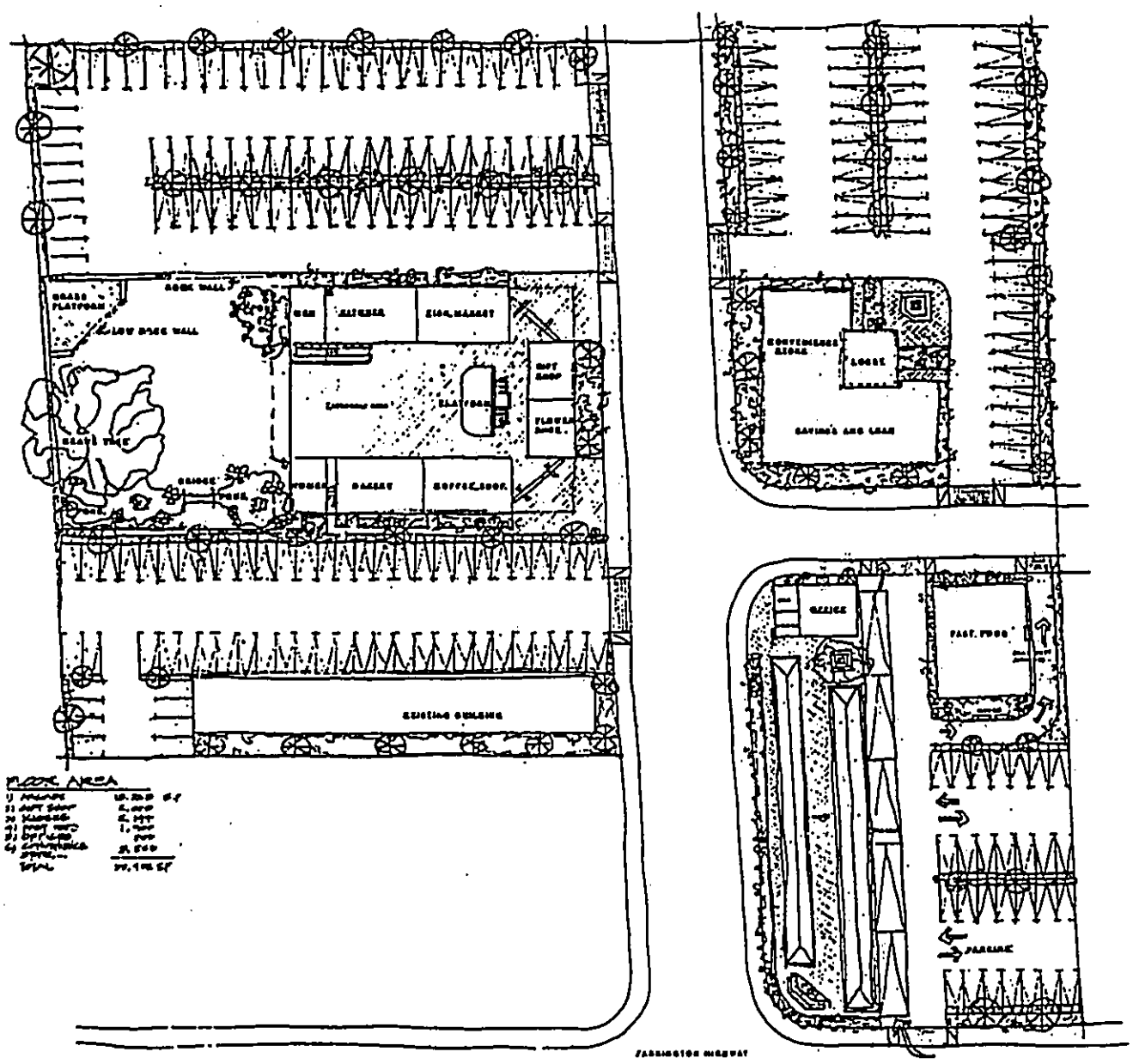
A proposed residential development would be located on the parcel mauka of the proposed Nanakuli Commercial Development. The proposed residential development would include 143 multi-family dwelling units. The residential development is expected to be built out and occupied by the Year 1995. The traffic forecast in this study includes vehicle trips generated by the proposed residential development.

III. EXISTING TRAFFIC CONDITIONS

A. Area Roadway System

Farrington Highway is a four lane, two way roadway in the vicinity of the project site. Farrington Highway serves as the primary access to communities located on the west coast of the island of Oahu, such as Waianae and Makaha. The posted speed limit on Farrington Highway in the project vicinity is 35 miles per hour (mph).

Project site access will be provided by a new access road on Farrington Highway located between Helelua Street and Lualualei Naval Road. A road connecting the new project access road and Helelua Street, located mauka of Farrington Highway, would provide an additional site access. Helelua Street and Lualualei Naval Road intersect Farrington Highway as signalized intersections.



SITE DEVELOPMENT PLAN
Mele Ohana Commercial Development
Nanakuli Investment Company, Ltd.

0 60 120
FEET

R. M. TOWILL CORPORATION
SEPTEMBER 1992

Source: Paul Osumi, AIA

FIGURE 2 - SITE DEVELOPMENT PLAN

B. Traffic Volumes and Conditions

1. General

a. Field Investigation

The field investigation was conducted on January 15 and 16, 1992. The field investigation comprised of a site inspection of the road and traffic conditions, and a traffic count survey. The site investigation indicates that relatively heavy traffic moves well along Farrington Highway. The traffic count survey was conducted between the hours of 5:15 AM and 7:15 AM in the morning, and between 3:30 PM and 5:30 PM in the afternoon at the intersections of Helelua Street at Farrington Highway and Lualualei Naval Road at Farrington Highway.

b. Capacity Analysis Methodology

The highway capacity analysis performed for this study is based upon procedures presented in the "Highway Capacity Manual", Special Report 209, Transportation Research Board, 1985, and the "Highway Capacity Software", developed by the Federal Highways Administration.

Level of Service (LOS) is a quantitative and qualitative assessment of traffic operations. Levels of Service are defined by LOS "A" through "F", LOS "A" being the best operating condition and LOS "F" the worst operating condition.

"Volume-to-capacity" (v/c) ratio is another measure indicating the relative traffic demand to the road carrying capacity. A v/c ratio of one (1.00) indicates that the roadway is operating at capacity. A v/c ratio of greater than 1.00 indicates that the projected traffic demand exceeds the road's carrying capacity. The Appendix includes the capacity analysis calculations.

2. Existing AM Peak Hour Traffic Analysis

The AM peak hour of traffic at the intersections on Farrington Highway at Helelua Street and Lualualei Naval Road occurs between 6:00 AM and 7:00 AM. The north bound approach at the intersection of Farrington Highway and Helelua Street operates at LOS "B" while the south bound approach operates at LOS "C". The west bound left turn and right turn movements on

Helelua Street both operate at LOS "C" during the AM peak hour of traffic. Farrington Highway, south of Helelua Street, services 2,322 vehicles per hour (vph) during the AM peak hour, 622 vph north bound and 1,700 vph south bound. Farrington Highway, south of Helelua Street, operates at LOS "C" and v/c ratio 0.55 for south bound traffic. Based on the existing AM peak hour traffic volumes, an exclusive south bound left turn lane on Farrington Highway is warranted at the intersection with Helelua Street.

At the intersection of Farrington Highway and Lualualei Naval Road, the north bound approach operates at LOS "A" while the south bound approach operates at LOS "B". On Lualualei Naval Road, the left turn movement operates at LOS "D" and the right turn movement operates at LOS "C". Farrington Highway, north of Lualualei Naval Road, services 2,386 vph during the AM peak hour, 543 vph north bound and 1,843 vph south bound. The south bound traffic on Farrington Highway, north of Lualualei Naval Road, operates at LOS "C" and v/c ratio 0.60. Based on the existing AM peak hour traffic volumes, an exclusive south bound left turn lane on Farrington Highway is warranted at the intersection with Lualualei Naval Road. Figure 3 show the existing AM peak hour traffic volumes and capacity conditions.

3. Existing PM Peak Hour Traffic Analysis

The PM peak hour of traffic at the intersections of Farrington Highway at Helelua Street and at Lualualei Naval Road occurs between 3:45 PM and 4:45 PM. At the intersection of Farrington Highway and Helelua Street, the north bound approach operates at LOS "B", while the south bound through movement also operates at LOS "B". The south bound left turn movement operates at LOS "F" because of the heavy north bound opposing through traffic volume. The shared left turn and through lane of the south bound approach at Farrington Highway and Helelua Street is primarily utilized by vehicles turning left to Helelua Street. During the PM peak hour of traffic, the south bound approach generally operates as a left turn lane and one through lane. The left and right turn movements on Helelua Street operate at LOS "D" and LOS "C", respectively. Farrington Highway, south of Helelua Street, carries 3,073 vph during the PM peak hour, 2,003 vph north bound and 1,070 vph south bound. Farrington Highway, south Helelua Street, operates at LOS "D"

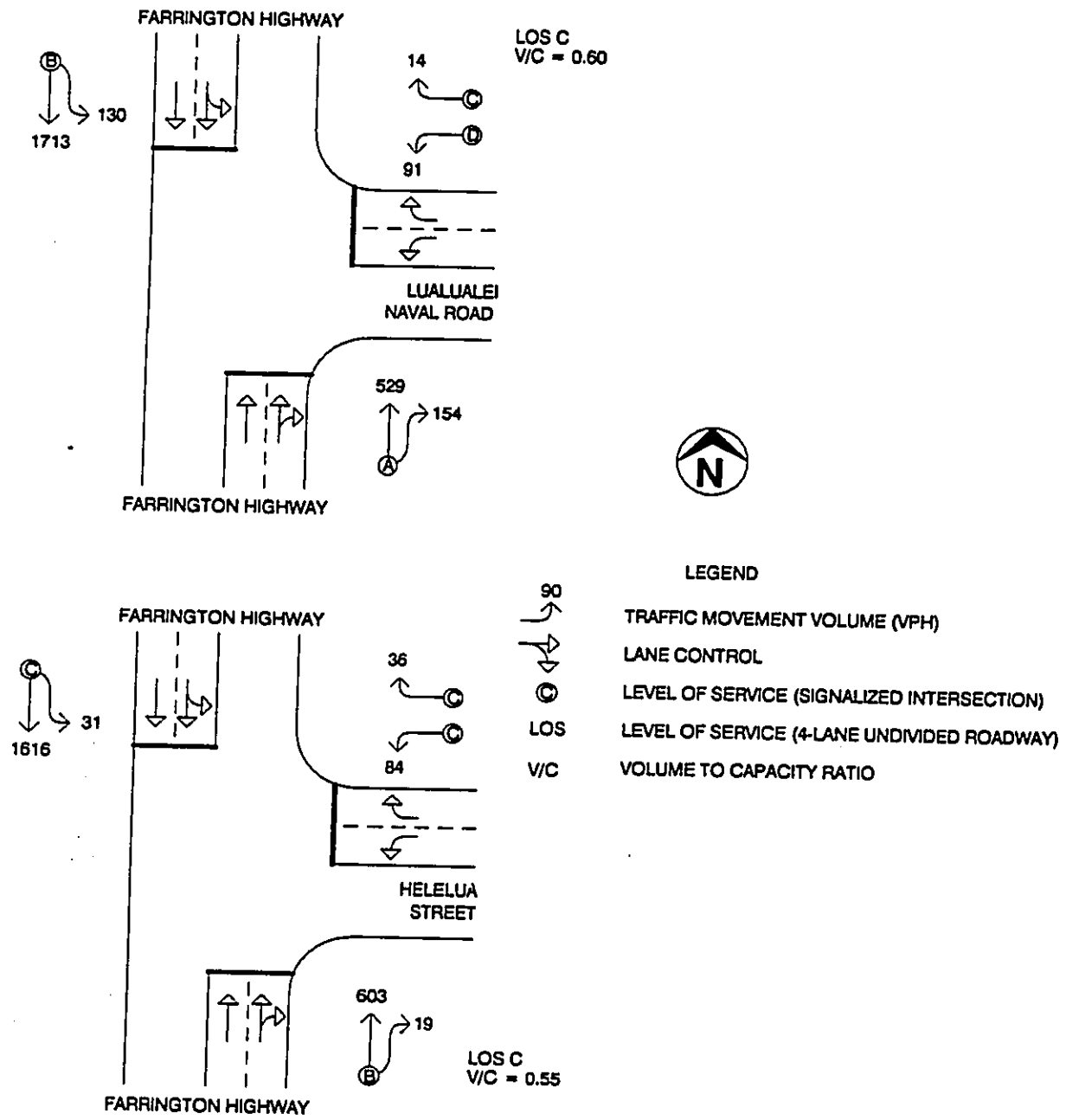


FIGURE 3 - EXISTING AM PEAK HOUR OF TRAFFIC

and v/c ratio 0.67 for north bound traffic. Based on the existing PM peak hour traffic volumes, an exclusive south bound left turn lane on Farrington Highway is warranted at the intersection with Helelua Street.

At the intersection of Farrington Highway and Lualualei Naval Road, the north bound approach operates at LOS "C", while the south bound approach operates at LOS "B". The south bound Farrington Highway left turn movement to Lualualei Naval Road operates at LOS "E". The left and right turn movements on Lualualei Naval Road both operate at LOS "C". Farrington Highway, north of Lualualei Naval Road, carries 2,936 vph during the PM peak hour, 1,983 vph north bound and 953 vph south bound. The north bound traffic on Farrington Highway, north of Lualualei Naval Road, operates at LOS "D" and v/c ratio 0.69. Based on the existing PM peak hour traffic volumes, an exclusive south bound left turn lane on Farrington Highway is warranted at the intersection with Lualualei Naval Road. Figure 4 show the existing PM peak hour traffic volumes and capacity conditions.

IV. PROJECTED TRAFFIC

A. Site-Generated Traffic

1. Trip Generation Methodology

The trip generation methodology used in this study is based upon generally accepted techniques developed by the Institute of Transportation Engineers (ITE) and published in "Trip Generation, 5th Edition", 1991. The ITE trip rates are developed empirically, by correlating the vehicle trip generation data with various land use characteristics, such as vehicle trips per floor area of development.

Some of the trips generated by a commercial project during the PM peak hour of traffic can be considered as "pass-by" trips, i.e., vehicular traffic already on the road, stopping at the shopping center as a matter of convenience. Pass-by trips are made as intermediate stops on the way from an origin to a primary trip destination. Pass-by trips are attracted from traffic passing the site on an adjacent street that contains access to the specific generator, in this case, the retail shops, the drive-through fast food restaurant, and the convenience market. These trips are represented as percentages of driveway traffic entering and exiting the proposed project. The percentages of PM peak hour

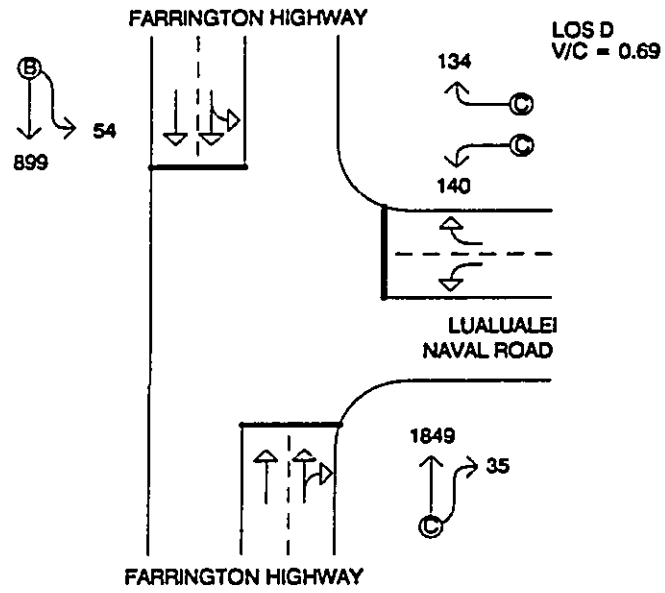


FIGURE 4 - EXISTING PM PEAK HOUR OF TRAFFIC

pass-by trips for the different land uses are derived empirically and are based on a relationship between floor area and the proportion of measured pass-by trips. The pass-by trips estimated during the PM peak hour of traffic do not affect the projected driveway volumes but reduces the through traffic volumes on the adjacent street system. "Primary" trips are trips made for the specific purpose of visiting the generator. The stop at the generator is the primary reason for the trip. The total vehicle trip is the sum of primary trips and pass-by trips. The total trip represents driveway traffic entering and exiting the project site during the peak hour study periods. Table 1 shows a summary of the vehicle trip generation.

TABLE 1. TRIP GENERATION SUMMARY

Land Use	AM Peak Hour Traffic						PM Peak Hour Traffic					
	Total Trips			Pass-By Trips			Total Trips			Pass-By Trips		
	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
Retail Center	36	39	75	-	-	-	33	25	58	12	9	21
Fast-Food Restaurant	54	52	106	-	-	-	36	33	69	14	13	27
Convenience Market	28	28	56	-	-	-	35	36	71	13	13	26
Savings and Loan	4	4	8	-	-	-	17	17	34	-	-	-
General Office	2	0	2	-	-	-	0	2	2	-	-	-
PROJECT TOTALS	124	123	247	-	-	-	121	113	234	39	35	74

2. Trip Generation Characteristics

The proposed commercial development would generate a total of 247 vph during the AM peak hour, 124 vph entering and 123 vph exiting the project site. During the PM peak hour, the proposed project would generate 235 vph, 122 vph entering and 113 vph exiting the project site.

During the PM peak hour of traffic, ITE estimates that 35% of trips generated by the retail shops, 40% of trips generated by the drive-through fast food restaurant, and 35% of trips generated by the convenience market are considered "pass-by" trips. The through traffic volumes are reduced by the sum of pass-by trips that enter and exit the project site, continuing the trip in the same direction.

B. Through Traffic

1. Forecasting Methodology

The historical traffic data obtained from the State Department of Transportation at a traffic survey station, located on Farrington Highway at Lualualei Naval Road, are used as the basis for the travel forecast. Linear regression techniques were performed on the historical data to obtain the growth rate of traffic in the vicinity. The analysis indicates that traffic within the area increases at a rate of approximately 3.9% per year using 1992 as the base year. A growth factor of 1.23 was used in projecting through traffic demands to the Year 1998.

2. Other Projects in the Area

The residential development, located mauka of the proposed project, consists of 143 multi-family residential dwelling units. The proposed residential project is expected to generate 68 vph during the AM peak hour of traffic, 12 vph entering and 56 vph exiting. During the PM peak hour, the proposed residential project is expected to generate 83 vph, 55 vph entering and 28 vph exiting. Site access would be provided by the proposed project access road. For the purpose of this study, the trips generated by the proposed residential project are included in the traffic analysis.

C. Projected Traffic Volumes Without Project

1. General

Figures 5 and 6 show the Year 1998 traffic projections without the proposed project. The Figures show the capacity analysis for the intersections of Farrington Highway at Helelua Street and at Lualualei Naval Road. Exclusive south bound left turn lanes on Farrington Highway are included at each of the intersections. The analysis also includes the unsignalized intersection of Farrington Highway with the project access road. Site access to the proposed residential development, located mauka of the project site, would be provided by the project access road.

2. AM Peak Hour of Traffic

During the AM peak hour of traffic, the north bound approach on Farrington Highway at the intersection with Helelua Street would operate at LOS "A", while the south bound through movement at this intersection operates at LOS "B". The south bound left turn movement from Farrington Highway to Helelua Street would operate at LOS "A". The left turn and right turn movements on Helelua Street both would operate at LOS "C". Farrington Highway, south of Helelua Street would carry 2,876 vph, 766 vph north bound and 2,110 vph south bound. Farrington Highway, south of Helelua Street, would operate at LOS "D" and v/c ratio 0.64 for south bound traffic.

At the intersection of Farrington Highway and Lualualei Naval Road, the north bound approach would operate at LOS "A" while the south bound through movement operates at LOS "B" during the projected AM peak hour of traffic. The south bound left turn movement from Farrington Highway to Lualualei Naval Road would operate at LOS "C". The left turn and right turn movements on Lualualei Naval Road both would operate at LOS "C". Farrington Highway, north of Lualualei Naval Road would carry 2,926 vph, 682 vph north bound and 2,244 vph south bound. During the projected AM peak hour, Farrington Highway, north of Lualualei Naval Road, would operate at LOS "D" and v/c ratio 0.69 for south bound traffic.

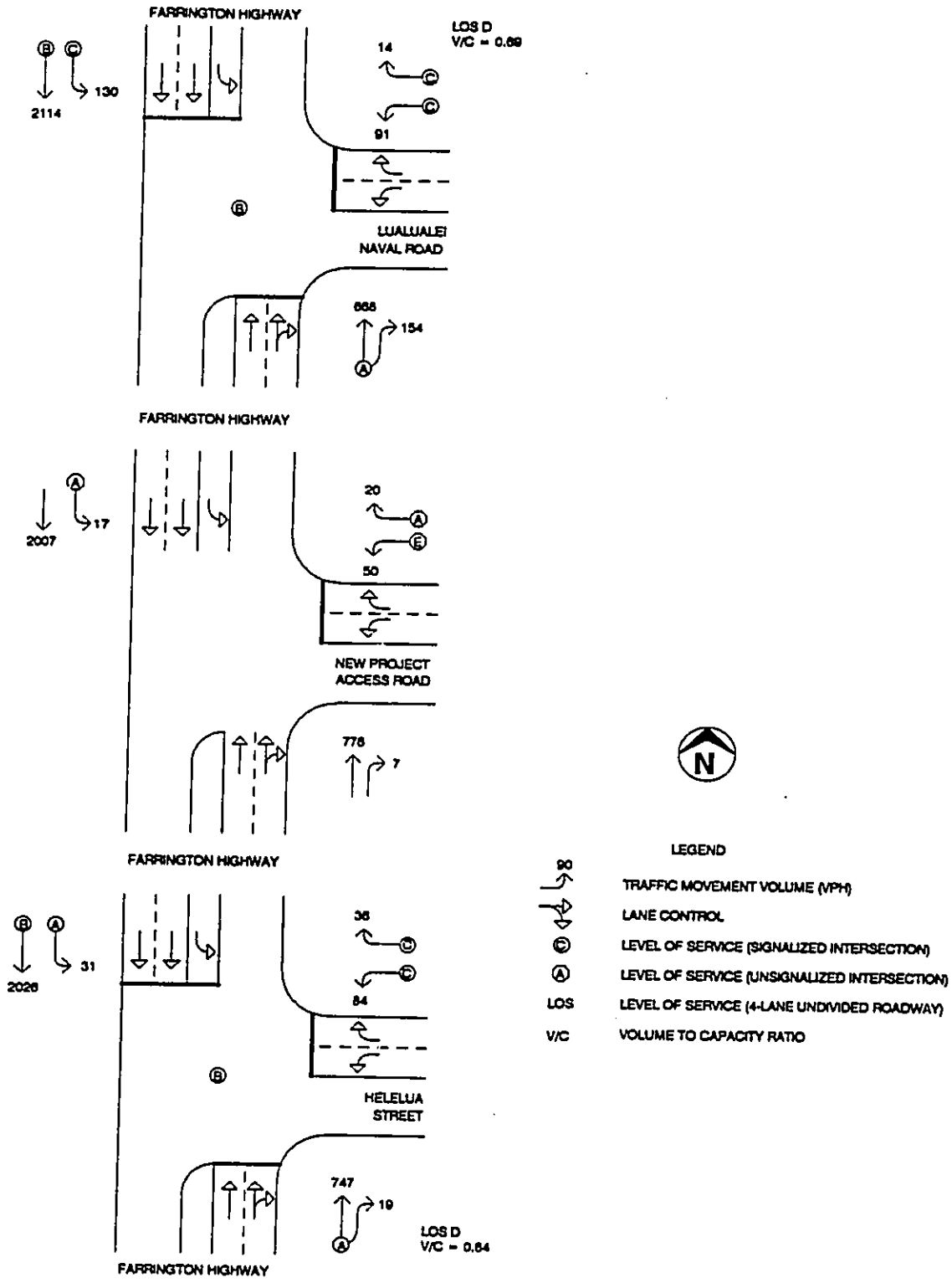


FIGURE 5 - 1998 AM PEAK HOUR OF TRAFFIC WITHOUT PROJECT

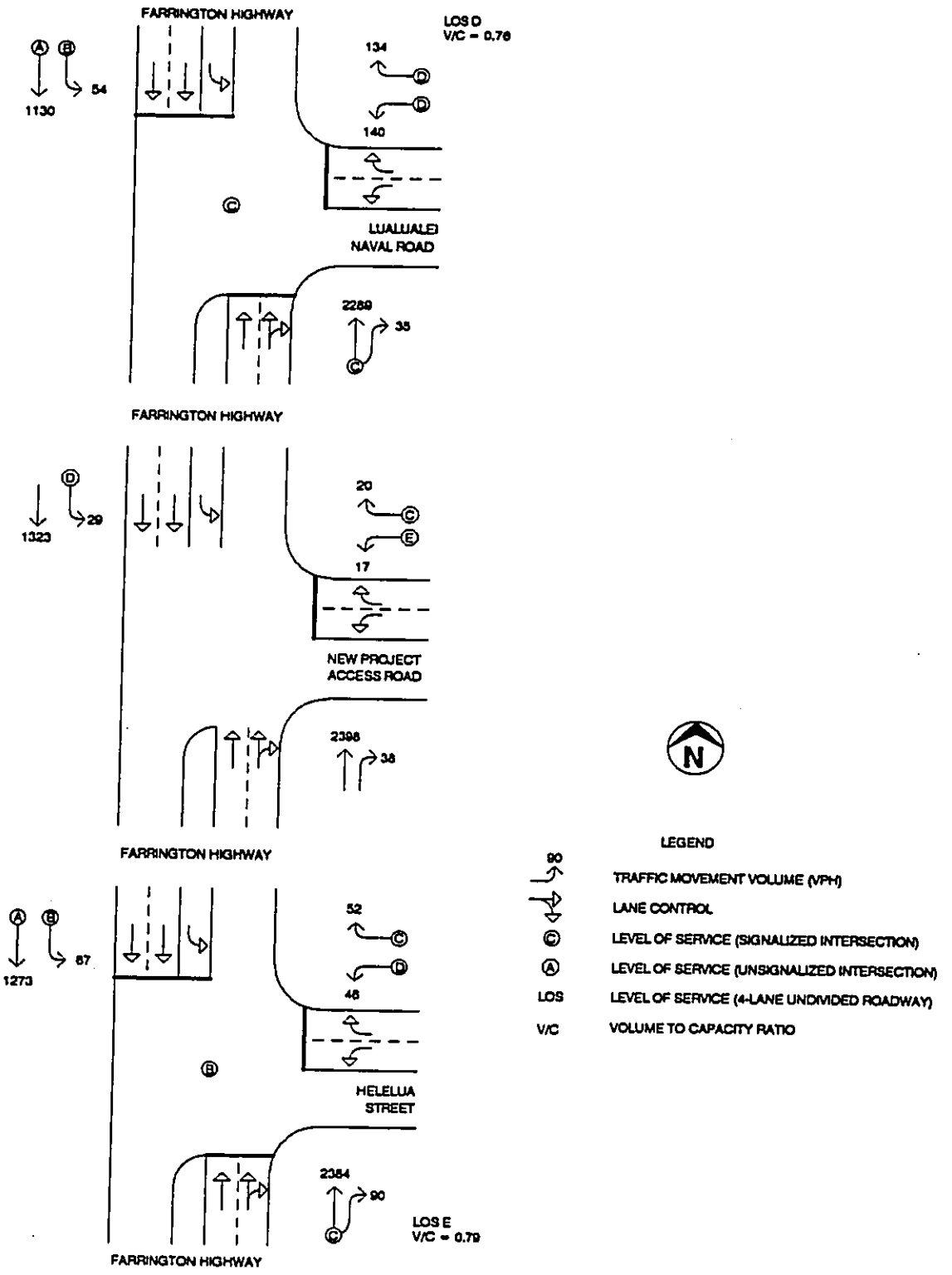


FIGURE 6 - 1998 PM PEAK HOUR OF TRAFFIC WITHOUT PROJECT

At the unsignalized intersection of Farrington Highway and the proposed project access road, the left turn movement on the access road would operate at LOS "E". The right turn movement from the project access road to north bound Farrington Highway would operate at LOS "A".

3. PM Peak Hour of Traffic

During the PM peak hour of traffic, the north bound approach on Farrington Highway at the intersection with Helelua Street would operate at LOS "C". The south bound Farrington Highway left turn movement to Helelua Street would operate at LOS "B", while the through movement operates at LOS "A". The left turn and right turn movements from Helelua Street would operate at LOS "D" and LOS "C", respectively. Farrington Highway, south of Helelua Street, would carry 3,793 vph during the projected PM peak hour, 2,474 vph north bound and 1,319 vph south bound. The north bound approach of Farrington Highway, south of Helelua Street, would operate at LOS "E" and v/c ratio 0.79.

At the intersection of Farrington Highway and Lualualei Naval Road, the north bound approach would operate at LOS "C". The left turn movement from south bound Farrington Highway to Lualualei Naval Road would operate at LOS "B" during the projected PM peak hour of traffic, while the south bound through movement operates at LOS "A". The left and right turn movements on Lualualei Naval Road both would operate at LOS "D". Farrington Highway, north of Lualualei Naval Road, would carry 3,607 vph during the projected PM peak hour, 2,423 vph north bound and 1,184 vph south bound. Farrington Highway, north of Lualualei Naval Road, would operate at LOS "D" and v/c ratio 0.76 for north bound traffic.

At the unsignalized intersection of Farrington Highway and the project access road, the west bound left turn movement on the access road to south bound Farrington Highway would operate at LOS "E". The right turn movement from the project access road to north bound Farrington Highway would operate at LOS "C".

D. Total Traffic With Project

Figures 7 and 8 show the peak hour of traffic with the site-generated traffic superimposed over 1998 traffic projections. The intersection of Farrington Highway and the project access road is restricted to right-turn-in and right-turn-out movements only to mitigate LOS "E" operating conditions analyzed in the previous section. As a result, the existing unpaved access road connecting the project access to Helelua Street would require upgrading to service the south bound entering and exiting site traffic at the intersection of Farrington Highway and Helelua Street. The next section discusses the traffic impact analysis of the site-generated traffic.

V. TRAFFIC IMPACT ANALYSIS

A. General

The cumulative traffic volumes consist of the 1998 traffic projections without project plus the site-generated traffic. The intersection of Farrington Highway and the project access road is restricted to right-turn-in and right-turn-out movements only. Exclusive south bound left turn lanes on Farrington Highway at each of the intersections in the study area are warranted and included in the analysis.

B. Cumulative AM Peak Hour Traffic With Project

The north bound approach on Farrington Highway at the intersection with Helelua Street would operate at LOS "B" during the projected AM peak hour. The south bound left turn movement and south bound through movement both would operate at LOS "B". The left turn and right turn movements on Helelua Street would operate at LOS "D" and LOS "C", respectively. The intersection would operate at an overall LOS "C". The south bound traffic on the four lane, undivided roadway segment of Farrington Highway, south of Helelua Street, would operate at LOS "D" and v/c ratio 0.66. Farrington Highway, south of Helelua Street, would carry 3,001 vph, 849 vph north bound and 2,152 vph south bound. The project site-generated traffic represents a 4% increase in total traffic on Farrington Highway south of Helelua Street.

At the intersection of Farrington Highway and Lualualei Naval Road, the south bound left turn movement would continue to operate at LOS "B", while the south bound through movement also operates at LOS "B". The north bound approach on Farrington Highway would operate at LOS "B" during the projected

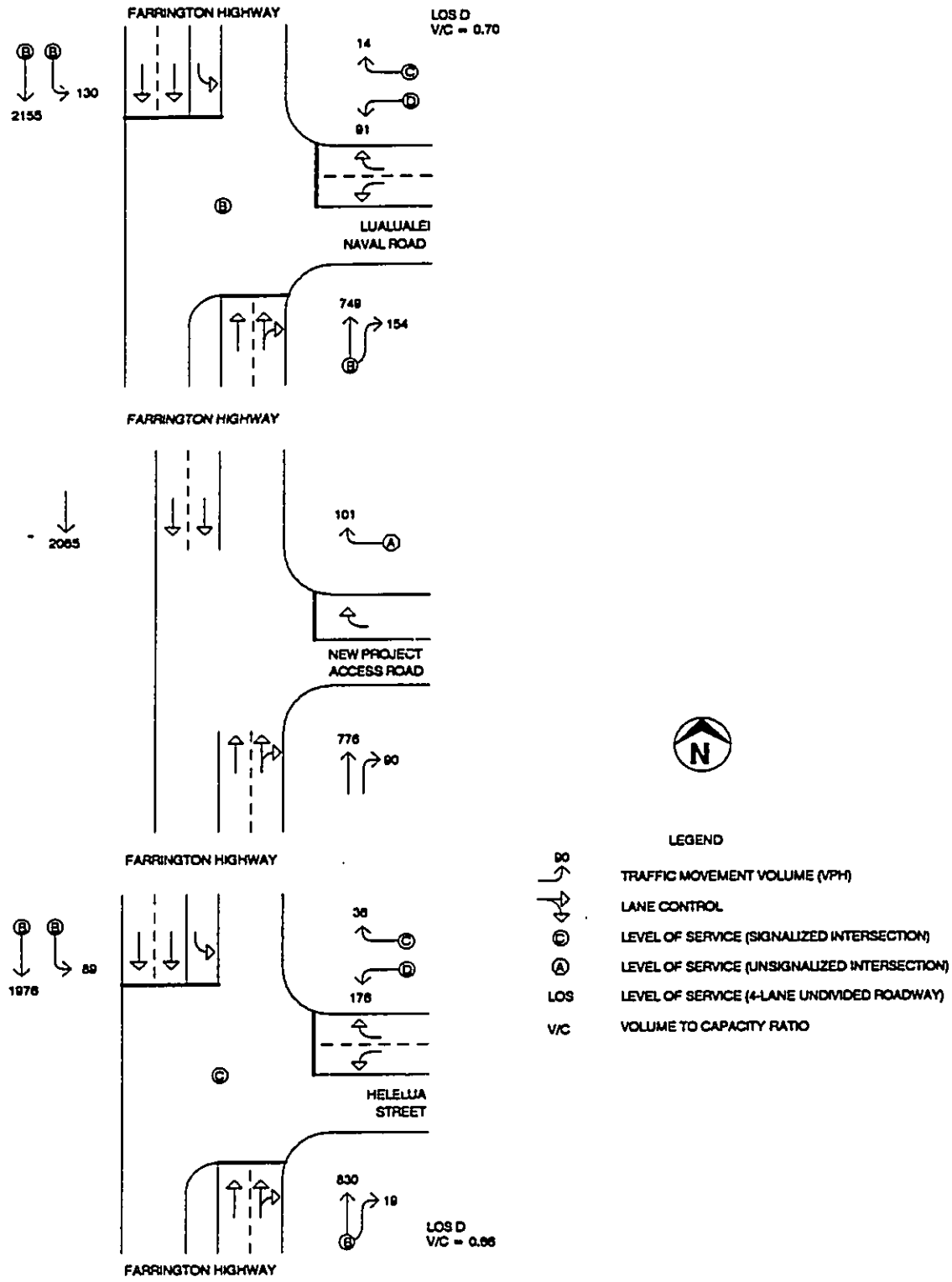


FIGURE 7 - CUMULATIVE AM PEAK HOUR OF TRAFFIC

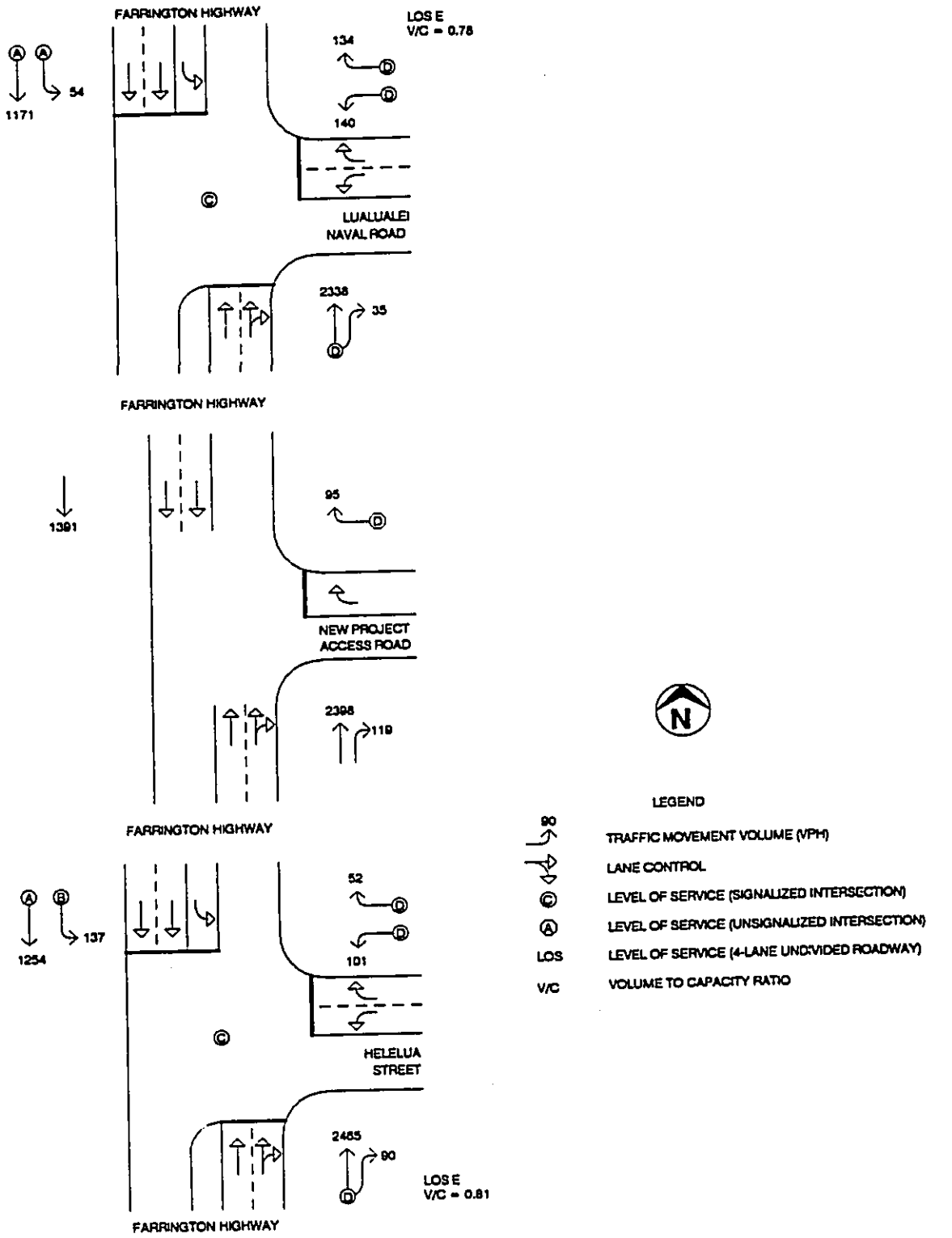


FIGURE 8 - CUMULATIVE PM PEAK HOUR OF TRAFFIC

AM peak hour of traffic. On Lualualei Naval Road, the left turn and right turn movements would operate at LOS "D"and LOS "C", respectively. The intersection would operate at an overall LOS "B". Farrington Highway, north of Lualualei Naval Road, would operate at LOS "D" and v/c ratio 0.70 for south bound traffic. Farrington Highway, north of Lualualei Naval Road, would carry 3,048 vph during the AM peak hour of traffic, 763 vph north bound and 2,285 vph south bound.

C. Cumulative PM Peak Hour Traffic With Project

At the intersection of Farrington Highway and Helelua Street, the south bound left turn movement would continue to operate at LOS "B". The south bound through movement would operate at LOS "B", while the north bound approach operates at LOS "D". The left and right turn movements on Helelua Street both would operate at LOS "D". The intersection of Farrington Highway and Helelua Street would operate at an overall LOS "C" during the project PM peak hour of traffic. The north bound approach of the four-lane Farrington Highway would continue to operate at similar LOS and v/c ratio to that of 1998 projections without the proposed project. The north bound through traffic on Farrington Highway, south of Helelua Street, would operate at LOS "E" and v/c ratio 0.81. Farrington Highway, south of Helelua Street, would carry 3,910 vph during the projected PM peak hour, 2,555 vph north bound and 1,355 vph south bound. The total traffic on the four-lane, undivided Farrington Highway, south of Helelua Street, represents a 3% increase over projected conditions without the proposed project.

At the intersection of Farrington Highway and Lualualei Naval Road, the north bound approach would operate at LOS "D", while the south bound through movement continues to operate at LOS "A". The south bound left turn movement on Farrington Highway would operate at LOS "A". The Lualualei Naval Road approach would operate at similar LOS to projected conditions without the proposed project. The left turn and right turn movements on Lualualei Naval Road would continue to operate at LOS "D". The intersection of Farrington Highway and Lualualei Naval Road would operate at an overall LOS "C" during the projected PM peak hour of traffic. Farrington Highway, just north of

Lualualei Naval Road, would carry 3,697 vph, 2,472 vph north bound and 1,225 vph south bound. Farrington Highway, north of Lualualei Naval Road, would operate at LOS "E" and v/c ratio 0.78 for north bound traffic.

VI. ALTERNATIVE ANALYSIS

A. General

Traffic signals, at the intersection of Farrington Highway and the project access road, are considered in this section of the report. With intersection signalization, the left turn movement from the project access road to south bound Farrington Highway and the south bound left turn movement from Farrington Highway to the project access road are permitted. The project access road is assumed to be the primary access to the proposed commercial development. The project access road would intersect Farrington Highway at approximately 720 feet north of Helelua Street and 930 feet south of Lualualei Naval Road. A cycle length of 100 seconds and an exclusive left turn traffic signal timing phase are used in the analysis. Exclusive south bound left turn lanes are also warranted and provided at each intersection in the study area. Figures 9 and 10 show the results of the capacity analysis and the cumulative peak hour traffic volumes with traffic signals at the intersection of Farrington Highway and the project access road.

B. Traffic Signal Warrant Analysis

The heavy traffic volumes entering the intersection of Farrington Highway and the project access road during the AM and PM peak hours of traffic satisfies Signal Warrant No. 11 for traffic signalization outlined in the "Manual on Uniform Traffic Control Devices for Streets and Highways", 1988 Edition (MUTCD). Signal Warrant No. 11, the "Peak Hour Volume Warrant", consists of several conditions that would justify the installation of a traffic signal at the intersection where motorists experience high traffic delay and impaired safety during the peak hour periods. The "Peak Hour Volume Warrant" is based on minor street traffic volumes relative to major street traffic. There is a minimum 150 vph lower threshold volume for a minor street approach with two or more lanes and a high corresponding major street two-way volume. The projected approach volumes on the project access road are 193 vph and 150 vph during the cumulative AM and

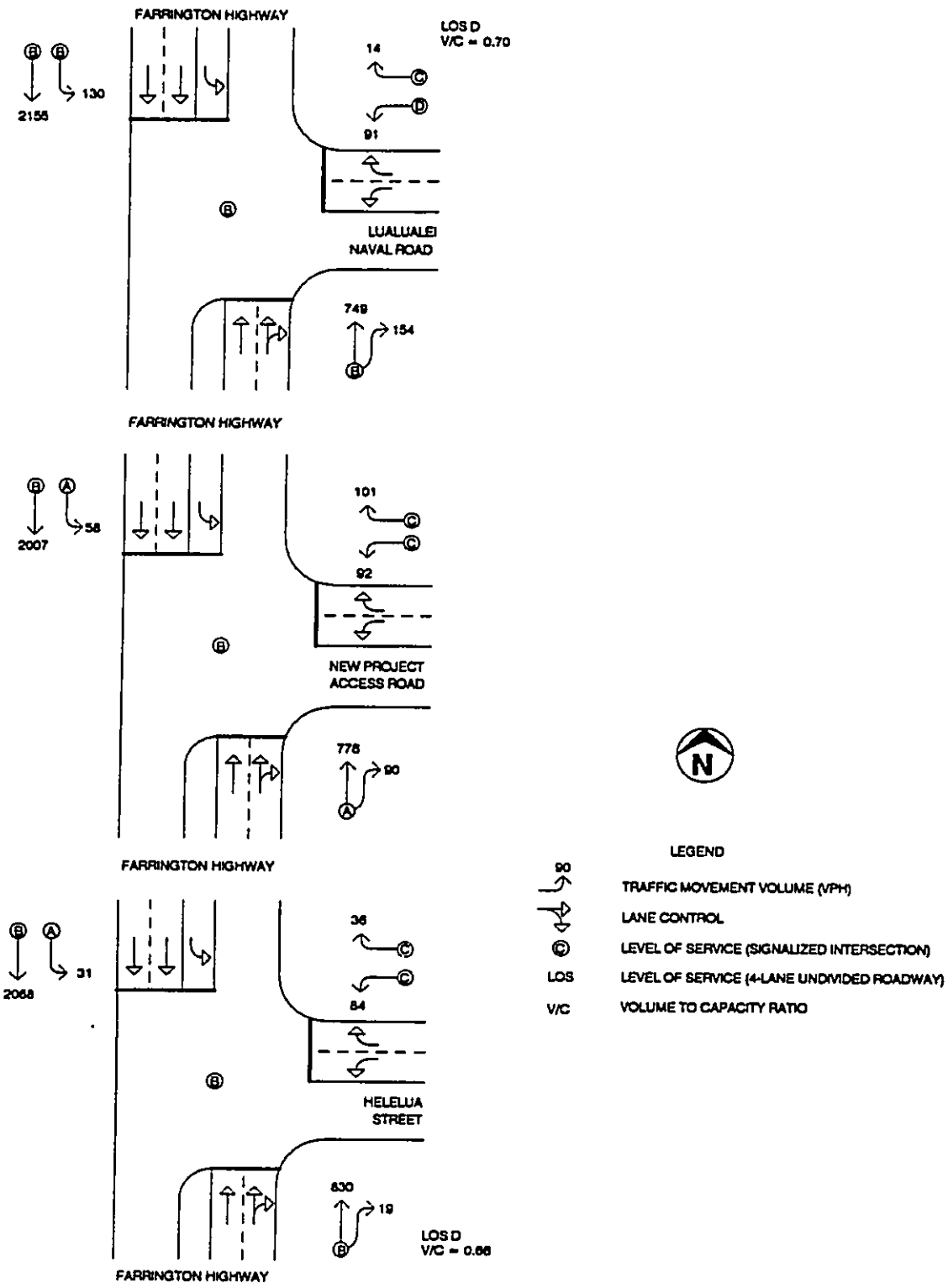


FIGURE 9 - CUMULATIVE AM PEAK HR. TRAFFIC SIGNAL ANALYSIS

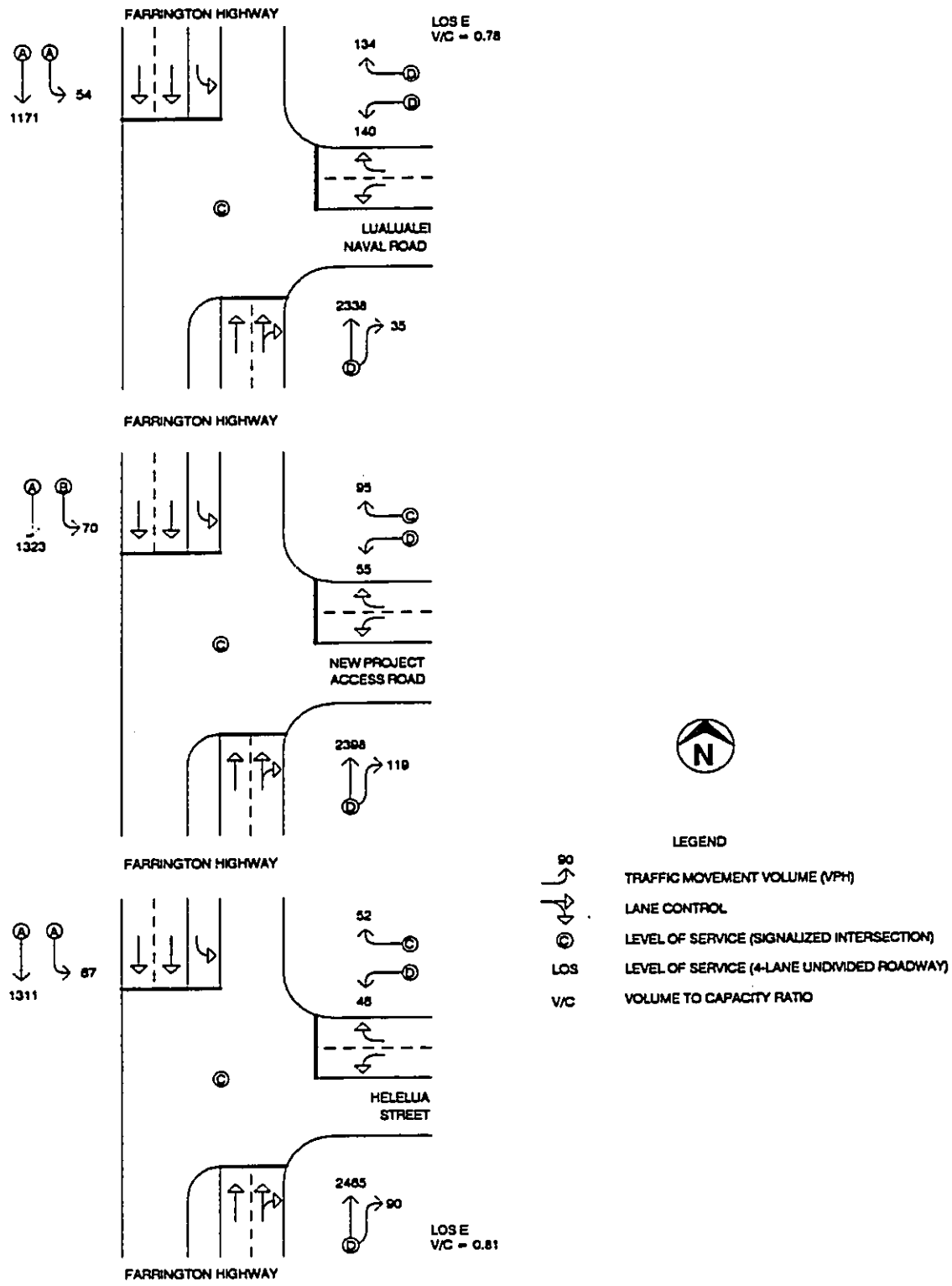


FIGURE 10 - CUMULATIVE PM PEAK HR. TRAFFIC SIGNAL ANALYSIS

PM peak hours of traffic, respectively. These volumes are above the required minimum as shown on Figure 4.5 in the MUTCD for their respective major street two-way volumes.

C. Cumulative Traffic Analysis With Access Road Traffic Signals

1. AM Peak Hour

The north bound approach on Farrington Highway at the intersection with Helelua Street would operate at LOS "B" during the projected AM peak hour. The south bound left turn movement and south bound through movement would operate at LOS "A" and LOS "B", respectively. The left turn and right turn movements on Helelua Street both would operate at LOS "C". The intersection would operate at an overall LOS "B".

At the intersection of Farrington Highway and Lualualei Naval Road, the south bound left turn movement would operate at LOS "B", while the south bound through movement also operates at LOS "B". The north bound approach on Farrington Highway would operate at LOS "B" during the projected AM peak hour of traffic. On Lualualei Naval Road, the left turn and right turn movements would operate at LOS "D"and LOS "C", respectively. The intersection would operate at an overall LOS "B".

At the signalized intersection of Farrington Highway and the project access road, the north bound approach on Farrington Highway would operate at LOS "A". The south bound left turn and through movements would operate at LOS "A" and LOS "B", respectively. The left turn and right turn movements on the project access road both would operate at LOS "C". The intersection of Farrington Highway and the project access road would operate at an overall LOS "B" during the projected AM peak hour of traffic.

2. PM Peak Hour

The north bound approach on Farrington Highway at the intersection with Helelua Street would operate at LOS "D" during the projected PM peak hour of traffic. The south bound left turn movement and south bound through movement both would operate at LOS "A". The left turn and right turn movements on Helelua Street would operate at LOS "D" and LOS "C", respectively. The intersection would operate at an overall LOS "C".

At the intersection of Farrington Highway and Lualualei Naval Road, the south bound left turn movement and south bound through movement each would operate at LOS "A". The north bound approach on Farrington Highway would operate at LOS "D" during the projected PM peak hour of traffic. On Lualualei Naval Road, the left turn and right turn movements both would operate at LOS "D". The intersection of Farrington Highway and Lualualei Naval Road would operate at an overall LOS "C".

At the signalized intersection of Farrington Highway and the project access road, the north bound approach on Farrington Highway would operate at LOS "D". The south bound left turn and through movements would operate at LOS "B" and LOS "A", respectively. The left turn and right turn movements on the project access road would operate at LOS "D"and LOS "C", respectively. The intersection of Farrington Highway and the project access road would operate at an overall LOS "C" during the projected PM peak hour of traffic.

VII. RECOMMENDATIONS

A. Proposed Improvements to Mitigate Existing Highway Deficiencies

Based on existing traffic volumes, exclusive south bound left turn lanes on Farrington Highway are warranted and should be constructed at the intersections with Helelua Street and Lualualei Naval Road. However, Farrington Highway, north of Helelua Street, has limited right-of-way for roadway widening. On the makai side of Farrington Highway, roadway widening is restricted by a railroad easement aligned parallel to Farrington Highway. On the mauka side of Farrington Highway, the existing residential homes restrict roadway widening. However, left turn lanes should improve existing operating conditions at the study intersections.

B. Proposed Improvements to Mitigate Highway Deficiencies Without Project

The projected volumes at the intersection of Farrington Highway and the project access road warrants an exclusive south bound left turn lane during the projected PM peak hour of traffic. The left turn lane should be constructed to improve traffic operations at the intersection, subject to right-of-way limitations.

C. Proposed Improvements to Mitigate Roadway Deficiencies With Project

1. The projected volumes during the cumulative AM and PM peak hours of traffic warrants the installation of traffic signals at the intersection of Farrington Highway and the project access road. The traffic signals should be synchronized with adjacent traffic signals.

2. As an alternative to traffic signals, the intersection of Farrington Highway and the project access road could be restricted to right-turn-in and right-turn-out movements only. South bound site traffic would be diverted to the Helelua Street traffic signals on Farrington Highway. The existing dirt road between Helelua Street and the project access road would require upgrading to City and County of Honolulu standards.

3. The intersection sight distances at the project access road should be adequate for the posted speed of 35 mph on Farrington Highway. The lines of sight should be clear of any obstructions.

4. The buses entering the parking lot near the kiosks should enter at the mauka driveway and exit at the makai driveway. This recommendation should improve traffic circulation with other trips generated by the drive-through fast food restaurant, and reduce the number bus passengers boarding in the aisle of the parking lot. Since boarding is typically on the right side of the bus, an option is to construct a bus stop on the project access road side of the kiosks. The turning radii at each of the driveways should be sufficient for bus turning maneuvers.

VIII. CONCLUSIONS

The proposed Nanakuli Commercial Development would not adversely affect projected peak hour traffic conditions. The trips generated by the proposed project would not significantly change the LOS of the individual movements at the intersections of Farrington Highway with Helelua Street, and Farrington Highway with Lualualei Naval Road. Exclusive left turn lanes are warranted at the study intersections under existing operating conditions. Roadway widening would require additional right-of-way that is limited by a railroad easement on the makai side and residential houses on the mauka side of Farrington Highway. The installation of traffic signals are also warranted for projected traffic conditions and should increase safety and improve traffic operations in the project vicinity. The traffic signals should

be synchronized with traffic signals at adjacent intersections to maximize through traffic movement. Restricting the intersection of Farrington Highway and the project access road to right-turn-in and right-turn-out movements would increase the number of vehicles on Helelua Street. South bound site traffic, diverted to Helelua Street, would lower the LOS of the intersection, however the operating level of service would still remain within acceptable standards.

APPENDIX
CAPACITY ANALYSIS CALCULATIONS

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..HELELUA STREET/FARRINGTON HIGHWAY
AREA TYPE.....OTHER
ANALYST.....PGP
DATE.....1/16/92
TIME.....6:00-7:00 AM
COMMENT.....FARHELA. EXISTING

	VOLUMES				GEOMETRY							
	EB	WB	NB	SB	EB		WB		NB		SB	
LT	0	84	0	31	12.0	L	10.0	T	11.0	LT	11.0	
TH	0	0	603	1616	12.0	R	10.0	TR	12.0	T	12.0	
RT	0	36	19	0	12.0		12.0		12.0		12.0	
RR	0	0	0	0	12.0		12.0		12.0		12.0	
					12.0		12.0		12.0		12.0	
					12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	0.00	N	0	0	0.90	0	N	19.3	3
WB	0.00	0.00	N	0	0	0.81	0	N	19.3	3
NB	0.00	2.00	N	0	2	0.67	0	N	10.3	3
SB	0.00	2.00	N	0	2	0.92	20	Y	10.3	3

SIGNAL SETTINGS — CYCLE LENGTH = 100.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT					NB	LT				
	TH						TH	X			
	RT						RT	X			
	PD						PD				
WB	LT	X				SB	LT	X			
	TH						TH	X			
	RT	X					RT				
	PD	X					PD	X			
GREEN		30.0	0.0	0.0	0.0	GREEN		60.0	0.0	0.0	0.0
YELLOW		5.0	0.0	0.0	0.0	YELLOW		5.0	0.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
WB	L	0.228	0.320	19.0	C	17.9	C
	R	0.098	0.320	15.4	C		
NB	TR	0.452	0.620	6.6	B	6.6	B
SB	LT	0.946	0.620	17.7	C	17.7	C

INTERSECTION: Delay = 14.1 (sec/veh) V/C = 0.702 LOS = B

CORRECTION

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

APPENDIX
CAPACITY ANALYSIS CALCULATIONS

Existing Peak Hour Conditions
Capacity Analysis Calculations

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..HELELUA STREET/FARRINGTON HIGHWAY
AREA TYPE.....OTHER
ANALYST.....PGP
DATE.....1/16/92
TIME.....6:00-7:00 AM
COMMENT.....FARHELA. EXISTING

	VOLUMES				GEOMETRY							
	EB	WB	NB	SB	EB		WB		NB		SB	
LT	0	84	0	31	12.0	L	10.0	T	11.0	LT	11.0	
TH	0	0	603	1616	12.0	R	10.0	TR	12.0	T	12.0	
RT	0	36	19	0	12.0		12.0		12.0		12.0	
RR	0	0	0	0	12.0		12.0		12.0		12.0	
					12.0		12.0		12.0		12.0	
					12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	0.00	N	0	0	0.90	0	N	19.3	3
WB	0.00	0.00	N	0	0	0.81	0	N	19.3	3
NB	0.00	2.00	N	0	2	0.67	0	N	10.3	3
SB	0.00	2.00	N	0	2	0.92	20	Y	10.3	3

SIGNAL SETTINGS — CYCLE LENGTH = 100.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT					NB	LT				
	TH						TH	X			
	RT						RT	X			
	PD						PD				
WB	LT	X				SB	LT	X			
	TH						TH	X			
	RT	X					RT				
	PD	X					PD	X			
GREEN		30.0	0.0	0.0	0.0	GREEN		60.0	0.0	0.0	0.0
YELLOW		5.0	0.0	0.0	0.0	YELLOW		5.0	0.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
WB	L	0.228	0.320	19.0	C	17.9	C
	R	0.098	0.320	15.4	C		
NB	TR	0.452	0.620	6.6	B	6.6	B
SB	LT	0.946	0.620	17.7	C	17.7	C

INTERSECTION: Delay = 14.1 (sec/veh) V/C = 0.702 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..LUALUALEI NAVAL ROAD/FARRINGTON HIGHWAY
AREA TYPE.....OTHER
ANALYST.....PGP
DATE.....1/16/92
TIME.....6:00-7:00 AM
COMMENT.....FARLUAA. EXISTING

	VOLUMES				GEOMETRY							
	EB	WB	NB	SB	EB		WB		NB		SB	
LT	0	91	0	130	12.0	L	10.0	T	11.0	LT	11.0	
TH	0	0	529	1713	12.0	R	10.0	TR	12.0	T	12.0	
RT	0	14	154	0	12.0		12.0		12.0		12.0	
RR	0	0	0	0	12.0		12.0		12.0		12.0	
					12.0		12.0		12.0		12.0	
					12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	0.00	N	0	0	0.90	0	N	19.3	3
WB	0.00	0.00	N	0	0	0.82	10	N	19.3	3
NB	0.00	2.00	N	0	2	0.70	0	N	10.3	3
SB	0.00	2.00	N	0	2	0.93	10	Y	10.3	3

SIGNAL SETTINGS — CYCLE LENGTH = 100.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT					NB	LT				
	TH						TH	X			
	RT						RT	X			
	PD						PD	X			
WB	LT	X				SB	LT	X			
	TH	X					TH	X			
	RT	X					RT				
	PD	X					PD				
GREEN		12.0	0.0	0.0	0.0	GREEN		78.0	0.0	0.0	0.0
YELLOW		5.0	0.0	0.0	0.0	YELLOW		5.0	0.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
WB	L	0.557	0.140	33.1	D	31.9	D
	R	0.086	0.140	24.2	C		
NB	TR	0.379	0.800	1.9	A	1.9	A
SB	LT	0.974	0.800	14.6	B	14.6	B

INTERSECTION: Delay = 11.3 (sec/veh) V/C = 0.912 LOS = B

1985 HCM:MULTILANE HIGHWAYS
****

FACILITY SECTION..... FARRINGTON HWY S. OF HELELUA ST
ANALYST..... PGP
TIME OF ANALYSIS..... 6:00-7:00 AM
DATE OF ANALYSIS..... 1/16/92
OTHER INFORMATION.... FARSHELA. EXISTING

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS	2	(TYPICAL - 200 #/HP)
PERCENTAGE OF BUSES	2	
PERCENTAGE OF RECREATIONAL VEHICLES	0	
DESIGN SPEED (MPH)	50	
PEAK HOUR FACTOR	.93	
DRIVER POPULATION FACTOR	1	(WEEKDAY/COMMUTER)
LANE WIDTH (FT)	11	
OBSTRUCTIONS	BOTH SIDES	
DISTANCE (FT) FROM ROADWAY EDGE	6	
TYPE OF MULTILANE HIGHWAY	RURAL, UNDIVIDED	

B) CORRECTION FACTORS

TERRAIN TYPE	E_T	E_B	E_R	f_{HV}	f_w	f_p	f_E
LEVEL	1.7	1.5	1.6	0.98	0.95	1.00	0.95

C) OPERATIONAL ANALYSIS RESULTS
****

NO. OF LANES	2
INPUT VOLUME	1700
V/C RATIO	.55
LEVEL OF SERVICE	C
COMPUTED CAPACITY (pcphpl)	1037
SPEED (mph)	39
DENSITY (pcpmpl)	29

1985 HCM:MULTILANE HIGHWAYS
****

FACILITY SECTION..... FARRINGTON HIGHWAY N. OF LUALUALEI NAVAL
ANALYST..... PGP
TIME OF ANALYSIS..... 6:00-7:00 AM
DATE OF ANALYSIS..... 1/16/92
OTHER INFORMATION.... FARSLUAA. EXISTING

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS	2	(TYPICAL - 200 #/HP)
PERCENTAGE OF BUSES	2	
PERCENTAGE OF RECREATIONAL VEHICLES	0	
DESIGN SPEED (MPH)	50	
PEAK HOUR FACTOR	.92	
DRIVER POPULATION FACTOR	1	(WEEKDAY/COMMUTER)
LANE WIDTH (FT)	11	
OBSTRUCTIONS	BOTH SIDES	
DISTANCE (FT) FROM ROADWAY EDGE	6	
TYPE OF MULTILANE HIGHWAY	RURAL, UNDIVIDED	

B) CORRECTION FACTORS

TERRAIN TYPE	E_T	E_B	E_R	f_{HV}	f_w	f_p	f_E
LEVEL	1.7	1.5	1.6	0.98	0.95	1.00	0.95

C) OPERATIONAL ANALYSIS RESULTS
****

NO. OF LANES	2
INPUT VOLUME	1843
V/C RATIO	.6
LEVEL OF SERVICE	C
COMPUTED CAPACITY (pcphpl)	1136
SPEED (mph)	38
DENSITY (pcpmpl)	32

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..HELELUA STREET/FARRINGTON HIGHWAY
AREA TYPE.....OTHER
ANALYST.....PGP
DATE.....1/15/92
TIME.....3:45-4:45 PM
COMMENT.....FARHELP. EXISTING

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB		EB		WB		NB		SB	
LT	0	46	0	67	:	12.0	L	10.0	T	11.0	LT	11.0	
TH	0	0	1913	1024	:	12.0	R	10.0	TR	12.0	T	12.0	
RT	0	52	90	0	:	12.0		12.0		12.0		12.0	
RR	0	0	0	0	:	12.0		12.0		12.0		12.0	
					:	12.0		12.0		12.0		12.0	
					:	12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	0.00	N	0	0	0.90	0	N	14.0	3
WB	0.00	0.00	N	0	0	0.84	0	N	14.0	3
NB	0.00	2.00	N	0	2	0.89	0	N	7.8	3
SB	0.00	2.00	N	0	2	0.89	20	Y	7.8	3

SIGNAL SETTINGS CYCLE LENGTH = 100.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT					NB	LT				
	TH						TH	X			
	RT						RT	X			
	PD						PD				
WB	LT	X				SB	LT	X			
	TH						TH	X			
	RT	X					RT				
	PD	X					PD	X			
GREEN		13.0	0.0	0.0	0.0	GREEN		77.0	0.0	0.0	0.0
YELLOW		5.0	0.0	0.0	0.0	YELLOW		5.0	0.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
WB	L	0.257	0.150	28.7	D	26.5	D
	R	0.290	0.150	24.6	C		
NB	TR	0.861	0.790	6.3	B	6.3	B
SB	L	0.971	0.790	75.7	F	10.8	B
	T	0.824	0.790	6.6	B		

INTERSECTION: Delay = 8.4 (sec/veh) V/C = 0.862 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..LUALUALEI NAVAL ROAD/FARRINGTON HIGHWAY
AREA TYPE.....OTHER
ANALYST.....PGP
DATE.....1/15/92
TIME.....3:45-4:45 PM
COMMENT.....FARLUAP. EXISTING

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB		EB		WB		NB		SB	
LT	0	140	0	54	:	12.0	L	10.0	T	11.0	LT	11.0	
TH	0	0	1849	899	:	12.0	R	10.0	TR	12.0	T	12.0	
RT	0	134	35	0	:	12.0		12.0		12.0		12.0	
RR	0	0	0	0	:	12.0		12.0		12.0		12.0	
					:	12.0		12.0		12.0		12.0	
					:	12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	0.00	N	0	0	0.90	0	N	14.0	3
WB	0.00	0.00	N	0	0	0.80	10	N	14.0	3
NB	0.00	2.00	N	0	2	0.86	0	N	7.8	3
SB	0.00	2.00	N	0	2	0.93	10	Y	7.8	3

SIGNAL SETTINGS — CYCLE LENGTH = 100.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT					NB	LT				
	TH						TH	X			
	RT						RT	X			
	PD						PD	X			
WB	LT	X				SB	LT	X			
	TH	X					TH	X			
	RT	X					RT				
	PD	X					PD				
GREEN		25.0	0.0	0.0	0.0	GREEN		65.0	0.0	0.0	0.0
YELLOW		5.0	0.0	0.0	0.0	YELLOW		5.0	0.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
WB	L	0.456	0.270	23.7	C	21.9	C
	R	0.438	0.270	20.0	C		
NB	TR	0.985	0.670	20.1	C	20.1	C
SB	L	0.834	0.670	45.9	E	12.5	B
	T	0.816	0.670	10.5	B		

INTERSECTION: Delay = 18.1 (sec/veh) V/C = 0.833 LOS = C

1985 HCM:MULTILANE HIGHWAYS
****

FACILITY SECTION..... FARRINGTON HWY S. OF HELELUA ST
ANALYST..... PGP
TIME OF ANALYSIS..... 3:45-4:45 PM
DATE OF ANALYSIS..... 1/16/92
OTHER INFORMATION.... FARSHELP. EXISTING

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS.....	2	(TYPICAL - 200 #/HP)
PERCENTAGE OF BUSES.....	2	
PERCENTAGE OF RECREATIONAL VEHICLES..	0	
DESIGN SPEED (MPH).....	50	
PEAK HOUR FACTOR.....	.89	
DRIVER POPULATION FACTOR.....	1	(WEEKDAY/COMMUTER)
LANE WIDTH (FT).....	11	
OBSTRUCTIONS.....	BOTH SIDES	
DISTANCE (FT) FROM ROADWAY EDGE.....	6	
TYPE OF MULTILANE HIGHWAY.....	RURAL, UNDIVIDED	

B) CORRECTION FACTORS

TERRAIN TYPE	E T	E B	E R	f HV	f w	f p	f E
LEVEL	1.7	1.5	1.6	0.98	0.95	1.00	0.95

C) OPERATIONAL ANALYSIS RESULTS
****

NO. OF LANES.....	2
INPUT VOLUME.....	2003
V/C RATIO.....	.67
LEVEL OF SERVICE.....	D
COMPUTED CAPACITY (pcphpl)..	1277
SPEED (mph).....	37
DENSITY (pcpmpl).....	37

1985 HCM:MULTILANE HIGHWAYS
****

FACILITY SECTION..... FARRINGTON HWY N. OF LUALUALEI NAVAL RD
ANALYST..... PGP
TIME OF ANALYSIS..... 3:45-4:45 PM
DATE OF ANALYSIS..... 1/15/92
OTHER INFORMATION.... FARSLUAP. EXISTING

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS	2	(TYPICAL - 200 #/HP)
PERCENTAGE OF BUSES	2	
PERCENTAGE OF RECREATIONAL VEHICLES	0	
DESIGN SPEED (MPH)	50	
PEAK HOUR FACTOR	.86	
DRIVER POPULATION FACTOR	1	(WEEKDAY/COMMUTER)
LANE WIDTH (FT)	11	
OBSTRUCTIONS	BOTH SIDES	
DISTANCE (FT) FROM ROADWAY EDGE	6	
TYPE OF MULTILANE HIGHWAY	RURAL, UNDIVIDED	

B) CORRECTION FACTORS

TERRAIN TYPE	E_T	E_B	E_R	f_{HV}	f_w	f_p	f_E
LEVEL	1.7	1.5	1.6	0.98	0.95	1.00	0.95

C) OPERATIONAL ANALYSIS RESULTS
****

NO. OF LANES	2
INPUT VOLUME	1983
V/C RATIO	.69
LEVEL OF SERVICE	D
COMPUTED CAPACITY (pcphpl)	1308
SPEED (mph)	37
DENSITY (pcpmpl)	38

1998 Peak Hour Conditions w/o Project
Capacity Analysis Calculations

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..HELELUA STREET/FARRINGTON HIGHWAY
AREA TYPE.....OTHER
ANALYST.....PGP
DATE.....PROJECTED
TIME.....AM PEAK HOUR
COMMENT.....FARHE0A. 1998 W/O PROJECT

	VOLUMES				GEOMETRY							
	EB	WB	NB	SB	EB		WB		NB		SB	
LT	0	84	0	31	12.0	L	10.0	T	11.0	L	11.0	
TH	0	0	747	2026	12.0	R	10.0	TR	12.0	T	12.0	
RT	0	36	19	0	12.0		12.0		12.0	T	12.0	
RR	0	0	0	0	12.0		12.0		12.0		12.0	
					12.0		12.0		12.0		12.0	
					12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	0.00	N	0	0	0.90	0	N	17.0	3
WB	0.00	0.00	N	0	0	0.81	0	N	17.0	3
NB	0.00	2.00	N	0	2	0.67	0	N	7.8	3
SB	0.00	2.00	N	0	2	0.92	20	Y	7.8	3

SIGNAL SETTINGS — CYCLE LENGTH = 100.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT					NB	LT				
	TH						TH	X			
	RT						RT	X			
	PD						PD				
WB	LT	X				SB	LT	X			
	TH						TH	X			
	RT	X					RT				
	PD	X					PD	X			
GREEN		21.0	0.0	0.0	0.0	GREEN		69.0	0.0	0.0	0.0
YELLOW		5.0	0.0	0.0	0.0	YELLOW		5.0	0.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
WB	L	0.317	0.230	24.5	C	23.1	C
	R	0.136	0.230	19.8	C		
NB	TR	0.485	0.710	4.3	A	4.3	A
SB	L	0.160	0.710	3.6	A	11.4	B
	T	0.917	0.710	11.5	B		

INTERSECTION: Delay = 9.5 (sec/veh) V/C = 0.771 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..LUALUALEI NAVAL ROAD/FARRINGTON HIGHWAY
AREA TYPE.....OTHER
ANALYST.....PGP
DATE.....PROJECTED
TIME.....AM PEAK HOUR
COMMENT.....FARLUOA. 1998 W/O PROJECT

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB		EB		WB		NB		SB	
LT	0	91	0	130	:	12.0	L	10.0	T	11.0	L	11.0	
TH	0	0	668	2114	:	12.0	R	10.0	TR	12.0	T	12.0	
RT	0	14	154	0	:	12.0		12.0		12.0	T	12.0	
RR	0	0	0	0	:	12.0		12.0		12.0		12.0	
					:	12.0		12.0		12.0		12.0	
					:	12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	0.00	N	0	0	0.90	0	N	17.0	3
WB	0.00	0.00	N	0	0	0.82	10	N	17.0	3
NB	0.00	2.00	N	0	2	0.70	0	N	7.8	3
SB	0.00	2.00	N	0	2	0.93	10	Y	7.8	3

SIGNAL SETTINGS — CYCLE LENGTH = 100.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT					NB	LT				
	TH						TH	X			
	RT						RT	X			
	PD						PD	X			
WB	LT	X				SB	LT	X			
	TH	X					TH	X			
	RT	X					RT				
	PD	X					PD				
GREEN		21.0	0.0	0.0	0.0	GREEN		69.0	0.0	0.0	0.0
YELLOW		5.0	0.0	0.0	0.0	YELLOW		5.0	0.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
WB	L	0.339	0.230	24.7	C	24.0	C
	R	0.052	0.230	19.4	C		
NB	TR	0.511	0.710	4.4	A	4.4	A
SB	L	0.726	0.710	15.1	C	13.8	B
	T	0.947	0.710	13.7	B		

INTERSECTION: Delay = 11.1 (sec/veh) V/C = 0.798 LOS = B

1985 HCM: UNSIGNALIZED INTERSECTIONS
****

IDENTIFYING INFORMATION

AVERAGE RUNNING SPEED, MAJOR STREET.. 30

PEAK HOUR FACTOR..... 1

AREA POPULATION..... 50000

NAME OF THE EAST/WEST STREET..... PROJECT ACCESS ROAD

NAME OF THE NORTH/SOUTH STREET..... FARRINGTON HIGHWAY

NAME OF THE ANALYST..... PGP

DATE OF THE ANALYSIS (mm/dd/yy)..... PROJECTED

TIME PERIOD ANALYZED..... AM PEAK HOUR

OTHER INFORMATION.... FARPR0A. 1998 WOP; W/RESIDENTIAL

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: T-INTERSECTION

MAJOR STREET DIRECTION: NORTH/SOUTH

CONTROL TYPE WESTBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	--	50	0	17
THRU	--	0	776	2007
RIGHT	--	20	7	0

NUMBER OF LANES

	EB	WB	NB	SB
LANES	--	2	2	2

ADJUSTMENT FACTORS

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	-----	---	---	-
WESTBOUND	0.00	90	20	N
NORTHBOUND	0.00	90	20	N
SOUTHBOUND	0.00	90	20	N

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	---	---	---
WESTBOUND	0	0	0
NORTHBOUND	0	0	0
SOUTHBOUND	0	0	0

CRITICAL GAPS

		TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS	WB	5.50	5.50	0.00	5.50
MAJOR LEFTS	SB	5.50	5.50	0.00	5.50
MINOR LEFTS	WB	7.00	7.00	0.00	7.00

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... PROJECT ACCESS ROAD
NAME OF THE NORTH/SOUTH STREET.... FARRINGTON HIGHWAY
DATE AND TIME OF THE ANALYSIS..... PROJECTED ; AM PEAK HOUR
OTHER INFORMATION.... FARPROA. 1998 WOP; W/RESIDENTIAL

CAPACITY AND LEVEL-OF-SERVICE

MOVEMENT	FLOW-RATE v(pcph)	POTEN-TIAL CAPACITY c_p (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)	SHARED CAPACITY c_{SH} (pcph)	RESERVE CAPACITY $c_R = c_{SH} - v$	LOS
MINOR STREET						
WB LEFT	50	75	73	73	23	E
RIGHT	20	708	708	708	688	A
MAJOR STREET						
SB LEFT	17	436	436	436	419	A

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... PROJECT ACCESS ROAD
NAME OF THE NORTH/SOUTH STREET.... FARRINGTON HIGHWAY
DATE AND TIME OF THE ANALYSIS..... PROJECTED ; AM PEAK HOUR
OTHER INFORMATION.... FARPROA. 1998 WOP; W/RESIDENTIAL

1985 HCM:MULTILANE HIGHWAYS
****

FACILITY SECTION..... FARRINGTON HWY S. OF HELELUA ST
ANALYST..... PGP
TIME OF ANALYSIS..... AM PEAK HOUR
DATE OF ANALYSIS..... PROJECTED
OTHER INFORMATION.... FARSHE0A. 1998 WOP

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS..... 2 (TYPICAL - 200 #/HP)
PERCENTAGE OF BUSES..... 2
PERCENTAGE OF RECREATIONAL VEHICLES.. 0
DESIGN SPEED (MPH)..... 50
PEAK HOUR FACTOR..... .93
DRIVER POPULATION FACTOR..... 1 (WEEKDAY/COMMUTER)
LANE WIDTH (FT)..... 12
OBSTRUCTIONS..... BOTH SIDES
DISTANCE (FT) FROM ROADWAY EDGE..... 6
TYPE OF MULTILANE HIGHWAY..... RURAL, UNDIVIDED

B) CORRECTION FACTORS

TERRAIN TYPE	E_T	E_B	E_R	f_{HV}	f_w	f_p	f_E
LEVEL	1.7	1.5	1.6	0.98	1.00	1.00	0.95

C) OPERATIONAL ANALYSIS RESULTS
****

NO. OF LANES..... 2
INPUT VOLUME..... 2110
V/C RATIO..... .64
LEVEL OF SERVICE..... D
COMPUTED CAPACITY (pcphpl).. 1223
SPEED (mph)..... 38
DENSITY (pcpmpl)..... 35

1985 HCM:MULTILANE HIGHWAYS
****

FACILITY SECTION..... FARRINGTON HWY. N. OF LUALUALEI RD.
ANALYST..... PGP
TIME OF ANALYSIS..... AM PEAK HOUR
DATE OF ANALYSIS..... PROJECTED
OTHER INFORMATION.... FARSLU0A. 1998 WOP

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS.....	2	(TYPICAL - 200 #/HP)
PERCENTAGE OF BUSES.....	2	
PERCENTAGE OF RECREATIONAL VEHICLES..	0	
DESIGN SPEED (MPH).....	50	
PEAK HOUR FACTOR.....	.92	
DRIVER POPULATION FACTOR.....	1	(WEEKDAY/COMMUTER)
LANE WIDTH (FT).....	12	
OBSTRUCTIONS.....	BOTH SIDES	
DISTANCE (FT) FROM ROADWAY EDGE.....	6	
TYPE OF MULTILANE HIGHWAY.....	RURAL, UNDIVIDED	

B) CORRECTION FACTORS

TERRAIN TYPE	E_T	E_B	E_R	f_{HV}	f_w	f_p	f_E
LEVEL	1.7	1.5	1.6	0.98	1.00	1.00	0.95

C) OPERATIONAL ANALYSIS RESULTS
****

NO. OF LANES.....	2
INPUT VOLUME.....	2244
V/C RATIO.....	.69
LEVEL OF SERVICE.....	D
COMPUTED CAPACITY (pcphpl)..	1315
SPEED (mph).....	37
DENSITY (pcpmpl).....	38

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..HELELUA STREET/FARRINGTON HIGHWAY
AREA TYPE.....OTHER
ANALYST.....PGP
DATE.....PROJECTED
TIME.....PM PEAK HOUR
COMMENT.....FARHE0P. 1998 WOP

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB		EB		WB		NB		SB	
LT	0	46	0	67	:	12.0	L	10.0	T	11.0	L	11.0	
TH	0	0	2384	1273	:	12.0	R	10.0	TR	12.0	T	12.0	
RT	0	52	90	0	:	12.0		12.0		12.0	T	12.0	
RR	0	0	0	0	:	12.0		12.0		12.0		12.0	
					:	12.0		12.0		12.0		12.0	
					:	12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	0.00	N	0	0	0.90	0	N	17.0	3
WB	0.00	0.00	N	0	0	0.84	0	N	17.0	3
NB	0.00	2.00	N	0	2	0.89	0	N	7.8	3
SB	0.00	2.00	N	0	2	0.89	20	Y	7.8	3

SIGNAL SETTINGS — CYCLE LENGTH = 100.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT					NB	LT				
	TH						TH		X		
	RT						RT		X		
	PD						PD		X		
WB	LT	X				SB	LT	X	X		
	TH						TH	X	X		
	RT	X					RT				
	PD						PD				
GREEN		13.0	0.0	0.0	0.0	GREEN		4.0	73.0	0.0	0.0
YELLOW		5.0	0.0	0.0	0.0	YELLOW		0.0	5.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
WB	L	0.257	0.150	28.7	D	26.5	D
	R	0.290	0.150	24.6	C		
NB	TR	1.007	0.750	20.5	C	20.5	C
SB	L	0.547	0.790	9.6	B	2.7	A
	T	0.482	0.790	2.4	A		

INTERSECTION: Delay = 14.6 (sec/veh) V/C = 0.873 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..LUALUALEI NAVAL ROAD/FARRINGTON HIGHWAY
AREA TYPE.....OTHER
ANALYST.....PGP
DATE.....PROJECTED
TIME.....PM PEAK HOUR
COMMENT.....FARLU0P. 1998 WOP

VOLUMES

	EB	WB	NB	SB
LT	0	140	0	54
TH	0	0	2289	1130
RT	0	134	35	0
RR	0	0	0	0

GEOMETRY

EB		WB		NB		SB
12.0	L	10.0	T	11.0	L	11.0
12.0	R	10.0	TR	12.0	T	12.0
12.0		12.0		12.0	T	12.0
12.0		12.0		12.0		12.0
12.0		12.0		12.0		12.0
12.0		12.0		12.0		12.0

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	0.00	N	0	0	0.90	0	N	17.0	3
WB	0.00	0.00	N	0	0	0.80	10	N	17.0	3
NB	0.00	2.00	N	0	2	0.86	0	N	7.8	3
SB	0.00	2.00	N	0	2	0.93	10	Y	7.8	3

SIGNAL SETTINGS

CYCLE LENGTH = 100.0

		PH-1	PH-2	PH-3	PH-4
EB	LT				
	TH				
	RT				
	PD				
WB	LT	X			
	TH				
	RT	X			
	PD				
GREEN		16.0	0.0	0.0	0.0
YELLOW		5.0	0.0	0.0	0.0

		PH-1	PH-2	PH-3	PH-4
NB	LT				
	TH				
	RT		X		
	PD		X		
SB	LT		X		
	TH	X	X		
	RT	X			
	PD				
GREEN		4.0	70.0	0.0	0.0
YELLOW		0.0	5.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
WB	L	0.683	0.180	34.1	D	31.1	D
	R	0.654	0.180	28.1	D		
NB	TR	1.017	0.720	23.9	C	23.9	C
SB	L	0.422	0.760	5.8	B	3.1	A
	T	0.473	0.760	3.0	A		

INTERSECTION: Delay = 18.3 (sec/veh) V/C = 0.928 LOS = C

IDENTIFYING INFORMATION

AVERAGE RUNNING SPEED, MAJOR STREET.. 30

PEAK HOUR FACTOR..... 1

AREA POPULATION..... 50000

NAME OF THE EAST/WEST STREET..... PROJECT ACCESS ROAD

NAME OF THE NORTH/SOUTH STREET..... FARRINGTON HIGHWAY

NAME OF THE ANALYST..... PGP

DATE OF THE ANALYSIS (mm/dd/yy)..... PROJECTED

TIME PERIOD ANALYZED..... PM PEAK HOUR

OTHER INFORMATION.... FARPROP. 1998 WOP; W/RESIDENTIAL

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: T-INTERSECTION

MAJOR STREET DIRECTION: NORTH/SOUTH

CONTROL TYPE WESTBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	--	17	0	29
THRU	--	0	2398	1323
RIGHT	--	20	38	0

NUMBER OF LANES

	EB	WB	NB	SB
LANES	--	2	2	2

ADJUSTMENT FACTORS

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	-----	---	---	-
WESTBOUND	0.00	90	30	N
NORTHBOUND	0.00	90	20	N
SOUTHBOUND	0.00	90	20	N

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	---	---	---
WESTBOUND	0	0	0
NORTHBOUND	0	0	0
SOUTHBOUND	0	0	0

CRITICAL GAPS

		TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS	WB	5.50	5.50	0.00	5.50
MAJOR LEFTS	SB	5.50	5.50	0.00	5.50
MINOR LEFTS	WB	7.00	7.00	0.00	7.00

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... PROJECT ACCESS ROAD
NAME OF THE NORTH/SOUTH STREET.... FARRINGTON HIGHWAY
DATE AND TIME OF THE ANALYSIS..... PROJECTED ; PM PEAK HOUR
OTHER INFORMATION.... FARPROP. 1998 WOP; W/RESIDENTIAL

CAPACITY AND LEVEL-OF-SERVICE

MOVEMENT	FLOW-RATE v(pcph)	POTEN-TIAL CAPACITY c_p (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)	SHARED CAPACITY c_{SH} (pcph)	RESERVE CAPACITY $c_R = c_{SH} - v$	LOS
MINOR STREET						
WB LEFT	17	75	65	65	48	E
RIGHT	20	249	249	249	229	C
MAJOR STREET						
SB LEFT	29	145	145	145	116	D

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... PROJECT ACCESS ROAD
NAME OF THE NORTH/SOUTH STREET.... FARRINGTON HIGHWAY
DATE AND TIME OF THE ANALYSIS..... PROJECTED ; PM PEAK HOUR
OTHER INFORMATION.... FARPROP. 1998 WOP; W/RESIDENTIAL

1985 HCM:MULTILANE HIGHWAYS
****

FACILITY SECTION..... FARRINGTON HWY S. OF HELELUA ST
ANALYST..... PGP
TIME OF ANALYSIS..... PM PEAK HOUR
DATE OF ANALYSIS..... PROJECTED
OTHER INFORMATION.... FARSHE0P. 1998 WOP

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS.....	2	(TYPICAL - 200 #/HP)
PERCENTAGE OF BUSES.....	2	
PERCENTAGE OF RECREATIONAL VEHICLES..	0	
DESIGN SPEED (MPH).....	50	
PEAK HOUR FACTOR.....	.89	
DRIVER POPULATION FACTOR.....	1	(WEEKDAY/COMMUTER)
LANE WIDTH (FT).....	12	
OBSTRUCTIONS.....	BOTH SIDES	
DISTANCE (FT) FROM ROADWAY EDGE.....	6	
TYPE OF MULTILANE HIGHWAY.....	RURAL, UNDIVIDED	

B) CORRECTION FACTORS

TERRAIN TYPE	E T	E B	E R	f HV	f w	f p	f E
LEVEL	1.7	1.5	1.6	0.98	1.00	1.00	0.95

C) OPERATIONAL ANALYSIS RESULTS
****

NO. OF LANES.....	2
INPUT VOLUME.....	2474
V/C RATIO.....	.79
LEVEL OF SERVICE.....	E
COMPUTED CAPACITY (pcphpl)..	1498
SPEED (mph).....	34
DENSITY (pcpmpl).....	46

1985 HCM:MULTILANE HIGHWAYS
****

FACILITY SECTION..... FARRINGTON HWY. N. OF LUALUALEI RD.
ANALYST..... PGP
TIME OF ANALYSIS..... PM PEAK HOUR
DATE OF ANALYSIS..... PROJECTED
OTHER INFORMATION.... FARSLU0P. 1998 WOP

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS.....	2	(TYPICAL - 200 #/HP)
PERCENTAGE OF BUSES.....	2	
PERCENTAGE OF RECREATIONAL VEHICLES..	0	
DESIGN SPEED (MPH).....	50	
PEAK HOUR FACTOR.....	.9	
DRIVER POPULATION FACTOR.....	1	(WEEKDAY/COMMUTER)
LANE WIDTH (FT).....	12	
OBSTRUCTIONS.....	BOTH SIDES	
DISTANCE (FT) FROM ROADWAY EDGE.....	6	
TYPE OF MULTILANE HIGHWAY.....	RURAL, UNDIVIDED	

B) CORRECTION FACTORS

TERRAIN TYPE	E_T	E_B	E_R	f_{HV}	f_w	f_p	f_E
LEVEL	1.7	1.5	1.6	0.98	1.00	1.00	0.95

C) OPERATIONAL ANALYSIS RESULTS
****

NO. OF LANES.....	2
INPUT VOLUME.....	2423
V/C RATIO.....	.76
LEVEL OF SERVICE.....	D
COMPUTED CAPACITY (pcphpl)..	1451
SPEED (mph).....	35
DENSITY (pcpmpl).....	43

Cumulative Peak Hour Conditions w/Project
Capacity Analysis Calculations
Unsignalized at Project Access Road

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..HELELUA STREET/FARRINGTON HIGHWAY
AREA TYPE.....OTHER
ANALYST.....PGP
DATE.....PROJECTED
TIME.....AM PEAK HOUR
COMMENT.....FARHE1A. WP; UNSIGNALIZED AT ACCESS RD.

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB		EB		WB		NB		SB	
LT	0	176	0	89	:	12.0	L	10.0	T	11.0	L	11.0	
TH	0	0	830	1976	:	12.0	R	10.0	TR	12.0	T	12.0	
RT	0	36	19	0	:	12.0		12.0		12.0	T	12.0	
RR	0	0	0	0	:	12.0		12.0		12.0		12.0	
					:	12.0		12.0		12.0		12.0	
					:	12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	0.00	N	0	0	0.90	0	N	17.0	3
WB	0.00	0.00	N	0	0	0.81	0	N	17.0	3
NB	0.00	2.00	N	0	2	0.67	0	N	7.8	3
SB	0.00	2.00	N	0	2	0.92	20	Y	7.8	3

SIGNAL SETTINGS — CYCLE LENGTH = 100.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT					NB	LT				
	TH						TH		X		
	RT						RT		X		
	PD						PD				
WB	LT	X				SB	LT	X	X		
	TH						TH	X	X		
	RT	X					RT				
	PD	X					PD		X		
GREEN		22.0	0.0	0.0	0.0	GREEN		5.0	59.0	0.0	0.0
YELLOW		5.0	0.0	0.0	0.0	YELLOW		4.0	5.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
WB	L	0.636	0.240	28.6	D	27.0	D
	R	0.130	0.240	19.3	C		
NB	TR	0.626	0.610	8.3	B	8.3	B
SB	L	0.423	0.700	6.0	B	9.1	B
	T	0.860	0.700	9.2	B		

INTERSECTION: Delay = 10.0 (sec/veh) V/C = 0.803 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..LUALUALEI NAVAL ROAD/FARRINGTON HIGHWAY
AREA TYPE.....OTHER
ANALYST.....PGP
DATE.....PROJECTED
TIME.....AM PEAK HOUR
COMMENT.....FARLU1A. WP; UNSIGNALIZED AT ACCESS DRWY

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB		EB		WB		NB		SB	
LT	0	91	0	130	:	12.0	L	10.0	T	11.0	L	11.0	
TH	0	0	749	2155	:	12.0	R	10.0	TR	12.0	T	12.0	
RT	0	14	154	0	:	12.0		12.0		12.0	T	12.0	
RR	0	0	0	0	:	12.0		12.0		12.0		12.0	
					:	12.0		12.0		12.0		12.0	
					:	12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	0.00	N	0	0	0.90	0	N	17.0	3
WB	0.00	0.00	N	0	0	0.82	10	N	17.0	3
NB	0.00	2.00	N	0	2	0.70	0	N	7.8	3
SB	0.00	2.00	N	0	2	0.93	10	Y	7.8	3

SIGNAL SETTINGS — CYCLE LENGTH = 100.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT					NB	LT				
	TH						TH		X		
	RT						RT		X		
	PD						PD		X		
WB	LT	X				SB	LT	X	X		
	TH						TH	X	X		
	RT	X					RT				
	PD	X					PD				
GREEN		16.0	0.0	0.0	0.0	GREEN		5.0	65.0	0.0	0.0
YELLOW		5.0	0.0	0.0	0.0	YELLOW		4.0	5.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
WB	L	0.433	0.180	28.5	D	27.6	D
	R	0.067	0.180	22.0	C		
NB	TR	0.593	0.670	6.1	B	6.1	B
SB	L	0.631	0.760	9.9	B	8.9	B
	T	0.902	0.760	8.8	B		

INTERSECTION: Delay = 8.5 (sec/veh) V/C = 0.812 LOS = B

****

IDENTIFYING INFORMATION

AVERAGE RUNNING SPEED, MAJOR STREET.. 30

PEAK HOUR FACTOR..... 1

AREA POPULATION..... 50000

NAME OF THE EAST/WEST STREET..... PROJECT ACCESS ROAD

NAME OF THE NORTH/SOUTH STREET..... FARRINGTON HIGHWAY

NAME OF THE ANALYST..... PGP

DATE OF THE ANALYSIS (mm/dd/yy)..... PROJECTED

TIME PERIOD ANALYZED..... AM PEAK HOUR

OTHER INFORMATION.... FARPR1A. WP

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: T-INTERSECTION

MAJOR STREET DIRECTION: NORTH/SOUTH

CONTROL TYPE WESTBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	--	0	0	0
THRU	--	0	776	2065
RIGHT	--	101	90	0

NUMBER OF LANES

	EB	WB	NB	SB
LANES	--	1	2	2

ADJUSTMENT FACTORS

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	-----	---	---	-
WESTBOUND	0.00	90	30	N
NORTHBOUND	0.00	90	20	N
SOUTHBOUND	0.00	90	20	N

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	---	---	---
WESTBOUND	0	0	0
NORTHBOUND	0	0	0
SOUTHBOUND	0	0	0

CRITICAL GAPS

		TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS	WB	5.50	5.50	0.00	5.50
MAJOR LEFTS	SB	5.50	5.50	0.00	5.50
MINOR LEFTS	WB	7.00	7.00	0.00	7.00

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... PROJECT ACCESS ROAD
NAME OF THE NORTH/SOUTH STREET.... FARRINGTON HIGHWAY
DATE AND TIME OF THE ANALYSIS..... PROJECTED ; AM PEAK HOUR
OTHER INFORMATION.... FARPR1A. WP

CAPACITY AND LEVEL-OF-SERVICE

MOVEMENT	FLOW-RATE v(pcph)	POTENTIAL CAPACITY c_p (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)	SHARED CAPACITY c_{SH} (pcph)	RESERVE CAPACITY $c_R = c_{SH} - v$	LOS
MINOR STREET						
WB LEFT	0	75	75	75	75	E
RIGHT	101	676	676	676	575	A
MAJOR STREET						
SB LEFT	0	394	394	394	394	B

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... PROJECT ACCESS ROAD
NAME OF THE NORTH/SOUTH STREET.... FARRINGTON HIGHWAY
DATE AND TIME OF THE ANALYSIS..... PROJECTED ; AM PEAK HOUR
OTHER INFORMATION.... FARPR1A. WP

1985 HCM:MULTILANE HIGHWAYS
****

FACILITY SECTION..... FARRINGTON HWY S. OF HELELUA ST
ANALYST..... PGP
TIME OF ANALYSIS..... AM PEAK HOUR
DATE OF ANALYSIS..... PROJECTED
OTHER INFORMATION.... FARSHE1A. WP

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS.....	2	(TYPICAL - 200 #/HP)
PERCENTAGE OF BUSES.....	2	
PERCENTAGE OF RECREATIONAL VEHICLES..	0	
DESIGN SPEED (MPH).....	50	
PEAK HOUR FACTOR.....	.93	
DRIVER POPULATION FACTOR.....	1	(WEEKDAY/COMMUTER)
LANE WIDTH (FT).....	12	
OBSTRUCTIONS.....	BOTH SIDES	
DISTANCE (FT) FROM ROADWAY EDGE.....	6	
TYPE OF MULTILANE HIGHWAY.....	RURAL, UNDIVIDED	

B) CORRECTION FACTORS

TERRAIN TYPE	E_T	E_B	E_R	f_{HV}	f_w	f_p	f_E
LEVEL	1.7	1.5	1.6	0.98	1.00	1.00	0.95

C) OPERATIONAL ANALYSIS RESULTS
****

NO. OF LANES.....	2
INPUT VOLUME.....	2152
V/C RATIO.....	.66
LEVEL OF SERVICE.....	D
COMPUTED CAPACITY (pcphpl)..	1247
SPEED (mph).....	37
DENSITY (pcpmpl).....	36

1985 HCM:MULTILANE HIGHWAYS
****

FACILITY SECTION..... FARRINGTON HWY. N. OF LUALUALEI RD.
ANALYST..... PGP
TIME OF ANALYSIS..... AM PEAK HOUR
DATE OF ANALYSIS..... PROJECTED
OTHER INFORMATION.... FARSLU1A. WP

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS..... 2 (TYPICAL - 200 #/HP)
PERCENTAGE OF BUSES..... 2
PERCENTAGE OF RECREATIONAL VEHICLES.. 0
DESIGN SPEED (MPH)..... 50
PEAK HOUR FACTOR..... .92
DRIVER POPULATION FACTOR..... 1 (WEEKDAY/COMMUTER)
LANE WIDTH (FT)..... 12
OBSTRUCTIONS..... BOTH SIDES
DISTANCE (FT) FROM ROADWAY EDGE..... 6
TYPE OF MULTILANE HIGHWAY..... RURAL, UNDIVIDED

B) CORRECTION FACTORS

TERRAIN TYPE	E T	E B	E R	f HV	f w	f p	f E
LEVEL	1.7	1.5	1.6	0.98	1.00	1.00	0.95

C) OPERATIONAL ANALYSIS RESULTS
****

NO. OF LANES..... 2
INPUT VOLUME..... 2285
V/C RATIO..... .7
LEVEL OF SERVICE..... D
COMPUTED CAPACITY (pcphpl).. 1339
SPEED (mph)..... 37
DENSITY (pcpmpl)..... 39

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..HELELUA STREET/FARRINGTON HIGHWAY
AREA TYPE.....OTHER
ANALYST.....PGP
DATE.....PROJECTED
TIME.....PM PEAK HOUR
COMMENT.....FARHE1P. WP; UNSIGNALIZED AT ACCESS DRWY

VOLUMES

	EB	WB	NB	SB
LT	0	101	0	137
TH	0	0	2465	1254
RT	0	52	90	0
RR	0	0	0	0

GEOMETRY

EB		WB		NB		SB
12.0	L	10.0	T	11.0	L	11.0
12.0	R	10.0	TR	12.0	T	12.0
12.0		12.0		12.0	T	12.0
12.0		12.0		12.0		12.0
12.0		12.0		12.0		12.0
12.0		12.0		12.0		12.0

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	0.00	N	0	0	0.90	0	N	17.0	3
WB	0.00	0.00	N	0	0	0.84	0	N	17.0	3
NB	0.00	0.00	N	0	0	0.90	0	N	7.8	5
SB	0.00	2.00	N	0	2	0.89	20	Y	7.8	5

SIGNAL SETTINGS

CYCLE LENGTH = 100.0

		PH-1	PH-2	PH-3	PH-4
EB	LT				
	TH				
	RT				
	PD				
WB	LT	X			
	TH				
	RT	X			
	PD	X			
GREEN		11.0	0.0	0.0	0.0
YELLOW		5.0	0.0	0.0	0.0

		PH-1	PH-2	PH-3	PH-4
NB	LT				
	TH		X		
	RT		X		
	PD				
SB	LT	X	X		
	TH	X	X		
	RT				
	PD		X		
GREEN		5.0	70.0	0.0	0.0
YELLOW		4.0	5.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
WB	L	0.650	0.130	36.7	D	33.1	D
	R	0.335	0.130	25.9	D		
NB	TR	1.056	0.720	25.5	D	25.5	D
SB	L	0.700	0.810	12.3	B	2.1	A
	T	0.515	0.810	1.0	A		

INTERSECTION: Delay = 17.8 (sec/veh) V/C = 0.966 LOS = C

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..LUALUALEI NAVAL ROAD/FARRINGTON HIGHWAY
AREA TYPE.....OTHER
ANALYST.....PGP
DATE.....PROJECTED
TIME.....PM PEAK HOUR
COMMENT.....FARLU1P. WP; UNSIGNALIZED AT ACCESS DRWY

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB		EB		WB		NB		SB	
LT	0	140	0	54	:	12.0	L	10.0	T	11.0	L	11.0	
TH	0	0	2338	1171	:	12.0	R	10.0	TR	12.0	T	12.0	
RT	0	134	35	0	:	12.0		12.0		12.0	T	12.0	
RR	0	0	0	0	:	12.0		12.0		12.0		12.0	
					:	12.0		12.0		12.0		12.0	
					:	12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	0.00	N	0	0	0.90	0	N	17.0	3
WB	0.00	0.00	N	0	0	0.80	10	N	17.0	3
NB	0.00	2.00	N	0	2	0.90	0	N	7.8	5
SB	0.00	2.00	N	0	2	0.93	10	Y	7.8	3

SIGNAL SETTINGS — CYCLE LENGTH = 100.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT					NB	LT				
	TH						TH		X		
	RT						RT		X		
	PD						PD		X		
WB	LT	X				SB	LT	X	X		
	TH						TH	X	X		
	RT	X					RT				
	PD	X					PD				
GREEN		15.0	0.0	0.0	0.0	GREEN		5.0	66.0	0.0	0.0
YELLOW		5.0	0.0	0.0	0.0	YELLOW		4.0	5.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
WB	L	0.723	0.170	36.7	D	33.5	D
	R	0.696	0.170	30.1	D		
NB	TR	1.050	0.680	25.1	D	25.1	D
SB	L	0.264	0.770	2.8	A	2.8	A
	T	0.484	0.770	2.8	A		

INTERSECTION: Delay = 18.9 (sec/veh) V/C = 0.916 LOS = C

****

IDENTIFYING INFORMATION

AVERAGE RUNNING SPEED, MAJOR STREET..	30
PEAK HOUR FACTOR.....	1
AREA POPULATION.....	50000
NAME OF THE EAST/WEST STREET.....	PROJECT ACCESS ROAD
NAME OF THE NORTH/SOUTH STREET.....	FARRINGTON HIGHWAY
NAME OF THE ANALYST.....	PGP
DATE OF THE ANALYSIS (mm/dd/yy).....	PROJECTED
TIME PERIOD ANALYZED.....	PM PEAK HOUR

OTHER INFORMATION.... FARPR1P. WP

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: T-INTERSECTION

MAJOR STREET DIRECTION: NORTH/SOUTH

CONTROL TYPE WESTBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	--	0	0	0
THRU	--	0	2398	1391
RIGHT	--	95	119	0

NUMBER OF LANES

	EB	WB	NB	SB
LANES	--	1	2	2

ADJUSTMENT FACTORS

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	-----	---	---	-
WESTBOUND	0.00	90	30	N
NORTHBOUND	0.00	90	20	N
SOUTHBOUND	0.00	90	20	N

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	---	---	---
WESTBOUND	0	0	0
NORTHBOUND	0	0	0
SOUTHBOUND	0	0	0

CRITICAL GAPS

		TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS	WB	5.50	5.50	0.00	5.50
MAJOR LEFTS	SB	5.50	5.50	0.00	5.50
MINOR LEFTS	WB	7.00	7.00	0.00	7.00

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... PROJECT ACCESS ROAD
NAME OF THE NORTH/SOUTH STREET.... FARRINGTON HIGHWAY
DATE AND TIME OF THE ANALYSIS..... PROJECTED ; PM PEAK HOUR
OTHER INFORMATION.... FARPR1P. WP

CAPACITY AND LEVEL-OF-SERVICE

MOVEMENT	FLOW-RATE v(pcph)	POTENTIAL CAPACITY c_p (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)		SHARED CAPACITY c_{SH} (pcph)		RESERVE CAPACITY $c_R = c_{SH} - v$		LOS
MINOR STREET									
WB LEFT	0	75	75	>		75		75	E
RIGHT	95	236	236	>	236	>	141	> D	
				>		236		141	D
MAJOR STREET									
SB LEFT	0	145	145			145		145	D

IDENTIFYING INFORMATION

NAME OF THE EAST/WEST STREET..... PROJECT ACCESS ROAD
NAME OF THE NORTH/SOUTH STREET.... FARRINGTON HIGHWAY
DATE AND TIME OF THE ANALYSIS..... PROJECTED ; PM PEAK HOUR
OTHER INFORMATION.... FARPR1P. WP

1985 HCM:MULTILANE HIGHWAYS
****

FACILITY SECTION..... FARRINGTON HWY S. OF HELELUA ST
ANALYST..... PGP
TIME OF ANALYSIS..... PM PEAK HOUR
DATE OF ANALYSIS..... PROJECTED
OTHER INFORMATION.... FARSHE1P. WP

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS	2	(TYPICAL - 200 #/HP)
PERCENTAGE OF BUSES	2	
PERCENTAGE OF RECREATIONAL VEHICLES	0	
DESIGN SPEED (MPH)	50	
PEAK HOUR FACTOR	.89	
DRIVER POPULATION FACTOR	1	(WEEKDAY/COMMUTER)
LANE WIDTH (FT)	12	
OBSTRUCTIONS	BOTH SIDES	
DISTANCE (FT) FROM ROADWAY EDGE	6	
TYPE OF MULTILANE HIGHWAY	RURAL, UNDIVIDED	

B) CORRECTION FACTORS

TERRAIN TYPE	E_T	E_B	E_R	f_{HV}	f_w	f_p	f_E
LEVEL	1.7	1.5	1.6	0.98	1.00	1.00	0.95

C) OPERATIONAL ANALYSIS RESULTS
****

NO. OF LANES	2
INPUT VOLUME	2555
V/C RATIO	.81
LEVEL OF SERVICE	E
COMPUTED CAPACITY (pcphpl)	1547
SPEED (mph)	33
DENSITY (pcpmpl)	48

1985 HCM:MULTILANE HIGHWAYS
****

FACILITY SECTION..... FARRINGTON HWY. N. OF LUALUALEI RD.
ANALYST..... PGP
TIME OF ANALYSIS..... PM PEAK HOUR
DATE OF ANALYSIS..... PROJECTED
OTHER INFORMATION.... FARSLU1P. WP

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS.....	2	(TYPICAL - 200 #/HP)
PERCENTAGE OF BUSES.....	2	
PERCENTAGE OF RECREATIONAL VEHICLES..	0	
DESIGN SPEED (MPH).....	50	
PEAK HOUR FACTOR.....	.9	
DRIVER POPULATION FACTOR.....	1	(WEEKDAY/COMMUTER)
LANE WIDTH (FT).....	12	
OBSTRUCTIONS.....	BOTH SIDES	
DISTANCE (FT) FROM ROADWAY EDGE.....	6	
TYPE OF MULTILANE HIGHWAY.....	RURAL, UNDIVIDED	

B) CORRECTION FACTORS

TERRAIN TYPE	E_T	E_B	E_R	f_{HV}	f_w	f_p	f_E
LEVEL	1.7	1.5	1.6	0.98	1.00	1.00	0.95

C) OPERATIONAL ANALYSIS RESULTS
****

NO. OF LANES.....	2
INPUT VOLUME.....	2472
V/C RATIO.....	.78
LEVEL OF SERVICE.....	E
COMPUTED CAPACITY (pcphpl)..	1480
SPEED (mph).....	34
DENSITY (pcpmpl).....	45

Cumulative Peak Hour Conditions w/Project
Capacity Analysis Calculations
Signalized at Project Access Road

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..HELELUA STREET/FARRINGTON HIGHWAY
AREA TYPE.....OTHER
ANALYST.....PGP
DATE.....PROJECTED
TIME.....AM PEAK HOUR
COMMENT.....FARHE2A. WP; SIGNALIZED AT ACCESS DRWY.

	VOLUMES			
	EB	WB	NB	SB
LT	0	84	0	31
TH	0	0	830	2068
RT	0	36	19	0
RR	0	0	0	0

GEOMETRY							
EB		WB		NB		SB	
12.0	L	10.0	T	11.0	L	11.0	
12.0	R	10.0	TR	12.0	T	12.0	
12.0		12.0		12.0	T	12.0	
12.0		12.0		12.0		12.0	
12.0		12.0		12.0		12.0	
12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS									
	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	0.00	N	0	0	0.90	0	N	17.0	3
WB	0.00	0.00	N	0	0	0.81	0	N	17.0	3
NB	0.00	2.00	N	0	2	0.67	0	N	7.8	3
SB	0.00	2.00	N	0	2	0.92	20	Y	7.8	3

SIGNAL SETTINGS — CYCLE LENGTH = 100.0

		PH-1	PH-2	PH-3	PH-4
EB	LT				
	TH				
	RT				
	PD				
WB	LT	X			
	TH				
	RT	X			
	PD	X			
GREEN		21.0	0.0	0.0	0.0
YELLOW		5.0	0.0	0.0	0.0

		PH-1	PH-2	PH-3	PH-4
NB	LT				
	TH		X		
	RT		X		
	PD				
SB	LT	X	X		
	TH	X	X		
	RT				
	PD		X		
GREEN		7.0	58.0	0.0	0.0
YELLOW		4.0	5.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
WB	L	0.317	0.230	24.5	C	23.1	C
	R	0.136	0.230	19.8	C		
NB	TR	0.636	0.600	8.8	B	8.8	B
SB	L	0.129	0.710	3.5	A	9.7	B
	T	0.887	0.710	9.8	B		

INTERSECTION: Delay = 9.9 (sec/veh) V/C = 0.748 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..LUALUALEI NAVAL ROAD/FARRINGTON HIGHWAY
AREA TYPE.....OTHER
ANALYST.....PGP
DATE.....PROJECTED
TIME.....AM PEAK HOUR
COMMENT.....FARLU2A. WP SIGNALIZED AT ACCESS DRWY

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB		EB		WB		NB		SB	
LT	0	91	0	130	:	12.0	L	10.0	T	11.0	L	11.0	
TH	0	0	749	2155	:	12.0	R	10.0	TR	12.0	T	12.0	
RT	0	14	154	0	:	12.0		12.0		12.0	T	12.0	
RR	0	0	0	0	:	12.0		12.0		12.0		12.0	
					:	12.0		12.0		12.0		12.0	
					:	12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	0.00	N	0	0	0.90	0	N	17.0	3
WB	0.00	0.00	N	0	0	0.82	10	N	17.0	3
NB	0.00	2.00	N	0	2	0.70	0	N	7.8	3
SB	0.00	2.00	N	0	2	0.93	10	Y	7.8	3

SIGNAL SETTINGS — CYCLE LENGTH = 100.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT					NB	LT				
	TH						TH		X		
	RT						RT		X		
	PD						PD		X		
WB	LT	X				SB	LT	X	X		
	TH						TH	X	X		
	RT	X					RT				
	PD	X					PD				
GREEN		16.0	0.0	0.0	0.0	GREEN		5.0	65.0	0.0	0.0
YELLOW		5.0	0.0	0.0	0.0	YELLOW		4.0	5.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
WB	L	0.433	0.180	28.5	D	27.6	D
	R	0.067	0.180	22.0	C		
NB	TR	0.593	0.670	6.1	B	6.1	B
SB	L	0.631	0.760	9.9	B	8.9	B
	T	0.902	0.760	8.8	B		

INTERSECTION: Delay = 8.5 (sec/veh) V/C = 0.812 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..PROJECT ACCESS ROAD/FARRINGTON HIGHWAY
AREA TYPE.....OTHER
ANALYST.....PGP
DATE.....PROJECTED
TIME.....AM PEAK HOUR
COMMENT.....FARPR1A. WP

	VOLUMES				GEOMETRY							
	EB	WB	NB	SB	EB		WB		NB		SB	
LT	0	92	0	58	12.0	L	10.0	T	11.0	L	11.0	
TH	0	0	776	2007	12.0	R	10.0	TR	12.0	T	12.0	
RT	0	101	90	0	12.0		12.0		12.0	T	12.0	
RR	0	0	0	0	12.0		12.0		12.0		12.0	
					12.0		12.0		12.0		12.0	
					12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	0.00	N	0	0	0.90	0	N	14.0	3
WB	0.00	0.00	N	0	0	0.90	0	N	14.0	3
NB	0.00	2.00	N	0	2	0.90	0	N	7.8	3
SB	0.00	2.00	N	0	2	0.90	0	N	7.8	3

SIGNAL SETTINGS — CYCLE LENGTH = 100.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT					NB	LT				
	TH						TH	X			
	RT						RT	X			
	PD						PD				
WB	LT	X				SB	LT	X			
	TH	X					TH	X			
	RT	X					RT				
	PD						PD				
GREEN		21.0	0.0	0.0	0.0	GREEN		69.0	0.0	0.0	0.0
YELLOW		5.0	0.0	0.0	0.0	YELLOW		5.0	0.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
WB	L	0.312	0.230	24.5	C	22.7	C
	R	0.343	0.230	21.0	C		
NB	TR	0.413	0.710	3.9	A	3.9	A
SB	L	0.199	0.710	3.8	A	12.0	B
	T	0.929	0.710	12.2	B		

INTERSECTION: Delay = 10.4 (sec/veh) V/C = 0.786 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..HELELUA STREET/FARRINGTON HIGHWAY
AREA TYPE.....OTHER
ANALYST.....PGP
DATE.....PROJECTED
TIME.....PM PEAK HOUR
COMMENT.....FARHE2P. WP; UNSIGNALIZED AT ACCESS DRWY

	VOLUMES				GEOMETRY							
	EB	WB	NB	SB	EB		WB		NB		SB	
LT	0	46	0	67	12.0	L	10.0	T	11.0	L	11.0	
TH	0	0	2465	1311	12.0	R	10.0	TR	12.0	T	12.0	
RT	0	52	90	0	12.0		12.0		12.0	T	12.0	
RR	0	0	0	0	12.0		12.0		12.0		12.0	
					12.0		12.0		12.0		12.0	
					12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	0.00	N	0	0	0.90	0	N	17.0	3
WB	0.00	0.00	N	0	0	0.84	0	N	17.0	3
NB	0.00	0.00	N	0	0	0.90	0	N	7.8	5
SB	0.00	2.00	N	0	2	0.89	20	Y	7.8	5

SIGNAL SETTINGS — CYCLE LENGTH = 100.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT					NB	LT				
	TH						TH		X		
	RT						RT		X		
	PD						PD				
WB	LT	X				SB	LT	X	X		
	TH						TH	X	X		
	RT	X					RT				
	PD	X					PD		X		
GREEN		13.0	0.0	0.0	0.0	GREEN		5.0	68.0	0.0	0.0
YELLOW		5.0	0.0	0.0	0.0	YELLOW		4.0	5.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
WB	L	0.257	0.150	28.7	D	26.5	D
	R	0.290	0.150	24.6	C		
NB	TR	1.087	0.700	34.1	D	34.1	D
SB	L	0.343	0.790	2.9	A	1.3	A
	T	0.552	0.790	1.3	A		

INTERSECTION: Delay = 22.7 (sec/veh) V/C = 0.888 LOS = C

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

****

INTERSECTION..LUALUALEI NAVAL ROAD/FARRINGTON HIGHWAY
AREA TYPE.....OTHER
ANALYST.....PGP
DATE.....PROJECTED
TIME.....PM PEAK HOUR
COMMENT.....FARLU2P. WP; SIGNALIZED AT ACCESS DRWY

	VOLUMES				GEOMETRY							
	EB	WB	NB	SB	EB		WB		NB		SB	
LT	0	140	0	54	12.0	L	10.0	T	11.0	L	11.0	
TH	0	0	2338	1171	12.0	R	10.0	TR	12.0	T	12.0	
RT	0	134	35	0	12.0		12.0		12.0	T	12.0	
RR	0	0	0	0	12.0		12.0		12.0		12.0	
					12.0		12.0		12.0		12.0	
					12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	0.00	N	0	0	0.90	0	N	17.0	3
WB	0.00	0.00	N	0	0	0.80	10	N	17.0	3
NB	0.00	2.00	N	0	2	0.90	0	N	7.8	5
SB	0.00	2.00	N	0	2	0.93	10	Y	7.8	3

SIGNAL SETTINGS — CYCLE LENGTH = 100.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT					NB	LT				
	TH						TH		X		
	RT						RT		X		
	PD						PD		X		
WB	LT	X				SB	LT	X	X		
	TH						TH	X	X		
	RT	X					RT				
	PD	X					PD				
GREEN		15.0	0.0	0.0	0.0	GREEN		5.0	66.0	0.0	0.0
YELLOW		5.0	0.0	0.0	0.0	YELLOW		4.0	5.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
WB	L	0.723	0.170	36.7	D	33.5	D
	R	0.696	0.170	30.1	D		
NB	TR	1.050	0.680	25.1	D	25.1	D
SB	L	0.264	0.770	2.8	A	2.8	A
	T	0.484	0.770	2.8	A		

INTERSECTION: Delay = 18.9 (sec/veh) V/C = 0.916 LOS = C

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

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INTERSECTION..PROJECT ACCESS ROAD/FARRINGTON HIGHWAY
AREA TYPE.....OTHER
ANALYST.....PGP
DATE.....PROJECTED
TIME.....PM PEAK HOUR
COMMENT.....FARPR1P. WP

	VOLUMES					GEOMETRY							
	EB	WB	NB	SB		EB		WB		NB		SB	
LT	0	55	0	70	:	12.0	L	12.0	T	11.0	L	11.0	
TH	0	0	2398	1323	:	12.0	R	12.0	TR	12.0	T	12.0	
RT	0	95	119	0	:	12.0		12.0		12.0	T	12.0	
RR	0	0	0	0	:	12.0		12.0		12.0		12.0	
					:	12.0		12.0		12.0		12.0	
					:	12.0		12.0		12.0		12.0	

ADJUSTMENT FACTORS

	GRADE (%)	HV (%)	ADJ Y/N	PKG Nm	BUSES Nb	PHF	PEDS	PED. Y/N	BUT. min T	ARR. TYPE
EB	0.00	0.00	N	0	0	0.90	0	N	14.0	3
WB	0.00	0.00	N	0	0	0.90	0	N	14.0	3
NB	0.00	2.00	N	0	2	0.90	0	N	8.5	3
SB	0.00	2.00	N	0	2	0.90	0	N	8.5	3

SIGNAL SETTINGS — CYCLE LENGTH = 100.0

		PH-1	PH-2	PH-3	PH-4			PH-1	PH-2	PH-3	PH-4
EB	LT					NB	LT				
	TH						TH		X		
	RT						RT		X		
	PD						PD				
WB	LT	X				SB	LT	X	X		
	TH	X					TH	X	X		
	RT	X					RT				
	PD						PD				
GREEN		13.0	0.0	0.0	0.0	GREEN		7.0	70.0	0.0	0.0
YELLOW		5.0	0.0	0.0	0.0	YELLOW		0.0	5.0	0.0	0.0

LEVEL OF SERVICE

	LANE GRP.	V/C	G/C	DELAY	LOS	APP. DELAY	APP. LOS
WB	L	0.266	0.150	28.8	D	27.0	D
	R	0.460	0.150	26.0	D		
NB	TR	1.057	0.720	35.9	D	35.9	D
SB	L	0.416	0.790	3.9	A	2.7	A
	T	0.550	0.790	2.7	A		

INTERSECTION: Delay = 24.2 (sec/veh) V/C = 0.914 LOS = C