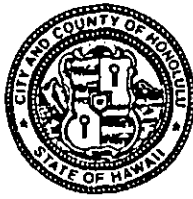


DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

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IDEB 99-0130

April 8, 1999

Mr. Gary Gill, Interim Director
Office of Environmental Quality Control
235 South Beretania Street, Room 702
Honolulu, Hawaii 96813-2437

Dear Mr. Gill:

Subject: Finding Of No Significant Impact (FONSI) For Manana Development Spine Road,
TMK: 9-7-24:41 por., Oahu, Hawaii

OFFICE OF ENVIRONMENTAL QUALITY CONTROL
99 APR -8 P 2:05
RECEIVED

The Department of Design and Construction, City and County of Honolulu, has reviewed the comments received regarding the Draft Environmental Assessment for the above referenced project during the 30-day public comment period, which began on October 23, 1998. The agency has made a determination under Hawaii Revised Statutes, Chapter 343, that this project will not have significant environmental effects and has issued a FONSI. Please publish this notice in the April 23, 1999, *OEQC Environmental Notice*.

The Federal Highway Administration, U. S. Department of Transportation, served as the other joint lead agency in the preparation of the agency's Environmental Assessment. Based on their independent review, they have issued a FONSI under the National Environmental Policy Act (NEPA). We have enclosed a copy of their FONSI.

We have also enclosed a completed OEQC Publication Form, a project summary (Spine FEA) on disk, and four (4) copies of the Final Environmental Assessment. Please call Robert Sarae of the Division of Infrastructure Design and Engineering at 523-4071 if you have any questions.

Very truly yours,


FOR RANDALL K. FUJIKI
Director

Attach.

cc: Engineering Concepts, Inc.
Planning Solutions, Inc.

47

APR 23 1999

FILE COPY

1999-04-23-DA-~~FEA~~ -

FINAL ENVIRONMENTAL ASSESSMENT

MANANA DEVELOPMENT SPINE ROAD
PEARL CITY, OAHU, HAWAII

Prepared by:

Engineering Concepts, Inc.
Planning Solutions, Inc.

Prepared for:

U.S. Department of Transportation
Federal Highway Administration

City and County of Honolulu
Department of Design and Construction

State of Hawaii
Department of Transportation

February 1999

**MANANA DEVELOPMENT SPINE ROAD
PEARL CITY, OAHU, HAWAII
FINAL ENVIRONMENTAL ASSESSMENT**

Submitted Pursuant to the National Environmental Policy Act (NEPA),
42 U.S.C. 4332 (2)(c) and Chapter 343, Hawaii Revised Statutes (HRS)

U.S. Department of Transportation, Federal Highway Administration (FHWA)
State of Hawaii, Department of Transportation, Highways Division
City and County of Honolulu, Department of Design and Construction (DDC)

The following persons may be contacted for additional information concerning this document:

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Department of Design and Construction
City and County of Honolulu
650 South King Street, 2nd Floor
Honolulu, Hawaii 96813
(808) 523-4564

The proposed project consists of the construction of a major collector road through the former Manana Storage Area. This proposed roadway, Spine Road, would be constructed within a 92-foot wide right-of-way. It would include two through lanes, a bicycle lane and a sidewalk on each side of the street. The design includes a median strip that ranges from 16 feet to four feet wide where left-turn storage lanes are present at all internal road intersections. The Spine Road would connect to the existing roadway system at the Waimano Home Road intersection with Moanalua Road and at the intersection of Acacia Road and Kuala Street. Underground utilities would be provided in the road right-of-way. The project would provide access to the Manana Storage Area community master planned development. The proposed improvements will help maintain the existing level of service on area roadways. Measures will be taken to mitigate the effect of traffic noise increases and construction activities.

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EDITORIAL NOTE

During the preparation of this document, the City and County of Honolulu underwent a reorganization. This reorganization resulted in the creation of new agencies which subsumed functions of old agencies. Therefore, this document may include references to both the former agency name as well as that of the new agency depending on the nature and timing of the reference.

To assist the reader in his/her review, the following table provides a cross reference between the former agencies and the new ones that are mentioned in this document.

FORMER AGENCY NAME	AGENCY NAME
Board of Water Supply	No change
Building Department	Department of Design and Construction
Department of Community & Social Resources	Department of Community Services
Department of Corporation Counsel	No change
Department of Housing and Community Development	Department dissolved
Department of Land Utilization	Department of Planning & Permitting
Department of Parks and Recreation	Department of Parks & Recreation Services
Department of Personnel	Department of Human Resources
Planning Department	Department of Planning & Permitting
Department of Public Works	Department of Facility Maintenance
Department of Transportation Services	No change
Department of Wastewater Management	Department of Environmental Services
Honolulu Police Department	No change
Honolulu Fire Department	No change

EXECUTIVE SUMMARY

ES-1 BACKGROUND

The City and County of Honolulu (City) purchased the 109-acre former Manana Storage Area (TMK 9-7-24:41) and nearby 14-acre Pearl City Junction properties from the U.S. Navy in the early 1990s with the intention of developing a mixed-use, master-planned development. The City established the Pearl City Planning Task Force to develop community-based land use recommendations for the property, and the City agency then responsible for the redevelopment effort (the Department of Housing and Community Development) worked with the Task Force to develop a conceptual redevelopment plan for the properties. The resulting master plan for the former Manana Storage Area included commercial (retail and office) space, public facilities, a community park, a family entertainment center, medical facilities, and light industrial sites. The redevelopment master plan specifically included an internal collector road which is commonly referred to as the "Spine Road" (see Figure ES-1).

ES-2 AGENCY ROLES

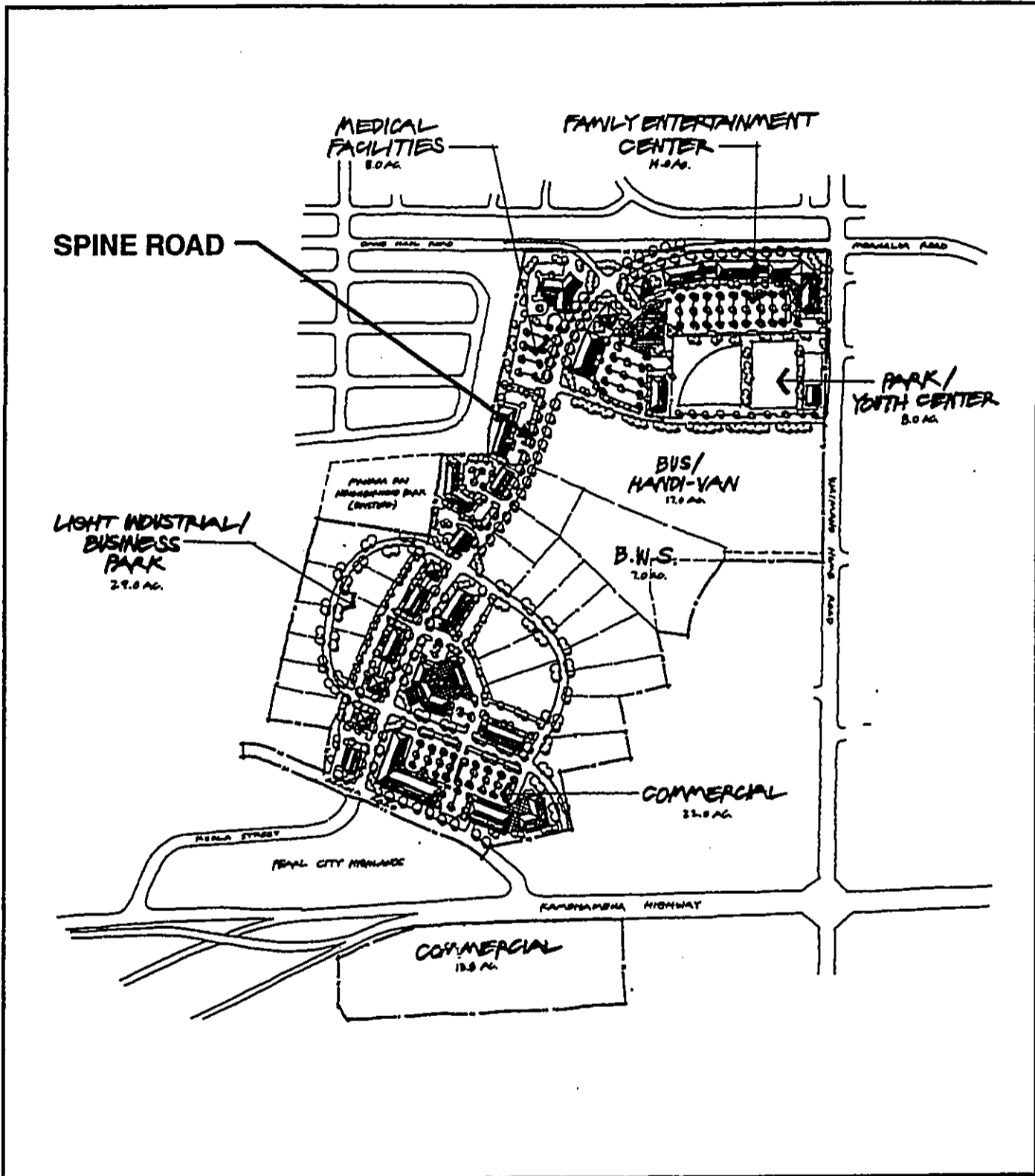
The City Department of Design and Construction (DDC) is responsible for designing and constructing the proposed Spine Road. DDC is the project proponent and the approving agency/accepting authority for the Chapter 343 Hawaii Revised Statutes (HRS) Environmental Assessment (EA). In this role it has determined that a finding of no significant impact (FONSI) is appropriate for the project. DDC is also the applicant for federal funds required for construction of this and, therefore, serves as a joint lead agency for the purposes of complying with National Environmental Policy Act of 1969 (NEPA). As a joint lead agency, DDC is responsible for developing substantial portions of the environmental documentation needed to satisfy NEPA and Chapter 343 HRS.

The Federal Highway Administration (FHWA) of the U.S. Department of Transportation is the other joint lead agency under NEPA and is responsible for procedural oversight and technical assistance. FHWA has reviewed the Final EA, public comments received on the Draft EA, and DDC's FONSI. Based on this review, the FHWA will decide whether to issue a FONSI for the purpose of NEPA.

Since all FHWA aid requests are processed through the Hawaii State Department of Transportation, Highways Division, that agency will review the funding request and project proposal. It has served as a cooperating agency in the preparation of the environmental documentation.

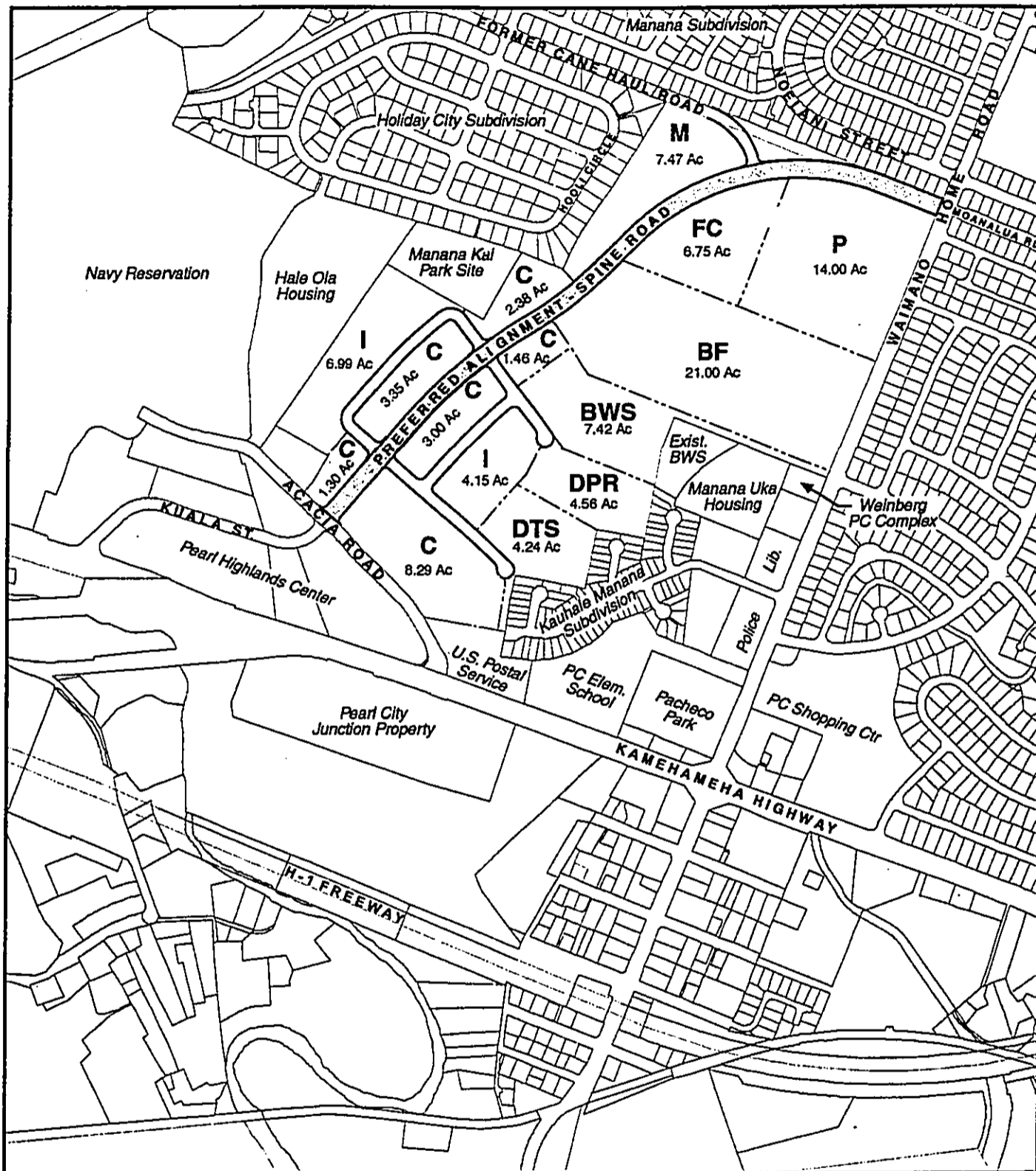
ES-3 DESCRIPTION OF THE PROPOSED PROJECT

The City's preferred alignment for the proposed Spine Road traverses the former Manana Storage Area property from the existing Moanalua Road/Waimano Home Road intersection to Acacia Road at Kuala Street (Figure ES-2). The planned road transitions smoothly from the Waimano Home Road intersection, running for a short distance along the former cane



<p>SOURCE: City and County of Honolulu Dept. of Housing and Community Development, 1996. Manana and Pearl City Junction Development EIS</p>	<p>LEGEND:</p> <p>0 600 1200 Feet</p>	<p>FIGURE ES-1:</p> <p>Pearl City Planning Task Force Preferred Conceptual Master Plan</p> <p>Manana Development Spine Road Environmental Assessment</p>
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Manana Spine Road, Fig ES-1 Master Plan, 10-12-96

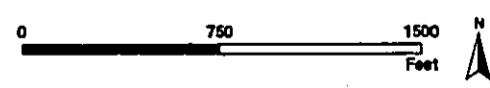


LEGEND:

BF Bus Facility	FC Family Center
BWS Board of Water Supply	I Industrial
C Commercial	M Medical
DPR Dept. of Parks & Recreation	P Park
DTS Dept. of Transportation Services	

FIGURE ES-2:
Preferred Alignment
 Manana Development Spine Road
 Environmental Assessment

SOURCE:
 C & C of Honolulu, DPW, April 1998
 C & C of Honolulu, DLU, June 5, 1998
 Engineering Concepts, Inc.,
 July 10, 1998



Manana Spine Road, Fig. ES-2 Preferred Alignment, 10-12-98

haul road at the *mauka* (north) boundary of the former Manana Storage Area property. The proposed design includes a Connector Road between the Spine Road and the Holiday City and Manana subdivisions.

The roadway would be constructed within a 92-foot wide right-of-way. It would have two through-lanes, a bicycle lane, and a sidewalk on each side of the street. Typical roadway sections are shown in Figure ES-3. The design includes a median strip that ranges from 16 feet to four feet wide depending upon whether or not turn-storage lanes are present. The width would change gradually, with transitional areas to accommodate the left-turn lanes planned at all internal intersections and at Acacia Road. All intersections and median openings would be equipped for traffic signals. The wider portions of the median would be landscaped with appropriate vegetation.

Underground utilities would be provided within the road right-of-way. Pedestrian crosswalks and Americans with Disabilities Act (ADA) ramps are proposed at each corner of internal intersections (Figure ES-4) and at the intersection of the proposed Spine Road and Acacia Road (Figure ES-5). One crosswalk, with two associated ADA ramps, would be provided for crossing of the Spine Road at Waimano Home Road (Figure ES-6).

ES-4 PURPOSE OF THIS DOCUMENT

This Environmental Assessment has been prepared to comply with:

- Chapter 343, Hawaii Revised Statutes (HRS)
- National Environmental Policy Act (NEPA)
- Federal Transit Administration and Federal Highway Administration Joint Regulations, Environmental Impact and Related Procedures, 23 CFR 771

The project involves the use of both City and federal funds. Consequently, it must comply with the applicable requirements of both federal (NEPA) and State (Chapter 343 HRS) regulations.

ES-5 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The proposed Spine Road is designated as a "collector" road and is integral to the City's redevelopment plans for the former Manana Storage Area. It is needed to provide access to the commercial and industrial uses included in the master plan (Figure ES-7). It would also provide access to other uses, such as the proposed neighborhood park, the proposed family entertainment center, medical facilities, and City corporation yards.

ES-6 ALTERNATIVES CONSIDERED

The City developed and evaluated an alternative alignment for the proposed collector road. It has the same roadway design (e.g., intersections, lane widths, traffic signals, crosswalks and ramps) as the preferred alignment. The alternative alignment essentially overlays the

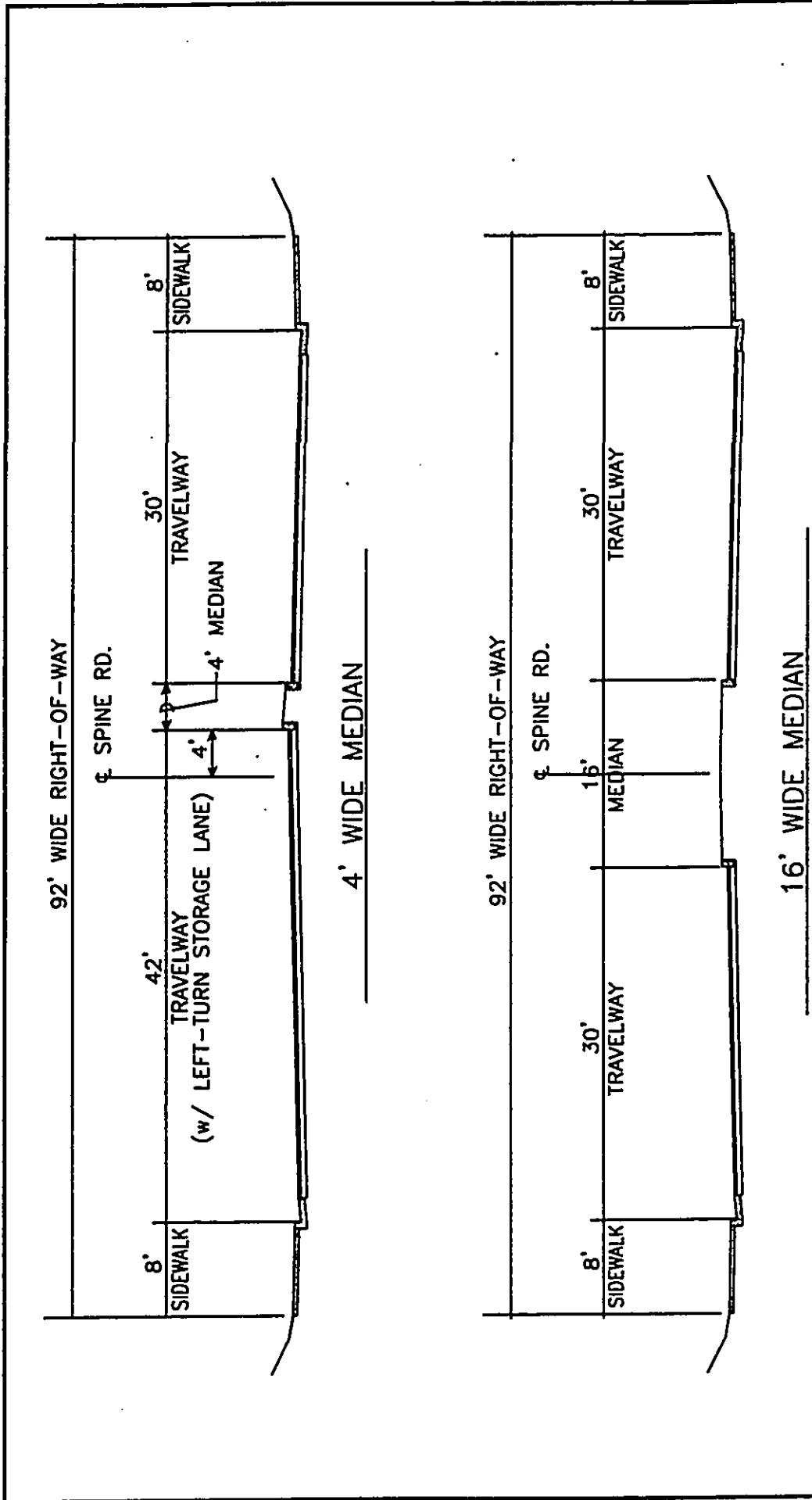


FIGURE ES-3:

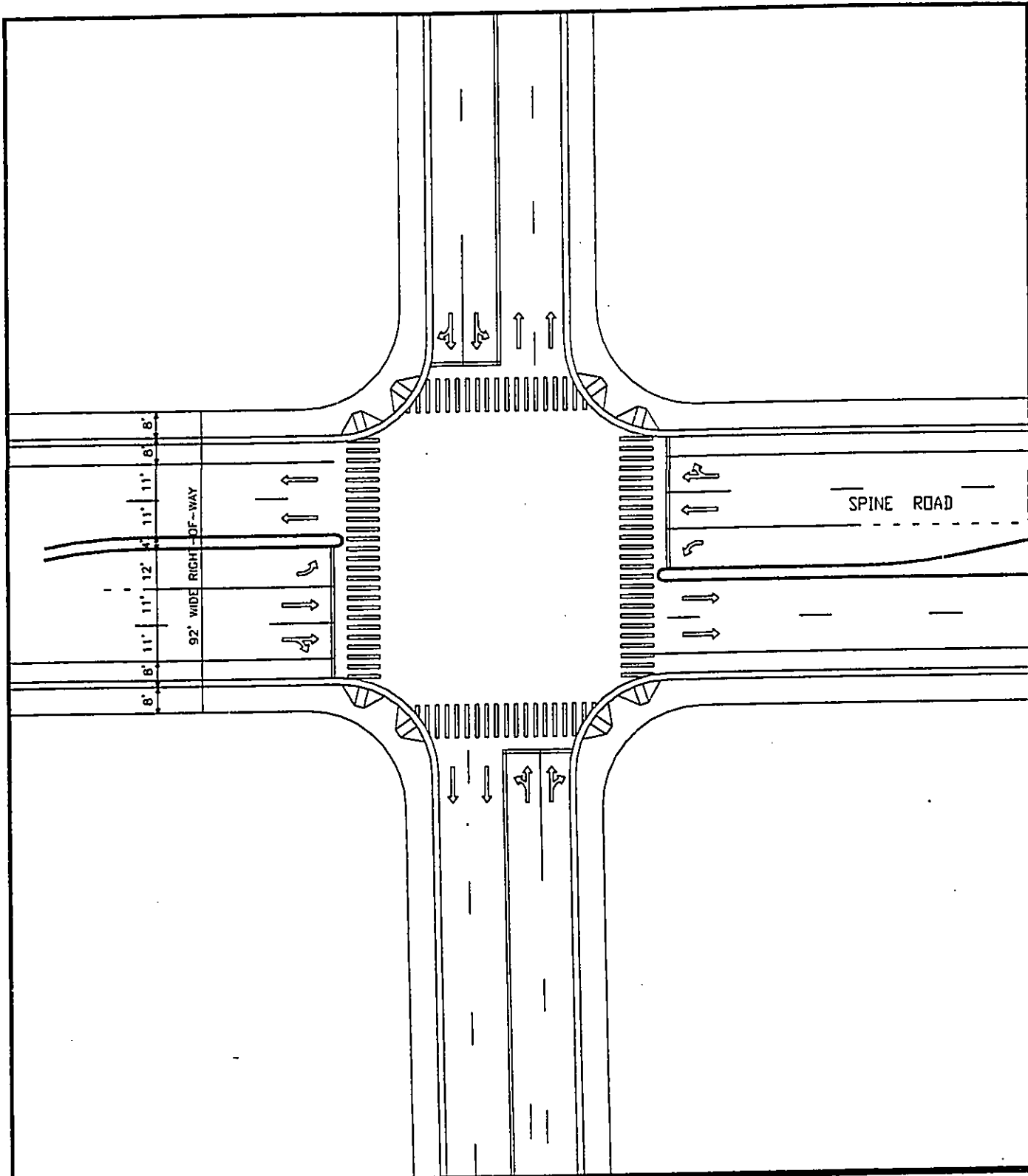
Typical Roadway Sections

NOT TO SCALE



SOURCE:
Engineering Concepts, Inc., July 10, 1998

Manana Development Spine Road
Environmental Assessment

Manana Development Spine Road ES-3 Typical Roadway Section (10-15-98)



LEGEND:

-  Crosswalk
-  ADA Ramp

SOURCE:
Engineering Concepts, Inc.
July 10, 1998

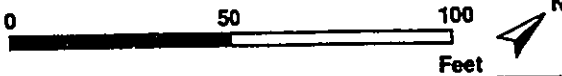
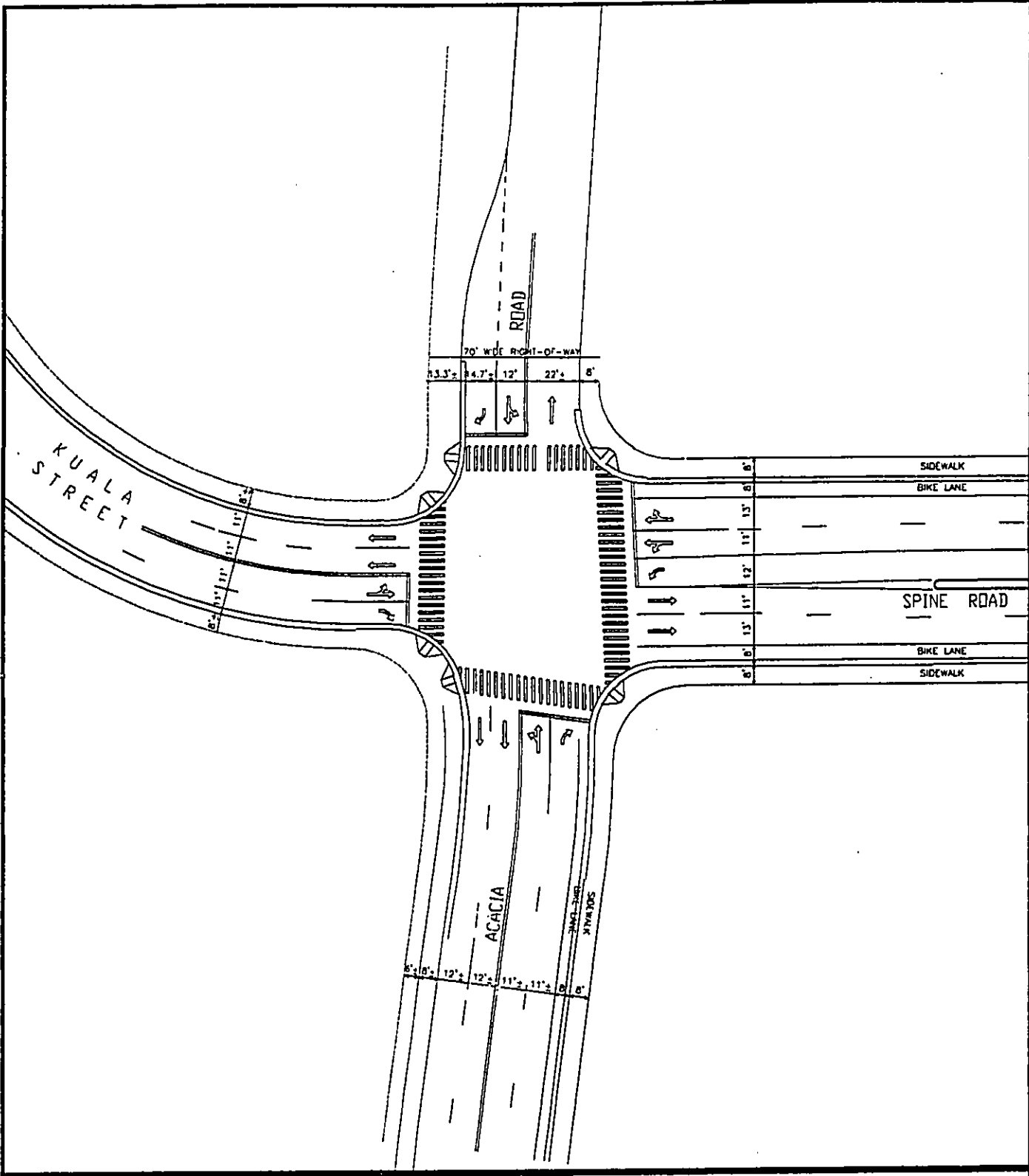




FIGURE ES-4:

**Details of Proposed Spine Road -
Internal Intersection**

Manana Development Spine Road
Environmental Assessment

Manana Spine Road, PG ES-4 Proposed Intersection - Internal Road, 10-12-98



- LEGEND:**
-  Crosswalk
 -  ADA Ramp

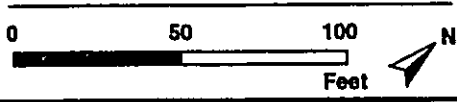


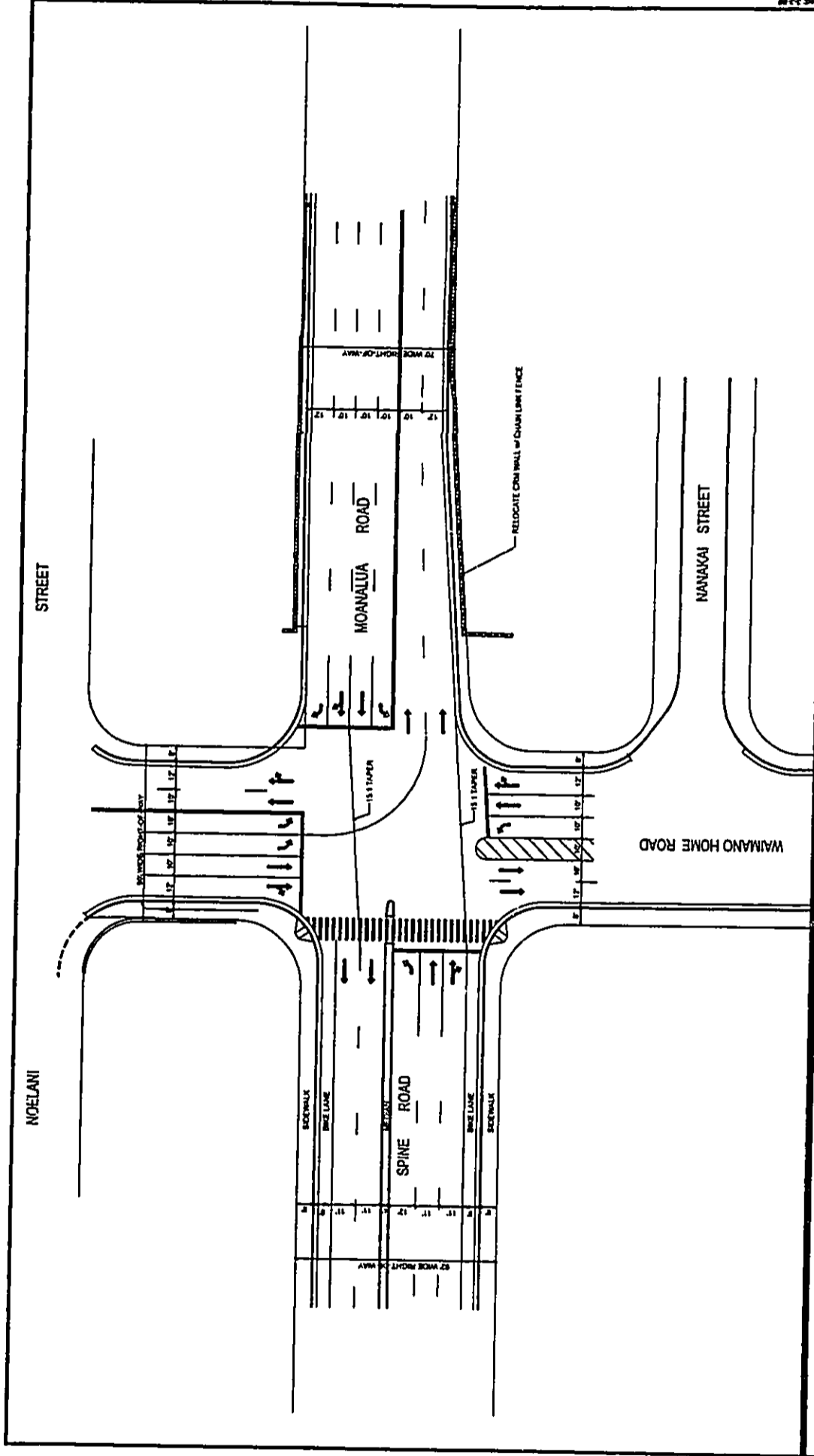
FIGURE ES-5:

Details of Proposed Spine Road - Acacia Road Intersection

Manana Development Spine Road Environmental Assessment

SOURCE:
Engineering Concepts, Inc.,
July 10, 1998

Manana Spine Road, Fig. ES-5 Proposed Intersection - Acacia Road, 05-12-98



LEGEND:

- Crosswalk
- ADA Ramp

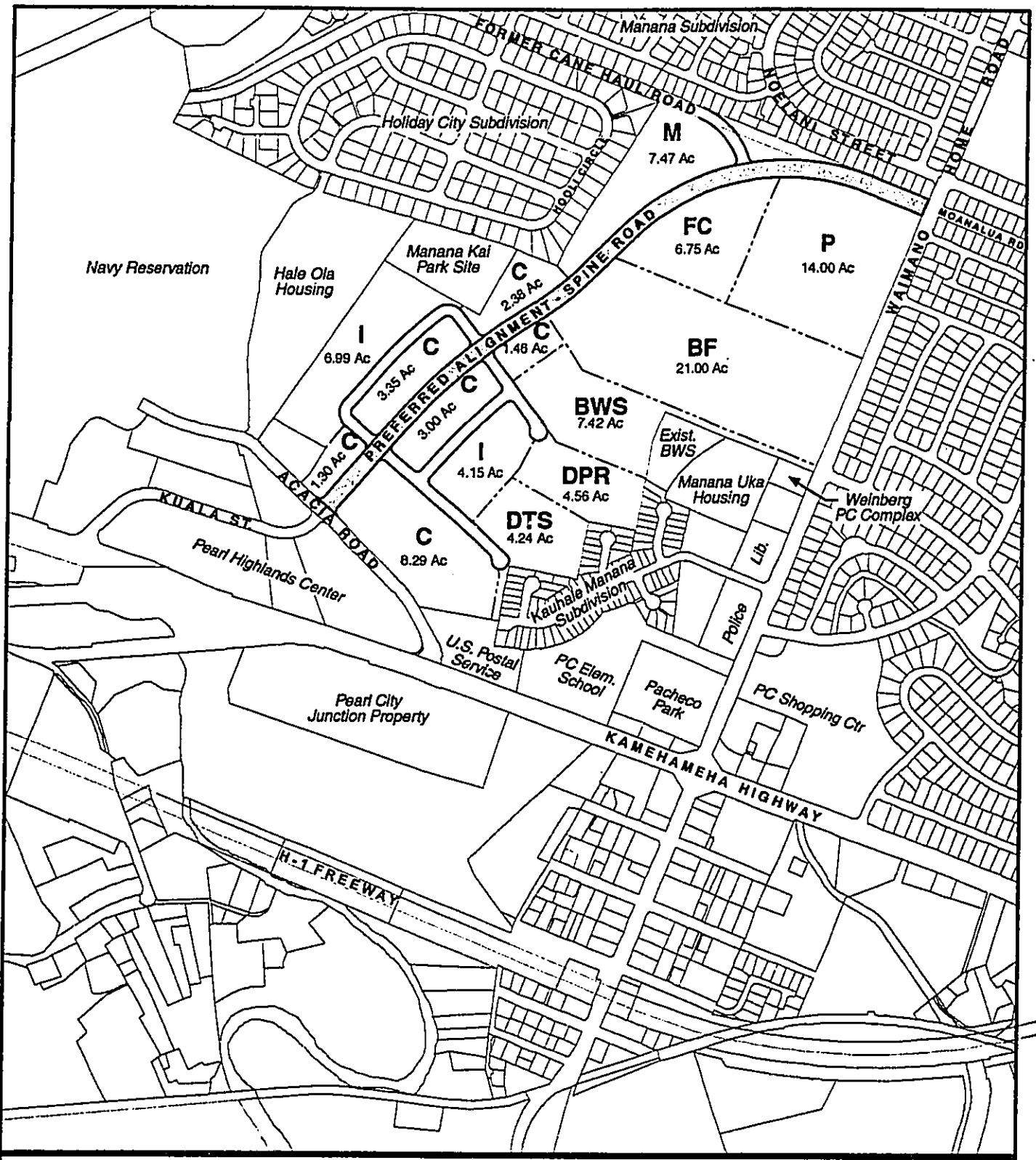
SOURCE:
Engineering Concepts, Inc., March 3, 1999.

FIGURE ES-6:

**Details of Proposed Spine Road -
Waimano Home Road Intersection**

Manana Development Spine Road
Environmental Assessment

Manana Development Spine Road - Waimano Home Road Intersection - Waimano Home Road - March 3, 1999



LEGEND:

- | | |
|---|-------------------------|
| BF Bus Facility | FC Family Center |
| BWS Board of Water Supply | I Industrial |
| C Commercial | M Medical |
| DPR Dept. of Parks & Recreation | P Park |
| DTS Dept. of Transportation Services | |

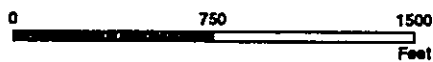
FIGURE ES-7:

**Manana Storage Area
Redevelopment Plan**

**Manana Development Spine Road
Environmental Assessment**

SOURCE:

C & C of Honolulu, DPW, April 1998
 C & C of Honolulu, DLU, June 5, 1998
 Engineering Concepts, Inc.



Manana Storage Road, Fig. ES-7, MSEA Redevelopment Plan, 10-12-98

preferred alignment for approximately 800 feet from the Waimano Home Road intersection. The *makai* (southern) portion of the alternative alignment is located more through the center of the former Manana Storage Area. Approximately 100 feet of this alignment at its *makai* terminus follows the existing Acacia Road right-of-way, including the Acacia Road/Kamehameha Highway intersection. Acacia Road would be relocated to form a T-intersection with the alternative alignment Spine Road.

A grade difference between the alternative alignment right-of-way and the adjacent Post Office property would require excavation and construction of a 210-foot long retaining wall. This wall would be approximately 20 feet in total height and its top would be about 15 feet above the road grade. The alternative road alignment would result in more excavation, steeper slopes and a higher cost relative to the preferred alignment.

For the purpose of this EA, the "No Action Alternative" is assumed to be a decision by the City not to undertake any redevelopment of the former Manana Storage Area. This would then result in continuation of existing uses of the site and no development of the Spine Road.

ES-7 POTENTIAL IMPACTS AND MITIGATION MEASURES

The proposed Spine Road is an integral part of the redevelopment of the former Manana Storage Area. The entire parcel has been substantially disturbed in the past, through both sugar cane cultivation and military activities. No surface water, wetlands, known archaeological or historic resources are located in the former Manana Storage Area. No rare, threatened or endangered species or critical habitats are located in the vicinity.

The primary concerns associated with the proposed road are temporary construction-related impacts and long-term operational impacts such as noise and traffic. These effects, as well as proposed mitigation measures are summarized here. Chapter 4 presents a full discussion of potential impacts and mitigation. Table ES-2 (at the end of this executive summary) summarizes the environmental impacts associated with the three alternatives evaluated.

ES-7.1 NOISE

The proposed Spine Road is predicted to decrease traffic noise along segments of Waimano Home Road and Kamehameha Highway, while traffic noise immediately adjacent to Moanalua Road would increase slightly. The project-related effect is small and below the threshold of detection for most people.

Two areas are of concern with respect to the proposed Spine Road-related traffic noise. One is the *mauka* segment near Moanalua Road; the other consists of residences on either side of the cane haul road where the proposed connector road would be built.

At the *mauka* part of the roadway, the hourly L_{eq} 67-dB noise contour would extend approximately 14 feet from the road right-of-way into existing residential parcels. Without mitigation, some homes in this area could be exposed to noise levels above the FHWA's

hourly L_{eq} criteria of 67 dB for residences. Additional residences experiencing a traffic noise increase greater than 15 dB could also be adversely impacted. Installation of noise attenuation barriers or use of other suitable noise abatement procedures will mitigate this.

Traffic noise along the proposed connector road is predicted to be lower than that along the Spine Road itself. The hourly L_{eq} 67-dBA contour is expected to extend only 10 feet from the edge of the road right-of-way. Preliminary data indicate that there are no homes that would be subjected to an hourly L_{eq} greater than 67 dBA. However, some residences are likely to experience an hourly L_{eq} increase greater than the 15-dB threshold that the State uses to determine significance. A noise barrier will be installed to mitigate these impacts.

The alternative alignment is identical to the preferred alignment in areas close to noise-sensitive uses. Consequently, the noise impacts of that alignment would be the same as those described for the preferred alignment.

ES-7.2 TRAFFIC

Results of a traffic study prepared for this report predict level-of-service (LOS) for affected or nearby intersections for the Year 2020. LOS are defined generally in terms of average delays experienced by motorists at intersections. Delay times define the LOS and are different for signalized versus unsignalized intersections as shown in Table ES-1.

Based on the results of the traffic analysis prepared for this report and reproduced in Appendix A, the LOSs compare as described below for the three considered alternatives:

- **Preferred Alignment:** The LOS at existing signalized intersections during the morning and afternoon peak hours would be the same or better than at present at the Waimano Home Road/Hoolaulea Street, Waimano Home Road/Kamehameha Highway, and Kamehameha Highway/Acacia Road intersections. Unless additional mitigation measures (such as use of a peak-hour contraflow lane) are taken, the LOS may be lower than desirable at the Waimano Home Road/Moanalua Road intersection. This is due principally to the decision to maintain all of the existing turning movements at the Waimano Home Road/Noelani Street intersection. The new and modified intersections (Spine Road/Acacia Road, Spine Road/Connector Road, and Spine Road/Moanalua Road) would have adequate-to-good LOSs.
- **Alternative Alignment:** The intersection LOSs associated with this alignment are the same as those for the preferred alignment with one exception. This alternative provides a worse LOS (E rather than D) at the Kamehameha Highway/Acacia Street intersection.
- **No Action Alternative:** Intersection LOSs indicate that recommended improvements are likely to result in slightly improved service levels at the intersections that are presently most congested, despite the forecast increase in ambient traffic. Service levels at two of the intersections that presently operate at the highest LOS (A and B) would decrease slightly.

The relative merits of the two Spine Road alignments were evaluated using five criteria. The results of the evaluation indicate that the preferred alignment is slightly superior to the alternative alignment.

Table ES-1. Level-of-Service (LOS) Definitions

UNSIGNALIZED INTERSECTIONS	
LOS A	Little or no delays: less than 5 seconds
LOS B	Short traffic delays: more than 5 seconds, less than 10 seconds
LOS C	Average traffic delays: between 10 and 20 seconds
LOS D	Long Traffic delays: more than 20 seconds and less than 30 seconds
LOS E	Very long traffic delays: between 30 and 45 seconds
LOS F	Demand volume exceeds capacity, delays longer than 45 seconds
SIGNALIZED INTERSECTIONS	
LOS A	Delays less than 5 seconds
LOS B	Delays from 5.1 to 15.0 seconds
LOS C	Delays from 15.1 to 25.0 seconds
LOS D	Delays from 25.1 to 40.0 seconds
LOS E	Delays from 40.1 to 60.0 seconds
LOS F	Delays exceeding 60 seconds

ES-8 DETERMINATION

In accordance with Chapter 343, HRS and the significance criteria described in Hawaii Administrative Rules §11-200-12, the City has made a determination that the proposed Spine Road would have no substantial impact on water quality, air quality, utilities, noise, archaeological sites, wildlife habitat, or other natural or man-made resources. All potential impacts would be mitigated to the extent practicable. Therefore, the DDC has made a finding of no significant impact for this project.

ES-9 MAJOR UNRESOLVED ISSUES

Because the proposed project is the result of a long-term public planning process that has involved all known stakeholders, most issues have been resolved. Those that remain include the following:

- The traffic, air and noise analyses are based on the assumption that future conditions include complete redevelopment of the former Manana Storage Area. Funding limitations, market characteristics and other unknowns, however, may prevent full build-out of the

property. Consequently, the results presented here represent "worst case" scenarios. Less development of the property would result in a reduction of impacts.

- The traffic impact analysis assumes that City and State agencies will implement a number of suggested roadway improvements and traffic management changes in the vicinity (including changes in signalization, prohibition of some turning movements, etc.). These improvements are suggested as suitable for improving existing traffic conditions in the area whether or not the project is constructed. Since these improvements would require funding, inter-governmental approvals, and other actions there is no absolute assurance that these will occur.
- This document is based on conceptual development plans. Ultimately, land use on the former Manana Storage Area may differ slightly from those used in the analyses.

ES-10 PROJECT SCHEDULE AND COST

The project construction will be phased.

The first phase will include the construction of the Spine Road itself and the interim phase of the noise mitigation measures. DDC plans to award the construction contract in mid-1999; construction of the Spine Road is expected to last approximately 12 months.

The second phase will occur in 2002. It will include the construction of the Connector Road and installation of the permanent noise mitigation measures with the exception of the wall that follows the boundary between the Holiday City Subdivision and the redeveloped Manana Area. This wall will be installed as this area is developed unless buildings that are part of the development provide adequate attenuation.

The final phase of the Spine Road project is expected to occur in 2003. It will include widening of Moanalua Road at its intersection with Waimano Home Road.

Total estimated costs for the preferred and alternative alignments are \$9,800,000 and \$11,200,000 (1998 dollars), respectively.

Table ES-2. Summary of Environmental Impacts.

	No Action	Preferred Alignment	Alternative Alignment
Land Use	<ul style="list-style-type: none"> No change for the foreseeable future Existing warehouses would continue to deteriorate 	<ul style="list-style-type: none"> Removal of 11 existing warehouses and their occupants (8 are currently occupied) Purchase of residential property(s) along cane haul road Facilitation of redevelopment of former Manana Storage Area 	<ul style="list-style-type: none"> Removal of 9 existing warehouses and their occupants (7 are currently occupied) Purchase of residential property(s) along cane haul road Facilitation of redevelopment of former Manana Storage Area Modifications to Post Office property (possibly involving purchase of land)
Topography	<ul style="list-style-type: none"> No impact 	<ul style="list-style-type: none"> Grubbing and grading, including cut and fill along 3,800 feet of 92-foot right-of-way Total of 57,000 cubic yards excavated Greatest elevation change: 12 feet Steepest slope: 5% 	<ul style="list-style-type: none"> Grubbing and grading, including cut and fill along 4,300 feet of 92-foot right-of-way Total of 91,000 cubic yards excavated Greatest elevation change: 20 feet Steepest slope: 6%
Economic	<ul style="list-style-type: none"> Reduced incentive for private development since necessary infrastructure would not be constructed. Therefore reduced possibility of recouping monies expended by the City for the purchase of the area. Interest on debt would continue to accrue. 	<ul style="list-style-type: none"> Construction cost of roadway and associated features: \$9,800,000 Provides temporary and permanent job opportunities 	<ul style="list-style-type: none"> Construction cost of roadway and associated features: \$11,200,000 Provides temporary and permanent job opportunities

Table ES-2 (continued). Summary of Environmental Impacts

	No Action	Preferred Alignment	Alternative Alignment
Noise	<ul style="list-style-type: none"> Increased noise due to ambient traffic growth. 	<ul style="list-style-type: none"> Reductions in noise levels along Waimano Home Road and Kamehameha Highway relative to No Action. Increases in noise levels along Moanalua Road, Cane Haul Road, and in certain portions of residential development near the <i>mauka</i> end of the proposed Spine Road and the Connector Road. Noise barriers needed. Temporary impacts due to construction activities. 	<ul style="list-style-type: none"> Reductions in noise levels along Waimano Home Road and Kamehameha Highway relative to No Action. Increases in noise levels along Moanalua Road, Cane Haul Road, and in certain portions of residential development near the <i>mauka</i> end of the proposed Spine Road and the Connector Road. Noise barriers needed. Temporary impacts due to construction activities.
Traffic	<ul style="list-style-type: none"> If suggested traffic improvements are implemented, LOSs of nearby intersections will remain similar to existing despite growth in ambient traffic. If they are not made these LOSs will deteriorate. 	<ul style="list-style-type: none"> Most existing signalized intersections would experience better or the same LOS as with No Action. The LOS at the Waimano Home Road/Moanalua Road intersection would decrease unless additional traffic mitigation measures are implemented. 	<ul style="list-style-type: none"> Identical to preferred alignment with exception of Spine Road (Acacia Road) with Kamehameha Hwy which would have a lower LOS in the p.m. peak hour under this scenario
Flora Resources	<ul style="list-style-type: none"> No impact. 	<ul style="list-style-type: none"> Permanent destruction of existing vegetation within right-of-way (no endangered species). Improvements in landscaping of median and sidewalks. 	<ul style="list-style-type: none"> Permanent destruction of existing vegetation within right-of-way (no endangered species). Improvements in landscaping of median and sidewalks.

Table ES-2 (continued). Summary of Environmental Impacts

	No Action	Preferred Alignment	Alternative Alignment
Fauna Resources	<ul style="list-style-type: none"> No impact. 	<ul style="list-style-type: none"> Temporary relocation of fauna (none are endangered) Permanent destruction of limited existing habitat and relocation of some animals (none are endangered or otherwise rare species). Creation of new habitat within landscaped areas. 	<ul style="list-style-type: none"> Temporary relocation of fauna (none are endangered) Permanent destruction of limited existing habitat and relocation of some animals (none are endangered or otherwise rare species). Creation of new habitat within landscaped areas.
Archaeological Resources	<ul style="list-style-type: none"> No impact. 	<ul style="list-style-type: none"> No impact expected. 	<ul style="list-style-type: none"> No impact expected.
Surface and Groundwater Resources	<ul style="list-style-type: none"> No impact 	<ul style="list-style-type: none"> No impact expected. 	<ul style="list-style-type: none"> No impact expected
Floodplains	<ul style="list-style-type: none"> No impact 	<ul style="list-style-type: none"> No impact 	<ul style="list-style-type: none"> No impact
Soils	<ul style="list-style-type: none"> No impact 	<ul style="list-style-type: none"> No impact expected because excavated soil may be used productively either on or off-site 	<ul style="list-style-type: none"> No impact expected because excavated soil may be used productively either on or off-site (34,000 cubic yards more than preferred alternative)
Natural Disasters	<ul style="list-style-type: none"> No effect. 	<ul style="list-style-type: none"> No effect. 	<ul style="list-style-type: none"> No effect.

Table ES-2 (continued). Summary of Environmental Impacts

	No Action	Preferred Alignment	Alternative Alignment
Hazardous Materials	<ul style="list-style-type: none"> No impact. 	<ul style="list-style-type: none"> Asbestos and lead-based paint will be removed and disposed of in accordance with pertinent laws and regulations. 	<ul style="list-style-type: none"> Asbestos and lead-based paint will be removed and disposed of in accordance with pertinent laws and regulations.
Visual and Aesthetic Resources	<ul style="list-style-type: none"> Existing warehouses would continue to deteriorate. No visual corridor through the area would exist. 	<ul style="list-style-type: none"> Establishes a visual corridor through the area with views towards the coastline. Improves aesthetics by establishing appropriate landscaping along the proposed Road. 	<ul style="list-style-type: none"> Establishes a visual corridor through the area with views towards the coastline. Improves aesthetics by establishing appropriate landscaping along the proposed Road.
Air Quality	<ul style="list-style-type: none"> No change. 	<ul style="list-style-type: none"> Improves air quality at nearby intersections. Enables potential development of some industrial type facilities with potential to generate air emissions. Temporary impact due to construction activities. 	<ul style="list-style-type: none"> Improves air quality at nearby intersections. Enables potential development of some industrial type facilities with potential to generate air emissions. Temporary impact due to construction activities.

CHAPTER 1

PURPOSE OF AND NEED FOR THE PROPOSED ACTION

1.1 BACKGROUND

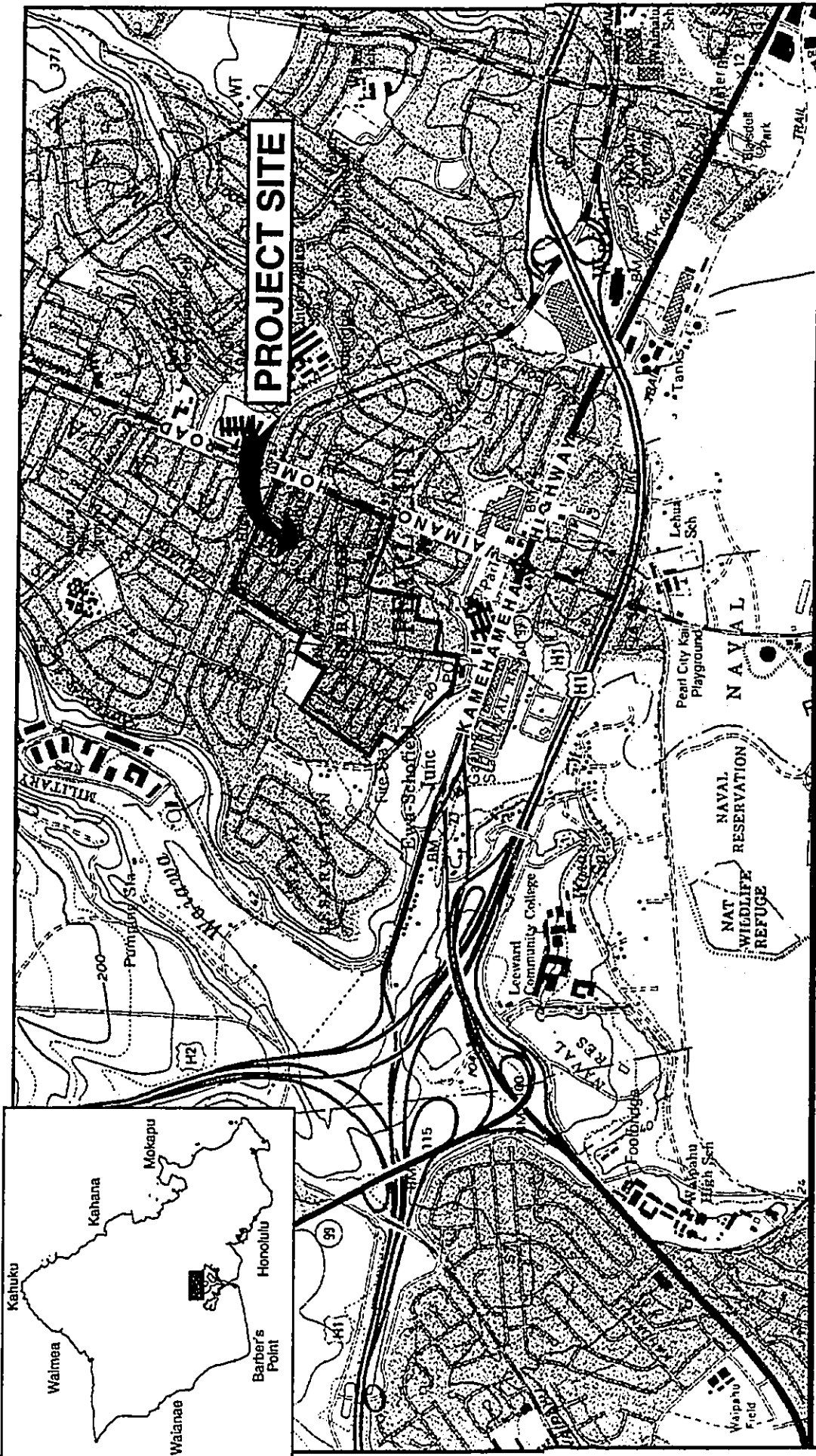
The City and County of Honolulu (City) Department of Design and Construction (DDC) proposes to construct a new collector road to serve the planned redevelopment of the former Manana Storage Area in Pearl City, Oahu. DDC plans to use both City and federal-aid funding. This Environmental Assessment (EA) addresses the potential impacts associated with construction and use of the proposed road as well as alternatives.

1.1.1 PLANNED REDEVELOPMENT OF THE FORMER MANANA STORAGE AREA

The City purchased the 109-acre Manana Storage Area and 14-acre Pearl City Junction properties (Figure 1-1) from the U.S. Navy in accordance with City Council Resolution 91-220 adopted on September 11, 1991 with plans for a mixed use, master-planned development.

The original conceptual master plan for the former Manana Storage Area was developed jointly by the former City Department of Housing and Community Development and the Pearl City Planning Task Force (PCPTF)¹. The PCPTF met nine times and held four community meetings during their original tenure (January to August 1995). The result of their land use planning efforts was a report entitled *Pearl City Task Force Final Report: Recommended Land Use Alternative for the Manana and Pearl City Junction Properties* (PCPTF, 1995). Included in the plan were commercial (retail and office) space, public facilities, a community park, a family entertainment center, medical facilities, and light industrial sites (Figure 1-2). The redevelopment master plan specifically included provisions for a "Spine Road" through the Manana Storage Area between Moanalua Road and Acacia Road.

¹ The City Council established the PCPTF for the specific purpose of generating community-based land use recommendations for the Manana and Pearl City Junction properties (PCPTF, 1995). Members of the Task Force originally included representatives of the City and County Planning Department, Department of Land Utilization, Department of Housing and Community Development, Department of Transportation Services, and the Honolulu Public Transit Authority. Community groups included Hale Ola Association, Century Park Plaza Association, Manana Community Association, Pearl City Neighborhood Board, Pearl City Community Association, Wailuna Recreation Association, Pacific Palisades Community Association, Aiea - Pearl City Business Association, and Newtown Community Association. Non-voting members included federal, state and local elected officials.



PROJECT SITE

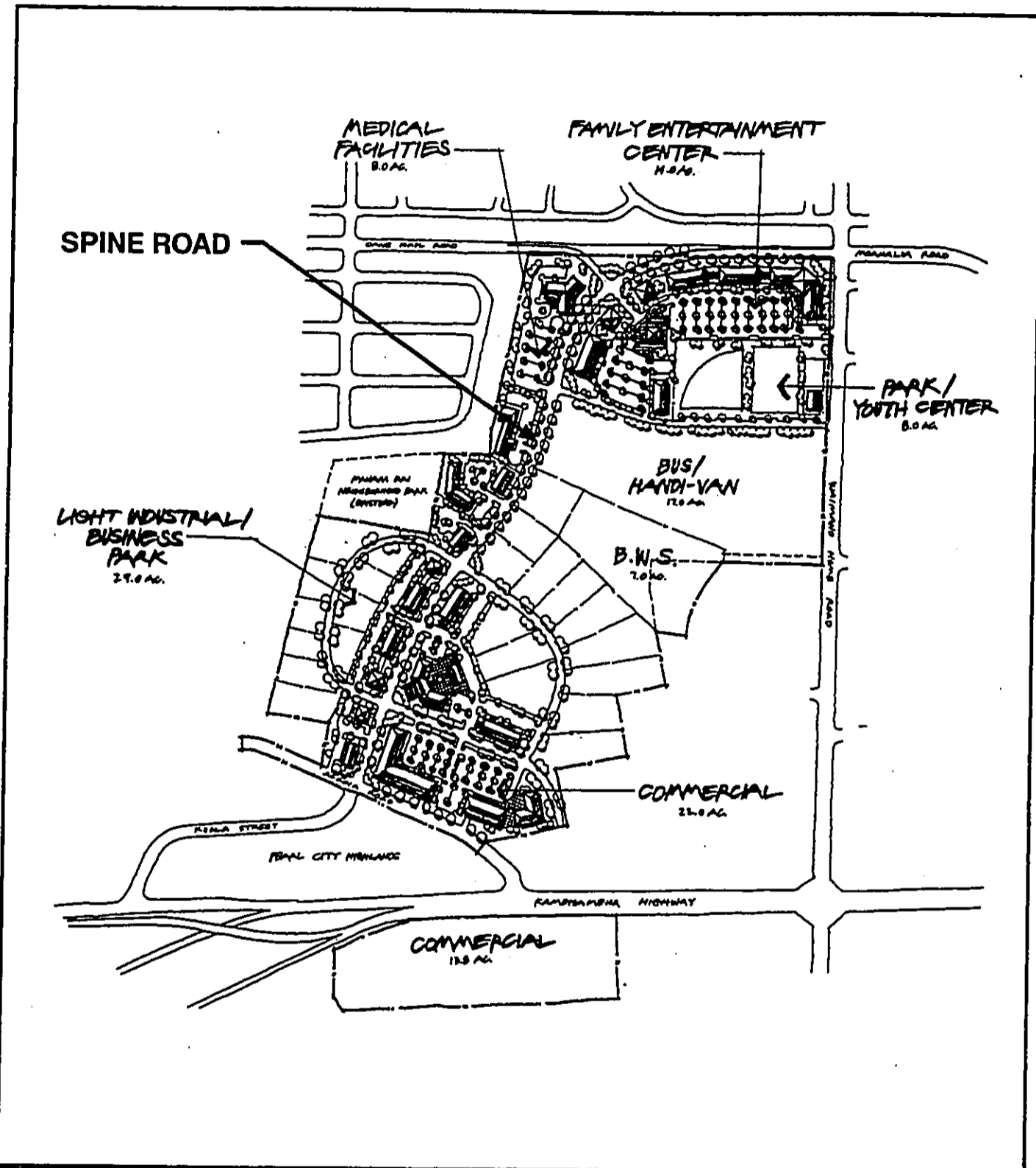
FIGURE 1-1:

Project Location Map

Manana Development Spine Road
Environmental Assessment



SOURCE:
USGS Digital Raster Graphic of
7.5 Minute Waipahu Topographic Quad, 1983



SOURCE:
 City and County of Honolulu
 Dept. of Housing and Community
 Development, 1996.
 Manana and Pearl City Junction
 Development EIS

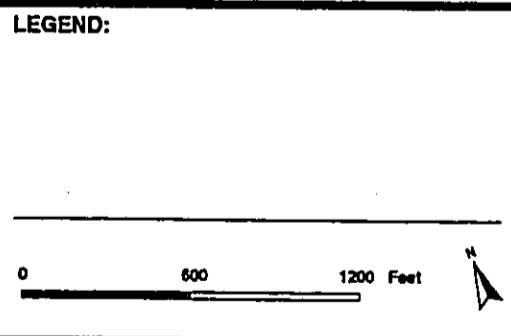


FIGURE 1-2:

**Pearl City Planning Task Force
 Preferred Conceptual Master Plan**

**Manana Development Spine Road
 Environmental Assessment**

Manana Spine Road, Fig. 1-2, Master Plan, 10-12-88

The conceptual redevelopment plan developed by the PCPTF and the City has been revised and refined in the three years since completion of the PCPTF report and two years since acceptance of the Final Environmental Impact Statement for the project (see Section 1.1.2). For example, several City agencies have modified and/or added projects (Figure 1-3)².

1.1.2 PREVIOUS ENVIRONMENTAL DOCUMENTATION

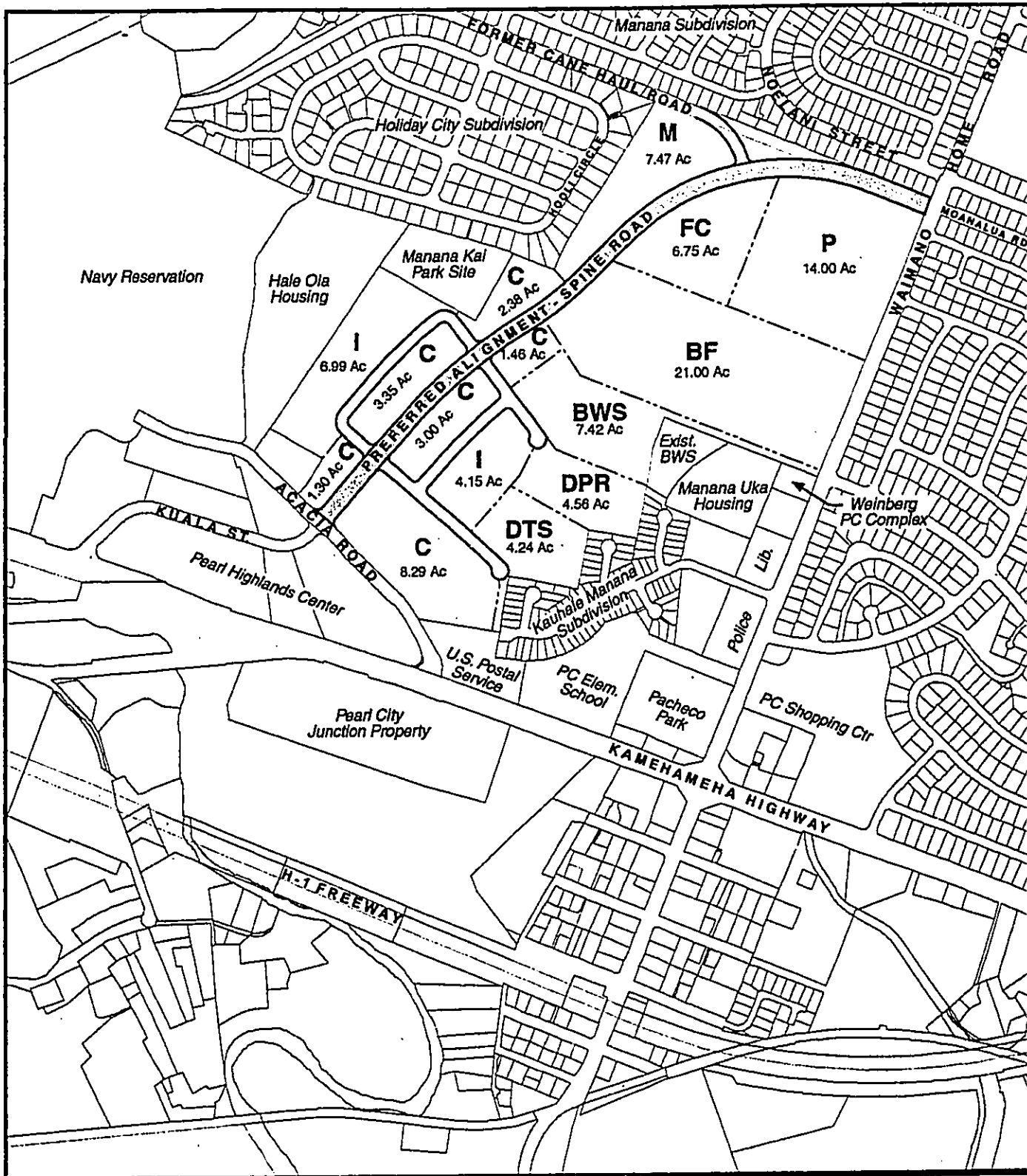
The City has completed the State Environmental Impact Statement process for the redevelopment of the former Manana Storage Area and Pearl City Junction properties. Processing was in accordance with Chapter 343, Hawaii Revised Statutes (HRS) and Hawaii Administrative Rules (HAR) Title 11 Chapter 200. The Environmental Impact Statement Preparation Notice (EISPN) for the proposed redevelopment was published October 23, 1995. Comments were sought from more than 50 agencies, elected officials, community groups, and individuals. The *Manana and Pearl City Junction Development Draft Environmental Impact Statement* was made available in February 1996. The *Final Environmental Impact Statement (FEIS)* was completed in May 1996. The City Planning Department accepted the FEIS in July 1996.

1.1.3 NEED FOR ADDITIONAL ENVIRONMENTAL DOCUMENTATION

As part of the City's overall redevelopment plan for the former Manana Storage Area, the Spine Road and its potential impacts were addressed in the *Manana and Pearl City Junction Development FEIS*. In the past two years, however, the City has refined its conceptual development plan, and as a consequence, more detailed information regarding the road's design and potential impacts is now available. This EA supplements the original EIS by more fully describing the road design and including the results of project-specific studies. As a result of the additional information, this EA also includes more specific measures to mitigate potential impacts.

In addition, DDC is seeking funds from the Federal Highway Administration (FHWA) for construction of the proposed road. Consequently, the project must comply with the National Environmental Policy Act (NEPA), the implementing regulations of the Council on Environmental Quality (*Code of Federal Regulations (CFR) Title 40, Parts 1500-1508*) and the environmental impact regulations of the FHWA (*CFR Title 23, Part 771*). This document is intended to fulfill these NEPA requirements.

² Ordinance 96-36 approved by City Council on June 14, 1998 amended the Public Development Plan Public Facility Map by placing appropriate symbols for public facilities that the Manana Storage Area master plan recommended be developed on the 109-acre property. Subsequently, the City Department of Public Works applied for an amendment to the Primary Urban Center Development Plan Public Facilities Map to reflect the proposed corporation base yards and some minor adjustments to the sizes of previously approved public facilities. The City Council enacted these amendments by approving Ordinance 98-34 on June 9, 1998.



LEGEND:

- | | |
|---|-------------------------|
| BF Bus Facility | FC Family Center |
| BWS Board of Water Supply | I Industrial |
| C Commercial | M Medical |
| DPR Dept. of Parks & Recreation | P Park |
| DTS Dept. of Transportation Services | |

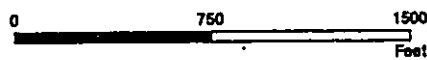


FIGURE 1-3:

Manana Storage Area Redevelopment Plan

Manana Development Spine Road Environmental Assessment

SOURCE:

C & C of Honolulu, DPW, April 1998
 C & C of Honolulu, DLU, June 5, 1998
 Engineering Concepts, Inc.

Pearl City Junction Property

1.2 NEED FOR AND PURPOSE OF THE PROPOSED SPINE ROAD

The State Department of Transportation (DOT) and the FHWA have designated the proposed Spine Road as a "collector" road³. As such, the Spine Road is integral to the City's redevelopment plans for the former Manana Storage Area. The road is needed to provide access to the proposed commercial and industrial areas, neighborhood park, family entertainment center, and medical facilities included in the master plan. In addition, more recently planned uses, such as City corporation yards would also be accessed via the proposed Spine Road (Figure 1-3).

In order to serve this purpose, the *mauka* termini of the roadway must provide a connection with the existing Moanalua Road and Waimano Home Road intersection. The *makai* termini must provide a connection with Kamehameha Highway, either through Acacia Road or directly.

³ Collector roads are intended to serve the areas through which they pass, as opposed to "arterial" roadways which are designed to move traffic through an area.

CHAPTER 2

DESCRIPTION OF ALTERNATIVES

2.1 INTRODUCTION

This chapter summarizes alternatives that the City and County of Honolulu (City) considered to fulfill the purpose of the proposed Spine Road project as described in Section 1.2. Section 2.2 summarizes various design requirements, guidelines and standards for the proposed road. Section 2.3 describes the City's preferred alignment. Section 2.4 describes the other road alignment under consideration (i.e., the alternative alignment) and Section 2.5 concludes the chapter with a discussion of the "No Action" alternative.

2.2 DESIGN CONSIDERATIONS

The proposed Spine Road is designed to comply with guidelines and standards established by recognized agencies and organizations. These include:

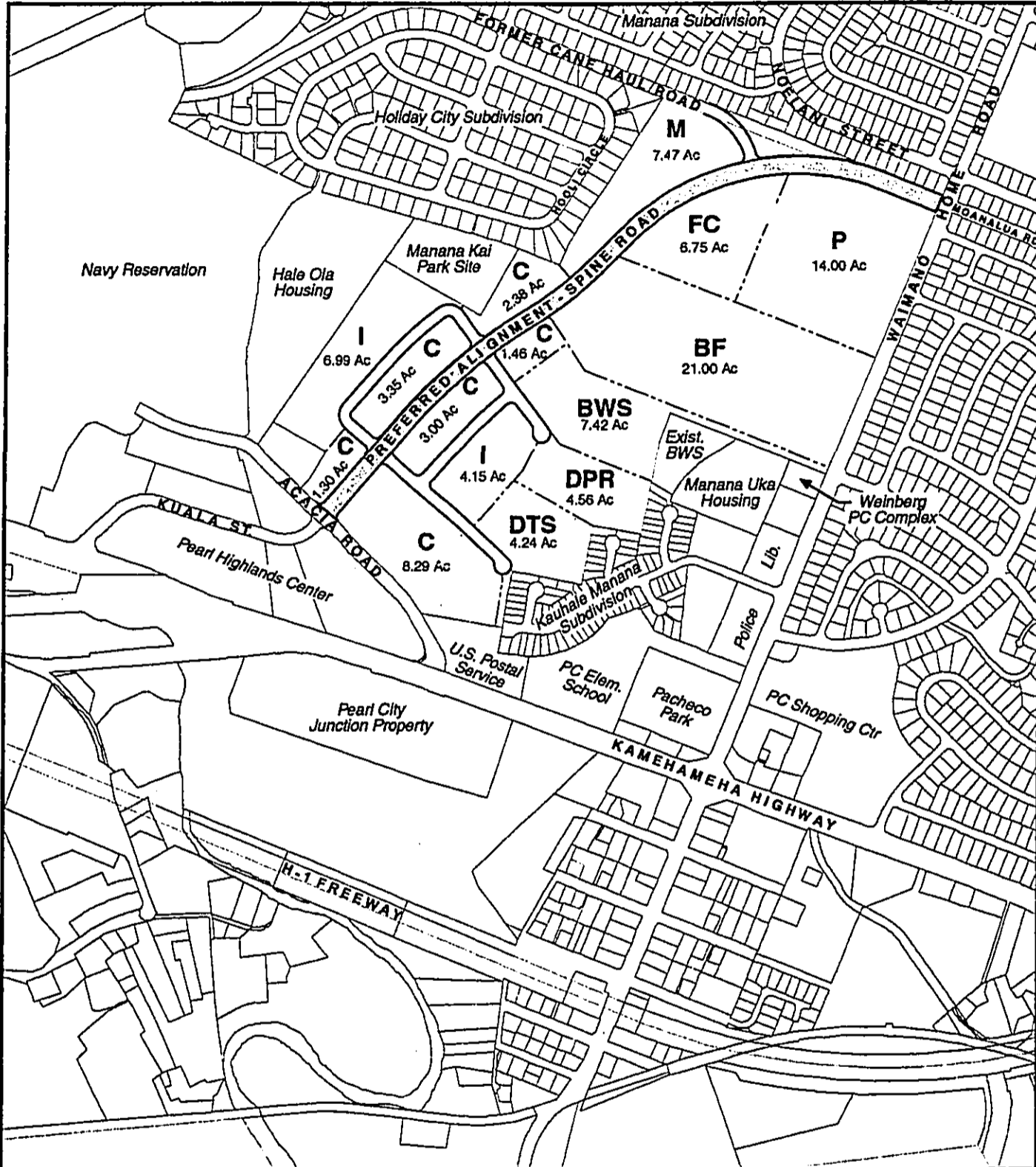
- American Association of State Highway and Transportation Officials (AASHTO) guidelines,
- State Department of Transportation (DOT) guidelines, standards and criteria,
- Americans with Disabilities Act (ADA) Accessibility Guidelines, and
- City policies, criteria and standards.

2.3 PREFERRED ALIGNMENT

2.3.1 PREFERRED ALIGNMENT ROAD DESIGN

The City's preferred alignment for the proposed Spine Road traverses the former Manana Storage Area from the existing Moanalua/Waimano Home Road intersection to Acacia Road at Kuala Street (Figure 2-1). The total length of the preferred alignment is approximately 3,800 feet. The road would transition smoothly from the Waimano Home Road intersection, running for a short distance along the existing cane haul road at the *mauka* (north) boundary of the former Manana Storage Area property. The posted speed limit on the proposed Spine Road would be 25 miles per hour.

The proposed design includes a connector road (Connector Road) between the Spine Road and the Holiday City and Manana subdivisions (Figure 2-2) connecting to the existing cane haul road. To mitigate traffic impacts at the intersection of Waimano Home Road with Moanalua Road/Spine Road and to satisfy concerns raised by area residents, an exclusive left-turn lane from Spine Road onto Waimano Home Road will be provided along with one through lane onto Moanalua Road and a dual-purpose through and right turn lane. Access to Noelani Street at its intersection with Waimano Home Road will be left unchanged.

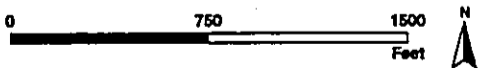


LEGEND:

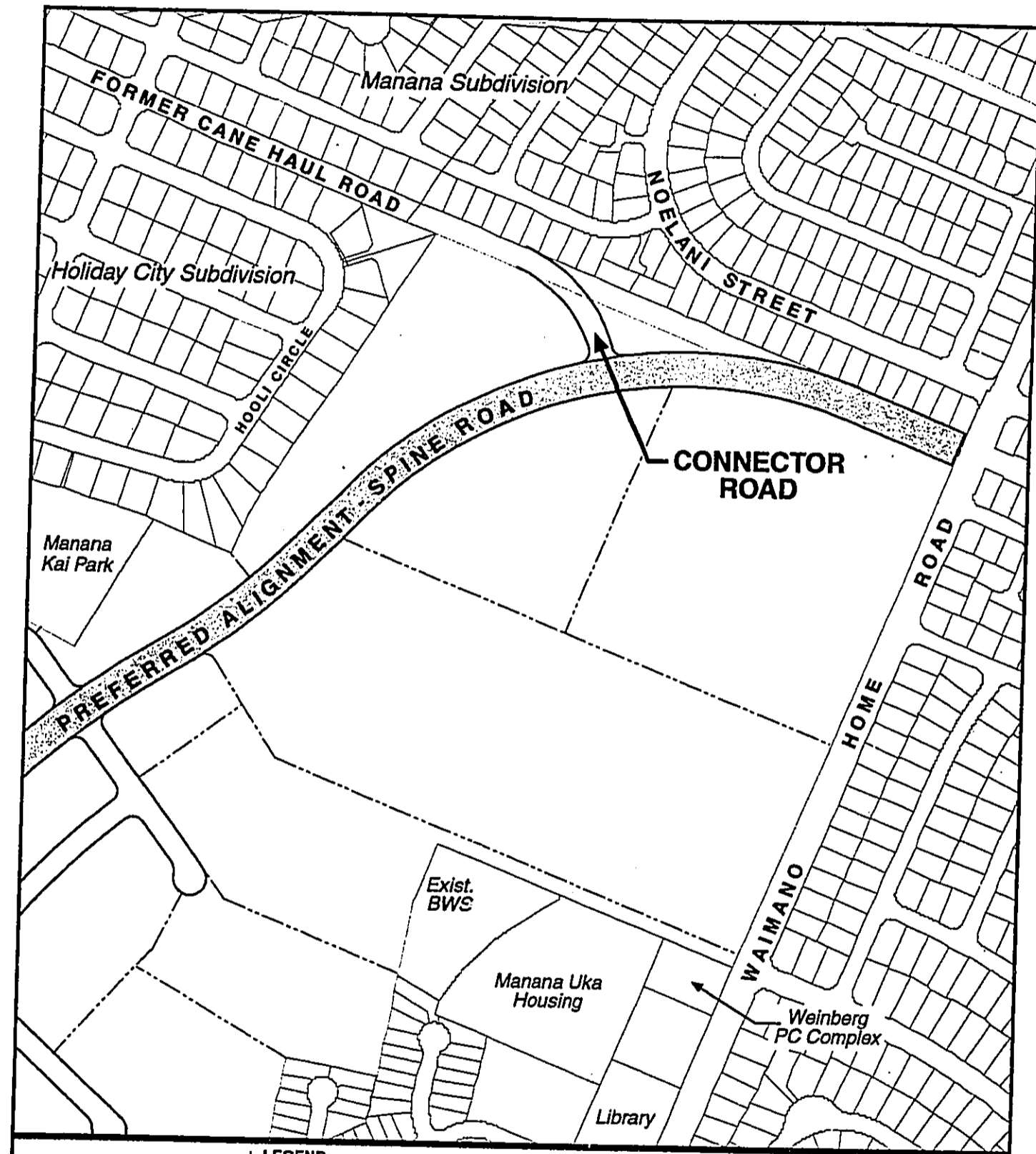
BF Bus Facility	FC Family Center
BWS Board of Water Supply	I Industrial
C Commercial	M Medical
DPR Dept. of Parks & Recreation	P Park
DTS Dept. of Transportation Services	

FIGURE 2-1:
Preferred Alignment
Manana Development Spine Road Environmental Assessment

SOURCE:
C & C of Honolulu, DPW, April 1998
C & C of Honolulu, DLU, June 5, 1998
Engineering Concepts, Inc.,
July 10, 1998



Manana Spine Road, Fig. 2-1 Preferred Alignment, 10-12-98



SOURCE:
 C & C of Honolulu, DPW, April 1998
 C & C of Honolulu, DLU, June 5, 1998
 Engineering Concepts, Inc.

LEGEND:

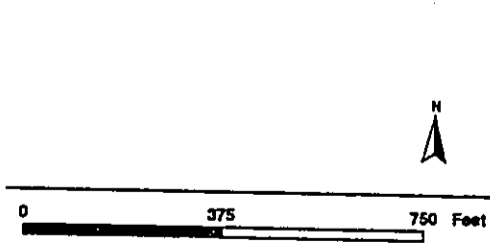


FIGURE 2-2:

Proposed Connector Road

**Manana Development Spine Road
 Environmental Assessment**

Manana Spine Road, Fig. 2-2 Proposed Connector Road, 10/19/98

The roadway would have two 11-foot wide vehicle lanes, a six-foot wide bicycle lane, and an eight-foot wide sidewalk on each side of the street (Figure 2-3). Two different roadway pavement designs are being considered. One would use asphaltic concrete, the other Portland cement concrete. A permeable aggregate sub-base would be provided in either case to facilitate adequate drainage. Sidewalks, curbs and drainage gutters would be constructed of Portland cement concrete.

The design includes a median strip that ranges from 16 to four feet wide. The width would change gradually, with 90-foot long transitional areas designed to accommodate left-turn lanes planned at all internal intersections, driveways and at Acacia Road. The left-turn storage lanes would range in length from a minimum of 50 feet at internal driveways to 180 feet at the Acacia Road intersection. All intersections and median openings would be equipped for traffic signals. The wider portions of the median would be landscaped with appropriate vegetation.

The Spine Road intersection with Waimano Home Road would include two west-bound and three east-bound lanes. Of the three east-bound lanes, the *mauka*-most (northern-most) lane would provide for exclusive left turns. The *makai*-most (southern-most) lane would be a right turn and through lane (Figure 2-4). The middle east-bound lane would be a through lane only. Because of the alignment the two *makai*-most lanes in relation to the two existing east-bound lanes on Moanalua Road, a small¹ taking of property will be required. The property required is from two residential parcels located along the *makai*-side of Moanalua Road at its intersection with Waimano Home Road and the proposed Spine Road. The proposed Spine Road, at its intersection with Acacia Road, would include a dedicated left turn lane and two other lanes for both turns and through movements (Figure 2-5). Both termini would be signalized.

The roadway would be constructed so that surface drainage flows away from the center of the road toward two-foot wide concrete swale-like gutters adjacent to the sidewalk curbs. Storm drain catch basins would be constructed at appropriate intervals and at road intersections. Proposed road grades would generally vary between about one to two percent, but increase to five percent in the 400 feet just *mauka* of the intersection with Acacia Road (Figure 2-6).

Pedestrian crosswalks and Americans with Disabilities Act (ADA) ramps are proposed at each corner of internal intersections (Figure 2-7). Crosswalks and ramps would also be constructed at the intersection of the proposed Spine Road and Acacia Road (Figure 2-5). One crosswalk, with two ADA curb ramps, would be provided for pedestrian crossing of the Spine Road at the intersection with Waimano Home Road (Figure 2-4).

¹ Property required from the parcel closest to the intersection is bounded by Moanalua Road and measures about 6-foot wide on the side closest to the intersection (west) tapering to about 3-foot wide on the opposite side of the parcel. The property required from the adjacent parcel is also bounded by Moanalua Road and measures about 3-foot wide on the west side and tapers off completely by the time it reaches the other side of the parcel.

15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

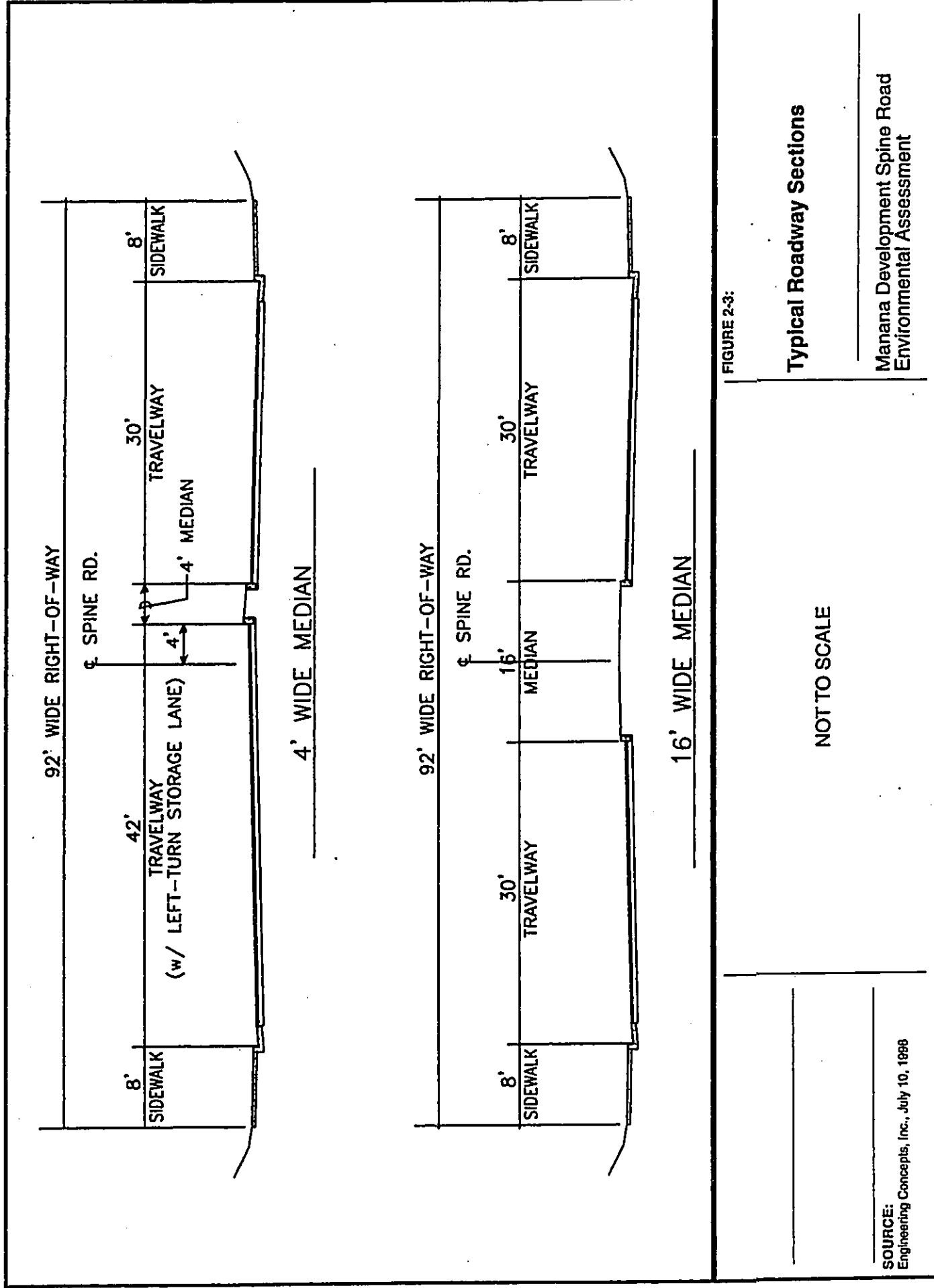


FIGURE 2-3:

Typical Roadway Sections

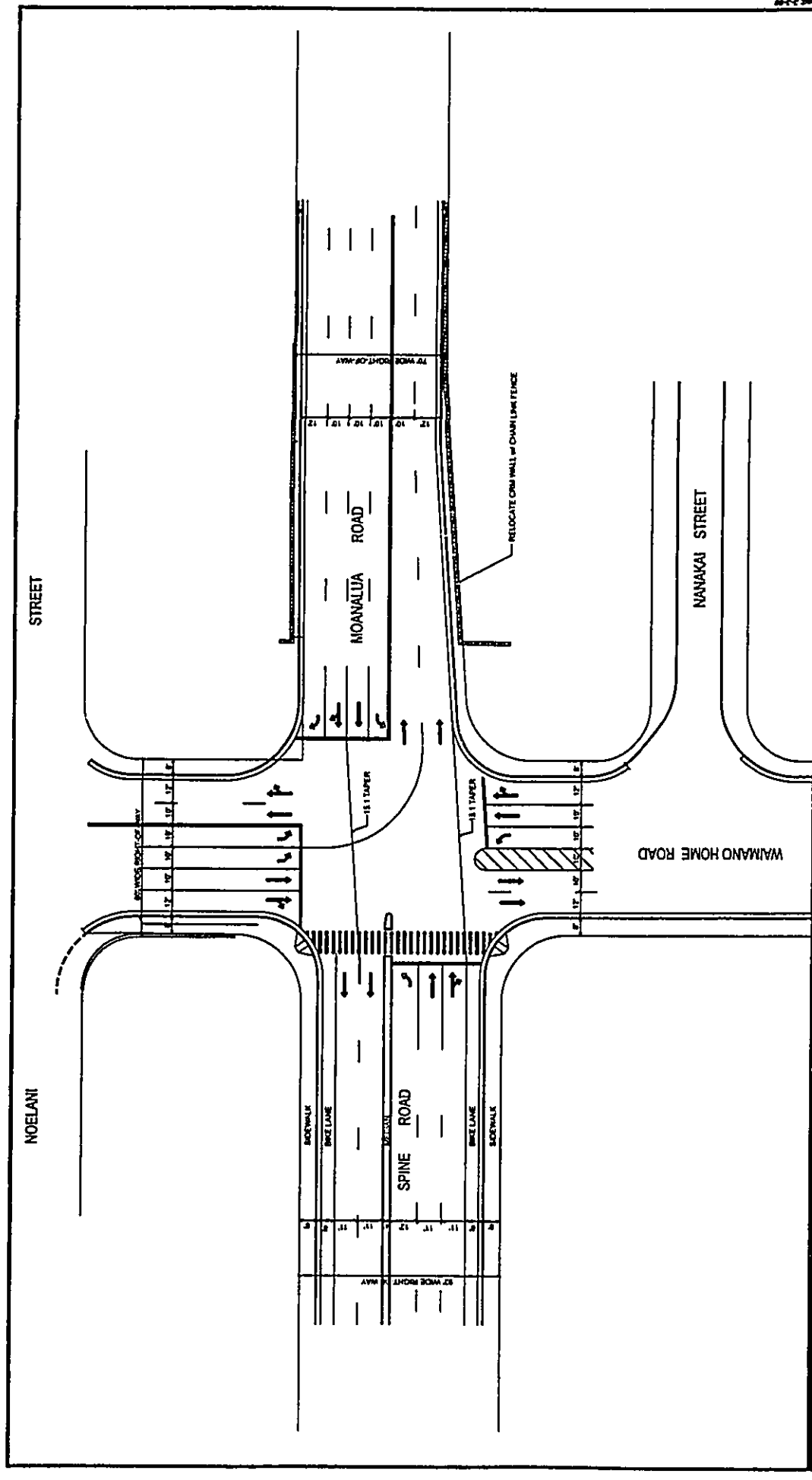
Manana Development Spine Road
Environmental Assessment

NOT TO SCALE

SOURCE:
Engineering Concepts, Inc., July 10, 1998

Manana Development Spine Road, Fig. 2-3 Typical Roadway Sections, 10/1/98

Waimano Home Road - Proposed Intersection - Manana Road - Manana Road



Manana Road - Proposed Intersection - Waimano Home Road - Manana Road

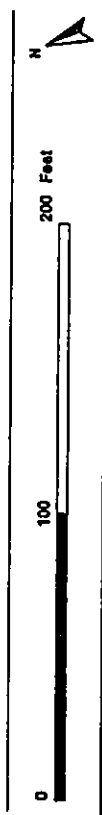
FIGURE 2-4:

Details of Proposed Spine Road - Waimano Home Road Intersection

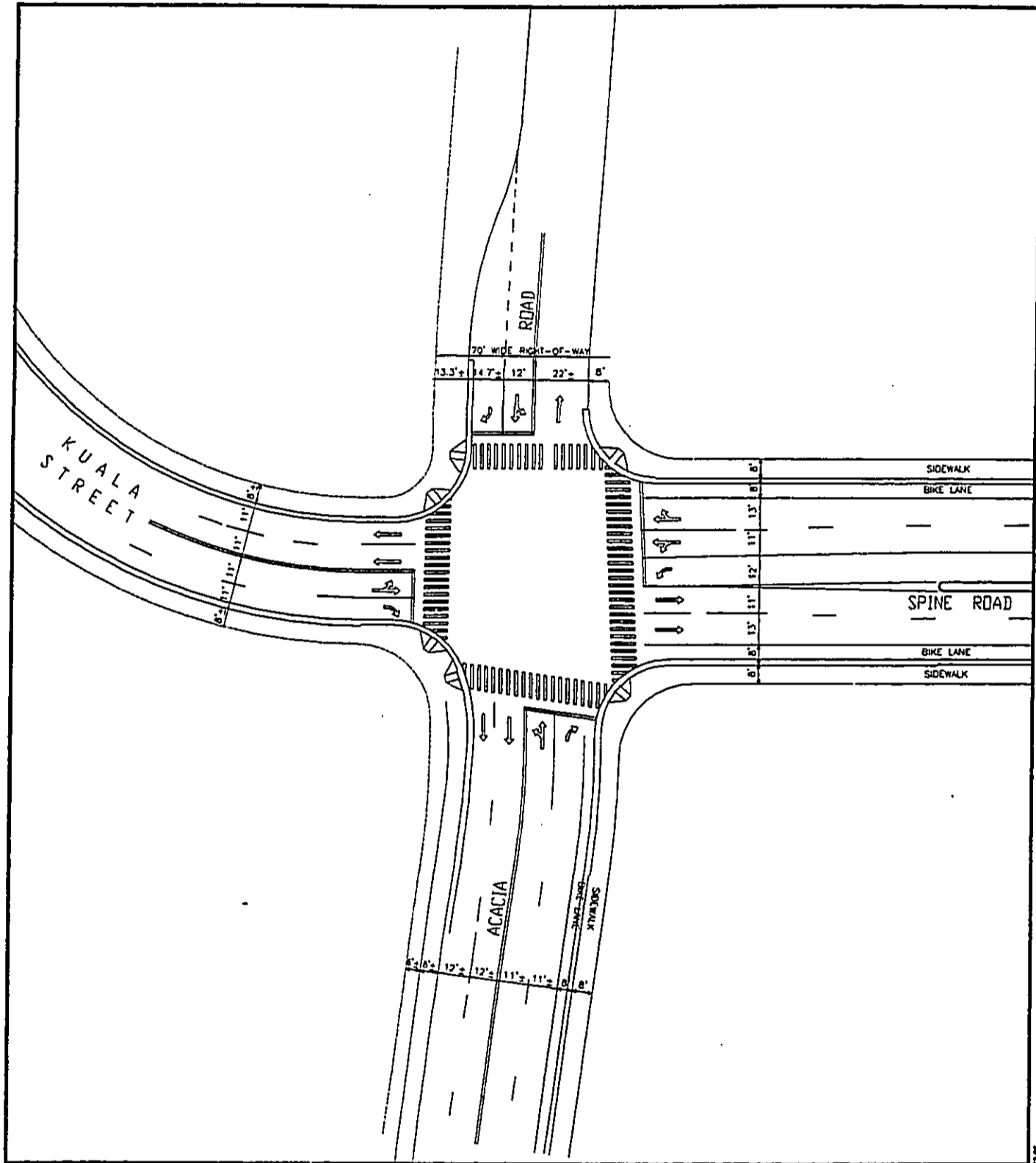
Manana Development Spine Road Environmental Assessment

LEGEND:

- Crosswalk
- ADA Ramp



SOURCE: Engineering Concepts, Inc., March 3, 1999.



LEGEND:

Crosswalk

ADA Ramp

0 50 100 Feet

N

FIGURE 2-5:

Details of Proposed Spine Road - Acacia Road Intersection

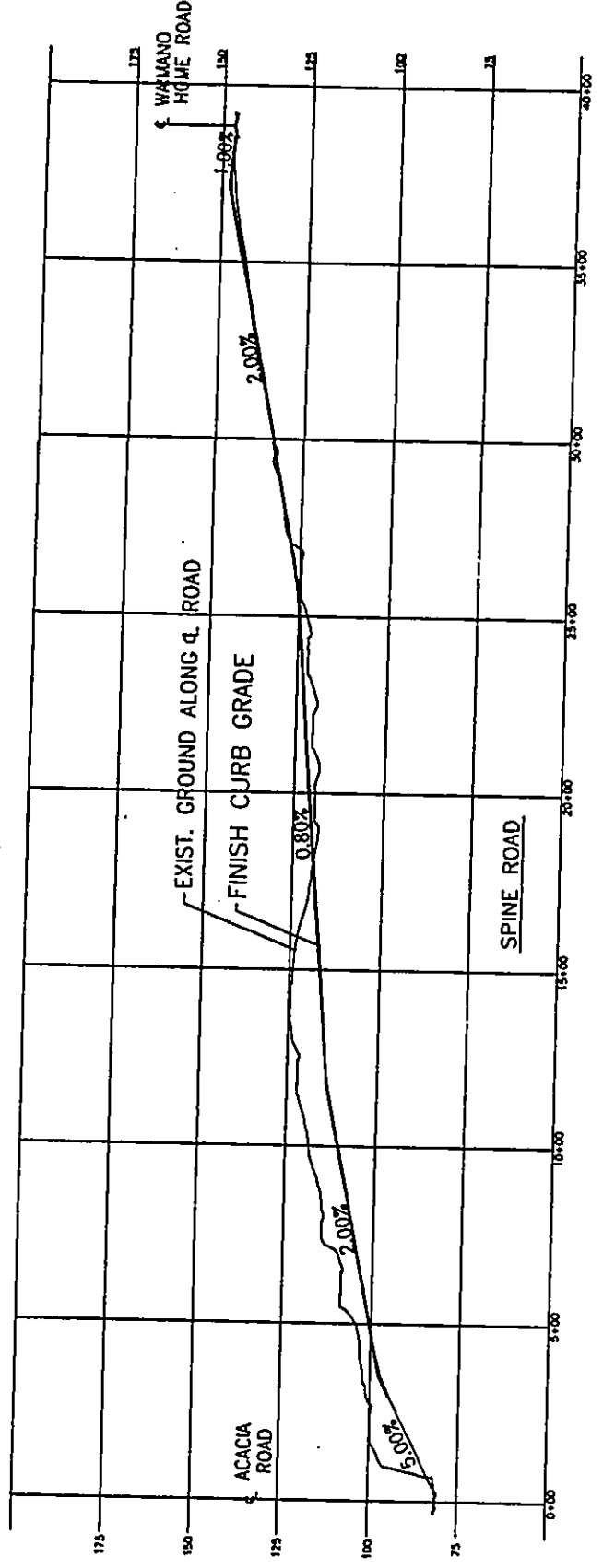
Manana Development Spine Road Environmental Assessment

SOURCE:
Engineering Concepts, Inc.,
July 10, 1998

Manana Spine Road, Fig 2-5 of Proposed Intersection - Acacia Road, 10-12-98

10-12-98 10:00 AM

MANANA DEVELOPMENT SPINE ROAD - PREFERRED ALIGNMENT



Manana Spine Road - Preferred Alignment - Preferred Alignment: 10-12-88

FIGURE 2-6:

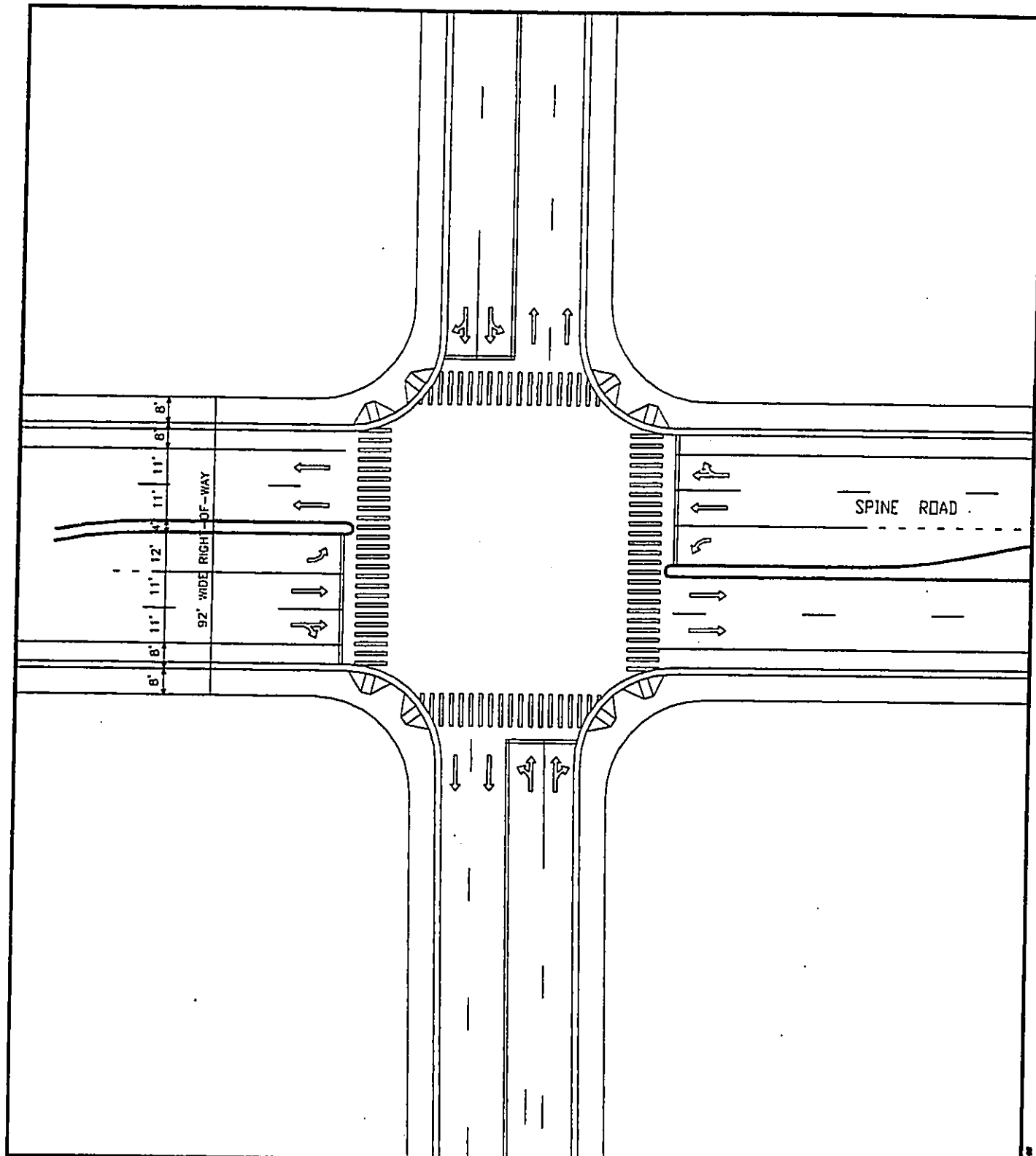
**Roadway Profile:
Preferred Alignment**

Manana Development Spine Road
Environmental Assessment

LEGEND:

Scales:
Horizontal: 1" = 500 feet
Vertical: 1" = 50 feet

SOURCE:
Engineering Concepts, Inc., July 17, 1988



LEGEND:



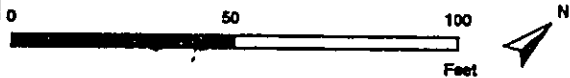
-  Crosswalk
-  ADA Ramp

FIGURE 2-7:

Details of Proposed Spine Road - Internal Intersection

Manana Development Spine Road
Environmental Assessment

SOURCE:
Engineering Concepts, Inc.
July 10, 1988



Manana Spine Road, Page 7 Proposed Intersection - Internal Road 10-12-88

The Spine Road would be appropriately landscaped. Median landscapes would be automatically irrigated with lawn and/or groundcover shrub spray pop-up heads. Specific landscaping materials will be determined during the design phase of the proposed project.

Utility lines would be installed underground within the Spine Road right-of-way. These include sanitary sewer, water, and ducts for electrical and communication lines. Stub-outs² from the utility lines would be provided to each lot within the former Manana Storage Area. The actual connections would be made at the time these lots are developed.

2.3.2 PREFERRED ALIGNMENT CONSTRUCTION

The preferred alignment right-of-way traverses land that presently contains portions of 11 warehouses. Six of the warehouses are currently occupied by temporary tenants (see Section 3.1.1). Once the warehouses are vacated, they would be demolished and removed before site work begins the proposed Spine Road³. As discussed in Chapters 3 and 4, the structures may contain asbestos and lead-based paint. Demolition and disposal would be in accordance with all applicable federal, state and county laws and regulations.

Tenants of these warehouses hold one- or two-year rental agreements on a month-to-month basis. The City, in its lease agreements with these tenants stated that: *"The City may require the future use of the rented premises. Should the rented premises not be required by the City after the 1- or 2-year period, the City may extend the rental agreement on a month-to-month basis. The term of the agreement shall not exceed five years."* Among other requirements, the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 obligates the landowner to providing relocation assistance to those who are displaced as a result of a project receiving federal funds, such as the one proposed. However, this obligation is removed when any person who occupies such property on a rental basis for a short term or a period subject to termination when the property is needed for the program or project. Based on the terms of the City's rental agreement with their tenants, the City is not obligated to offer relocation assistance.

Construction on the proposed road would begin with grubbing and grading. Overall, more material would be excavated than placed. The contractor would remove excess soil to a proper location, either within the Manana Storage Area or off-site. In addition, the contractor would employ best management practices throughout the construction period. These would include, as appropriate, silt fences, diversion berms, daily watering for dust control, temporary siltation basins, and revegetation of disturbed areas as soon as practicable (see Section 4.12 for additional details).

² A "stub-out" is a short connection from the main utility line to the boundary of a parcel. The parcel owner/developer is responsible for extending the utility service within the parcel.

³ The Spine Road right-of-way contains portions of existing warehouses that are also within the area that would be developed for the proposed Pearl City Bus Facility (preferred alignment, one warehouse; alternative alignment, two warehouses). Depending upon the timing of the two projects, it is possible that these two warehouses could be removed before work begins on the Spine Road. In addition, because only parts of the various warehouses are within the road rights-of-way, the City may opt to demolish only portions of the affected structures.

2.3.3 PREFERRED ALIGNMENT PROJECT SCHEDULE AND CONSTRUCTION COSTS

The City anticipates starting construction in mid-1999 and estimates that the road, associated utilities, lighting and landscaping would be completed within approximately 12 months. Preliminary construction costs associated with the preferred alignment are \$9,800.00 (FY 1998)*.

2.4 ALTERNATIVE ALIGNMENT

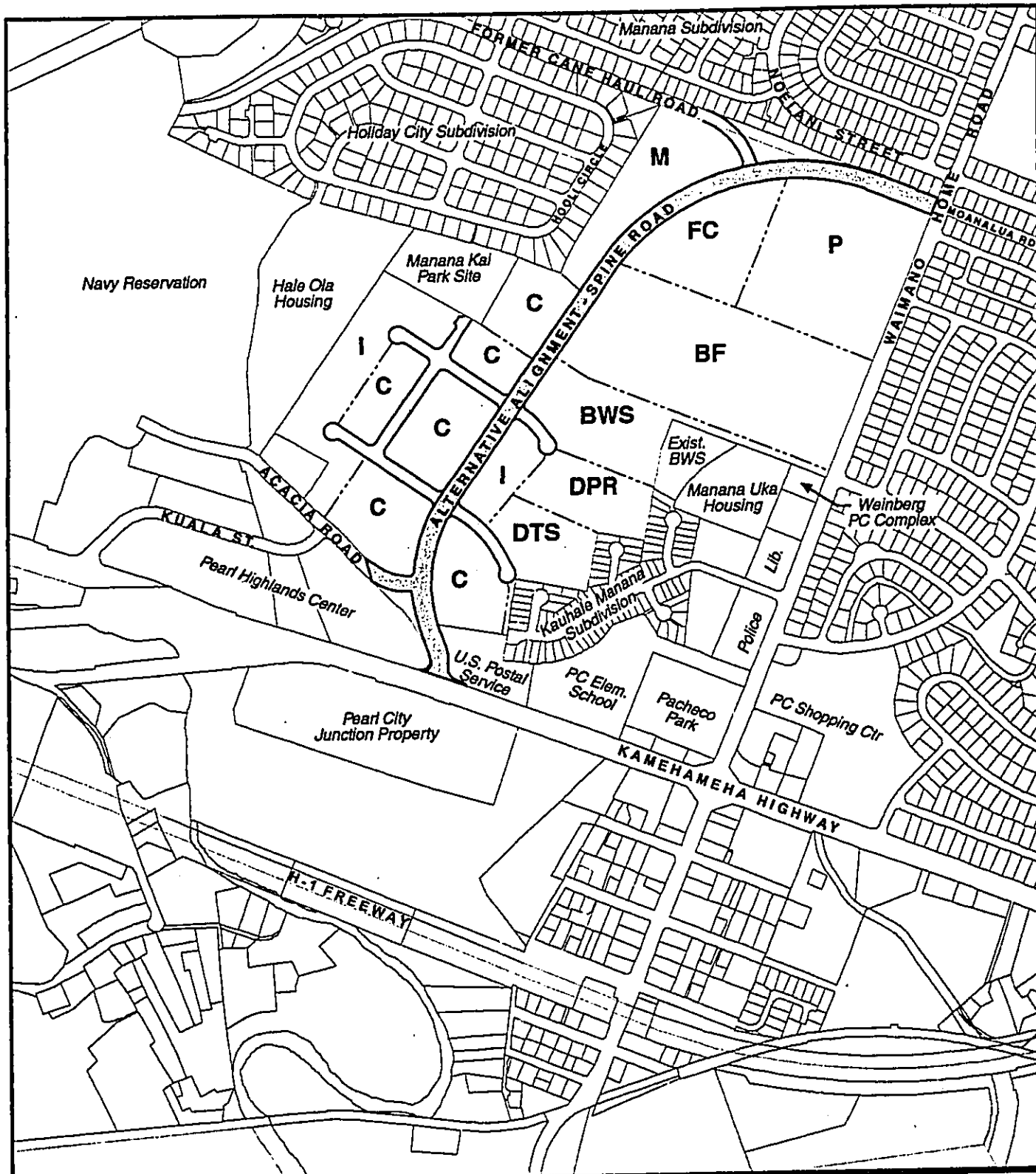
2.4.1 ALTERNATIVE ALIGNMENT ROAD DESIGN

The alternative alignment has the same roadway design (e.g., intersections, lane widths, traffic signals, crosswalks and ramps) and landscaping as the preferred alignment. The alternative alignment essentially overlays the preferred alignment from its intersection with Waimano Home Road to the *mauka* boundary of the proposed bus facility (Figure 2-8). The *makai* portion of the alternative alignment differs from the preferred alignment both in terms of its general location (more through the center of the former Manana Storage Area) and in its *makai* terminus (approximately at the existing intersection of Acacia Road and Kamehameha Highway). The alternative alignment would be about 500 feet longer than the preferred alignment (4,300 feet). In addition, a portion of Acacia Road would have to be realigned to connect up with the alternative alignment in a T-intersection.

The intersection of the rerouted Acacia Road with the alternative alignment Spine Road would be signalized. *Mauka*-bound traffic on the Spine Road would be provided with a dedicated left-turn lane and two through lanes; two *makai*-bound lanes would include a through lane and a shared right turn/through lane. Acacia Road would have one dedicated left turn and one dedicated right turn lane. The alternative alignment would tie into the existing Acacia Road just *mauka* of the existing intersection with Kamehameha Highway. The intersection laneage, signal cycling and other operational characteristics would be the same as the preferred alignment. A grade difference between the alternative alignment's tie in and the adjacent Post Office property would require excavation and construction of a 210-foot long retaining wall along the road right-of-way (Figure 2-9). This wall would be approximately 20 feet in total height and its top would be about 15 feet above the road grade. This alignment would also necessitate acquisition of portions of the Post Office property.

The alternative road alignment would also result in an excess of excavated material. A total of 91,000 cubic yards (versus a total of 57,000 cubic yards of excavation for the preferred alignment). The road grade would generally be two percent or less, but includes an 800-foot long portion along its *makai* section with a six percent grade (Figure 2-10).

* *Manana Infrastructure Improvements Spine Road Cost Comparison* (revised 9-18-98), Engineering Concept, Inc. 9-21-98



LEGEND:

BF Bus Facility	FC Family Center
BWS Board of Water Supply	I Industrial
C Commercial	M Medical
DPR Dept. of Parks & Recreation	P Park
DTS Dept. of Transportation Services	

SOURCE:
 C & C of Honolulu, DPW, April 1998
 C & C of Honolulu, DLU, June 5, 1998
 Engineering Concepts, Inc.
 July 10, 1998

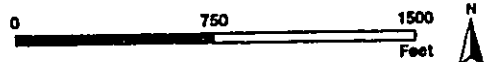
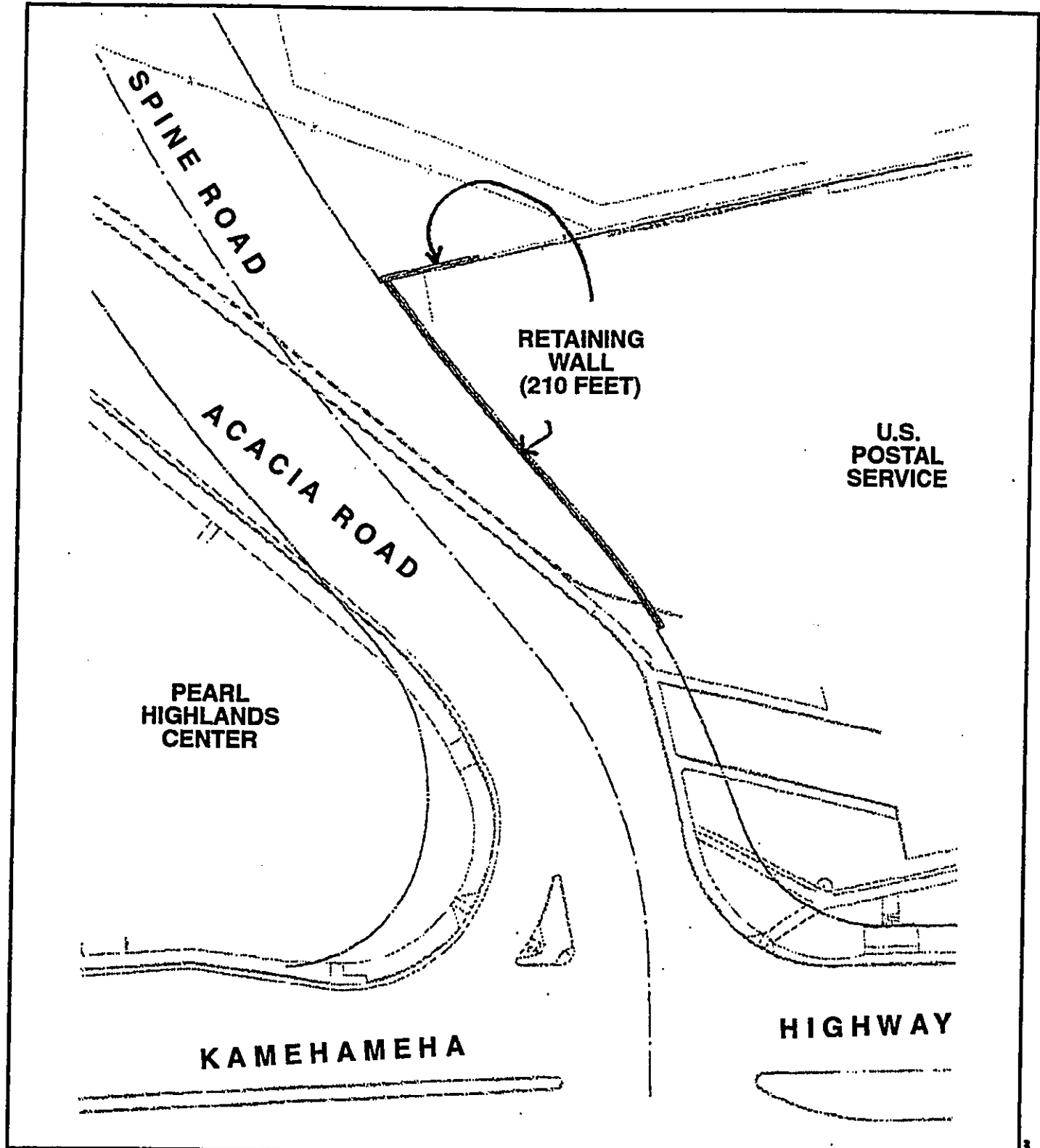


FIGURE 2-8:

Alternative Alignment

**Manana Development Spine Road
 Environmental Assessment**

Map of Manana Development Spine Road Environmental Assessment



SOURCE:
Engineering Concepts, Inc., July 1998

LEGEND:

NOT TO SCALE

N

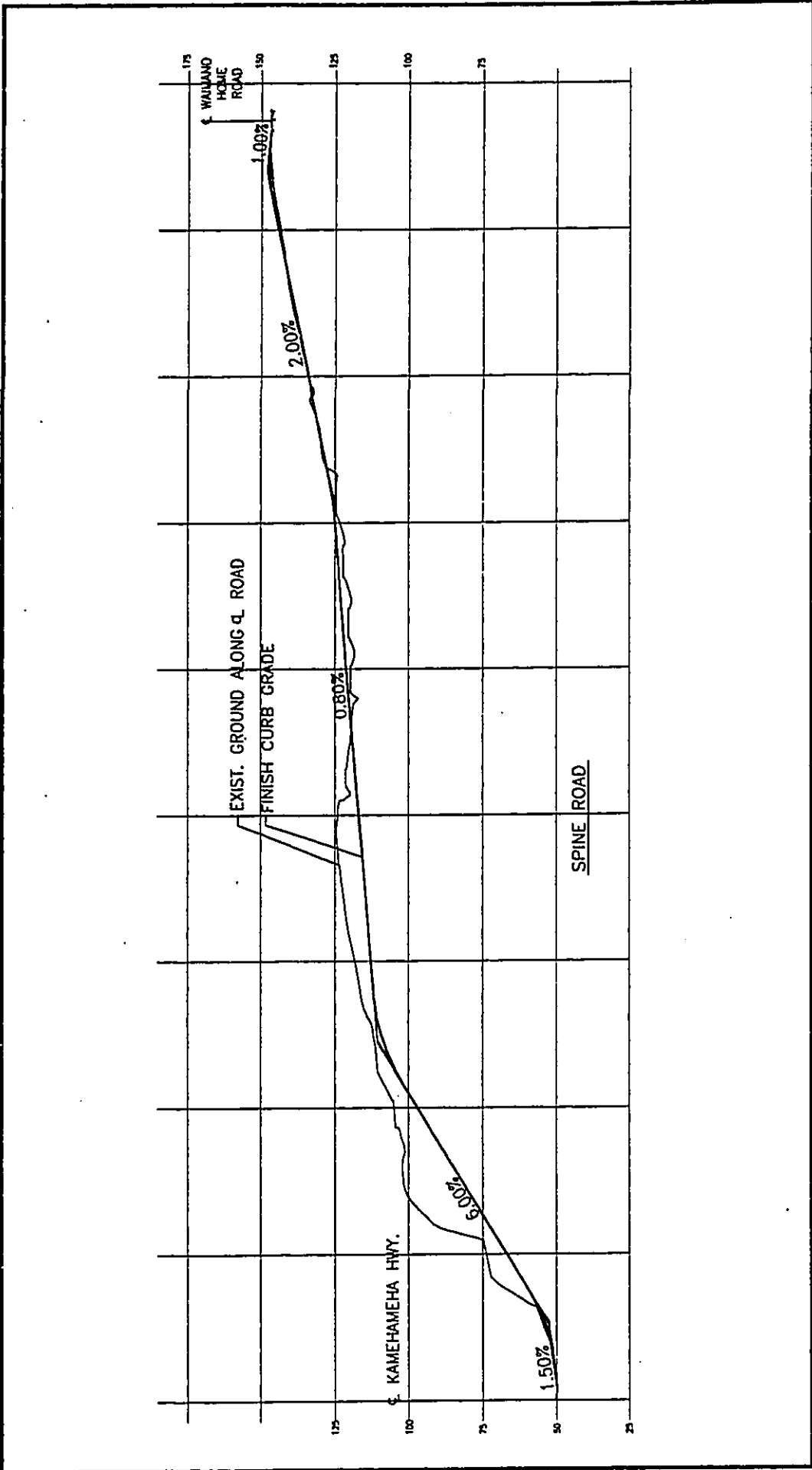
FIGURE 2-9:

Alternative Alignment - Tie-In to Acacia Road

Manana Development Spine Road Environmental Assessment

Manana Spine Road Fly SP Alternative Alignment - Acacia Road, 10-12-98

100 125 150 175 200 225 250 275 300 325 350 375 400 425 450 475 500 525 550 575 600 625 650 675 700 725 750 775 800 825 850 875 900 925 950 975 1000



Manana Spine Road PG 2-10 Roadway Profile - Alternative Alignment 10-12-98

FIGURE 2-10:

**Roadway Profile:
Alternative Alignment**

Manana Development Spine Road
Environmental Assessment

LEGEND:

Scales:
Horizontal: 1" = 500 feet
Vertical: 1" = 50 feet

SOURCE:
Engineering Concepts, Inc., July 17, 1998

2.4.2 ALTERNATIVE ALIGNMENT CONSTRUCTION

The right-of-way for this alternative contains portions of nine warehouses, seven of which are currently occupied. As with the preferred alignment, these would be vacated, demolished and removed before the start of construction work.

2.4.3 ALTERNATIVE ALIGNMENT PROJECT SCHEDULE AND CONSTRUCTION COSTS

The construction schedule and other aspects of the work are comparable to that of the preferred alignment. Preliminary construction costs associated with the alternative alignment are estimated to be \$11,200,000 (FY 1998)⁵. The differences are primarily associated with an increase in roadway improvement costs and supporting systems such as drainage, water, electrical, phone, CATV, street lighting, and the required retaining wall near the post office. Total cost of the alternative alignment exceeds that of the preferred alignment by \$1,400,000.

The City is not offering financial relocation assistance to existing warehouse tenants as previously explained in Section 2.3.2

2.5 NO ACTION ALTERNATIVE

The City Administration set development objectives for the former Manana Storage Area and Pearl City Junction properties. The City's main goal is to develop the properties in a manner which addresses the needs of the City and community while recouping the City's initial investment. Nevertheless, for the purpose of this Environmental Assessment (EA), the "No Action Alternative" is assumed to be a decision by the City not to undertake any redevelopment of the 109-acre former Manana Storage Area property. This would then result in continuation of existing uses of the site and no development of the Spine Road.

The No Action Alternative has implications for potential tenants of the Manana Storage Area property, such as City agencies that have plans to relocate there. This EA does not assess the far-ranging effects that this might have.

⁵ *Ibid*

CHAPTER 3

AFFECTED ENVIRONMENT

This chapter provides an overview of existing conditions on the former Manana Storage Area which the preferred Spine Road alignment rights-of-way traverse. Information contained in the *Manana and Pearl City Junction Development FEIS* was supplemented as necessary where conditions have changed or more recent data are available.

3.1 LAND USE AND DEVELOPMENT

Both road alignments would traverse the former Manana Storage Area, a property of approximately 109 acres (TMK 9-7-24:41) in Pearl City, Oahu. Most of the area surrounding the former Manana Storage Area is comprised of single-family homes, including the Holiday City, Manana and Kauhale Manana subdivisions. The southeastern corner adjoins the Manana Uka multi-family residences and the Harry and Jeanette Weinberg Pearl City Complex, a gated facility for the mentally disabled. The western boundary abuts the Hale Ola complex of multi-family residences. The Pearl Highlands shopping center is located south of Acacia Road. An aerial photograph of the former Manana Storage Area and vicinity is reproduced in Figure 3-1.

3.1.1 EXISTING STRUCTURES AND USES

There are 38 warehouses on the former Manana Storage Area. Of these 21 are available for rental on a month-to-month basis for a lease term of one or two years.

The preferred alignment right-of-way (Figure 2-1) contains portions of 11 warehouses. Nine existing warehouses are along the alternative alignment (Figure 2-8). Information on the existing users of these structures is summarized in Table 3-1.

3.1.2 EXISTING LAND USE DESIGNATIONS

The former Manana Storage Area is in the State Urban Land Use District, and therefore, land use is under the jurisdiction of the City and County of Honolulu (City). The area is designated "Military" on the City's Primary Urban Center Development Plan (DP) Land Use map (Figure 3-2). The DP Public Facilities Map shows a road, water and sewer lines in the approximate location of the preferred alignment (Figure 3-3). As shown in Figure 3-4, the former Manana Storage Area is zoned F-1, "Military and Federal". As a public use, the proposed road is designated a principal use in the Military and Federal District and no zoning change is necessary.



FIGURE 3-1:

Aerial Photograph of Manana Storage Area and Vicinity

Manana Development Spine Road Environmental Assessment

SOURCE:
Air Survey Hawaii, 1993



NOT TO SCALE

MANANA DEVELOPMENT SPINE ROAD ENVIRONMENTAL ASSESSMENT

Table 3 - 1. Existing Warehouse Tenants

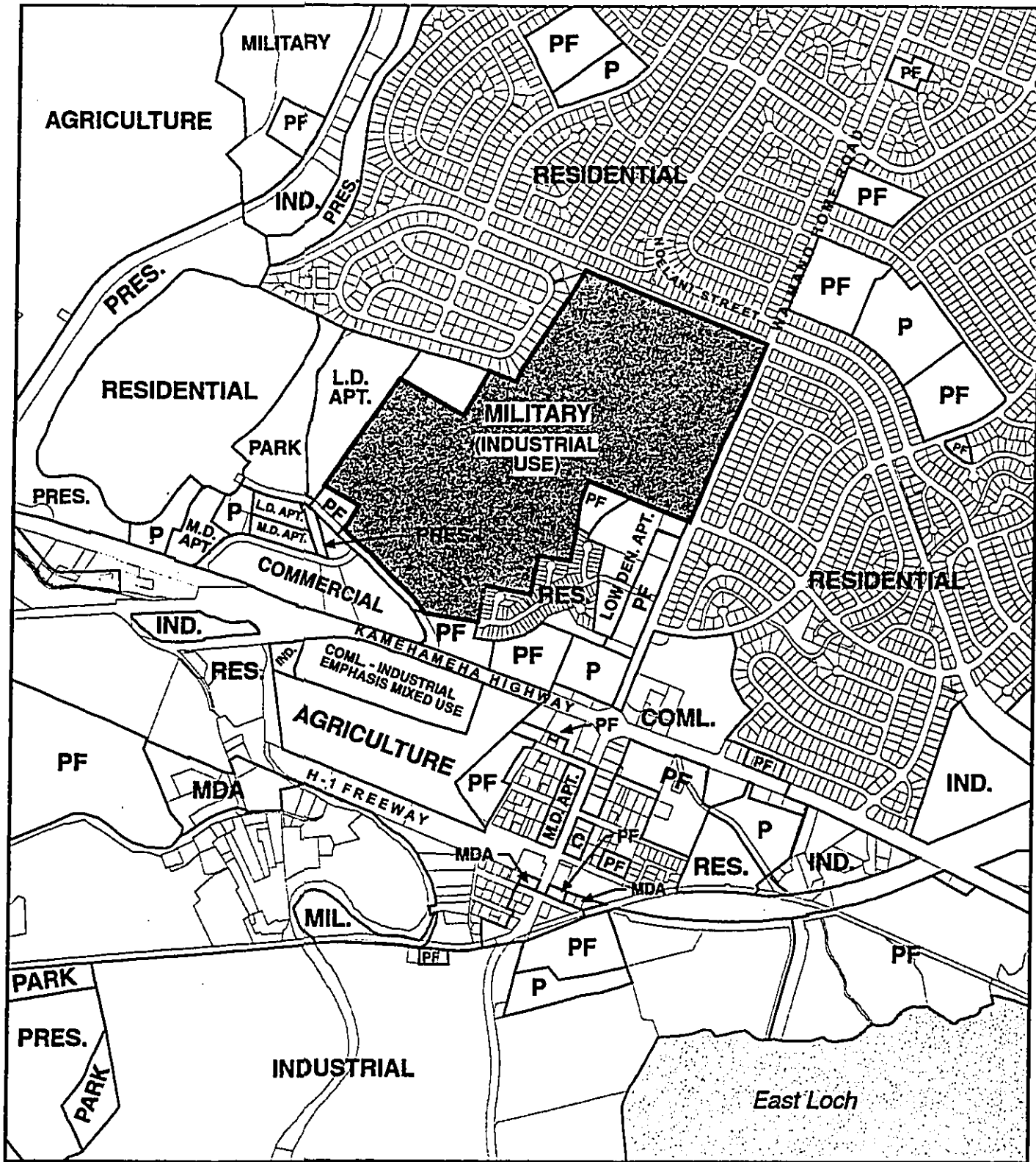
Warehouse No.	Alignment	Current User	Status
1	Alternative	Hawaii's Homeless Women & Children	non-profit
2	Alternative	Shredded Foam of Hawaii, Inc	for profit
3	Alternative	empty	
4	Alternative	Dept. Facility Maintenance - Roads Division	City agency
5	Both	empty	
6	Preferred	Hawaii Human Development Corp.	non-profit
7	Preferred	Dept. of Emergency Services - Ambulance Service	City agency
8	Preferred	empty	
9	Preferred	Dept. Design & Construction - City Lights Storage	City agency
10	Preferred	Dept. Facility Maintenance - Body & Fender Ops	City agency
11	Preferred	Dept. Facility Maintenance - Training	City agency
12	Preferred	empty	
20	Alternative	Dept. of Transportation Services (TheHandi-Van)	City agency
21	Both	Dept. Design & Construction - Radio Equipment	City agency
22	Both	American Box Car Racing International	non-profit
33	Both	Department of Transportation Services	City agency

Source: City and County of Honolulu, Director of Finance




3.2 PHYSICAL ENVIRONMENT

3.2.1 TOPOGRAPHY, GEOLOGY AND SOILS

The ground elevation of the former Manana Storage Area ranges from about 50 to 145 feet above sea level. The parcel slopes gently downward toward the south/south-east. The original topography has been modified extensively during the period the site was cultivated for sugar cane and again by the U.S. Navy. The preferred alignment's lowest elevation is about 80 feet (see Figure 2-6); the alternative alignment spans the full range of elevations on the property (see Figure 2-10). According to the U.S. Soil Conservation Service soil survey of the area (Foote, *et al.*, August 1972), the soil on the property consists principally of Molokai silty clay loam, 3 to 7 percent slopes. Soils in this series have moderate permeability, slow to medium runoff and slight to moderate erosion hazard. They are suitable for sugarcane, pineapple, pasture, wildlife habitat, and homesites.



LEGEND:

-  Manana Storage Area
-  Land Use Boundary
-  Parcels

SOURCE:
C & C of Honolulu, DLU, June 5, 1998

0 1000 2000 Feet

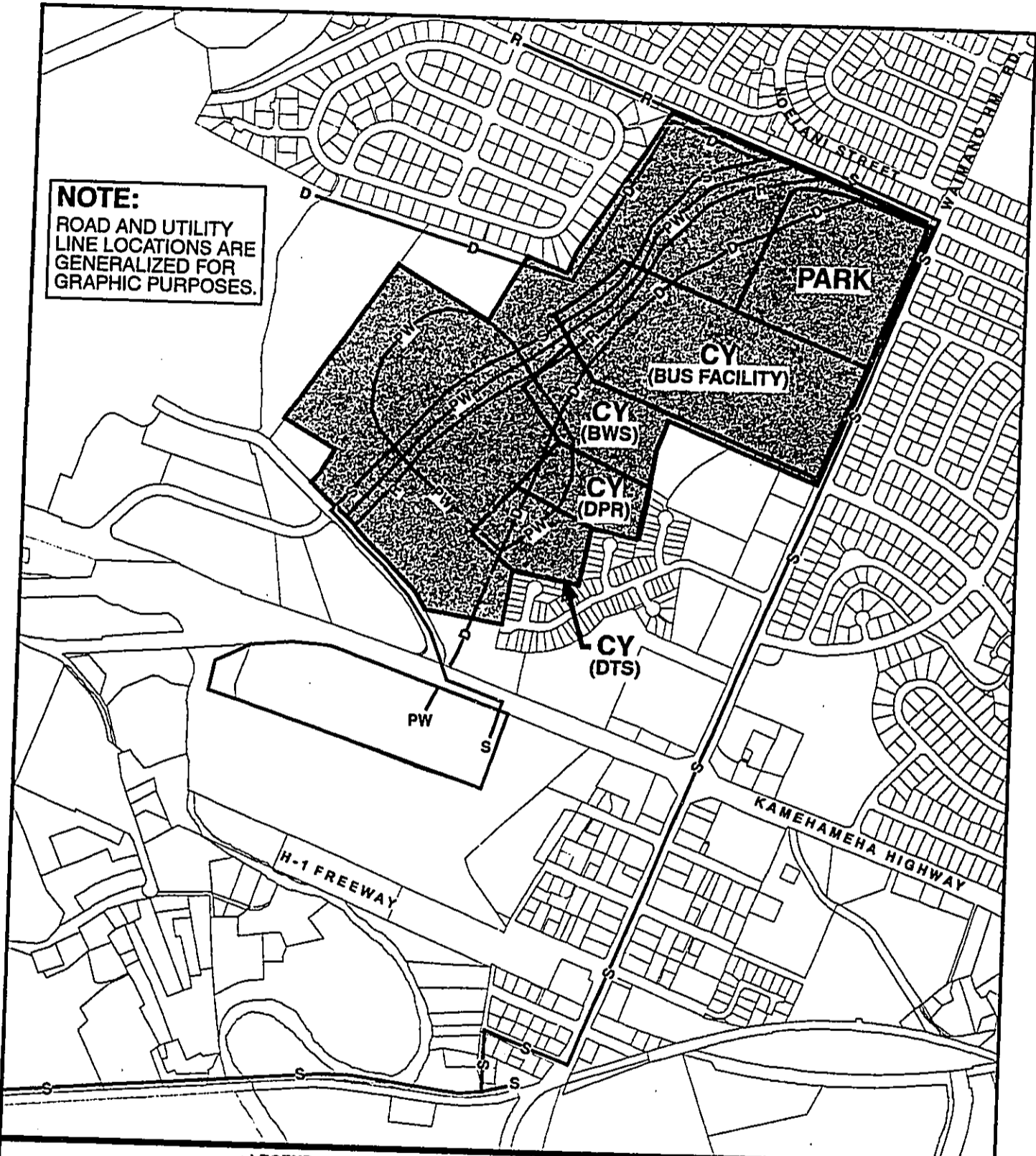
N

FIGURE 3-2:

**Primary Urban Center
Development Plan Land Use Map**

Manana Development Spine Road
Environmental Assessment

Manana Spine Road, Fig. 3-2, PLUZ, City and County of Honolulu, 10-12-98



SOURCE:
 C & C of Honolulu, DLU, June 5, 1998
 Engineering Concepts, Inc.
 July 10, 1998

- LEGEND:**
- CY Corporation Yard
 - D- Drain Line
 - PW- Potable Water
 - R- Road
 - S- Sanitary Sewer Line

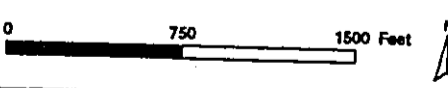


FIGURE 3-3:
**Primary Urban Center
 Development Plan Public Facilities
 Map**

Manana Development Spine Road
 Environmental Assessment

Manana Spine Road Fig. 3-3 PUC Dev Plan Public Facilities 10-12-98



LEGEND:



-  Manana Storage Area
-  Zoning Boundary

FIGURE 3-4:

Land Use Zoning Map

Manana Development Spine Road
Environmental Assessment

SOURCE:
C & C of Honolulu, DLU, June 5, 1998

0 1000 2000 Feet



The Land Study Bureau (LSB) inventoried each island in the state with the intent of developing a land inventory and agricultural productivity evaluation (Baker *et al.*, 1965). The LSB designated the former Manana Storage Area and surrounding land as "Urban", and did not classify it for agricultural purposes. Similarly, because of the urbanized nature of the project area and surrounding region, the property was not classified in Agricultural Lands of Importance to the State of Hawaii (State Department of Agriculture, 1977).

3.2.2 CLIMATE AND AIR QUALITY

3.2.2.1 Climate and Meteorology

Temperature and Rainfall. The nearest long-term weather station operated by the National Weather Service is located at the Honolulu International Airport approximately six miles southeast of the project site. Data from that station indicate that the annual average day/night variation is about 14 degrees. Average daily high temperatures range from the low 80's in the winter to the high 80's in the summer. Average daily low temperatures range from the mid-60's to the low 70's. The historical recorded high at the airport station is 95 degrees, while the low is 53 degrees. Average annual precipitation at the project site is approximately 30 inches. Average monthly rainfall during the wettest months (December and January) is nearly five inches. During the summer months, average monthly rainfall drops to less than two inches (Hawaii Department of Business, Economic Development, and Tourism, 1996).

Surface Winds. Meteorological records from Honolulu International Airport and Hickam Air Force Base (U.S. Air Force, 1974) were analyzed (Morrow, July 1998). Results indicate that low wind velocities (less than 10 mph) occur frequently, and that the "normal" northeasterly trade winds tend to give way to more light, variable wind conditions through winter and into early spring. It is during these times that Honolulu generally experiences its highest air pollution levels.

Table 3-2 summarizes twelve months of hourly wind data for morning and afternoon peak traffic hours (Morrow, July 1998). In addition, stability wind roses prepared for Hickam Air Force Base (U.S. Air Force, 1974) indicate that stable conditions occur about 28% of the time on an annual basis. It is under such conditions that the greatest potential for air pollutant buildup from ground level sources, *e.g.*, motor vehicles, exists. These conditions occur 36% of the time during January, the month with the highest frequency of stable conditions.

3.2.2.2 Applicable Air Quality Standards

Table 3-3 summarizes State of Hawaii and national ambient air quality standards. Primary standards are intended to protect public health with an adequate margin of safety. Secondary standards, which are intended to protect public welfare through the prevention of damage to soils, water, vegetation, man-made materials, animals, wildlife, visibility, climate, and economic values (Library of Congress, 1974), are more stringent (*i.e.*, the limits are lower.) Only primary standards exist for the common automotive pollutants [carbon monoxide (CO), nitrogen dioxide (NO₂), and ozone (O₃)].

Table 3 - 2. Summary Of Typical Wind Conditions During Peak Traffic Hours

Period	Direction Quadrant	Annual Frequency (%)	Mean Wind Speed (m/sec)
A.M. Peak (7:00 a.m. - 8:00 a.m.)	NE	67.1	4.1
	SE	4.8	3.9
	SW	3.3	2.9
	NW	24.4	1.8
P.M. Peak (4:00 p.m. - 5:00 p.m.)	NE	78.8	6.0
	SE	7.1	4.2
	SW	10.1	3.3
	NW	3.9	4.8
Notes: 1. Frequencies may not total 100% due to rounding. 2. Based on 1991 Honolulu International Airport data. 3. A.M. frequency for winds 1.5 m/s = 3.7% 4. P.M. frequency for winds 1.5 m/s = 0.27%			
Source: Morrow, July 1998: Table 4.			

Note that Hawaii's standards are not divided into primary and secondary standards as are the federal standards. Nevertheless, some of Hawaii's standards (CO, NO₂, and O₃) are more stringent than their federal counterparts. Ambient pollutant concentrations may exceed the standards once each year without constituting a violation.

In addition to the standards shown in Table 3-3, Hawaii also has fugitive dust regulations for particulate matter associated with construction activities. Hawaii Administrative Rules, Title 11, Chapter 60 states that such activities cannot produce visible emissions.

The project site is in an attainment area with respect to all national ambient air quality standards.

3.2.2.3 Regional Air Quality

The State Department of Health (DOH) maintains a limited network of air quality monitoring stations around the State. These stations gather data on seven regulated pollutants. The pollutants are particulate matter less than 10 microns in size (PM₁₀), total suspended particulate matter (TSP), sulfur dioxide (SO₂), nitrogen dioxide (NO₂), carbon monoxide (CO), ozone (O₃), and lead (Pb).

Table 3 - 3. Summary of State of Hawaii and Federal Ambient Air Quality Standards

POLLUTANT	SAMPLING PERIOD	NAAQS PRIMARY	NAAQS SECONDARY	STATE STANDARDS
PM ₁₀	Annual	50	50	50
	24-hr	150	150	150
SO ₂	Annual	80	---	80
	24-hr	365	---	365
	3-hr	---	1,300	1,300
NO ₂	Annual	100	---	70
CO	8-hr	10	---	5
	1-hr	40	---	10
O ₃	1-hr	235	---	100
H ₂ S	1-hr	---	---	35
Pb	Calendar Quarter	1.5	---	1.5

KEY: NAAQS - National Ambient Air Quality Standards
 PM₁₀ - particulate matter ≤ 10 microns
 SO₂ - sulfur dioxide
 NO₂ - nitrogen dioxide
 CO - carbon monoxide
 O₃ - ozone
 H₂S - hydrogen sulfide
 Pb - lead

Note: All concentrations except CO are in micrograms per cubic meter (µg/m³). CO values are in milligrams per cubic meter (mg/m³).

Source: Morrow, July 1998: Table 1.

The DOH monitoring station nearest to the project site is located at the Leeward Medical Center on Fourth Street in Pearl City about 2,000 feet away from the closest corner of the former Manana Storage Area. Only PM₁₀ is monitored at this site. Table 3-4 summarizes the most recent published air quality data from that station and others that measure pollutants not monitored at the Leeward Medical Center.

3.2.2.4 Results of Onsite Carbon Monoxide Sampling

Carbon monoxide (CO) data were collected at the *Ewa* (west) side of the Moanalua Road/Waimano Home Road intersection during morning and evening peak traffic hours on May 29, 1998 (Morrow, July 1998). Measurements were made using a continuous sampling instrument. An anemometer and vane were used to record onsite surface winds during the sampling period. Traffic was also recorded along the segment of Waimano Home Road fronting the sampling site.

Skies were mostly cloudy during the morning sampling period. Traffic counts were comparable to the morning peak hour volumes reported by Pacific Planning and Engineering (July 13, 1998). Winds were light (about 1 mph) and from the northwest during the first part of the sampling period. Winds changed to northeasterly trade winds shortly before 8:00 a.m. The effects of wind direction were clearly demonstrated in the CO data. The northwesterly winds during most of the peak traffic hour put the sampling site upwind of Waimano Home Road and thus CO levels were very low, *i.e.*, less than 1 mg/m³ during this period. As soon as the winds shifted to the normal trade wind direction, CO concentrations increased markedly. However, measured concentrations remained below State and federal standards (see Table 3-3).

Weather continued to be overcast with northeasterly winds averaging about six mph during the afternoon sampling period. The CO level was higher than the level recorded during the morning sampling period, averaging 2.5 mg/m³. This was due primarily to steadier wind direction, and it occurred despite lower traffic volumes observed. As in the morning, measured CO concentrations were below State and federal standards.

3.2.2.5 Modeled Carbon Monoxide Concentrations

The air quality consultant modeled carbon monoxide concentrations at intersections in the vicinity of the former Manana Storage Area using U.S. Environmental Protection Agency (EPA) recommended computer modeling methods. The intersections chosen were those with the greatest potential for air pollution impacts based on traffic volumes, level of service, and other factors (Morrow, July 1998):

- Moanalua Road at Waimano Home Road,
- Kamehameha Highway at Waimano Home Road,
- Kamehameha Highway at Acacia Road, and
- Acacia Road at Kuala Street.

Table 3 - 4. Air Quality Data from Hawaii Department of Health Monitoring Sites: 1996

Pollutant	Concentration ($\mu\text{g}/\text{m}^3$)
Particulate matter ≤ 10 microns (PM_{10})	
24-hr (max)	26
Annual	14
Sulfur dioxide (SO_2)	
3-hr (max)	73
24-hr (max)	18
Annual	3
Carbon monoxide (CO)	
1-hr (max)	4,589
8-hr (max)	2,127
Annual	936
Ozone (O_3)	
1-hr (max)	92
Annual	27
Nitrogen dioxide (NO_2)	
Annual	2
Lead (Pb)	
Quarterly (max)	0.0
Annual	0.0
Notes: 1. PM_{10} data are from the Leeward Medical Center site. 2. CO, SO_2 , and Pb are from the DOH building in downtown Honolulu 3. O_3 data are from site on Sand Island. 4. NO_2 data are from site in Kapolei.	
Source: Morrow, July 1998: Table 2.	

The air quality analysis focused on carbon monoxide (CO), a non-reactive pollutant. Carbon monoxide is normally selected for modeling because it has a relatively long half-life (about one month) in the atmosphere (Seinfeld, 1975) and because it comprises the largest fraction of automotive emissions.

The following were used to estimate carbon monoxide concentrations:

- Traffic volume and intersection design (Pacific Planning and Engineering, July 13, 1998; see Section 3.7).
- One year of Honolulu meteorological data pre-processed with EPA's PCRAMMET program (EPA, April 1993).
- A revised version of EPA's guideline model CAL3QHC (U. S. Environmental Protection Agency, November 1992, September 1995).
- A background CO concentration of 0.1 milligrams per cubic meter (mg/m^3).

An array of 40 "receptor sites" were modeled at a distance of 10 meters from the street edge, spaced at 10 meter intervals.

Automotive emission factors for carbon monoxide (CO) were generated using the Mobile Source Emissions Model (MOBILE-5B) (EPA, September, 1996). To localize the emission factors as much as possible, the analysis used the City's data on registered vehicles, particularly age distribution and vehicle miles traveled. (City and County of Honolulu, March 1992).

The model results for existing conditions were comparable to the onsite measurements and to the DOH historical data at other sites. Maximum estimated CO concentrations in mg/m^3 during morning and afternoon peak traffic hours and eight-hour estimates are included in the impact analysis in Chapter 4 (see Figures 4-3 through 4-6).

Results: 1-Hour Concentrations The modeling indicates that the federal 1-hour CO standard is currently being met at all four intersections. However, the more stringent State 1-hour CO standard (see Table 3-3) is exceeded during the morning peak hour at the Kamehameha Highway/Waimano Home Road (Figure 4-4) intersection and in the afternoon at the Kamehameha Highway/Acacia Road intersection (Figure 4-5).

Results: 8-Hour Concentrations Estimates of 8-hour CO concentrations were derived by applying a "persistence" factor to the maximum 1-hour concentrations. The persistence factor accounts for the fact that the worst-case 1-hour meteorology and traffic volumes do not persist for eight hours. EPA recommends calculation of a persistence factor based on actual 1-hour and 8-hour CO measurements. A local persistence factor computed from State of Hawaii, Department of Health data for a recent project in the Honolulu area (Morrow, June 1995) was used. To achieve a worst-case scenario, that factor was then used to estimate 8-hour concentrations by applying it to the higher of the morning, or afternoon, peak hour concentrations at each intersection.

Federal 8-hour CO standards are now being met at all the modeled intersections. The State standard, however, is currently exceeded by a small amount at the Kamehameha

Highway/Acacia Road intersection and by about 40% at the Kamehameha Highway/Waimano Home Road intersection.

3.2.3 HYDROLOGY

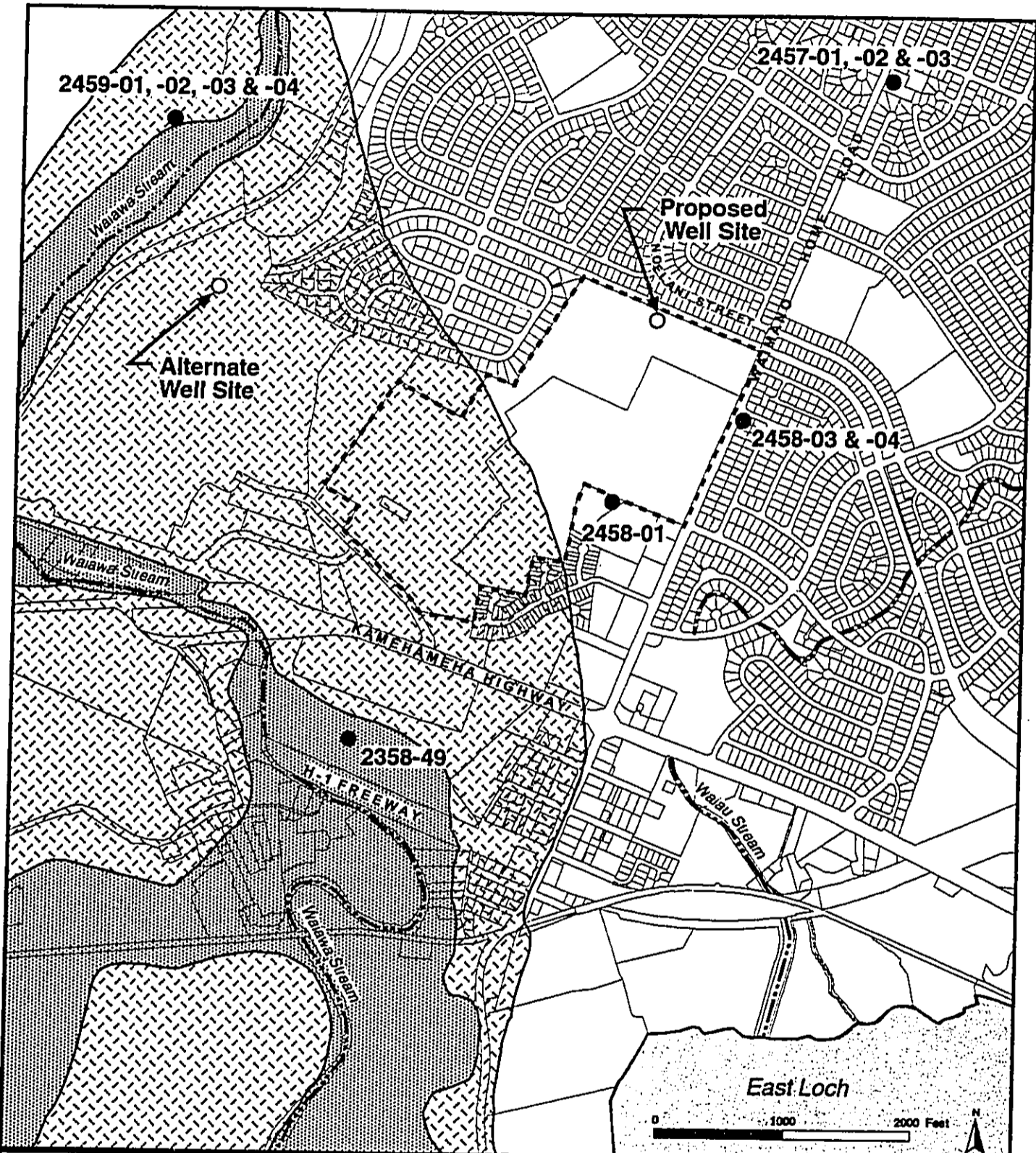
3.2.3.1 Surface Water and Flooding

The locations of prominent hydrologic features in the vicinity of the project area are depicted in Figure 3-5. No surface water bodies or wetlands occur on or adjacent to the former Manana Storage Area. According to the United States Geological Service (USGS) map of the area, the closest water body is an unnamed intermittent drainageway in Waiiau Gulch (subsequently referred to as Waiiau Stream in this EA) east of Waimano Home Road approximately 5,000 feet east of the former Manana Storage Area and the closest point of either road alignment.

No substantial flooding of the area has been reported. The *mauka* half of the former Manana Storage Area (and thus, each alignment) is located within Zone "D" on the Federal Emergency Management Agency Flood Insurance Rate Map (FIRM), while the *makai* portion is in Zone "X". Areas in Zone "X" are outside the 500-year flood plain and Zone "D" is characterized by "undetermined" flood hazards. The Zone D designation is generally given to areas which do not have serious flooding hazards but which have not been studied in detail.

The former Manana Storage Area parcel contributes runoff to both Waiawa and Waiiau Streams. Approximately 57 acres drain toward the west into existing drainage systems located in the adjoining residential developments and in Acacia Road (Community Planning, Inc., December 1997a:2). Storm runoff discharges into Waiawa Stream at two points. The first system crosses the Pearl Highlands Center and discharges into Waiawa Stream just *mauka* of the Farrington Highway ramp. The second part runs from Acacia Road along Kamehameha Highway into culverts which cross the highway. The stream eventually flows into Pearl Harbor. An additional 23 acres along the *makai* portion of the former Manana Storage Area drains to the south into two existing pipeline systems in the Kauhale Manana Subdivision and near the Pearl City Post Office (see Figure 1-3 for locations). These systems cross Kamehameha Highway in culverts and discharge into a lined ditch which also empties into Waiawa Stream.

Approximately 29 acres of the former Manana Storage Area drain toward two existing pipeline systems in Waimano Home Road. Both systems extend to connections with Waiiau Stream which is concrete-lined in this area. The channel crosses Kamehameha Highway and eventually empties into the East Loch of Pearl Harbor.



LEGEND:

- Existing Production Well & Well Identification Number
- Proposed & Alternate Board of Water Supply Production Well Sites
- - - Manana Storage Area Boundary
- ~ Stream
- Zone A
100-Yr Flood Area
No Base Flood Elev. Determined
- Zone D
Areas in which Flood Hazards are Undetermined
- Zone X
Areas Determined to be Outside 500-Yr Flood Plain

FIGURE 3-5:

Hydrologic Features in Vicinity

Manana Development Spine Road Environmental Assessment

SOURCE:
 RM Towill Corporation, Feb. 1998.
 C & C Honolulu, DLU, June 5, 1998
 Engineering Concepts, Inc.
 July 10, 1998

Manana Spine Road, Fig. 3-5 Hydrologic Features in Vicinity, 10/12/98

3.2.3.2 Groundwater

The former Manana Storage Area overlies Oahu's basal lens. It is within the Commission on Water Resource Management's Waipahu-Waiawa Water Management Area. The Waipahu-Waiawa groundwater aquifer is recharged by rainfall in the Koolau mountain range. Relatively impermeable coastal deposits retard the seaward movement of groundwater, resulting in elevated heads. Measurements by the Board of Water Supply (BWS) indicate that the water level in the basal aquifer stands approximately 17 feet above sea level in this area. As of 1996, the aquifer had an estimated sustainable yield of 119 million gallons per day (MGD). Already permitted uses total just over 110 MGD, leaving about 8 MGD for possible future development.

Several existing potable water sources are either on the former Manana Storage Area or within one half a mile of it (Figure 3-5). They are the Pearl City Wells I (Well #3458-03 and #2458-0), Pearl City Wells II (Wells #2457-01, #2457-02 and #2457-03, and Pearl City Shaft (Well #2458-01) (Honolulu Board of Water Supply February 1998). Pearl City Wells I and Pearl City Shaft are water sources closest to the proposed site. Pearl City Wells I average a sustained yield of 0.3 MGD. The Pearl City Shaft, which is a short distance makai (south) of the Manana Storage Area has a "permitted" use of 1.32 MGD for municipal purposes. The Waiawa Springs Complex is a private source of irrigation and potable water located south of the H-1 Freeway near the Leeward Community College/West Oahu College campus.

Pursuant to section 1424(e) of the Safe Drinking Water Act, the U.S. Environmental Protection Agency has determined that the Southern Oahu Basal Aquifer is the sole or principal source of drinking water for the Wahiawa District, the Ewa District, and the portion of the Honolulu District west of the Manoa Stream Channel (Federal Register, Volume 52, No. 229, November 30, 1997). The Manana Spine Road is located over a portion of the Southern Oahu Basal Aquifer, and the City is seeking Federal financial aid for its construction. Consequently, the proposed project is subject to a "sole source aquifer review" in accordance with an October 1984 Memorandum of Understanding (MOU) between Region IX of the U.S. Environmental Protection Agency and Region 9 of the U.S. Department of Transportation Federal Highway Administration. The review is intended to insure that Federal financial aid is not provided for projects that the EPA Administrator determines may contaminate such an aquifer through a recharge zone so as to create a significant hazard to public health.

The proposed Manana Spine Road was evaluated to determine the extent to which it might degrade the Southern Oahu Basal Aquifer. The analysis focused on the major threats identified when the Sole Source designation was granted. These include: the potential to increase salt water intrusion through excessive pumping or other means; the potential to cause adverse water quality effects through excess irrigation return water; the potential to cause contamination from industrial, military, or urban land uses; possible contamination from landfills; and adverse water quality effects due to chemical spills, poorly situated injection wells, and cesspools. The results of this evaluation are summarized below.

- The proposed Manana Spine Road does not involve the withdrawal of ground water that might cause saltwater intrusion. The proposed roadway is located in a relatively low-rainfall area where evapotranspiration exceeds rainfall under most circumstances. Consequently, the slight increase in impermeable surface that would accompany the project would not substantially alter the volume of recharge to the Southern Oahu Basal Aquifer. (Virtually all of the aquifer's recharge occurs in higher elevation areas far removed from the project.)
- Landscaping is provided within the right-of-way of the proposed roadway. However, the automatic irrigation system that would be provided is designed to provide just enough water to meet the plants' needs. Consequently, it would not produce irrigation return water.
- Runoff from the proposed roadway would be collected in the stormwater collection system that would be installed within the road right-of-way. The system consists of closed pipes. The pipes would not discharge into natural (unlined) drainage channels until shortly before they enter Pearl Harbor. Consequently, there is no potential for contaminants that might find their way into the runoff to reach portions of the Southern Oahu Basal Aquifer that are suitable for potable water wells.
- The proposed Manana Spine Road project does not involve landfills, injection wells, or cesspools. Neither does it entail the use of piles or other similar construction features. Consequently, it would not increase the potential for contamination from these sources.
- The proposed roadway does not involve the use of chemicals in and of itself. However, it could be used by vehicles carrying chemicals, and there is always the possibility that an accident could cause chemicals to be released into the environment. Such spills are much more likely to occur on one of the many highways that transit the area (e.g., Kamehameha Highway and the H-1 Freeway), however. Moreover, a spill from a vehicle traveling on the Spine Road is likely to be contained within the roadway. Material that is not contained could find its way into the storm drainage system. However, as noted above, there is little likelihood that it would reach the Southern Oahu Basal Aquifer through this pathway.

Based on the above analysis the United States Environmental Protection Agency, Region IX, approved this project under the provisions of the Safe Drinking Water Act Section 1424(e) in a September 24, 1998 letter (Appendix D).

3.2.4 NOISE LEVELS

3.2.4.1 Introduction

Local, State and Federal agencies have established regulations, goals, and guidelines that can be used to assess environmental noise and land use compatibility. Those that are relevant to the types of noise associated with the proposed Spine Road are summarized

below. The regulations are legally enforceable, whereas goals and guidelines are not. Nevertheless, goals and guidelines may be used to determine if a proposed project would have an impact and the significance of that impact. Appendix B describes the common acoustical terminology used.

3.2.4.2 State Department of Health, HAR §11-42, Vehicular Noise Control for Oahu

HAR §11-42 specifies noise level limits for vehicles operating on roadways on Oahu. The regulations specify the following limits in dBA (decibels A-weighted; see Appendix A) for "heavy vehicles" (Table 3-5). Heavy vehicles are defined as vehicles which have a gross vehicular weight rating of 10,000 pounds or greater.

Table 3 - 5. HAR §11-42 Vehicular Noise Limits for Heavy Vehicles

Posted Speed Limit	Time Periods When Applicable	Measurement Distance		
		20 feet	25 feet	50 feet
35 mph or less	6:00 a.m. - 6:00 p.m.	92 dBA	90 dBA	84 dBA
	6:00 p.m. - 10:00 p.m.	92 dBA	90 dBA	84 dBA
	(10:00 p.m.- 6:00 a.m.), Holidays and Sundays	81 dBA	79 dBA	73 dBA
> 35 mph	All	92 dBA	90 dBA	84 dBA
Truck Routes	All	96 dBA	94 dBA	88 dBA

Source: D.L. Adams Associates, Ltd., 1998

3.2.4.3 Federal Highway Administration Design Goals

The Federal Highway Administration (FHWA) has established noise abatement criteria (NAC) for traffic noise exposure.² The FHWA defines five land use categories and assigns corresponding maximum hourly equivalent sound levels, L_{eq} . These are shown in Table 3-6.

3.2.4.4 Hawaii State Department of Transportation, Highways Division Guidelines

The Hawaii State Department of Transportation, Highways Division (June 1977) has adopted the FHWA's design goals for traffic noise exposure. According to the policy, a traffic noise impact occurs when the predicted traffic noise levels "approach" or exceed FHWA's noise abatement criteria (NAC) shown in Table 3-6 or when the predicted traffic noise levels "substantially exceed the existing noise levels." The policy specifies that "approach" means at least 1 dBA less than the NAC and "substantially exceed the existing noise levels" means an increase of at least 15 dBA.

¹ The discussion below is based on the noise impact report prepared by D.L. Adams Associates, Ltd. (July 1998).

² These goals, as well as other noise-level guidance are not regulatory limits. However, they provide reasonable means of evaluating the potential effects of project-related noise and the need (if any) for mitigation.

Table 3 - 6. FHWA Noise Abatement Criteria (NAC).

Activity Category	L_{eq} (h) for Noisiest Traffic Hour	Description of Activity Category
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential of the area is to continue to serve its intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B.
D	—	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches libraries hospitals, and auditoriums.

3.2.4.5 U.S. Environmental Protection Agency Goals

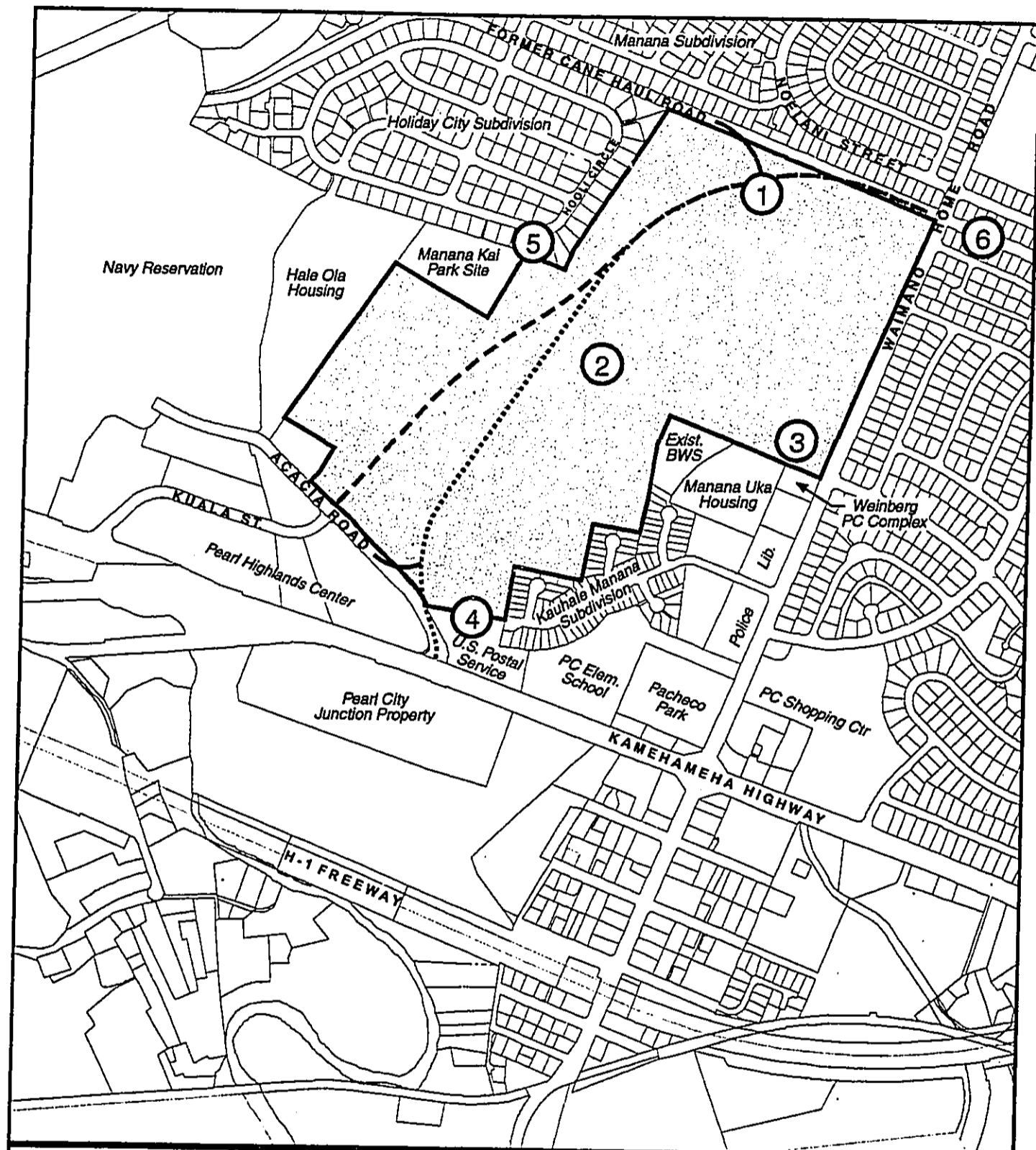
The U.S. Environmental Protection Agency (April 1977) has identified a range of day-night equivalent sound levels (L_{dn}) considered sufficient to protect public health and welfare from the effects of environmental noise. Goals set by the agency are not intended as regulations, as it has no authority to regulate noise levels. The immediate goal is to reduce exterior noise to a L_{dn} not exceeding 65 dBA and the long-term goal is a L_{dn} not exceeding 55 dBA.

3.2.4.6 Results of Onsite Acoustic Measurements

Noise level measurements were conducted on April 21, 1998, June 17, 1998 and July 17, 1998 to assess the existing acoustical environment of the project site, its vicinity, and existing noise sensitive areas. Measurement locations are shown in Figure 3-6.

The measurements were obtained using Larson-Davis Laboratories Sound Level Meters (Models 700 and 820). The results are expressed in terms of the equivalent continuous noise level, L_{eq} , in units of A-weighted decibels (dBA). (Appendix A provides a brief description of A-weighted sound level and statistical noise levels commonly used to describe environmental noise.)

Fifteen minute noise measurements were taken at Locations 1, 2, 3 and 4. Longer, 24-hour measurements, were made at Locations 5 and 6. The longer sampling period at these stations provided information needed to evaluate the potential effects of project-related noise during late-night and early-morning hours.



LEGEND:

- Preferred Alignment
- Alternative Alignment

SOURCE:

C & C of Honolulu, DLU, June 5, 1988
 D.L. Adams Associates, Ltd., July 1988
 Engineering Concepts, Inc.
 July 10, 1988



FIGURE 3-6:

Acoustic Measurement Locations

Manana Development Spine Road
 Environmental Assessment

Manana Spine Road, Pg. 3-6 Acoustic Measurement Locations, 10-12-88

Referring to the measurement locations shown in Figure 3-6, the following sound levels were measured:

Measurement Location (See Figure 3-6)	L _{eq} (dBA)
1	54
2	50
3	71
4	51
5 (5:00 a.m. to 10:00 p.m.)	36 to 44
5 (10:00 p.m. and 5:00 a.m.)	32 to 38
6 (5:00 a.m. to 10:00 p.m.)	49 to 57
6 (10:00 p.m. and 5:00 a.m.)	41 to 48

Source: D.L. Adams Associates, Ltd., July 1998

Identifiable noise sources during the measurement periods included traffic on local roads, occasional aircraft fly-overs, birds, and wind in the foliage.

3.2.5 NATURAL HAZARDS

All of Oahu is situated in Seismic Zone 2A (Furumoto *et al.*, 1988). Therefore, the project area is no more or less likely to experience an earthquake than elsewhere on the island. The most *makai* section of either alignment is nearly 5,000 feet from the coast, at an elevation of about 50 feet above sea level; neither tsunamis nor coastal flooding are considered threats in the area.

3.2.6 MAN-MADE HAZARDS/HAZARDOUS MATERIAL

When the Navy transferred the property to the City, it did so in accordance with a "Memorandum of Understanding" (MOU) between the City and the Navy. The MOU made the Navy responsible for "deliver[ing] the property to the City free of all surface and subsurface hazardous materials." According to two "Finding of Suitability to Transfer" documents (dated November 2, 1994 and May 29, 1996), the Navy certified that the property was cleared of all known hazardous waste in accordance with the standards of the Resource Conservation and Recovery Act (RCRA) of 1976 as amended, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980 as amended, and as applicable, Chapters 128D and 342J of the Hawaii Revised Statutes as amended. A 1991 study prepared for the Navy concluded that non-friable and low friability asbestos are present in the roofing tar of 38 warehouses in the former Manana Storage Area. Additional non-friable asbestos was found in the lining of a sink in Warehouses 13 and 29 and in the floor tiles of the office and break room of Warehouse 40. Warehouse 18 and 26 have been clean closed as they may have contained hazardous

materials related to their previous use. A 15 gallon acid interceptor tank and a 50 gallon oil and water separator tank and a 50-gallon waste oil tank exist below grade at the east end of Warehouse 13³. In addition, because of the age of the structures, it is likely that all contain lead-based paint.

3.3 BIOLOGICAL ENVIRONMENT

3.3.1 VEGETATION

A botanical assessment was performed to identify vegetation on the former Manana Storage Area and to determine if any significant vegetative resources exist (Char and Associates, 1995). The study concluded that most of the original flora of the area has been replaced by introduced weedy species such as koa haole (*Leucaena leucocephala*) and grasses. The latter generally include pitted beardgrass (*Bothriochloa pertusa*), Bermuda grass (*Cynodon dactylon*), and Guinea grass (*Panicum maximum*). Trees planted near the warehouses include mango (*Mangifera indica*), African tulip tree (*Spathodea campanulata*), plumeria (*Plumeria* spp.), octopus tree (*Schefflera actinophylla*), avocado (*Persea americana*), banana (*Musa*), and coconut (*Cocos nucifera*). Only one native species, the indigenous *hi'aloa* or *'uhaloa* (*Waltheria indica*) was discovered during the botanical assessment study. None of the plants found are rare, listed, proposed for listing, or candidate threatened or endangered species.

During the review of the Manana and Pearl City Junction Development Final Environmental Impact Statement, for which the above mentioned botanical assessment was prepared, the United States Department of the Interior, Fish and Wildlife Service confirmed in their April 8, 1995 letter that it did not anticipate significant adverse impacts to fish and wildlife resources resulting from the Manana and Pearl City Junction Development. However, a additional consultation letter (See Appendix D) regarding the development of the proposed Spine Road has been sent to the agency soliciting any issues or concerns regarding any potential impact on fish and wildlife resources resulting from this project. A memorandum of a phone call with the agency (See Appendix D) has confirmed that it still does not anticipate significant adverse impacts to fish and wildlife resources.

3.3.2 FAUNA

A faunal survey (Bruner, 1995) indicates that mammals on the property are those typically found throughout urbanized portions of the Hawaiian islands, *i.e.*, feral cats, mongoose, and dogs. No endemic birds were observed, although 28 indigenous (migratory) Pacific golden plovers (*Pluvialis fulva*), which winter in Hawaii, were seen. The plover are very site-faithful to their wintering grounds and establish foraging territories which they defend vigorously.

Bruner reported that the vast majority of birds present in the area are introduced species. The most abundant are spotted doves (*Streptopelia chinensis*), zebra dove (*Geopelia*

³ Addendum No.1 for the Renting of the City-Owned Warehouses Located at the Manana Storage Area, Areas A, B and C Tax Map Key NOS. 9-7-024:6 (portion) and 41 Waiawa and Manana-Uka Hawaii, March 10 1997.

striata), common waxbill (*Estrilda astrild*), house finch (*Carpodacus mexicanus*), and Java sparrow (*Padda oryzivora*). No threatened, endangered, candidate or rare species were observed. And although the pueo (*Asio flammeus sandwichensis*), which is listed by the State of Hawaii as endangered on Oahu, does occur in leeward Oahu, it is unlikely to use the project site.

Habitat for wildlife on the property is extremely limited, due to previous use and manipulation. Habitat similar to that found on the property occurs throughout leeward Oahu. The U.S. Fish and Wildlife Service, in a comment letter to the *Manana and Pearl City Junction Development Draft EIS* stated that the project site "does not provide significant habitat for fish and wildlife resources" (letter reproduced in the *Manana and Pearl City Junction Development Final EIS*). As part of this project, an additional consultation letter has been sent to the agency to reconfirm their position and to solicit any new issues or concerns they may have (See Appendix D). A memorandum of a phone call with the agency (See Appendix D) has confirmed that it still does not anticipate significant adverse impacts to fish and wildlife resources.

3.4 HISTORIC AND ARCHAEOLOGICAL RESOURCES

Scientific Consultant Services, Inc. (July 1995) prepared an assessment of the historic and archaeological resources on the former Manana Storage Area. The assessment included a review of available documents and a field inspection conducted on June 22, 1995. Based on a review of Land Court Awards, the assessment report concluded that the Manana area had at one time been cultivated for dryland crops, such as yams and sweet potatoes. By the end of the 19th century, much of the area was being used by the Honolulu Plantation for sugarcane cultivation. The U.S. military assumed control of the Manana Storage Area property and other land around Pearl Harbor during World War II and maintained control until the City acquired the property in the early 1990s.

Scientific Consultant Services, Inc.'s report did not identify any potential historic, archaeological or cultural resources. The report concluded that, based on the extensive amount of disturbance, the presence of historic or archaeological resources is unlikely. The State Historic Preservation Office (SHPO)'s March 25, 1996 letter to the City concurred with the conclusion that the proposed re-use of the former Manana Storage Area would have "no effect" on historic sites. In view of the foregoing, no native Hawaiian gathering rights are believed to be exercised on the Spine Road site and are therefore not expected to be an issue.

The City sent a written request for early consultation to the SHPO regarding the proposed Spine Road (see Appendix D). SHPO has concurred in writing with the finding of "no effect" on historic resources (see Appendix D).

3.5 SCENIC AND AESTHETIC RESOURCES

The existing views of the former Manana Storage Area is dominated by light gray deteriorating warehouses, chain link fences, and overhead utility lines (see Figures 3-7, 3-8, and 3-9). Most of the existing structures are in some degree of disrepair and landscaping is minimal. The overall character of the property is one of industrial deterioration. Signs erected by current occupants and occasional vegetation break the monotony. No particularly unique or spectacular views exist at the present time, partially because the existing warehouses block the view of Pearl Harbor and the coastline.

3.6 NEIGHBORHOOD CHARACTERISTICS

The *Manana and Pearl City Junction Development FEIS Market Assessment* (PKF Hawaii, 1996) reviewed census data to assess demographics of the region. The authors of that report concluded that households in the Ewa District⁴ are larger and younger than average for Oahu, and have above-average household incomes. This suggests that residents in the area are more family-oriented and affluent than the island as a whole. The ethnicity of residents of the Ewa District generally resembles that of the rest of Oahu, but Pearl City, Aiea, and Waimalu show statistically higher than average percentages of people of Japanese ancestry.

The Pearl City Neighborhood Board and a number of local resident and community groups represent the community surrounding the former Manana Storage Area. The primary ones include the Hale Ola Association, the Manana Community Association, the Wailuna Recreation Association, the Pearl City Community Association, the Momilani Community Association, and the Newtown Community Association.

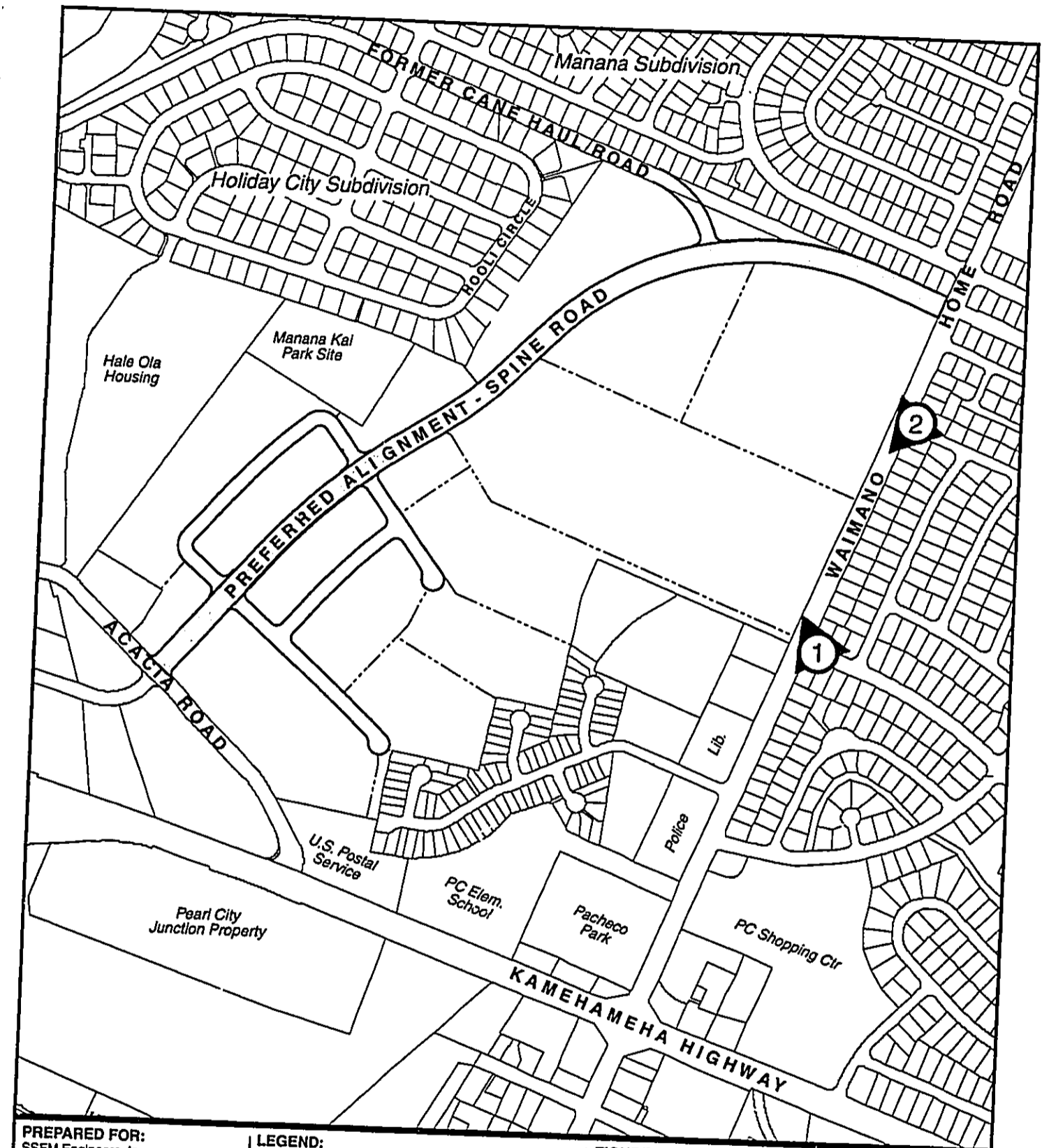
3.7 ROADWAYS AND TRAFFIC

3.7.1 REGIONAL ROADWAYS

Farrington Highway, Kamehameha Highway, Moanalua Road and the H-1 Freeway provide regional and sub-regional access to the former Manana Storage Area. Waimano Home Road, Hoolaulea Street, Noelani Street, Acacia Road, and Kuala Street accommodate local circulation and access. The locations and major features of these roadways are shown on Figures 3-10 and 3-11.

- **Kamehameha Highway** in the vicinity of the project site is a six-lane, divided major arterial highway with signalized intersections at Waimano Home Road and Acacia Road. The posted speed limit is 35 mph near the project site.

⁴ The Ewa District is a geographical unit that extends from Red Hill to Kahe, from the shoreline to Mililani. It includes the Pearl City/Manana area.



PREPARED FOR:
SSFM Engineers, Inc.

PREPARED BY:
Planning Solutions, Inc.
Pacific Data Digitizing

SOURCE:
C & C of Honolulu, DLU, June 5, 1998

LEGEND:

- ① View Angle for Figure 3-8 Photo
- ② View Angle for Figure 3-9 Photo

NOT TO SCALE



FIGURE 3-7:

View Angle for Figure 3-8 and
Figure 3-9

Manana Development Spine Road
Environmental Assessment

Manana Spine Road Fig. 3-7 Photo Locations 8/21/98

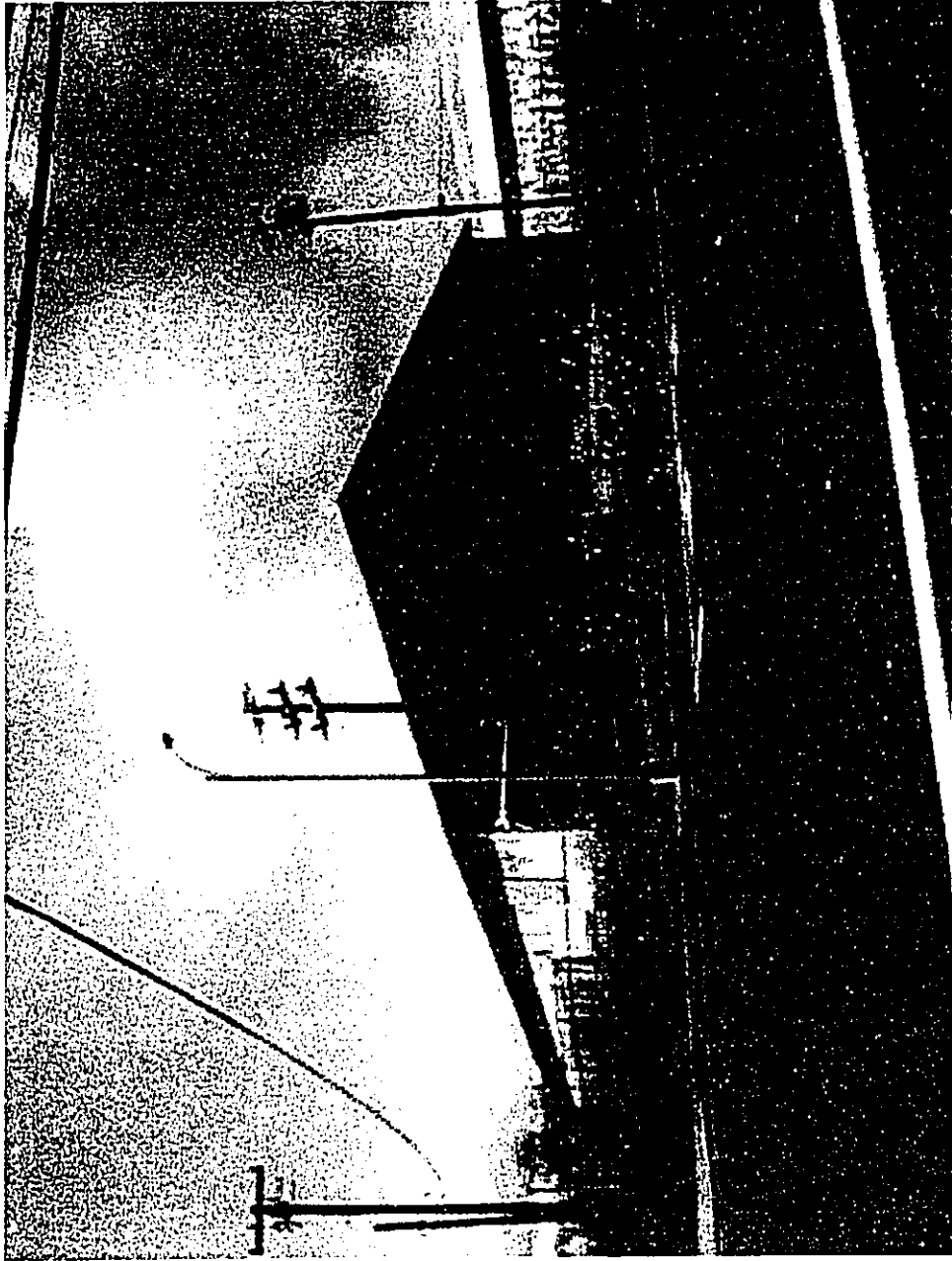


FIGURE 3-8:

View of Manana Storage Area from
Waimano Home Road

NOT TO SCALE

Manana Development Spine Road
Environmental Assessment

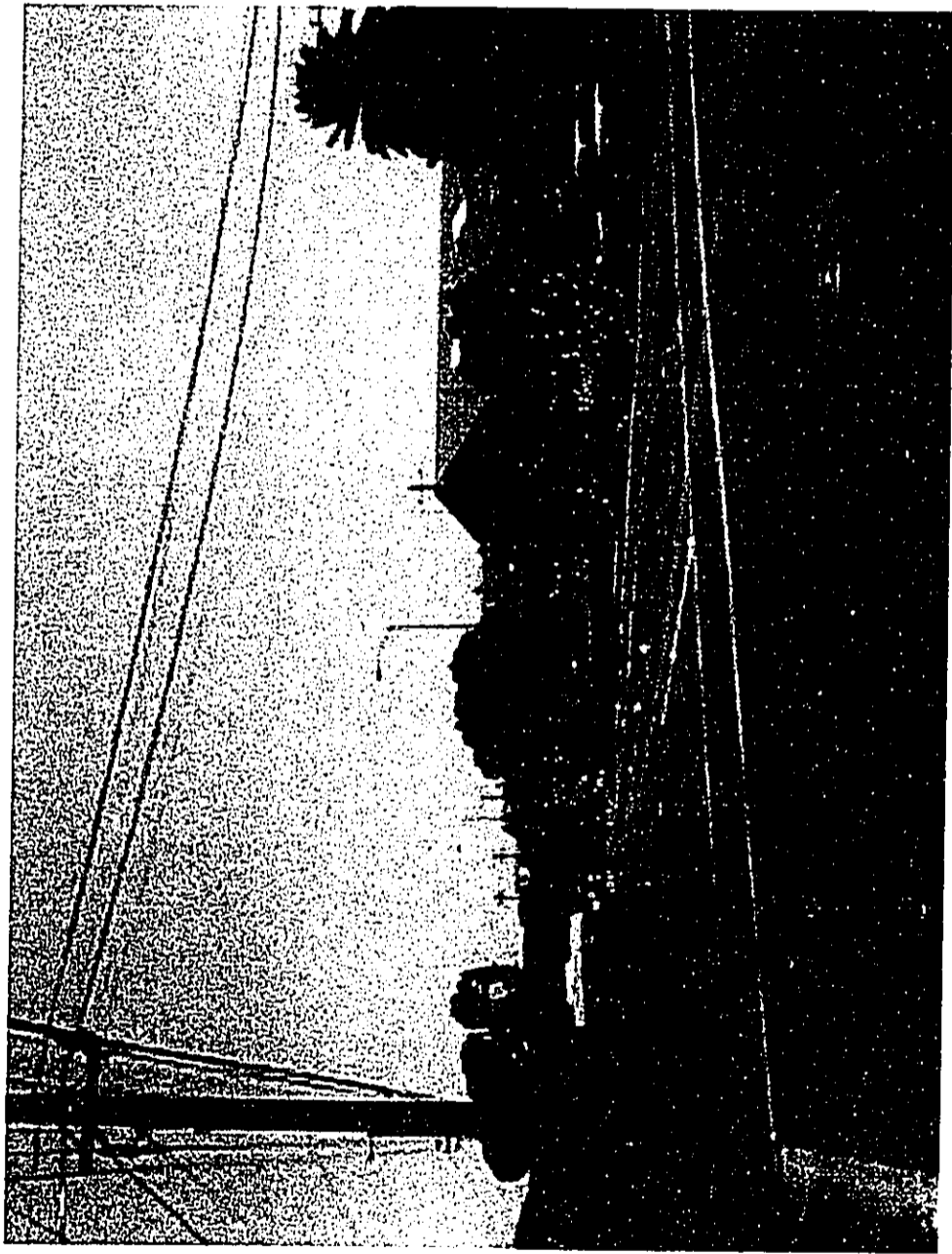
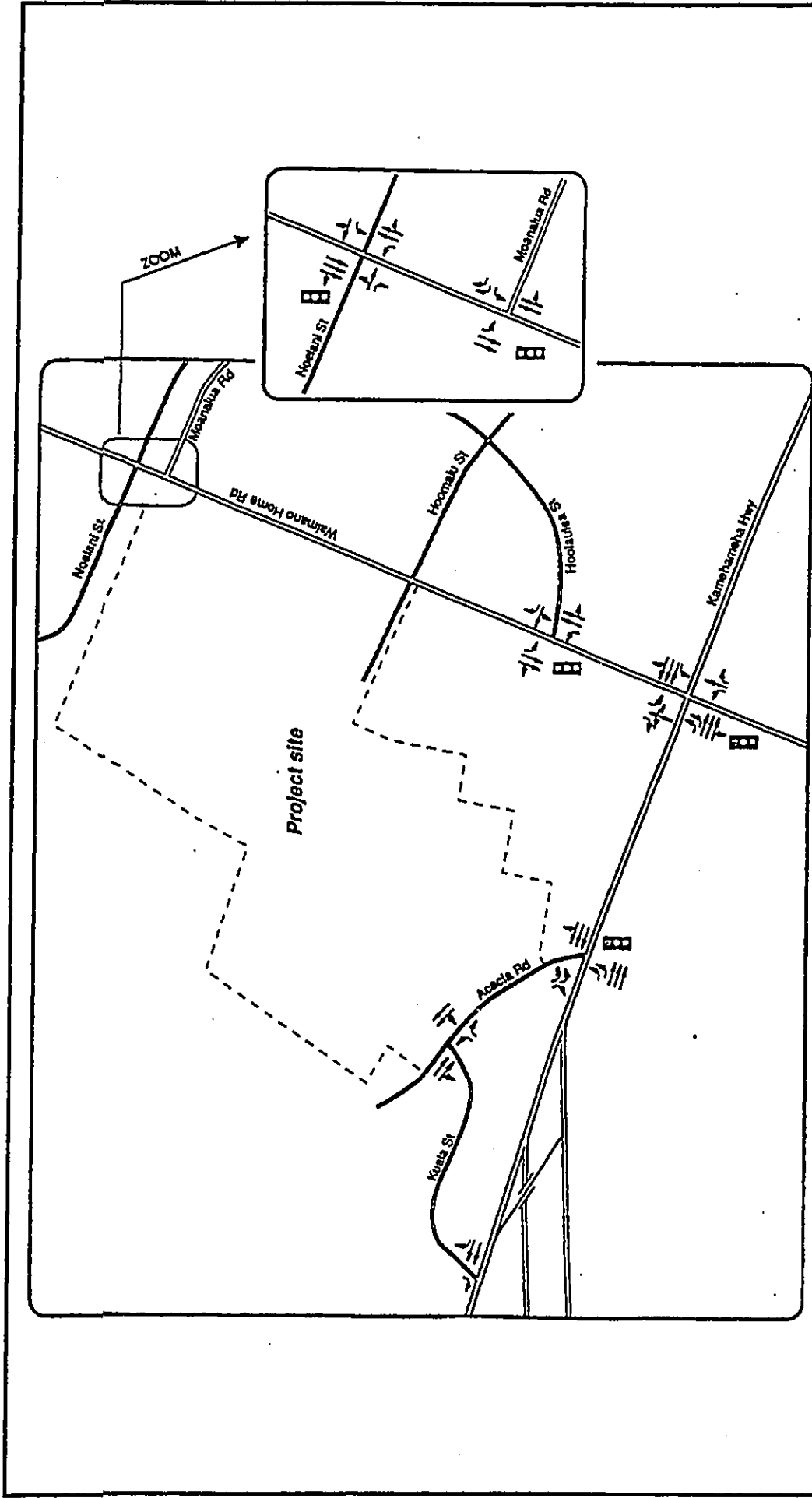


FIGURE 3-9:

Typical View of Manana Storage
Area Warehouses

NOT TO SCALE

Manana Development Spine Road
Environmental Assessment



LEGEND:

SOURCE:
Pacific Planning & Engineering, Inc., July 13, 1998

FIGURE 3-10:

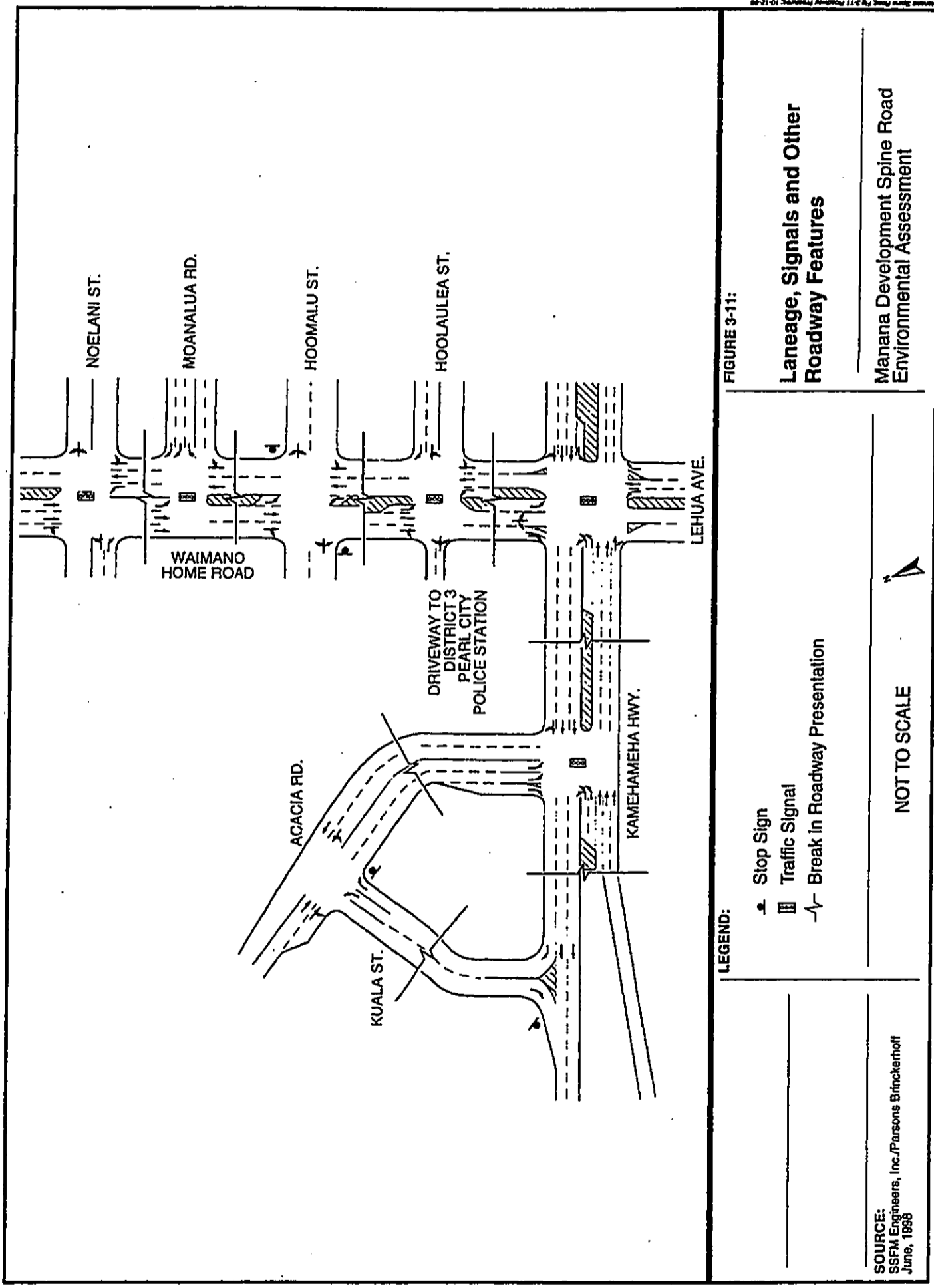
Streets in Vicinity of the Manana Storage Area

Manana Development Spine Road Environmental Assessment

NOT TO SCALE



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



Manana Spine Road, Figure 3-11, Roadway Features, 10-12-98

Figure 3 - 11. Laneage, Signals, and Other Roadway Features.

- **Moanalua Road** is a two way, four-lane undivided arterial roadway which terminates at a signalized intersection at Waimano Home Road.
- **Waimano Home Road** is a four-lane, undivided arterial road providing *mauka-makai* access from Kamehameha Highway through Pearl City. Waimano Home Road has signalized intersections at Kamehameha Highway, Hoolaulea Street, Moanalua Road and Noelani Street. Median left-turn lanes are provided throughout the segment between Kamehameha Highway and Moanalua Road. Waimano Home Road becomes Lehua Avenue *makai* of Kamehameha Highway; Lehua Avenue provides access and circulation for the Pearl City Peninsula.
- **Hoolaulea Street** is a residential collector road that intersects Waimano Home Road at a signalized T-intersection. The entrance to the Pearl City Police Station is approximately across Waimano Home Road from Hoolaulea Street.
- **Acacia Road** is a four-lane collector roadway between Kamehameha Highway and Kuala Street. It is reduced to two lanes west of Kuala Street. Acacia Road provides access to the Pearl Highlands Center, the Pearl City Post Office, Navy housing, and the Century Park Plaza Condominiums. Its T-intersection with Kamehameha Highway is signalized.
- **Kuala Street** is a two-lane road that links Kamehameha Highway and Acacia Road. It also provides access to the Pearl Highlands Center. Its intersections with both Kamehameha Highway and Acacia Road are stop-controlled.
- **Noelani Street** provides the most direct access to the *makai* portion of the Manana subdivision. It is a two-lane residential street that originates within the Manana subdivision at Paaaina Street and terminates at Kaahumanu Street in Waiiau.

3.7.2 TRAFFIC AND INTERSECTION PERFORMANCE

Traffic counts were taken at selected intersections in the study area⁵ on March 18 and 19, 1998. The highest traffic volumes occurred between 7:00 a.m. and 8:00 a.m. and between 4:00 p.m. and 5:00 p.m.

Methodologies described in the *Highway Capacity Manual* (Transportation Research Board, 1994) were used to evaluate intersection operations at key intersections in the area, expressing operations in terms of "level of service" (LOS)⁶. LOSs are defined generally in terms of average delays. Table 3-7 provides brief descriptions of levels of service. LOSs of evaluated intersections are shown in Figures 3-12 and 3-13.

⁵ For the purpose of the traffic impact analysis, the term "study area" refers to the area bounded by Kamehameha Highway on the south, Noelani Street on the north, Waimano Home Road on the east, and Kuala Street on the west.

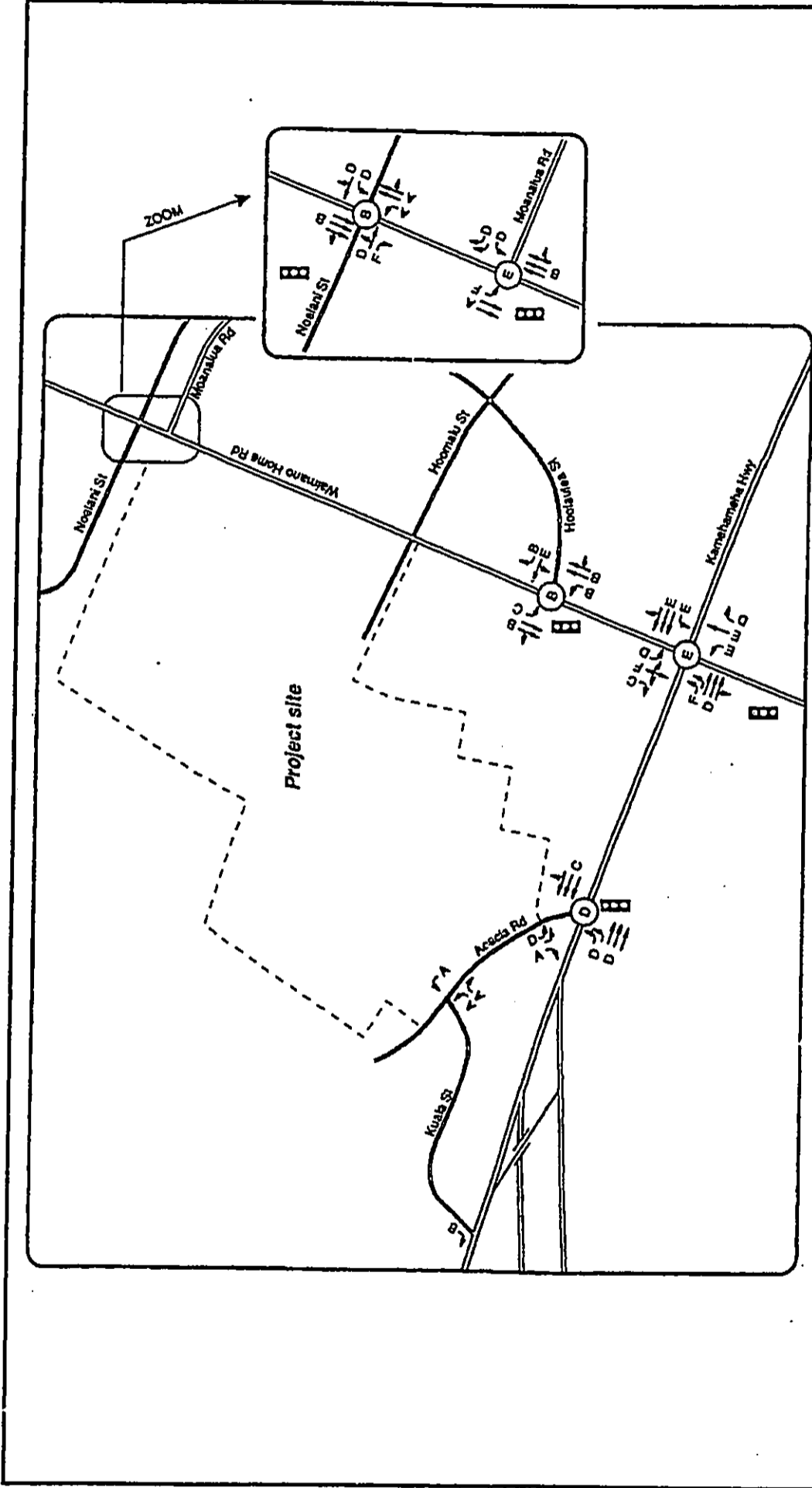
⁶ LOS is an indicator of how well an intersection is able to accommodate a particular number of vehicles. The rating system is on a scale of "A" to "F", with "A" being the best. LOS E is commonly considered acceptable, but not desirable, during the peak hours of traffic flow in urban areas.

Table 3 - 7. Definitions of Level-of-Service (LOS) for Traffic Analyses

UN SIGNALIZED INTERSECTIONS	
LOS A	Little or no delay: less than 5 seconds
LOS B	Short traffic delays: more than 5 seconds, less than 10 seconds
LOS C	Average traffic delays: between 10 and 20 seconds
LOS D	Long traffic delays: more than 20 seconds, less than 30 seconds
LOS E	Very long traffic delays: between 30 and 45 seconds
LOS F	Demand volume exceeds capacity, delays longer than 45 seconds
SIGNALIZED INTERSECTIONS	
LOS A	Delay of less than 5 seconds per vehicle. This occurs when traffic progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all.
LOS B	Delays in the range of 5.1 to 15.0 seconds per vehicle. This generally occurs with good progression and/or short signal cycle lengths. More vehicles stop than in LOS A, causing higher delays.
LOS C	Delays in the range of 15.1 to 25.0 seconds per vehicle. These higher delays may result from fair progression and/or cycle lengths. Individual "cycle failures" (i.e., green light cycles when not all the waiting cars are able to get through the intersection during a single cycle) begin to appear. Many vehicles still pass through the intersection without stopping.
LOS D	Delays in the range of 25.1 to 40.0 seconds per vehicle. Congestion becomes more noticeable at this level of service. Longer delays may result from a combination of unfavorable congestion, long cycle lengths, or high vehicle-to-capacity ratios. Many vehicles stop at the intersection before passing through. Individual cycle failures are noticeable.
LOS E	Delays in the range of 45.1 to 60.0 seconds per vehicle. This is considered the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high vehicle-to-capacity ratios.
LOS F	Average delay exceeds 60.0 seconds per vehicle. This is considered unacceptable to most drivers. This level of service typically occurs when the number of vehicles arriving at the intersection exceeds its capacity (i.e., when the vehicle-to-capacity ratio is greater than 1.0). Poor progression and long cycle length may also be major contributors.

Note: LOS for signalized versus unsignalized intersections are not directly comparable because they are based on different criteria.

Source: Pacific Planning and Engineering (September 16, 1998). *Traffic Impact Assessment Report for Manana Spine Road, Appendix B.*



LEGEND:

SOURCE:
Pacific Planning & Engineering, Inc.
July 13, 1998

NOT TO SCALE



FIGURE 3-12:

Existing Traffic LOS Morning Peak
Hour

Manana Development Spine Road
Environmental Assessment

Manana Development Spine Road Environmental Assessment

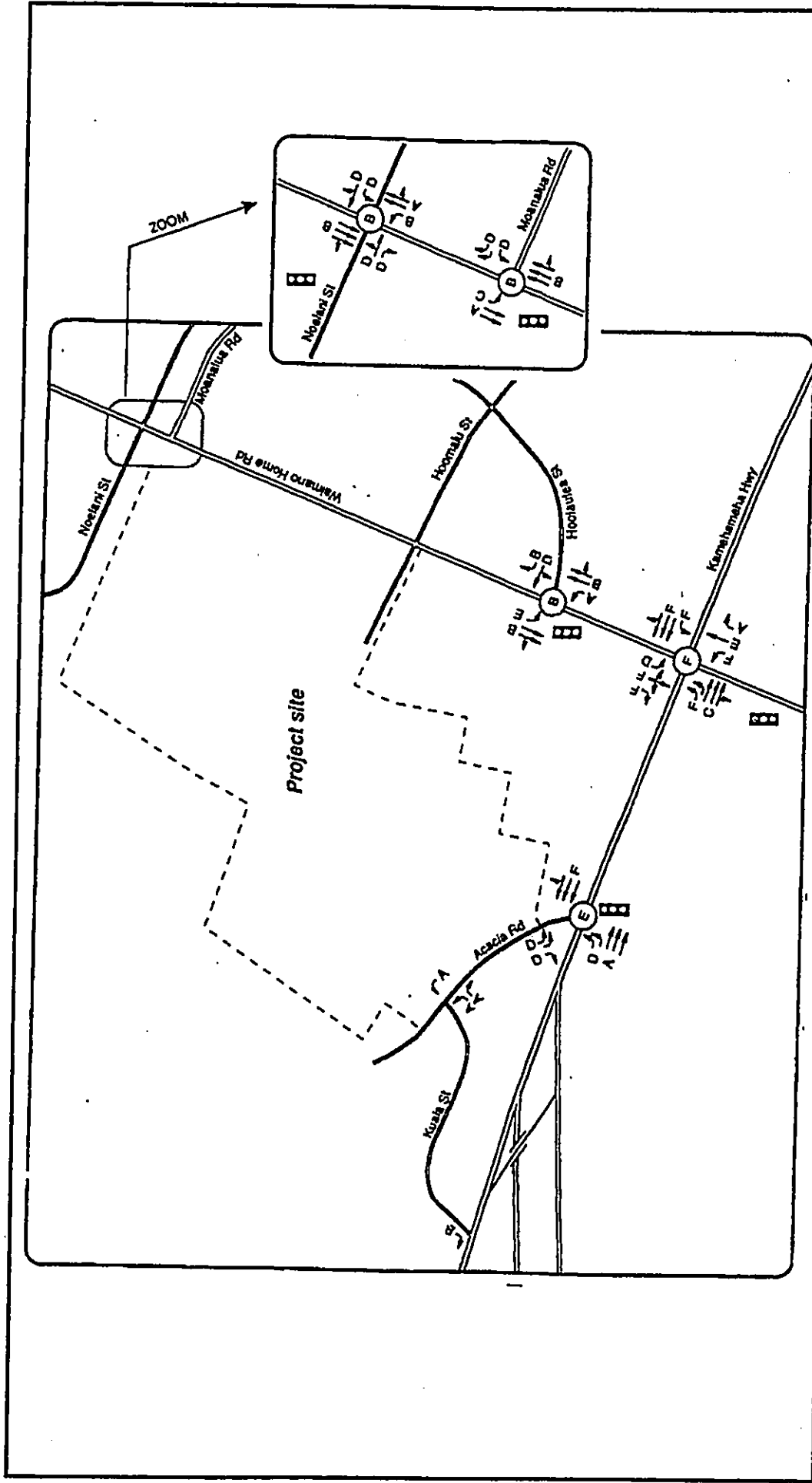


FIGURE 3-13:

Existing Traffic LOS Evening Peak Hour

Manana Development Spine Road Environmental Assessment

LEGEND:



NOT TO SCALE

SOURCE:
Pacific Planning & Engineering, Inc., July 13, 1998

Manana Spine Road Fig. 3-13 Existing Traffic LOS Peak Hour 10-12-98

- **Signalized Waimano Home Road and Kamehameha Highway Intersection:** This intersection is congested during both morning and afternoon peak hours. Long queues accumulate eastbound on Kamehameha Highway during the morning peak hour. The situation is worst in the eastbound left lane and motorists turning left onto Waimano Home Road experience long delays. During the afternoon peak hour, the overall LOS is even worse.
- **Signalized Acacia Road and Kamehameha Highway Intersection:** During the morning peak hour, congestion on Kamehameha Highway affects movements at the Acacia Road intersection, especially for east-bound motorists. During the afternoon peak hour, *Ewa*-bound Kamehameha Highway traffic is very congested for all traffic movements.
- **Signalized Waimano Home Road and Hoolaulea Street Intersection:** The most common through movements along Waimano Home Road flow smoothly during both the morning and afternoon peak periods. However, left-turn movements from Hoolaulea Street onto Waimano Home Road *makai*-bound experience long delays. Afternoon left turn movements from Waimano Home Road to Hoolaulea also rate a low LOS (E).
- **Signalized Waimano Home Road Intersections with Noelani Street and Moanalua Road:** Because of the close spacing of these two intersections (about 100 feet), the traffic signal timing and phasing are coordinated with each other. This frequently results in queuing problems at the Moanalua/Waimano Home Road intersection, however. During the morning peak period, *makai*-bound motorists turning left onto Moanalua Road experience long delays and a LOS of "F". East-bound movements from Noelani turning onto Waimano Home Road also experience long delays. Traffic is heavy during the afternoon peak hour, but the intersection operates at an overall acceptable level of service.
- **Unsignalized Kuala Street and Acacia Road Intersection:** This intersection operates well during both the morning and afternoon peak hours.
- **Unsignalized Kuala Street and Kamehameha Highway Intersection:** This intersection currently operates very well. Movements are restricted to right-in and right-out, and delays are minimal.

In summary, the traffic impact analysis indicates that roads and intersections in the vicinity of the proposed Spine Road are currently congested during both morning and afternoon peak traffic hours. Many intersections operate at overall undesirable LOSs and a number of individual traffic movements exhibit unacceptable LOSs.

3.8 PUBLIC SERVICES AND FACILITIES

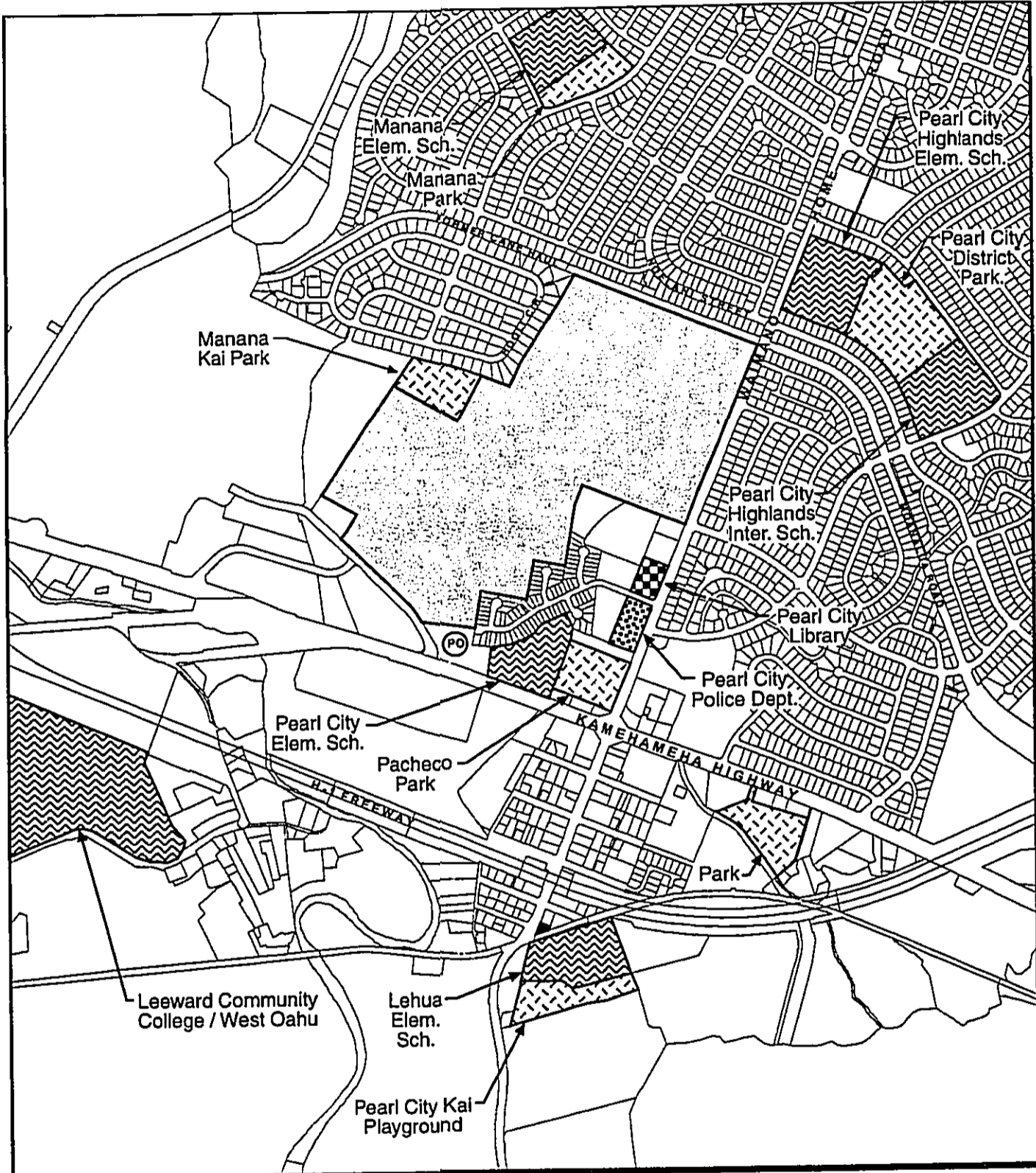
A number of public services are provided by facilities near the former Manana Storage Area (Figure 3-14). These include the following:

Recreational Facilities Manana Kai Park is located just *makai* of the Holiday City subdivision. The minimum separation between Manana Kai Park and the preferred alignment is approximately 100 feet. The alternative alignment is located about 240 feet away. In both cases, the road would be separated from the park by proposed commercial development planned along the *Ewa* side of the proposed Spine Road. All other public parks and recreational facilities in the area are farther away, and approximately the same distance to either alignment. These include: (1) the Manana Neighborhood Park located about 1,500 feet from Spine road and *mauka* (north) of the Manana Kai Park; (2) the Pearl City District Park, located on Hoomaemae Street roughly 0.4 miles northeast of former Manana Storage Area; and (3) Pacheco Park, located on the northwest corner of Kamehameha Highway and Waimano Home Road. It is approximately 2,000 feet from the *makai* terminus of the preferred alignment and about 1,000 feet from that of the alternative alignment.

Libraries and Schools The Pearl City Regional Library is situated on Waimano Home Road a few hundred feet *makai* of the former Manana Storage Area boundary. Several public schools are located in the vicinity of the former Manana Storage Area. Pearl City Highlands Elementary School is on Waimano Home Road just *mauka* of its intersection with Moanalua Road. Pearl City Elementary School is located on Kamehameha Highway, about 500 feet from the *makai* terminus of the alternative alignment and 1,200 feet from the intersection of the preferred alignment and Acacia Road. Manana Elementary School is approximately one mile northwest of the site and Lehua Elementary is located on the *makai* side of H-1 Freeway a little less than a mile from the former Manana Storage Area. The nearest intermediate school, Pearl City Highlands Intermediate School, is *mauka* of Moanalua Road east of Pearl City Highlands Elementary School. Pearl City High School is located over 1.5 miles from the project site. Leeward Community college, part of the University of Hawaii system, is southwest of the former Manana Storage Area, just *makai* of the H-1 Freeway. West Oahu College is collocated with Leeward Community College.

Hospitals and Clinics Two acute-care hospitals serve the area. One is the Kapiolani Medical Center at Pali Momi, which is located along Moanalua Road in Aiea approximately three miles east of the former Manana Storage Area property. The other is the St. Francis-West. It is located at the intersection of Farrington Highway and Fort Weaver Road, about four miles southwest of the former Manana Storage Area property.

Police and Fire Stations The Pearl City Police Station is located along Waimano Home Road immediately *makai* of the Pearl City Library. Two fire stations are located near the former Manana Storage Area. The Pearl City Station is situated *makai*, off Lehua Avenue. The Waiiau Fire Station is located at the intersection of Kaahumanu Street and Komo Mai Drive east of Waimano Home Road. There is a Federal Fire station located on Acacia Road about 500 feet northwest of its intersection with the proposed Spine Road.



PREPARED FOR:
Engineering Concepts, Inc.

PREPARED BY:
Planning Solutions, Inc.
Pacific Data Digitizing

SOURCE:
C & C of Honolulu, DLU, June 5, 1998
Engineering Concepts, Inc.
July 10, 1998

LEGEND:

- Manana Storage Area
- Schools & Colleges
- C&C Fire Dept.
- Post Office
- Library
- Parks & Recreation Centers
- C&C Police Dept.

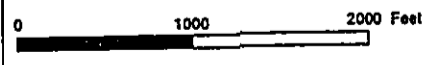


FIGURE 3-14:

Location of Nearby Public Facilities

**Manana Development Spine Road
Environmental Assessment**

Manana Spine Road; Fig. 3-14 Location of Nearby Public Facilities, P-27-98

3.9 INFRASTRUCTURE

3.9.1 STORM DRAINAGE SYSTEM

Stormwater from the former Manana Storage Area flows into the City storm drainage system which transports flow to the Waiiau and Waiawa Streams via lined open channels and underground conduits. This system is described in more detail in Section 3.2.3.1.

3.9.2 WATER SUPPLY

The former Manana Storage Area is located in the Board of Water (BWS) 285 service area. Up until July 1998, the Navy was providing water from its own private system for the users located in the overall Manana Storage Area. The BWS has installed a temporary FM master meter and is currently providing water to the area. The City expects to install a permanent water system as described in Chapter 4 as part of its infrastructure development effort of the overall Manana Storage Area.

The existing BWS system serving the surrounding area has a total storage capacity of 3.5 million gallons (mg). It is comprised of the Pearl City Reservoir (1.5 mg), the Waiiau Reservoir (1.0 mg), and the Newtown Reservoir (1.0 mg). Water sources include the Pearl City Shaft and a number of wells (See section 3.2.3.2 for related discussion). Water mains are currently located along Waimano Home Road, Moanalua Road, Kamehameha Highway, Acacia road, and the former cane haul road that bounds the mauka (north) side of the Manana parcel (Community Planning, Inc., December 1995; September 1997).

3.9.3 WASTEWATER

Currently, the former Manana Storage Area is serviced by a sewer main that the Navy recently turned over to the City which is now responsible for its operation and maintenance. This sewer main connects to the City's wastewater system *makai* of the Pearl City Junction parcel. The existing eight-inch sewer line passes through the Kauhale Manana Subdivision, crosses Kamehameha Highway where it increases in diameter to ten inches. This line eventually connects to the Pearl City Wastewater Pump Station. Wastewater is then conveyed to the Honouliuli Wastewater Treatment Plant.

3.9.4 ELECTRICAL AND TELECOMMUNICATION SYSTEMS

The project site is served by an existing Hawaiian Electric Company 11.5 kV (kilovolt) overhead line that runs along Waimano Home Road. The line enters the site near the intersection of Waimano Home Road and Hoomalu Street. Electrical usage is metered (measured) only at this location, not at the individual buildings (R. Ho & Associates, April 1998). In addition, there are both underground and overhead 46kV lines along Kamehameha Highway and an overhead line running through the Pearl Highlands Center.

GTE Hawaiian Telephone (HTCo) has existing underground telecommunication lines along both Kamehameha Highway and Waimano Home Road. Overhead and underground HTCo lines are also installed along the existing cane haul road *mauka* of the project site.

Oceanic Cable Company has existing overhead lines along Acacia Road, Waimano Home Road and Kamehameha Highway.

CHAPTER 4

POTENTIAL ENVIRONMENTAL CONSEQUENCES AND MITIGATION

Chapter 4 identifies the types of impacts, both positive and negative, expected to result from construction and use of a collector road through the former Manana Storage Area. Impacts anticipated from both the preferred alignment and alternative alignment are discussed. Proposed mitigation measures are included where appropriate. The potential effects associated with the "No Action" alternative are explored as well.

4.1 LAND USE AND DEVELOPMENT IMPACTS

The City and County of Honolulu (City) already owns the former Manana Storage Area. However, in order to permit a smooth transition from Moanalua Road to the proposed Spine Road as planned along the preferred or alternative alignment, it would need to acquire a portion of the former "cane haul road" parcel (TMK 9-7-24:26) that marks the *mauka* boundary of the property (see Figures 1-2 and 2-2). It is also possible that the City will need to acquire some additional land in order to construct the Connector Road as planned (see Section 4.6 for a discussion of the Connector Road). The City will also need to acquire a small amount of land from two parcels (TMK 9-7-36: 64 & 65) located along the *makai*-side of Moanalua Road in order to effect the transition between Spine Road's two east-bound through-lanes onto Moanalua Road. The parcels are those located closest to the intersection of Moanalua Road/Waimano Home Road and the proposed Spine Road.

4.1.1 PREFERRED ALIGNMENT

The City would demolish the existing structures along the road right-of-way as part of the proposed action. This would entail the removal of 11 warehouses, numbers 5 through 12, 21, 22 and 33.¹ Two non-profit organizations, the Hawaii Human Development Corporation, and American Box Car Racing International each using one warehouse, would be affected. Four City agencies, the Departments of Transportation Services, Emergency Services, Facility Maintenance, and Design and Construction, occupy space in six other warehouses along the preferred alignment right-of-way. The Department of Emergency Services uses the warehouse for the agency's ambulance service; the Department of Facility Maintenance uses one for vehicle body and fender work, and one for training.

The City's rental agreements with the non-City tenants are for a period of one or two years on a month-to-month basis (Charles Katsuyoshi, personal communication, June 1998). Occupancy after the rental agreement expires may continue on a month-to-month basis at the City's discretion for a period up to five years. Tenants are required to vacate the warehouses within one month after receiving written notification from the City. The non-profit tenants understand the temporary nature of their use of the property. While none have definite

¹ None of the existing warehouses lie entirely within the road right-of-way. The Department of Design and Construction may opt to demolish only portions of some warehouses.

ENVIRONMENTAL CONSEQUENCES

relocation plans, some have initiated discussions with the City concerning the alternatives that may be available to them. The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 does not require the City to offer relocation assistance since the obligation is removed when occupancy is on a rental basis subject to termination when the property is needed for a program or project, as is the case here.

Some of the agencies that would be displaced by the redevelopment may eventually find space at the City's existing Halawa bus facility. However, this would not occur until after the Pearl City Bus Facility is completed and buses are relocated from Halawa to it. Furthermore, it is likely that an interim period would exist when neither the former Manana Storage Area nor Halawa would be available to those who are displaced.

4.1.2 ALTERNATIVE ALIGNMENT

Two of the nine warehouses along the alternative alignment are currently being used by non-profit organizations, American Box Car Racing International and Hawaii's Homeless Women and Children. A for-profit company, Shredded Foam of Hawaii, Inc. occupies one warehouse and three City agencies use four others (Departments of Facility Maintenance, Design and Construction, and Transportation Services). One of the two warehouses used by the Department of Transportation Services houses part of the City's TheHandi-Van fleet. TheHandi-Van is the only tenant with a currently identified permanent relocation site. The City plans to relocate the TheHandi-Van operations to the Halawa bus facility after completion of the Pearl City Bus Facility. The City has not yet confirmed an interim location for the TheHandi-Van facilities.

This alignment would also necessitate acquisition of portions of the Post Office property on Kamehameha Highway.

4.1.3 NO ACTION ALTERNATIVE

The No Action alternative would result in no immediate changes in land use. The property and existing warehouses would remain underutilized. Furthermore, the City would be unable to recoup its investment in the property and loan interest, and the total debt would continue to increase.

4.2 TOPOGRAPHY, GEOLOGY AND SOILS IMPACTS

4.2.1 TOPOGRAPHIC CHANGES

4.2.1.1 Preferred Alignment

The proposed roadway would require cut and fill along its length. The total volume to be excavated for the preferred alignment is 57,000 cubic yards. Excavation is expected to exceed the volume of fill, leaving about 25,000 cubic yards of material to be disposed of outside the road right-of-way. The greatest quantities of material would be excavated from the *makai* half of the road. The maximum difference between the existing and finished grade is approximately 12 feet. This occurs in a cut that would be needed on the proposed Spine Road approach to Acacia Road (see Figure 2-5). The roadway segment requiring the most fill is

located near the mid-point of the alignment. The finished grade in this area would be approximately 2 feet above the existing ground level. Most of the roadway would have a slope of 1 to 2 percent, but a 400-foot-long segment at its *makai* end would have a slope of 5 percent.

4.2.1.2 Alternative Alignment

The alternative Spine Road alignment would also result in an excess of excavation over fill. The deepest cut would occur 700 to 800 feet *mauka* of Kamehameha Highway. The finished roadway grade in that area would be approximately 20 feet below the existing grade. The volume of excavated material is expected to exceed the volume of fill by approximately 55,000 cubic yards. Overall, the slope of this alignment is similar to that of the preferred alignment (1 to 2 percent). However, the *makai* end requires a longer segment (1,000 feet) of steeper (6 percent) slopes than does the preferred alignment (see Figure 2-10).

4.2.2 SOIL-RELATED IMPACTS

Existing soils beneath the roadway and sidewalks would be partially replaced with coarse-grained sub-base and base material, geo-textile fabric, and asphaltic or Portland cement concrete. The soils on the project site are already highly disturbed and have no known agricultural potential. Portions of the ground beneath both alignments are covered with asphaltic concrete paving or concrete building foundations that would be removed during the initial phase of construction. The only potential soil-related effect of the proposed action, a temporary increase in erosion potential during the construction period, is discussed in the "construction impacts" section of this chapter (Section 4.12).

4.2.3 NO ACTION ALTERNATIVE

The No Action Alternative would leave the topography of the roadway corridor unchanged.

4.3 HYDROLOGIC IMPACTS

4.3.1 IMPACTS ON SURFACE WATER

4.3.1.1 Preferred and Alternative Alignments

As noted in Chapter 3, there are no surface water bodies or wetlands on the former Manana Storage Area. Consequently, construction and use of the proposed road would not directly affect these resources. The area is outside of identified flood hazard areas.

The road right-of-way for either the preferred and alternative alignment would be graded so that surface runoff flows away from the center of the road and toward concrete gutters adjacent to the curbs. Appropriately spaced storm drains would collect the runoff and channel the stormwater into the City's storm drainage system. That system would convey runoff from the Spine Road to the 12-foot x 9-foot Kuala Street Box Drain that discharges into the Waiawa Stream Drainage Basin (see Table 4-1).

Table 4- 1. Change in Stormwater Discharge at Selected Points.

Drainage Basin	Drainage Feature	Tributary Area (in acres)		Forecast Runoff (in cfs)	
		Existing	Proposed	Existing	Proposed
Waiawa Stream Drainage Basin	12'x 9' Kuala St. Box Culvert	305	345	1,762	1,905
	12'x9' Kuala St. Box Drain	314	345	1,810	1,905
	Double 30" Kamehameha Hwy. Culverts	15.9	0.92	50.1	3.1
	36" Culvert Across Kamehameha Hwy.	10.71	5.1	33.7	19.7
	48" Kamehameha Hwy. Culvert	12.18	7.5	38.4	31.7
Waiawa Stream Drainage Basin	42" Pearl City Shopping Center Drain line	14.01	16.44	44.2	47.8
	48" Pearl Harbor View Lots Drain line	14.89	6.40	46.9	21.2

Source: Community Planning, Inc. (December 1997)

The paving (roadway and sidewalk) for the preferred alignment would cover approximately 6.5 acres (about 6 percent of the total former Manana Storage Area). Because of its slightly longer length, the alternative alignment requires pavement over approximately 7.3 acres, or about 7 percent of the parcel area. Both these percentages represent relatively small proportions of the total parcel area, and the storm drainage facilities planned within the road right-of-way are designed to accommodate them. Community Planning, Inc. (December 1997a) concluded that the small change in runoff would not have a substantial effect on the size of the down-stream areas subject to flooding. In addition, Community Planning, Inc. used estimates of future flows to conclude that the storm drainage system would be adequate.

4.3.1.2 Impacts on Surface Water: No Action Alternative

The No Action alternative would have no measurable impact on surface water drainage patterns, runoff volumes, or surface water quality.

4.3.2 IMPACTS ON GROUNDWATER

4.3.2.1 Preferred and Alternative Alignments

Construction and use of the proposed Spine Road along either the preferred or the alternative alignment would not have a substantial effect on the rate of groundwater recharge. There are several reasons for this.

- First, the impermeable surface within the roadway rights-of-way would amount to approximately 6 to 7 percent of the entire site area.
- Second, much of the area over which the proposed Spine Road would pass regardless of whether it followed the preferred or alternative alignments is already covered by impermeable surfaces (warehouses, paved roads, etc.).
- Because the former Manana Storage Area experiences only moderate rainfall and relatively high insolation (Blumenstock and Price, 1967), most of the rain that does fall and infiltrate into the ground is lost to evaporation before it can recharge the aquifer.

There is no mechanism through which the proposed roadway could affect groundwater quality. The surface of the travelway will be impermeable. Runoff will be collected in the curb and gutter system and conveyed to the existing storm drainage system, which would convey the runoff to Pearl Harbor.

4.3.2.2 No Action

The No Action alternative is not expected to affect groundwater quality or recharge rates relative to the current situation.

4.4 NOISE IMPACTS

4.4.1 FORECAST TRAFFIC NOISE IMPACTS NEAR EXISTING ROADWAYS

The FHWA Traffic Noise Prediction Model (FHWA, 1978) and forecast traffic volumes (Pacific Planning & Engineering, Inc, July 13, 1998) were used to predict project-related changes in traffic noise levels along Moanalua Road, Waimano Home Road, and Kamehameha Highway. These changes, which are the same for both the preferred and alternative alignments, are shown in Table 4-2.

The proposed Spine Road would decrease traffic noise along segments of Waimano Home Road and Kamehameha Highway, but would increase traffic noise immediately adjacent to Moanalua Road. The project-related effect on noise levels adjacent to existing roadways is small. In no instance does the forecast change in traffic noise level (increases or decreases) along existing roadways reach the 3-dB level that is the threshold of detection for most people.

The predicted noise increases along Moanalua Road do not "substantially exceed the existing noise levels," a Hawaii State Department of Transportation (SDOT) criteria for assessing the existence of a "traffic noise impact" (see Section 3.2.4). However, existing noise levels measured near the intersection of Waimano Home Road and Hoomalu Street (71 dBA) already exceed the FHWA/Hawaii SDOT's 67 dBA design criteria for residential areas.

Table 4-2. Predicted Changes in Peak Hour Traffic Noise Levels Adjacent to Existing Roadways: Preferred and Alternative Alignments

Source & Time	Changes in Traffic Noise Levels (Year 2020 L_{eq} in dBA)		
	Waimano Home Rd. (Hoomalu St. to Moanalua Rd.)	Kamehameha Hwy. (Acacia Rd. to Waimano Home Rd.)	Moanalua Road (Hoolaulea St. to Waimano Home Rd.)
Morning Peak-Hour:			
Ambient Growth	+0.7	+0.7	+0.7
Spine Road Effect	-1.0	-0.4	+0.5
Net Change	-0.3	+0.3	+1.2
Evening Peak Hour:			
Ambient Growth	+0.7	+0.7	+0.7
Spine Road Effect	-1.3	-0.6	+1.5
Net Change	-0.6	+0.1	+2.2

Notes:

- (1) Traffic noise level changes are calculated for 50 feet from the edge of the nearest traffic through-lane. They assume vehicle speeds of 25 to 35 miles per hour.
- (2) A negative value indicates a decrease in traffic noise levels.

Source: D. L. Adams Associates, Ltd., July 1998: Table 2.

4.4.2 FORECAST TRAFFIC NOISE IMPACTS ADJACENT TO THE PROPOSED ROADWAY: PREFERRED AND ALTERNATIVE ALIGNMENTS

The new development that is planned within the former Manana Storage Area consists of public and commercial uses and facilities that are not considered noise-sensitive. The majority of both the preferred and alternative Spine Road alignment rights-of-way are removed from existing residences and other noise-sensitive uses. However, three areas have the potential for adverse effect from Spine Road-related traffic noise:

- The first area is the *mauka* segment of the proposed road as it approaches Moanalua Road, passing just *makai* of backyards of existing residences on Noelani Street.
- The second area consists of the existing residences in the Holiday City subdivision that are closest to the proposed road.
- The third consists of homes that are adjacent to the right-of-way of the proposed new Connector Road.

There is no difference between the two alignment alternatives in noise generation in these areas. Consequently, the following discussion applies to both alignments.

4.4.2.1 Mauka Segment of Spine Road

The noise consultant developed noise estimates for the noise-sensitive areas adjacent to the proposed Spine Road. It estimated that the hourly L_{eq} 67-dBA noise contour would extend approximately 30 feet from the edge of the proposed Spine Road travelway on the road segment between the Connector Road and Moanalua Road. Thus, traffic noise is predicted to be heard at a level of 67 dBA approximately 14 feet from the edge of the road right-of-way, extending into adjacent existing residential parcels². Thus, without mitigation, some homes in this area would be exposed to noise levels above the FHWA's hourly L_{eq} criteria of 67 dBA for residences.

Some homes near the *mauka* end of the proposed Spine Road would also experience a traffic noise increase greater than the 15 dB threshold specified in the Hawaii SDOT Noise Analysis and Abatement Policy (see Section 3.2.4). Mitigating this increase would require the installation of noise barriers or sound attenuation treatment of the affected dwellings. The same type of acoustical barrier that would attenuate traffic noise to meet the 67-dBA design goal discussed in the preceding paragraph would also provide the sound attenuation needed to be consistent with this policy.

Preliminary analyses indicate that a concrete block wall or other noise attenuation barrier sufficiently high to block the line-of-sight between vehicles using the roadway and the tops of the windows of adjacent residences would reduce traffic noise to below 67 dBA and provide the 5+ dB noise reduction specified in the Hawaii SDOT Noise Analysis and Abatement Policy. Based on its preliminary analysis, the City proposes to construct a 6-foot high concrete block wall along the *mauka* side of the Manana Storage Area property where it abuts parcels 9-7-35:1 through 14.

4.4.2.2 Middle Segment of Spine Road and the Connector Road

At its closest, the right-of-way of the proposed Spine Road approaches within approximately 100 feet of the nearest residence in the Holiday City Subdivision. The proposed Connector Road passes immediately adjacent to other residences in the Holiday City and Manana subdivisions. Noise analyses conducted in conjunction with the proposed project indicate that vehicular traffic on both roads would increase noise levels in many of the adjacent homes by more than the 15 dB threshold specified in the Hawaii SDOT's Noise Analysis and Abatement Policy.

4.4.2.3 Makai-Side of Moanalua Road at its Intersection with Waimano Home Road.

The intersection of the proposed Spine Road and Moanalua Road/Waimano Home Road is very close to the intersection of Noelani Street and Waimano Home Road. As a result, the addition of the proposed Spine Road is expected to impact traffic accessing the Manana Community via Noelani Street. The City examined six possible intersection configurations and signal timing alternatives in order to mitigate these expected traffic impacts (See Section 4.6.3.4). As described in the EA, the City identified what it believed to be the best alternative from a traffic engineering standpoint. This alternative involves restricting the

² This distance is based on an assumed bicycle lane plus gutter width of 8 feet and a sidewalk width of 8 feet.

Noelani Street intersection with Waimano Home Road to a right-turn in and a right-turn out operation and diverting existing Noelani Street motorists to the proposed Connector Road. Based on opposition from the Manana Community to the imposition of any restrictions on movements into and out of Noelani Street, the City subsequently adopted Alternative 6 (see Appendix A - Alternative 6) as the preferred mitigative alternative. This measure involves construction of a Connector Road from the Spine Road to the existing cane haul road between the Manana and Holiday City Subdivisions. It also provides an exclusive left-turn lane on the Spine Road for east-bound traffic and leaves access to Noelani Street unchanged.

In order to implement this alternative configuration, the City will need to acquire a sliver of property from two parcels on the *makai*-side of Moanalua Road closest to its intersection with Waimano Home Road.³ This additional land will permit a smooth transition from the proposed Spine Road's two east-bound through-lanes onto Moanalua Road. Although the nearest traffic through-lane will move slightly closer to the two residences on these parcels, the concrete block wall that the City will erect along the realigned property boundary will prevent traffic noise from "substantially exceeding the existing noise levels," a SDOT criteria for assessing the existence of a "traffic noise impact" (see Section 3.2.4).⁴ The slight realignment of the roadway is also not expected to change traffic noise by 3-dB, which is the threshold of detection for most people.

Spine Road Mitigation. The City proposes a two-step effort to mitigate adverse noise impacts from vehicles using the Spine Road. Initially, it would install a noise barrier consisting of a continuous earthen berm along the western side of the Spine Road right-of-way. The temporary barrier would extend from the intersection of the proposed internal road serving the industrial and commercial areas *makai* of Manana Kai Park (Sta. 12+50±) to about the mauka driveway for the proposed Pearl City Bus Facility (Sta. 19+00±). The noise barrier would extend from the western end of the noise barrier described in Section 4.2.2.1 to a point south of the existing Manana Kai Neighborhood Park. The noise barrier would be designed to provide a minimum 5-dB reduction in traffic noise (See Figure 4-1).

The temporary noise barrier would be replaced with a permanent barrier as the parcels on the northwestern side of the Spine Road are developed (See Figure 4-2). The nature of the barrier would depend upon the specific design of the structures that are developed on these parcels. It is anticipated that in some cases the structures themselves will provide noise reduction equal or superior to the amount that could be obtained using traditional noise barriers. When they do not, the City will require the developer of these lots to install a replacement noise barrier that provides sound attenuation for ground floor spaces that is consistent with the 5 dB minimum reduction specified in the Hawaii SDOT Noise Analysis and Abatement Policy.

³ The sliver of land needed from the parcel closest to Waimano Home Road is about 6-feet deep on the western side (i.e. closest to the intersection) and tapers to approximately 3-feet deep on the eastern side of the property. The sliver of land along Moanalua Road needed from the adjacent parcel is approximately 3-feet wide on the western side of the parcel and tapers off completely by the time it reaches the eastern side of the parcel.

⁴ Personal communication between Perry White of Planning Solutions, Inc. and Thao Nguyen of D.L. Adams & Associates, Ltd.

Connector Road Mitigation. The proposed Connector Road (which is not needed when the Spine Road is first constructed) constitutes a special situation with respect to noise abatement requirements. Some homes adjacent to this road are likely to experience a change in hourly L_{eq} greater than the 15-dB threshold specified in the Hawaii SDOT Noise Analysis and Abatement Policy. Before it is constructed, the City would install 6-foot-high noise barriers on land adjacent to the parcels along both the *mauka* and *makai* sides of the Connector Road. The barriers would provide at least 5-dB noise reduction. On the *mauka* side the barrier would begin with parcel 9-7-35:23 and extend westward to Kuahaka Street. A 6-foot-high noise barrier would be provided for all of the existing residential parcels on the *makai* side of the proposed Connector Road (See Figure 4-2).

Information on the cost of the barriers and the number of benefited residences are shown in Figures 4-1 and 4-2.

4.4.3 NO ACTION ALTERNATIVE

As indicated in Table 4-2, the forecast growth in ambient traffic will slightly increase traffic noise adjacent to existing roadways if the proposed Spine Road is not constructed. The proposed road is expected to divert vehicles that would otherwise use Waimano Home Road and Kamehameha Highway. Thus, traffic noise adjacent to those two roadways would be higher without the proposed project than they would be with it.

Conversely, the proposed Spine Road would attract more vehicles to Moanalua Road than would otherwise be the case. Consequently, traffic noise adjacent to Moanalua Road without the proposed road would be 0.5 to 1.5 dB lower than it would be if the road were constructed.

4.5 AIR QUALITY IMPACTS

4.5.1 INTRODUCTION

Since the proposed Spine Road's primary association with air quality is its inherent attraction for mobile sources, *i.e.* vehicles, it is considered an "indirect source" of air pollution as defined in the federal Clean Air Act. The temporary air quality impacts associated with fugitive dust and the operation of batching plants during construction of the road are discussed in Section 4.12.

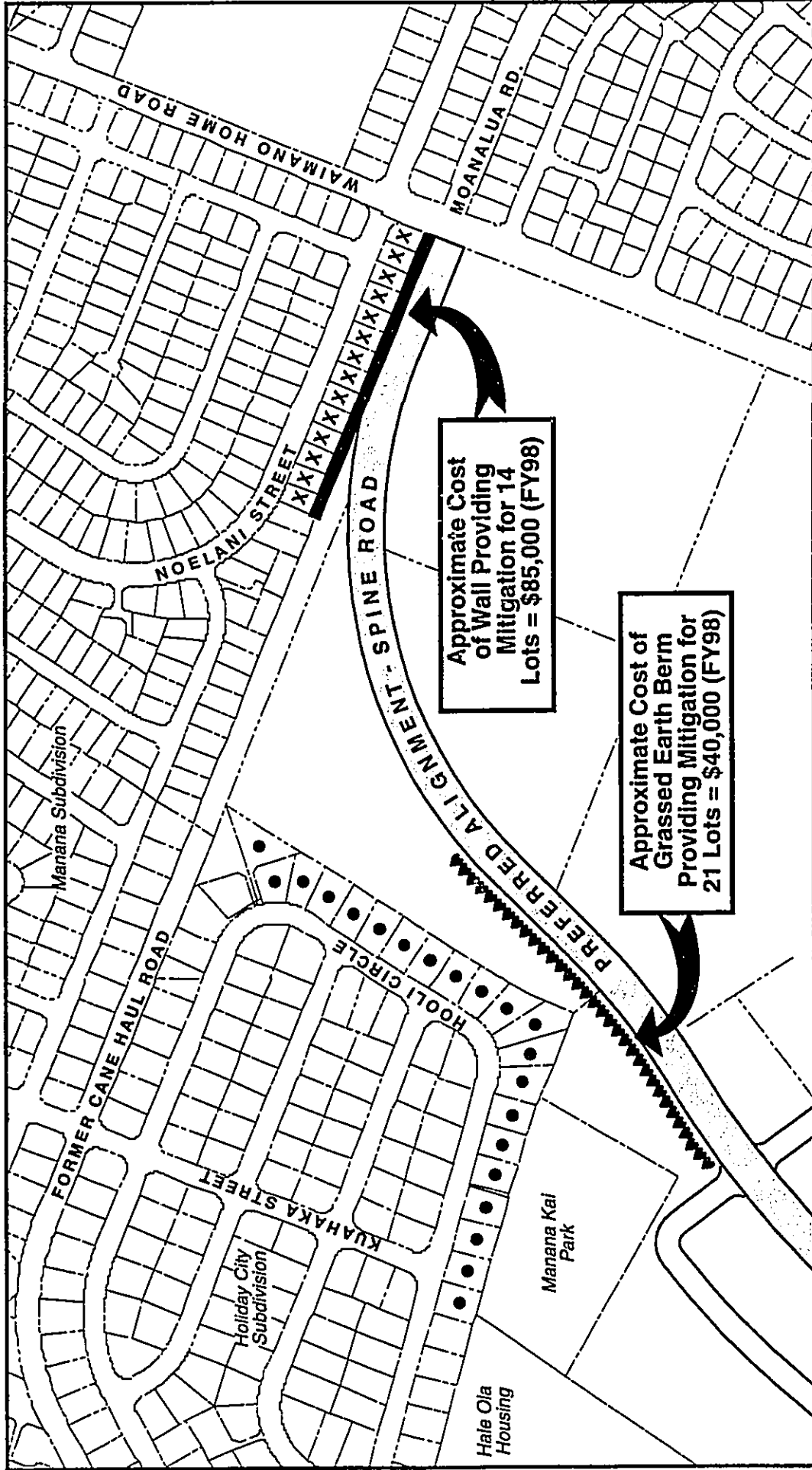


FIGURE 4-1:

**Noise Mitigation Measures:
Interim Phase**

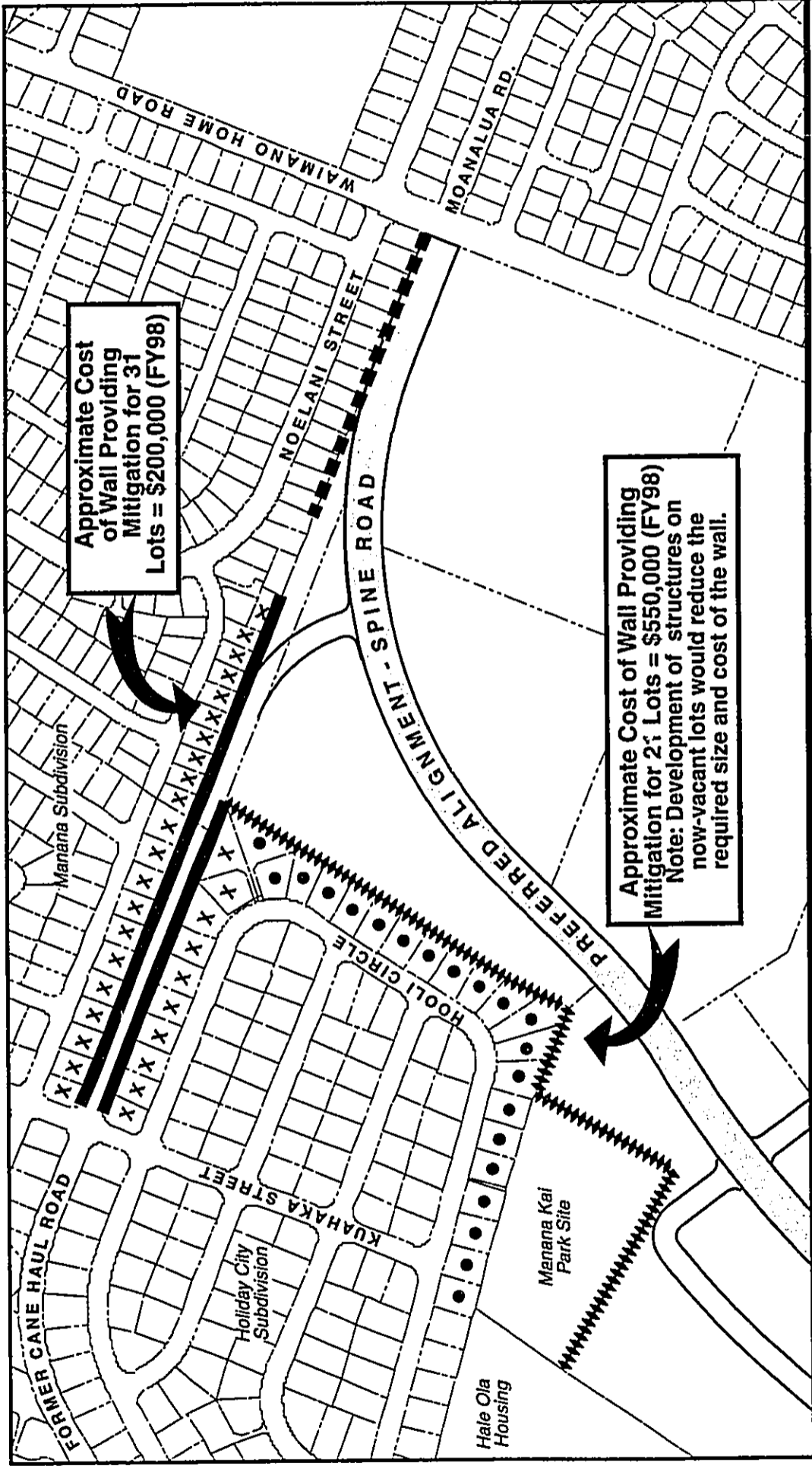
Manana Development Spine Road
Environmental Assessment

LEGEND:

- 6-Foot High CMU Wall
- Temporary Earth Berm
- Lot Benefitting from Wall
- Lot Benefitting from Berm



SOURCE:
C & C of Honolulu, DPW, April 1998
C & C of Honolulu, DLU, June 5, 1998
Engineering Concepts, Inc., July 10, 1998
Y. Ebisu & Associates, Sept. 21, 1998



Approximate Cost of Wall Providing Mitigation for 31 Lots = \$200,000 (FY98)

Approximate Cost of Wall Providing Mitigation for 21 Lots = \$550,000 (FY98)
 Note: Development of structures on now-vacant lots would reduce the required size and cost of the wall.

FIGURE 4-2:

Permanent Noise Mitigation Measures

Manana Development Spine Road Environmental Assessment

LEGEND:

- █ 6-Foot High CMU Wall
- █ 6-Foot High CMU Wall From Interim Phase
- ⚡ 6- to 15-Foot High CMU Wall
- ⊠ Lot Benefitting from Wall
- Lot Benefitting from Wall or Future Structure Within Manana Development



SOURCE:
 C & C of Honolulu, DPW, April 1998
 C & C of Honolulu, DLU, June 5, 1998
 Engineering Concepts, Inc., July 10, 1998
 Y. Ebisu & Associates, Sept. 21, 1998

4.5.1.1 Locations Selected For Analysis

The air quality analysis focuses on the intersections with the greatest potential for adverse air quality impacts based on their predicted intersection traffic volumes, levels of service and other factors (Morrow, July 1998). Four of the intersections are existing ones:

- Moanalua Road at Waimano Home Road (both alignments);
- Kamehameha Highway at Waimano Home Road (both alignments);
- Kamehameha Highway at Acacia Road (both alignments); and
- Acacia Road at Kuala Street (both alignments).

In addition to these existing intersections, the analysis also addresses air quality at the intersection of the realigned Acacia Road and the proposed Spine Road alternative alignment.

4.5.1.2 Emission Factors

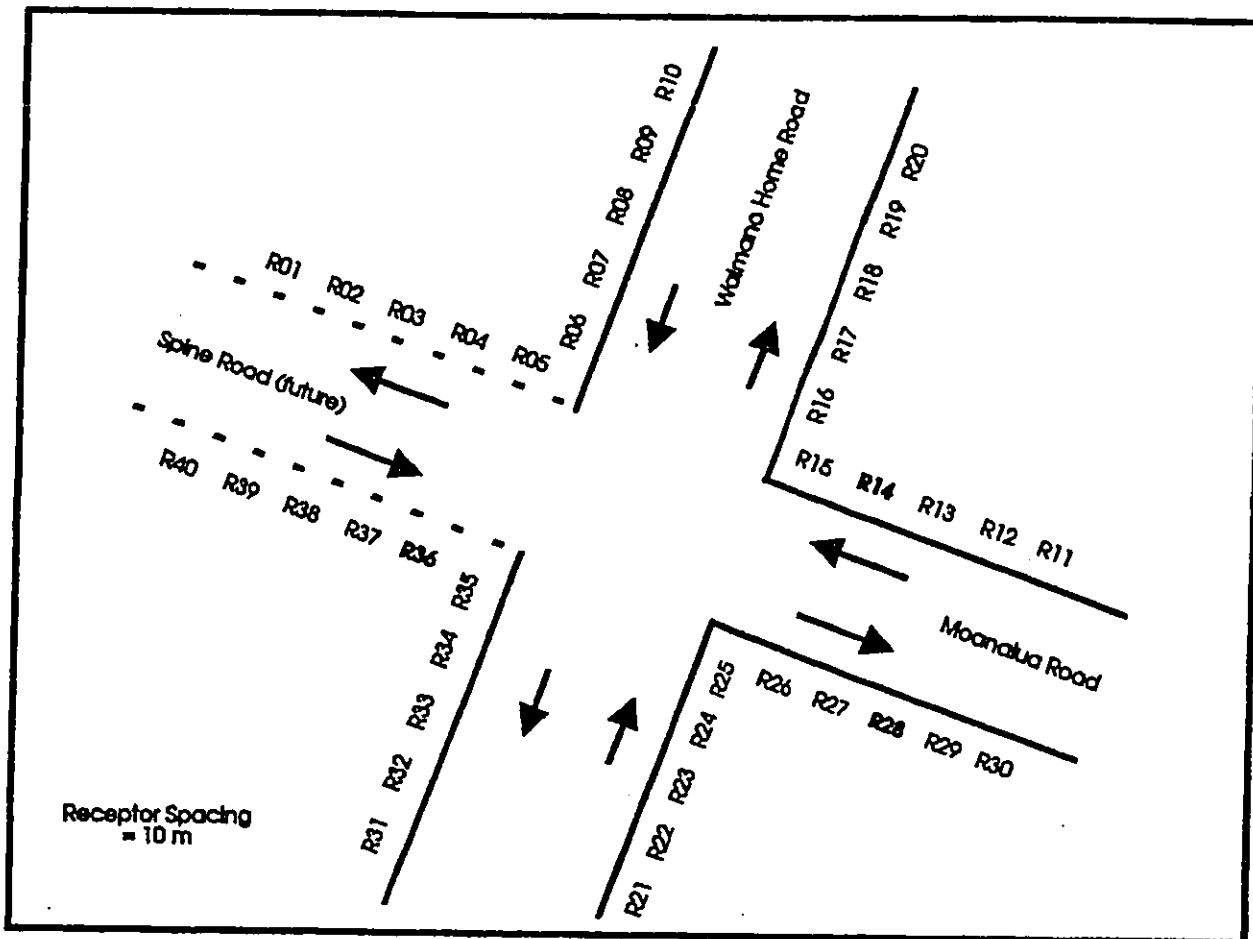
Automotive emission factors for CO⁵ were generated for calendar years 1998 and 2020 using the Mobile Source Emissions Model (MOBILE-5B) (U.S. Environmental Protection Agency, September 14, 1996). To localize the emission factors as much as possible, the analysis used the March 1992 age distribution for registered vehicles in the City and County of Honolulu and for the distribution of vehicle miles traveled.

The techniques used to estimate future carbon monoxide concentrations are the same as those used to model existing CO concentrations (see Section 3.2.2.5). These were used in conjunction with the traffic volume and intersection design information contained in Section 4.6, Pacific Planning and Engineering's July 13, 1998 report, and subsequent information provided describing the mitigative alternative intersection configuration (See Appendix A - Alternative 6) for Noelani Street/Waimano Home Road and the proposed Spine Road/Moanalua Road/Waimano Home Road.

4.5.2 MODELED 1-HOUR CO CONCENTRATIONS

Figures 4-3 through 4-7 show the results of the CO modeling. Each figure shows the locations of modeled "receptor sites" along with the estimated CO concentrations in milligrams per cubic meter (mg/m³). The four figures depicting existing intersections show estimated CO concentrations during morning and afternoon peak traffic hours for four scenarios: (1) Existing (1998) (2) No Action alternative (2020); (3) preferred alignment (2020); and (4) alternative alignment (2020). Figure 4-7 portrays an intersection that would exist only if the alternative alignment were implemented. Consequently, it shows estimated CO concentrations only for that alternative.

⁵ The impact analysis focused on concentrations of CO, a non-reactive pollutant. Carbon monoxide is normally selected for modeling because it has a relatively long half-life (about one month) in the atmosphere (Seinfeld, 1975) and it comprises the largest fraction of automotive emissions.



Estimated Maximum Concentration (mg/m³)

	Existing Conditions	2020 No Action	2020 Preferred Alignment	2020 Alternate Alignment	Critical Receptors
Morning Peak Hour	9.0	8.7	9.6	9.6	R26, R28, R36
Afternoon Peak Hour	6.0	5.1	5.0	5.0	R14
8-hour Concentration	4.2	4.1	4.5	4.5	R26, R28, R36

LEGEND:

NOT TO SCALE



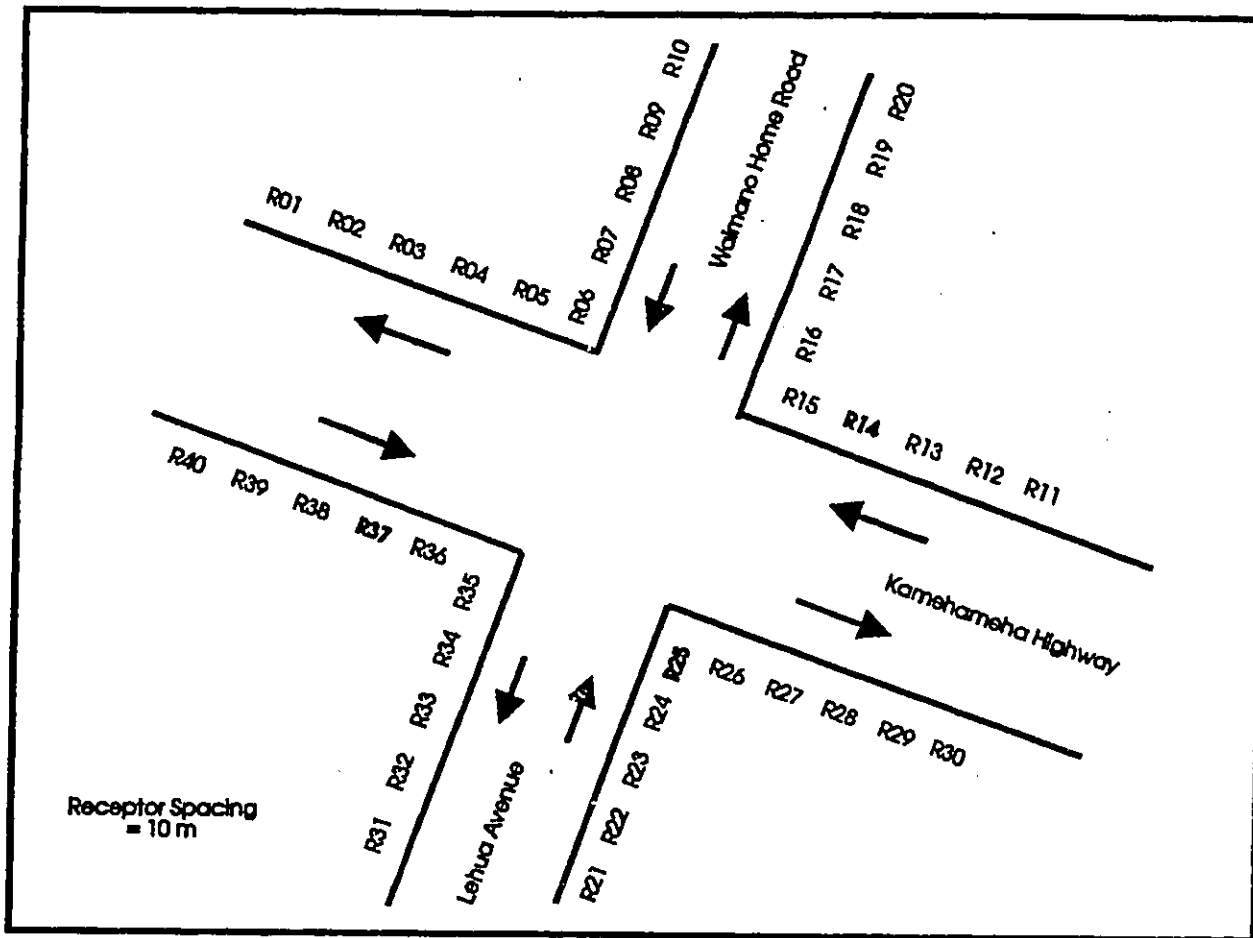
FIGURE 4-3:

Modeled Carbon Monoxide at Moanalua Road - Waimano Home Road Intersection

Manana Development Spine Road Environmental Assessment

SOURCE:
J. W. Morrow, July 1998

Manana Spine Road, Fig. 4-3 CO Moanalua Road, 7/9/98



Estimated Maximum Concentration (mg/m³)

	Existing Conditions	2020 No Action	2020 Preferred Alignment	2020 Alternate Alignment	Critical Receptors
Morning Peak Hour	15.2	11.2	10.4	10.4	R25
Afternoon Peak Hour	6.5	5.1	5.0	5.0	R14, R37
8-hour Concentration	7.1	5.3	4.9	4.9	R25

LEGEND:

NOT TO SCALE



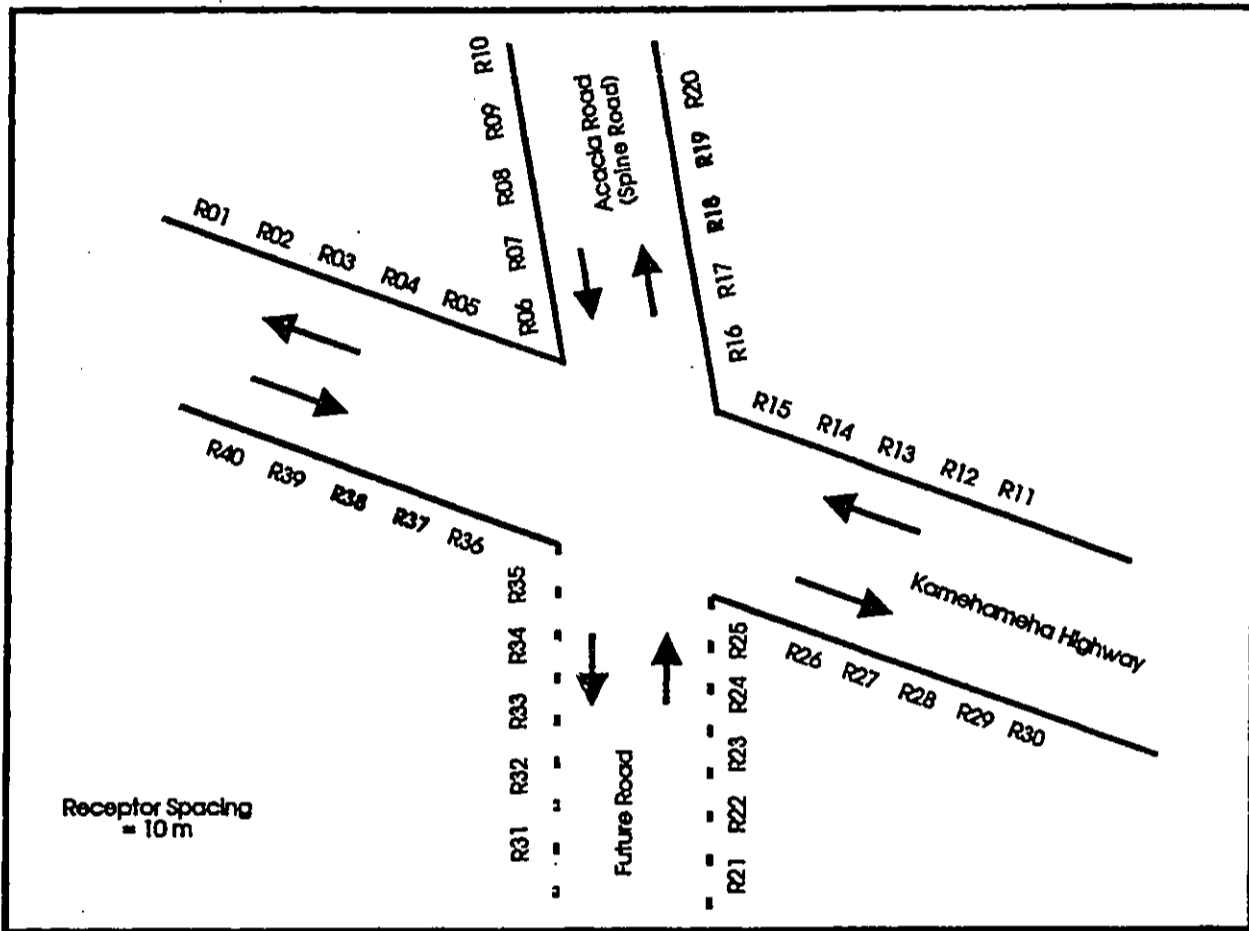
FIGURE 4-4:

Modeled Carbon Monoxide at Kamehameha Highway - Waimano Home Road Intersection

Manana Development Spine Road Environmental Assessment

SOURCE:
J. W. Morrow, July 1998

Manana Spine Road, Fig 4-4 CO Concentrations (mg/m³), 10-12-98



Estimated Maximum Concentration (mg/m³)

	Existing Conditions	2020 No Action	2020 Preferred Alignment	2020 Alternate Alignment	Critical Receptors
Morning Peak Hour	9.0	9.6	10.0	10.0	R25, R37, R38
Afternoon Peak Hour	11.7	8.2	10.0	10.0	R1, R19
8-hour Concentration	5.5	4.5	4.7	4.7	R37, R38

LEGEND:

NOT TO SCALE



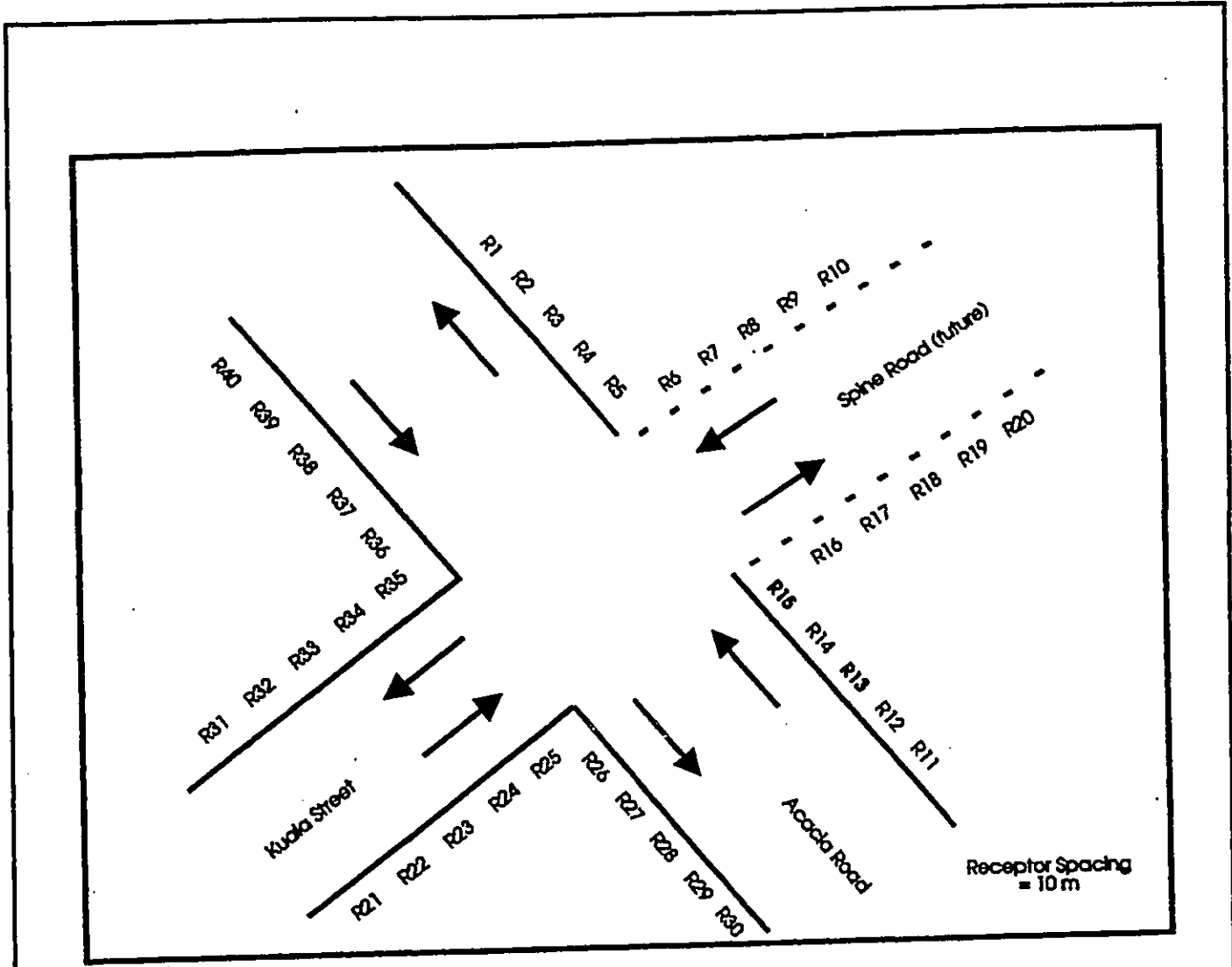
FIGURE 4-5:

Modeled Carbon Monoxide at Kamehameha Highway - Acacia Road Spine Road Intersection

Manana Development Spine Road Environmental Assessment

SOURCE:
J. W. Morrow, July 1998

Manana Spine Road, Fig 4-5 CO Acacia Street, 10-12-98



Estimated Maximum Concentration (mg/m³)

	Existing Conditions	2020 No Action	2020 Preferred Alignment	2020 Alternate Alignment	Critical Receptors
Morning Peak Hour	2.2	2.7	9.5	3.4	R13, R15
Afternoon Peak Hour	1.3	2.6	6.8	3.2	R13, R14, R15
8-hour Concentration	1.0	1.3	4.4	1.6	R13

LEGEND:

NOT TO SCALE



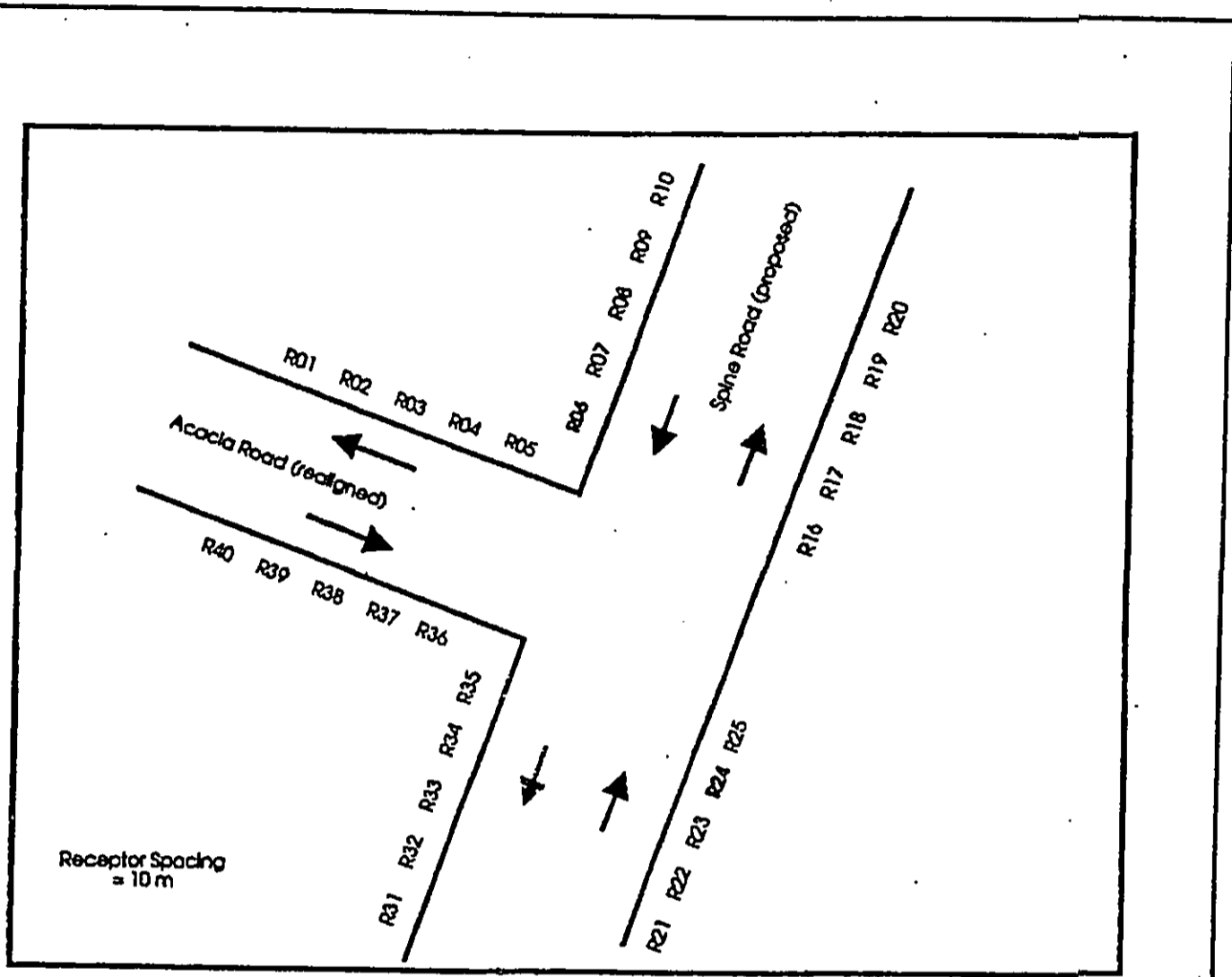
FIGURE 4-6:

Modeled Carbon Monoxide at Acacia Road - Kuala Street Intersection

Manana Development Spine Road Environmental Assessment

SOURCE:
J. W. Morrow, July 1998

Manana Spine Road ES & CO Issue Sheet 10-12-98



Estimated Maximum Concentration (mg/m³)

	Existing Conditions	2020 No Action	2020 Preferred Alignment	2020 Alternate Alignment	Critical Receptors
Morning Peak Hour	N/A	N/A	N/A	6.3	R24
Afternoon Peak Hour	N/A	N/A	N/A	5.2	R6
8-hour Concentration	N/A	N/A	N/A	2.9	R24

LEGEND:

NOT TO SCALE



FIGURE 4-7:

Modeled Carbon Monoxide at Realigned Acacia Road - Spine Road Intersection

Manana Development Spine Road Environmental Assessment

SOURCE:
J. W. Morrow, July 1998

Manana Spine Road, Figure 4-7: Modeled Carbon Monoxide at Realigned Acacia Road - Spine Road Intersection, 10/12/98

The modeling indicates that the federal 1-hour CO standard is currently being met at all four existing intersections and will continue to be met with or without the proposed project. The 1-hour CO standard would also be met at the future Spine Road/Acacia Road intersection that would be created by the alternative alignment.

The more stringent State 1-hour CO standard (see Table 3-3) is predicted generally to be met, except at the times and locations discussed below. CO modeling shows that State standards will continue to be exceeded during the morning peak hours at the intersection of Kamehameha Highway and Waimano Home Road for all alternatives, including No Action. However, the actual amount of the exceedance would decrease relative to present (1998) conditions. In addition, both Spine Road alternatives are predicted to result in lower CO concentrations at this intersection than are currently experienced or would be experienced under the No Action scenario.

The results of modeling of 1-hour CO concentrations at the intersection of Kamehameha Highway and Acacia Road (Figure 4-5) indicate that State standards are currently exceeded during the afternoon peak period. The concentrations are estimated to remain the same under the alternative alignment. The preferred alignment is expected to lower the CO concentration at this intersection to the State standard during the afternoon peak period. CO concentrations at this intersection are estimated to be at or barely above State Standards during the peak morning period for the both the preferred and alternative alignments.

It should be noted that the receptors used in these analyses are all located close (*i.e.*, within 10 meters or 33 feet) to the streets. CO concentrations drop off sharply with increasing distance from the traffic lanes. Consequently, CO concentrations are not likely to be an issue at distances beyond 10 meters.

4.5.3 MODELED 8-HOUR CO CONCENTRATIONS

Estimates of 8-hour CO concentrations were derived by applying a "persistence" factor to the maximum 1-hour concentrations. This "persistence" factor accounts for the fact that the worst-case 1-hour meteorology and traffic volumes do not persist for eight hours. EPA recommends calculation of a persistence factor based on actual 1-hour and 8-hour CO measurements. A local persistence factor was computed from Department of Health data for a recent project in the Honolulu area (Morrow, June 1995). To achieve a worst-case scenario, that factor was then used to estimate 8-hour concentrations by applying it to the higher of the morning or afternoon peak hour concentrations at each intersection.

These results are also shown in Figures 4-3 through 4-7. They indicate compliance with the federal 8-hour CO standard at all times and locations and with the more stringent state standard except as discussed below.

The 8-hour CO concentration at the intersection of Kamehameha Highway and Waimano Home Road currently exceeds the State 8-hour CO standard (Figure 4-4). This situation is expected to continue under the No Action alternative, although the concentrations would decrease as a result of anticipated regional roadway improvements. The same 8-hour CO concentrations are expected for the preferred and alternative Spine Road alignments, with the CO concentration at or barely below the State standard.

The 8-hour CO concentrations at the intersection of Kamehameha Highway at Acacia Road (Figure 4-5) also presently exceed the State Standard. The forecast decrease in 8-hour concentrations would meet the State 8-hour CO standard at this intersection under the No Action alternative. The preferred alignment would also comply with that standard. The alternative alignment concentrations would be the same as those that are currently experienced at the intersection, *i.e.*, they would remain slightly above the State standard.

4.6 ROADWAY AND TRAFFIC IMPACTS

4.6.1 INTRODUCTION

The traffic planning engineers, Pacific Planning and Engineering, Inc. (PPE), prepared a final traffic impact assessment report for the proposed project (PPE, December 28, 1998). This report, which updates the traffic impact report included in the Draft Environmental Assessment, is reproduced in Appendix A. Section 4.6 summarizes PPE's analysis.

4.6.2 FUTURE TRAFFIC WITHOUT THE SPINE ROAD PROJECT

4.6.2.1 Assumptions Concerning Future Land Use and Regional Traffic Without the Project

PPE (December 28, 1998) forecast future (year 2020) traffic conditions at key intersections near the former Manana Storage Area without the proposed Manana Storage Area redevelopment. The evaluation of future conditions assumed the following:

- Land uses in the study area consist of mature residential neighborhoods and commercial development. The *Oahu Regional Transportation Plan* (Kaku Associates, 1995) indicated minor traffic growth on the roadways in the study area. For the purpose of this analysis, ambient traffic was assumed to increase at an average annual rate of 0.6 percent, or approximately 14 per cent through the year 2020.
- The Pearl City Junction project would proceed independently of redevelopment of the former Manana Storage Area property.
- Uses similar to those presently located on the Manana Storage Area parcel would continue for the foreseeable future.

4.6.2.2 Year 2020 Key Intersection Traffic Conditions: No Action Alternative

PPE (December 28, 1998) forecasts of Year 2020 traffic volumes without the Manana Spine Road are presented in Figures 12 and 13 of Appendix A. PPE estimated intersection Level of Service (LOS) using methodologies documented in the *Highway Capacity Manual* (Transportation Research Board, 1994); these are the same methodologies used to prepare the evaluation of existing conditions presented in Chapter 3 of this EA⁶.

The morning and afternoon peak-hour LOS estimates for the No Action Alternative are shown in Figures 4-8 and 4-9. They are also summarized in Table 4-3 and 4-4. The tables

⁶ See Section 3.7 for a discussion of the terms and definitions that are used.

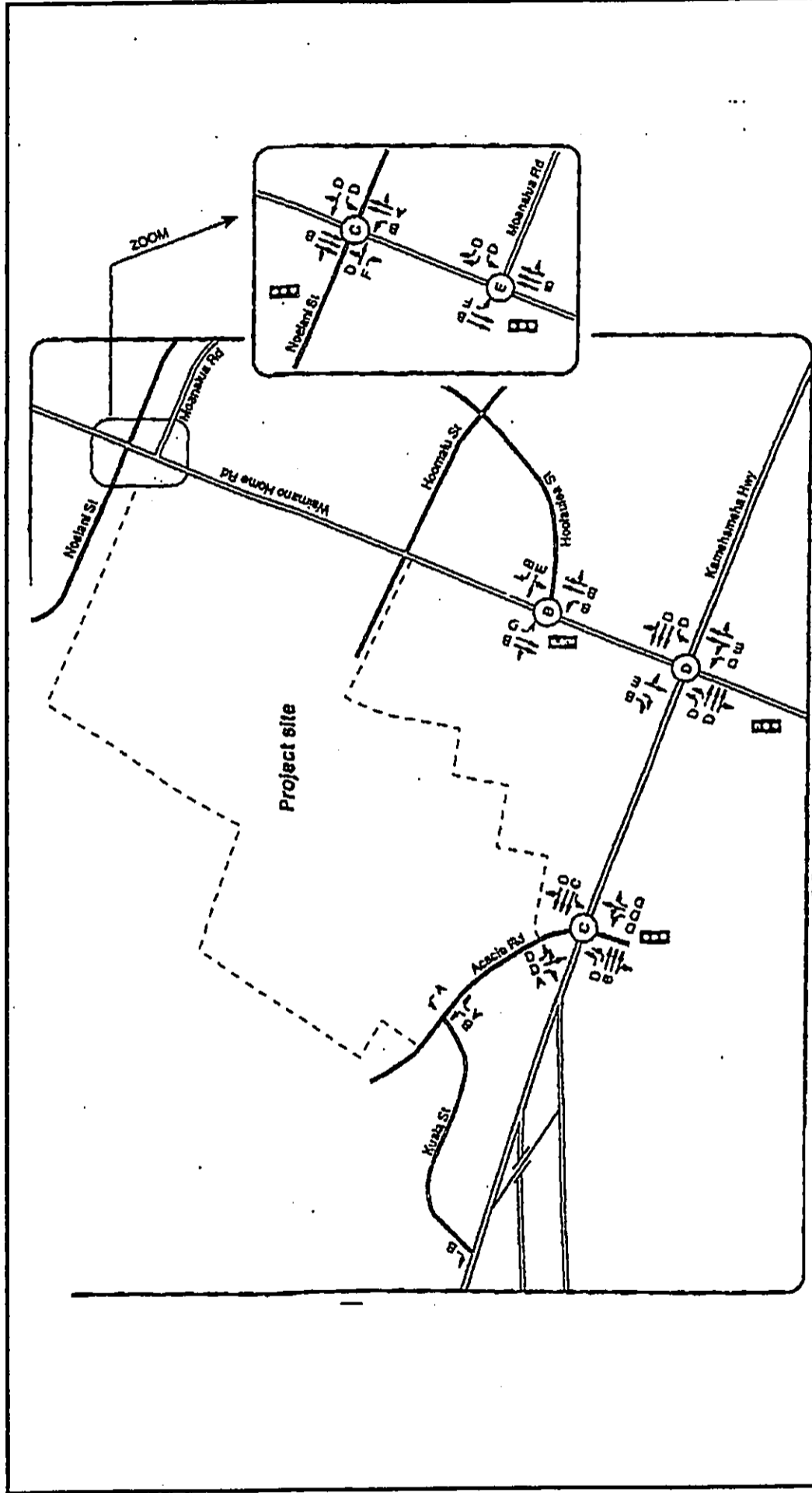


FIGURE 4-8:

Year 2020 Morning Peak Hour LOS:
No Action Alternative

Manana Development Spine Road
Environmental Assessment

LEGEND:

NOT TO SCALE

SOURCE:
Pacific Planning & Engineering, Inc.
July 13, 1998

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

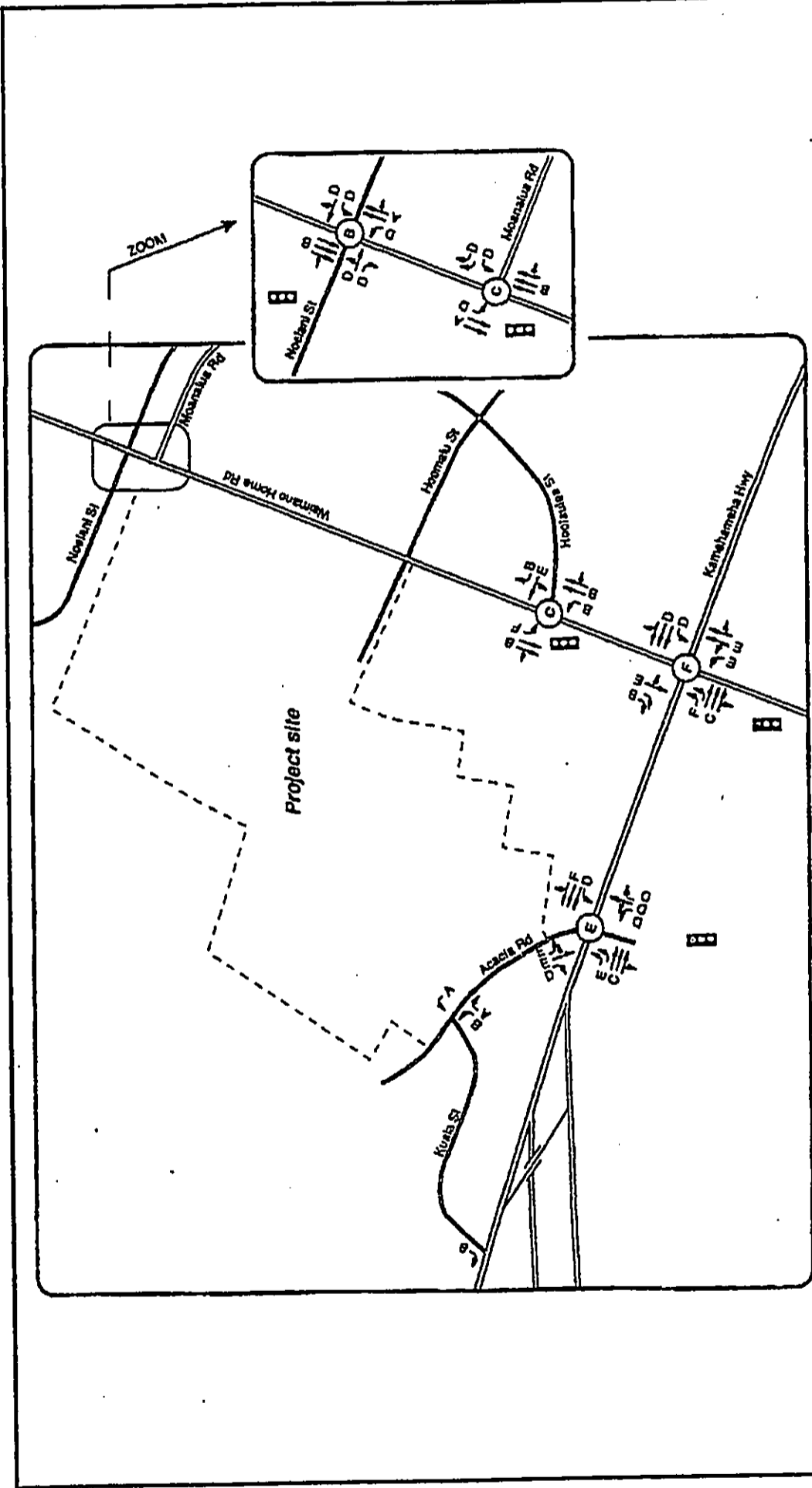


FIGURE 4-9:

**Year 2020 Afternoon Peak Hour LOS:
No Action Alternative**

Manana Development Spine Road
Environmental Assessment

LEGEND:

NOT TO SCALE

SOURCE:
Pacific Planning & Engineering, Inc.
July 13, 1998

Table 4-3. Comparison of Existing and Forecast Year 2020 Overall Levels-of-Service for Signalized Intersections: Morning (A.M.) Peak Hour.

Location	A.M. Peak Hour (7:00 a.m. to 8:00 a.m.)				
	Exist ⁷	Year 2020 No Action/ Without Improvements ⁸	Year 2020 No Action/ With Improvements ⁹	Year 2020 Preferred Alt. ¹⁰	Year 2020 Alt. Align. ¹¹
Waimano Home Road/ Moanalua Road/Spine Road	E	E	E	D/F ¹²	D/F ¹³
Waimano Home Road/Hoolaulea Street	B	B	B	B	B
Waimano Home Road/ Kamehameha Hwy.	E	E	D	D	D
Waimano Home Road/ Noelani Street	B	C	C	B	B.
Kamehameha Hwy./Acacia Road (preferred alignment)	D	D	C	C	n.a.
Kamehameha Hwy./Spine Road (alternative alignment)	n.a.	n.a.	n.a.	n.a.	C
Spine Road/ Acacia/Kuala St. (preferred alignment)*	A	B	B	B	n.a.
Spine Road /Acacia Road (alternative alignment)	n.a.	n.a.	n.a.	n.a.	B
Spine Road/Connector Road	n.a.	n.a.	n.a.	B	B

Notes: (a) Acacia/Kuala/Spine Road Intersection operates as unsignalized intersection in existing condition.

(b) Year 2020 LOS for Waimano Home Road/Noelani Street intersection is estimated for Alternative 6 with the intersection analyzed independently of Waimano Home Road/Moanalua Road/Spine Road intersection.

(c) Footnote references refer to figures and tables in source document.

* LOSs of signalized intersections are not directly comparable to LOSs of unsignalized intersections

Source: Pacific Planning & Engineering (December 28, 1998). *Traffic Impact Assessment Report for Manana Spine Road*.

⁷ Figure 20.

⁸ Figure 22.

⁹ Figure 24.

¹⁰ Figure 26. Assumes Restricted Movements at Noelani Street (i.e. Alternative 3).

¹¹ Figure 28. Assumes Restricted Movements at Noelani Street. (i.e. Alternative 3).

¹² Table C-4. Assumes No Restrictions at Noelani Street (i.e. Alternative 6)

¹³ Table C-4. Assumes No Restrictions at Noelani Street (i.e. Alternative 6)

Table 4-4. Comparison of Existing and Forecast Year 2020 Overall Levels-of-Service for Signalized Intersections: Afternoon (P.M.) Peak Hour.

Location	P.M. Peak Hour (4:00 p.m. to 5:00 p.m.)				
	Exist. ¹⁴	Year 2020 No Action/ Without Improvements ¹⁵	Year 2020 No Action/ With Improvements ¹⁶	Year 2020 Pref. Alt. ¹⁷	Year 2020 Alt. Align. ¹⁸
Waimano Home Road/ Moanalua Road/Spine Road	B	C	C	D/E ¹⁹	D/E ²⁰
Waimano Home Road/Hoolaulea Street	B	C	C	B	B
Waimano Home Road/ Kamehameha Hwy.	F	F	F	E	E
Waimano Home Road/ Noelani Street*	B	B	B	n.a.	n.a.
Kamehameha Hwy./Acacia Road (preferred alignment)	E	F	E	D	n.a.
Kamehameha Hwy./Spine Road (alternative alignment)	n.a.	n.a.	n.a.	n.a.	E
Spine Road/Acacia/Kuala St. (preferred alignment)*	n.a.	n.a.	n.a.	C	n.a.
Spine Road/Acacia Road (alternative alignment)	n.a.	n.a.	n.a.	n.a.	B
Spine Road/Connector Road	n.a.	n.a.	n.a.	B	B

Notes: (a) Acacia/Kuala/Spine Road Intersection operates as unsignalized intersection in existing condition.

(b) Year 2020 LOS for Waimano Home Road/Noelani Street intersection is estimated for Alternative 6 with the intersection analyzed independently of Waimano Home Road/Moanalua Road/Spine Road intersection.

(c) Footnote references refer to figures and tables in source document.

* LOSs of signalized intersections are not directly comparable to LOSs of unsignalized intersections.

Source: Pacific Planning & Engineering (December 28, 1998). *Traffic Impact Assessment Report for Manana Spine Road*

¹⁴ Figure 21.

¹⁵ Figure 23.

¹⁶ Figure 25.

¹⁷ Figure 27. Assumes Restricted Movements at Noelani Street (i.e. Alternative 3).

¹⁸ Figure 29. Assumes Restricted Movements at Noelani Street. (i.e. Alternative 3).

¹⁹ Table C-4. Assumes No Restrictions at Noelani Street (i.e. Alternative 6).

²⁰ Table C-4. Assumes No Restrictions at Noelani Street: (i.e. Alternative 6).

provides two sets of No Action LOS estimates. The first set assumes that the intersection configurations and traffic controls will remain as they are at present. The second set assumes that the following intersection improvements would be made to improve traffic flow .

- (1) Waimano Home Road/Kamehameha Highway intersection would be modified to provide the laneage and turning movements shown in Figure 4-8.
- (2) The left-turn storage lane on the eastbound approach to the above mentioned intersection would be extended to prevent queued-vehicles from blocking through-vehicles.
- (3) U-turns would be prohibited from the left-turn lane, thereby allowing southbound right-turn movements to occur at the same time as the eastbound left-turn movement.
- (4) The signal timing at this intersection would be modified to allow *simultaneous* movements of the southbound right-turn and eastbound left-turn movements. The cycle length would be adjusted as well.

Because these are not currently approved projects, it cannot be guaranteed that they will be implemented.

4.6.3 KEY INTERSECTION TRAFFIC CONDITIONS WITH THE PROPOSED PROJECT: PREFERRED ALIGNMENT

4.6.3.1 Assumed Redevelopment Plan for the Former Manana Storage Area

Traffic forecasts for the preferred alignment assumed that the Manana Storage Area redevelopment would proceed in accordance with the land use plan shown in Figure 1-3.

4.6.3.2 Assumed Growth in Ambient Traffic

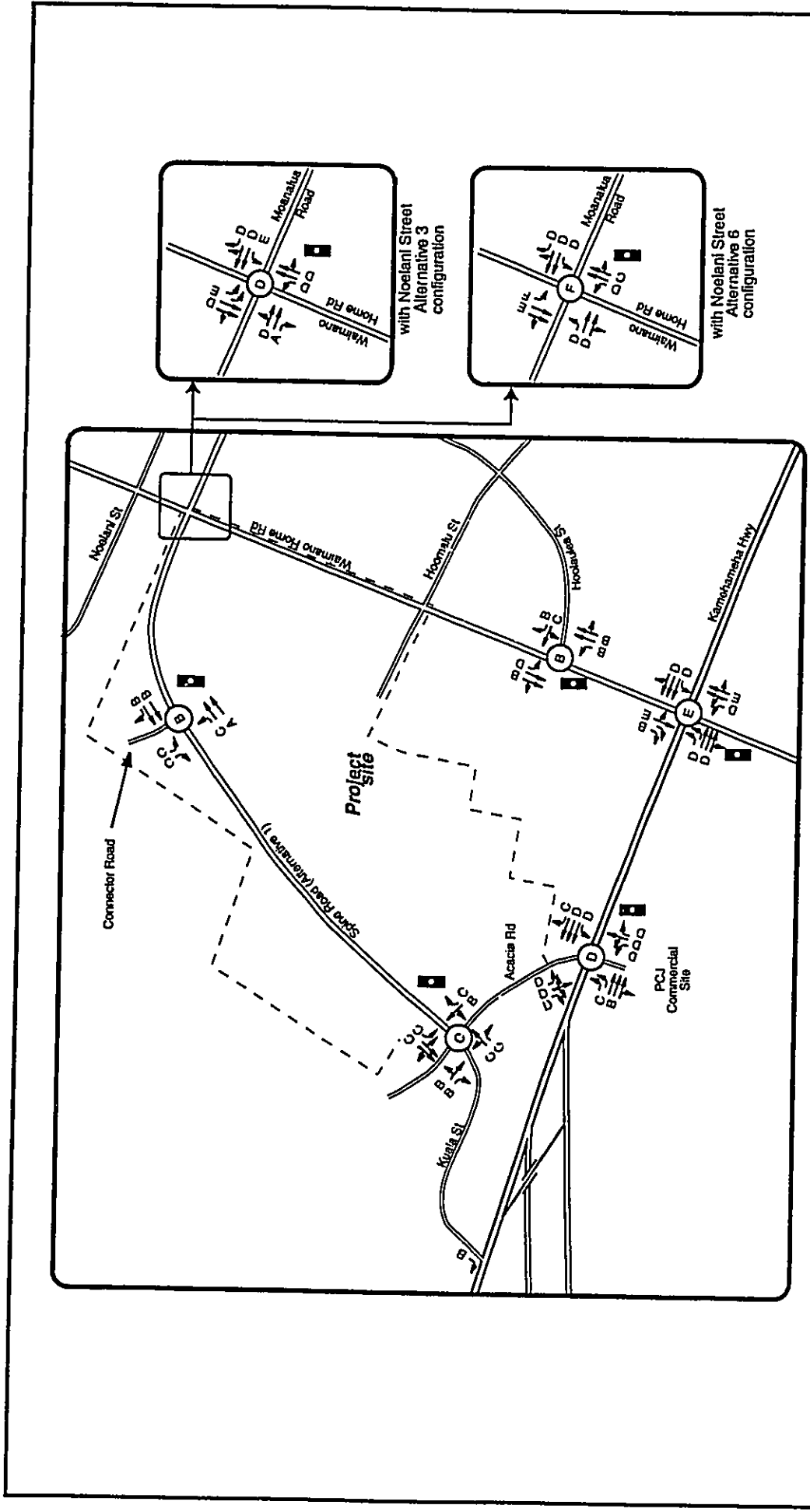
The traffic impact analysis assumed that ambient traffic on area roadways would increase as described in Section 4.6.2.1 above.

4.6.3.3 Assumed Roadway and Intersection Configurations

The overall configuration for the preferred alignment is shown in Figure 2-1. Details of the planned intersection laneage for the Spine Road preferred alignment are shown in Figure 4-10 or Figure 4-11. In addition to the laneage shown in the figures, the following changes were assumed:

- Waimano Home Road/Moanalua Road/Spine Road. The traffic signal would be modified to accommodate the addition of the proposed Spine Road. Separate phasing for the eastbound and westbound approaches and lead/lag left-turn phasing for the northbound and southbound approaches are necessary.
- Kamehameha Highway/Waimano Home Road/Lehua Avenue Intersection The left-turn storage lane on the eastbound approach would be extended. U-turns from the left-turn lane on the eastbound approach would be prohibited, and the traffic signals would be modified to allow simultaneous southbound right-turn and eastbound left-turn movements.
- Acacia Road/Kuala Street/Spine Road Intersection This intersection would be signalized.

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



Manana Spine Road Pg. 4-10 Year 2020 AM Peak Preferred 3-20

FIGURE 4-10:
**Year 2020 Morning Peak Hour LOS:
 Preferred Alignment**

LEGEND:

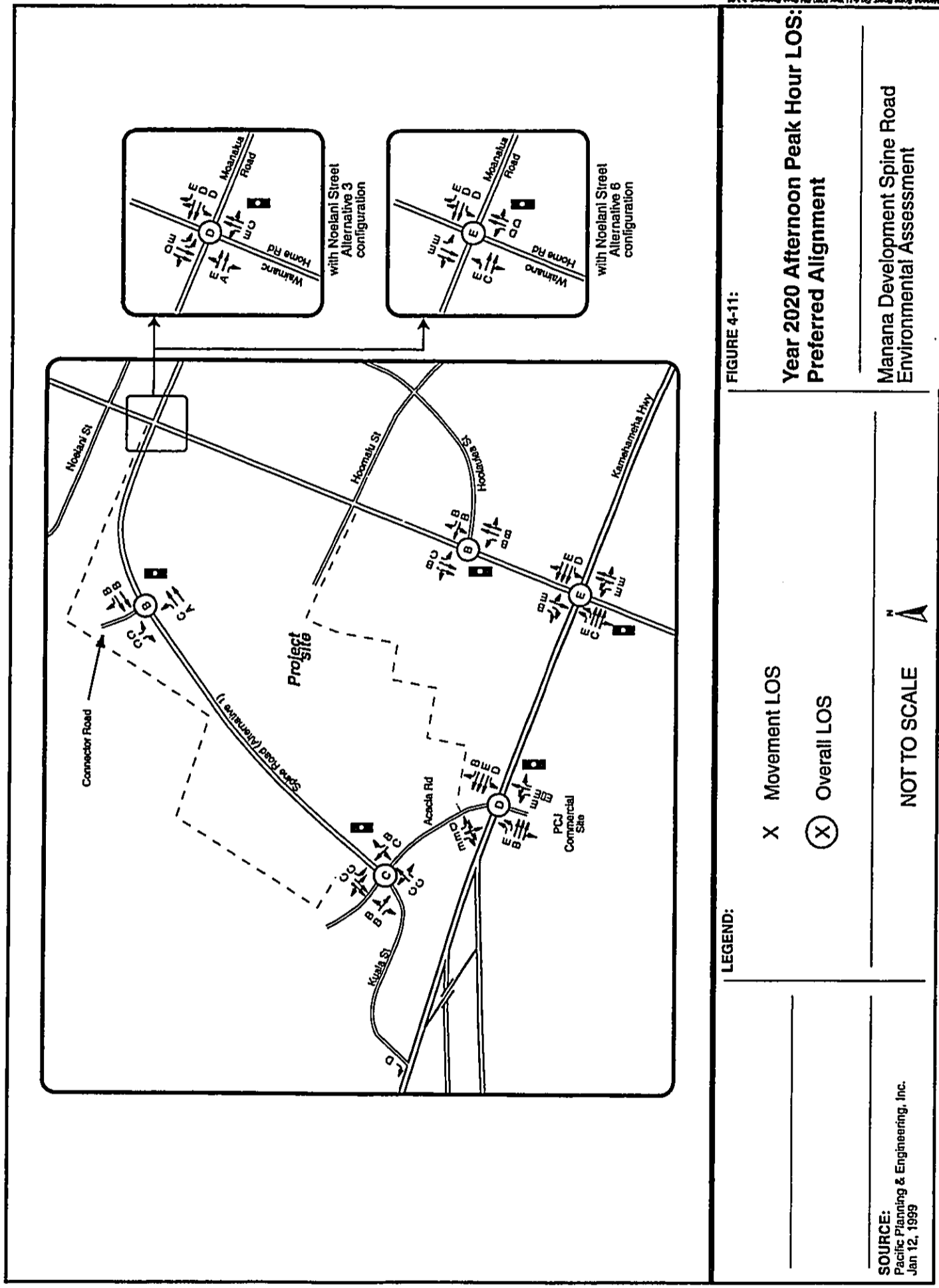
- X Movement LOS
- (X) Overall LOS

NOT TO SCALE

SOURCE:
 Pacific Planning & Engineering, Inc.
 Jan 12, 1999

Manana Development Spine Road
 Environmental Assessment

20010110 10:30 AM



- Waimano Home Road/Moanalua Road/Noelani Street The existing intersections of Waimano Home Road with Moanalua Road and with Noelani Street (see Figure 1-3) are separated by only about 100 feet. Therefore, traffic phasing must be coordinated between the two. The addition of the Spine Road will have a substantial impact on the functioning of this intersection. An analysis of six different intersection configurations and signal timing alternatives as a means of mitigating potential adverse effects on access to the Manana and Holiday City subdivisions was conducted and is discussed in Section 4.6.3.4, based on community input the City proposes to implement the mitigative alternative 6 as described in Appendix A and discussed below. This involves constructing a connector road between the Spine Road and the existing cane haul road (thereby providing an alternative route for area residents), reconfiguring the eastbound lanes at the of the proposed Spine Road/Waimano Home Road/Moanalua intersection to include an exclusive left-turn lane instead of a shared left-turn/through lane, and not imposing turning movement restrictions on Noelani Street.

4.6.3.4 Alternative Means of Mitigating Potential Adverse Effects on Access to the Manana and Holiday City Subdivisions

Noelani Street presently provides the most direct access to the *makai* portion of the Manana and Holiday City subdivisions. The City's initial plan for the proposed Spine Road called for restricting movements at the Waimano Home Road/Noelani Street intersection to right-in and right-out movements. The City recommended this because it provided superior overall LOSs when considered in conjunction with the nearby Spine Road/Waimano Home Road/Moanalua Road intersection. In order to provide continued access to residents of the Manana and Holiday City subdivisions following the access restrictions at Noelani Street, the City's initial plan provided a Connector Road between the proposed Spine Road and Kuahaka Street. The laneage at the Spine Road/Connector Road intersection is shown in Figure 4-10. The Spine Road/Connector Road intersection would be signalized.

Some members of the Manana and Holiday City subdivisions expressed serious concerns about the proposed restrictions. In response to these concerns, the City expanded its analysis to consider the following six mitigative alternative intersection configurations.

- (1) Remove the traffic signals at the intersection of Noelani Street with Waimano Home Road and restrict Noelani Street to a right-turn in and right-turn out operation. Divert existing Noelani Street motorists to Leomele Street.
- (2) Remove the traffic signals at the intersection of Noelani Street with Waimano Home Road and restrict Noelani Street to a right-turn in and right-turn out operation. Divert existing Noelani Street motorists to a Connector Road from the Spine Road to a Kuahaka Street extension.
- (3) Remove the traffic signals at the intersection of Noelani Street with Waimano Home Road and restrict Noelani Street to a right-turn in and right-turn out operation. Divert existing Noelani Street motorists to a Connector Road from the Spine Road to the existing cane haul road. The cane haul road would intersect with Kuahaka Street just north of Hooli Circle.

ENVIRONMENTAL CONSEQUENCES

- (4) Construct a Connector Road from the Spine Road to the existing cane haul road between the Manana and Holiday City subdivisions and leave access to Noelani Street unchanged.
- (5) Construct a Connector Road from the Spine Road to the existing cane haul road between the Manana and Holiday City subdivisions, provide an exclusive left-turn lane on the Spine Road for eastbound traffic, and restrict left turns into Noelani Street.
- (6) Construct a Connector Road from the Spine Road to the existing cane haul road between the Manana and Holiday City subdivisions, provide an exclusive left-turn lane on the Spine Road for eastbound traffic, and leave access to Noelani Street unchanged.

Alternative 1 does not appear feasible from a traffic operations and construction perspective. Alternative 2 requires the use of park land and introduces an element of uncertainty because of the additional regulations imposed by Section 4(f) regulations. Alternative 4 results in a poor overall level of service at the critical Waimano Home Road/Moanalua Road/Spine Road intersection.

From a traffic operations perspective, Alternatives 3 and 5 provide the best operating conditions at the Waimano Home Road/Spine Road/Moanalua Home Road intersection. Alternative 3, which uses a portion of an existing cane haul road and connects to Kuahaka Street and which limits access into Noelani Street would be the best means of mitigating potential adverse impacts on the LOS at the Moanalua Road/Waimano Home Road/Spine Road intersection. However, this alternative would eliminate the existing pedestrian walk phase at the Moanalua Road/Waimano Home Road/Spine Road intersection. To insure continued safe pedestrian access across Waimano Home Road, the traffic impact report recommended a new signalized pedestrian crosswalk be installed near the existing bus stop on Waimano Home Road north of the Pearl City Highlands Elementary School driveway.

According to the traffic impact analyses, adequate anticipated LOS for the year 2020 at the Waimano Home Road/Moanalua Road/Spine Road intersection could also be provided by Alternative 5. This configuration would require the acquisition of additional right-of-way. The additional right-of-way is needed to provide adequate transition for the eastbound through-movement crossing Waimano Home Road onto Moanalua Road. This would allow an exclusive left turn lane on the Spine Road leg rather than the shared left-turn/through lane that is provided in Alternative 3. Alternative 5 retains the existing crosswalk across Waimano Home Road, but left-turns into Noelani Street would be prohibited. Both Alternative 3 and 5 anticipate overall LOS of D during morning and afternoon peak hours for the intersection of the proposed Spine Road and Waimano Home Road/Moanalua Road in the year 2020.

Alternative 6 provides a lower overall LOS at the Waimano Home Road/Moanalua Road/Spine Road intersection than do Alternatives 3 and 5. However, it does not impose restrictions on turning movements into and out of Noelani Street. This is a perceived benefit to some area residents who currently use it as their primary route into and out of the area.

The above conclusions were based on anticipated conditions in the Year 2020, i.e., at the time that redevelopment of the former Manana Storage Area property is expected to be complete. Improvements needed for the interim period (i.e. before the Manana Development Area is fully redeveloped) are included as Appendix D in the traffic impact assessment report

contained in Appendix A of this document. Traffic volumes during this interim period would be lower than at full build-out, and this would allow satisfactory intersection performance without all of the changes that would ultimately be needed. The traffic consultant's analysis indicated that adequate LOS could be provided at the Waimano Home Road/Moanalua Road/Spine Road intersection during this interim period without restricting access to Noelani Street and without constructing the Connector Road that is part of the ultimate design. However, as indicated in Figure D-5 of the report contained in Appendix A, some decrease in the LOS would be experienced on the Waimano Home Road legs of the Waimano Home Road/Moanalua Road/Spine Road intersection.

In order to satisfy the primary concern of the representatives of the affected community - the desire for continued unrestricted access to the Manana Community via Noelani Street - the City proposes to implement Alternative 6. Alternative 6 reconfigures eastbound lanes on the proposed Spine Road to provide one exclusive left-turn lane and will require additional right-of-way from the two parcels closest to the intersection along the *makai*-side of Moanalua Road.

Because the LOS at the Waimano Home Road/Moanalua Road/Spine Road intersection will deteriorate as traffic volumes at the intersection increase over time, additional mitigation measures may eventually need to be implemented. Possible measures include contraflow of the northbound left-turn lane on Waimano Home Road at Noelani Street and signal timing modifications.

4.6.3.5 Forecast Level of Service

Forecast morning and afternoon LOSs for the preferred alignment are shown in Figures 4-10 and 4-11 and in Tables 4-3 and 4-4. Results of the analysis indicate that, with one exception, the LOS at existing signalized intersections would be better or the same with the proposed Spine Road than it would be if no action were taken. The exception is the Waimano Home Road/Moanalua Road/Spine Road intersection during the morning and afternoon peak hours. At that intersection the forecast Year 2020 LOS would be worse with the preferred alignment and mitigative Alternative 6 than that for the No Action alternative.

Tables 4-3 and 4-4 also show LOS for intersections which are either new or at which new intersection legs would be constructed (Spine Road/Acacia Road, Spine Road/Connector Road, and Spine Road/Moanalua Road).

4.6.4 KEY INTERSECTION TRAFFIC CONDITIONS: ALTERNATIVE ALIGNMENT

4.6.4.1 Assumed Redevelopment Plan and Roadway and Intersection Configurations

The overall configuration for the Alternative Spine Road alignment is shown in Figure 2-8. Details of the planned intersection laneage and other design features of this alternative are shown in Figures 4-12 and 4-13. A traffic signal would be installed at the intersection of the proposed Spine Road and the realigned Acacia Road.

The Alternative Spine Road Alignment necessitates a slightly different land use configuration for the proposed redevelopment than does the preferred alignment. However, as shown in Figure 2-8, the differences are slight, and the overall land use type and intensity is the same

as for the Preferred Alternative. Consequently, this alternative would generate the same number of vehicle-trips as the preferred alternative.

4.6.4.2 Assumed Growth in Ambient Traffic

Ambient traffic in the vicinity of the proposed Manana Storage Area redevelopment would not be affected by the Spine Road alignment. Consequently, the traffic impact analysis assumed that ambient (regional) traffic on area roadways would be the same for the alternative alignment as for the preferred alignment and no action alternatives.

4.6.4.3 Alternative Means of Mitigating Potential Adverse Effects on Access to the Manana and Holiday City Subdivisions

The alternative alignment involves the same issues concerning mitigating potential adverse effects on access to the Manana and Holiday City subdivisions as the Preferred Alternative. These are discussed above in Section 4.6.3.4.

4.6.4.4 Forecast Level of Service

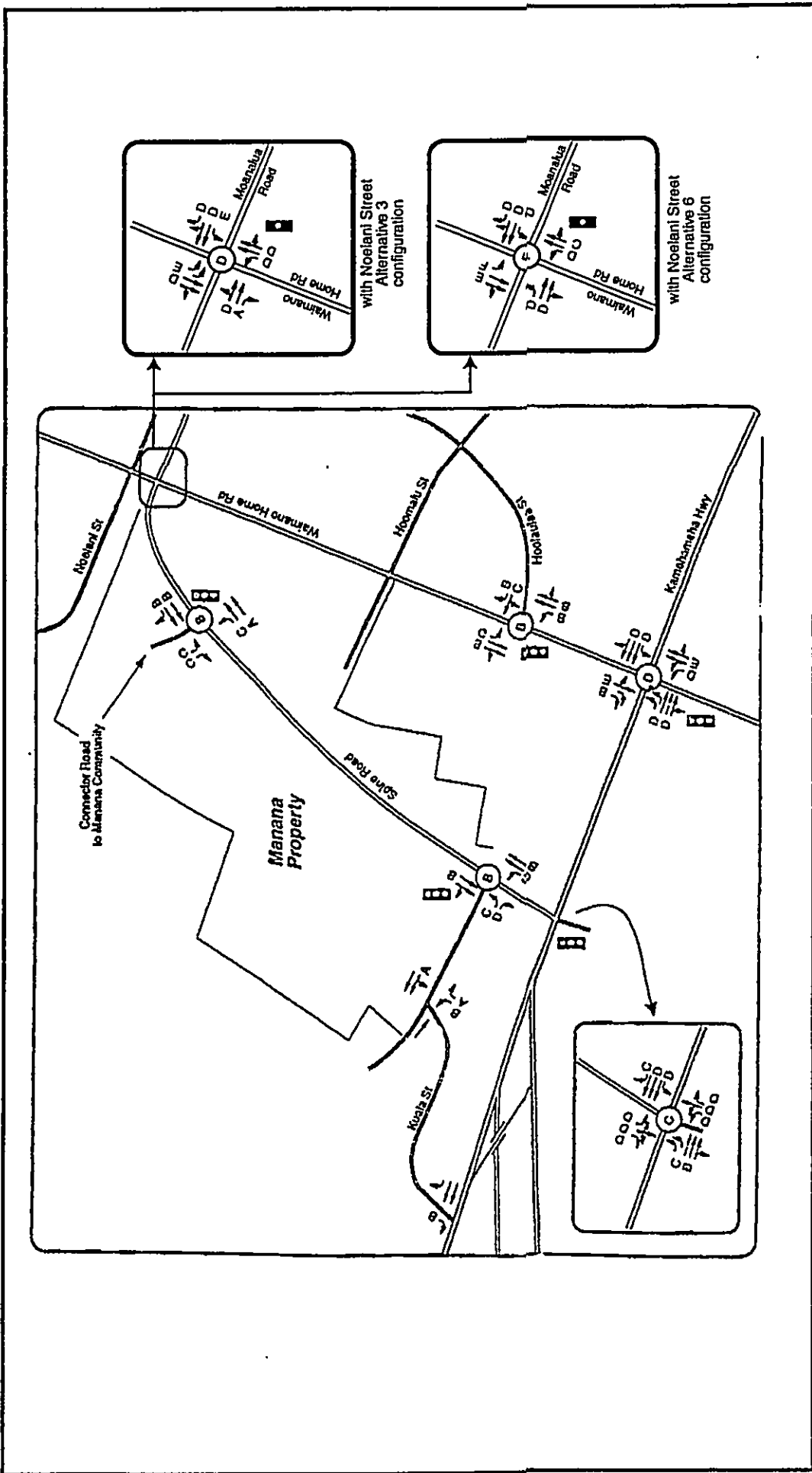
Forecast overall LOSs for the alternative alignment are shown in Figures 4-12 and 4-13 and in Tables 4-3 and 4-4. They are the same as those for the preferred alignment with one exception. This alternative provides a LOS of "E" rather than "D" during the afternoon peak hour at its Kamehameha Highway intersection. [Note: the Spine Road/Kamehameha Highway intersection in this alternative is the same as the Acacia Road/Kamehameha Highway intersection in the preferred alignment.]

4.6.5 COMPARISON OF ALTERNATIVE ALIGNMENTS

The traffic planning engineers (PPE, December 28, 1998) evaluated the relative merits of the two Spine Road alignments using the following five criteria:

- compatibility with the approved master plan for the redevelopment of the former Manana Storage Area;
- quality of access to the former Manana Storage Area;
- difficulty of implementing the alignment;
- LOS that each alternative would provide at study area intersections; and
- secondary benefit of providing an alternative to Waimano Home Road for north-south travel.

100' 200' 300' 400' 500' 600' 700' 800' 900' 1000'



Manana Spine Road Fig 4-12 Year 2020 AM Peak Hour LOS

FIGURE 4-12:

**Year 2020 Morning Peak Hour LOS:
Alternative Alignment**

LEGEND:

X Movement LOS

⊗ Overall LOS

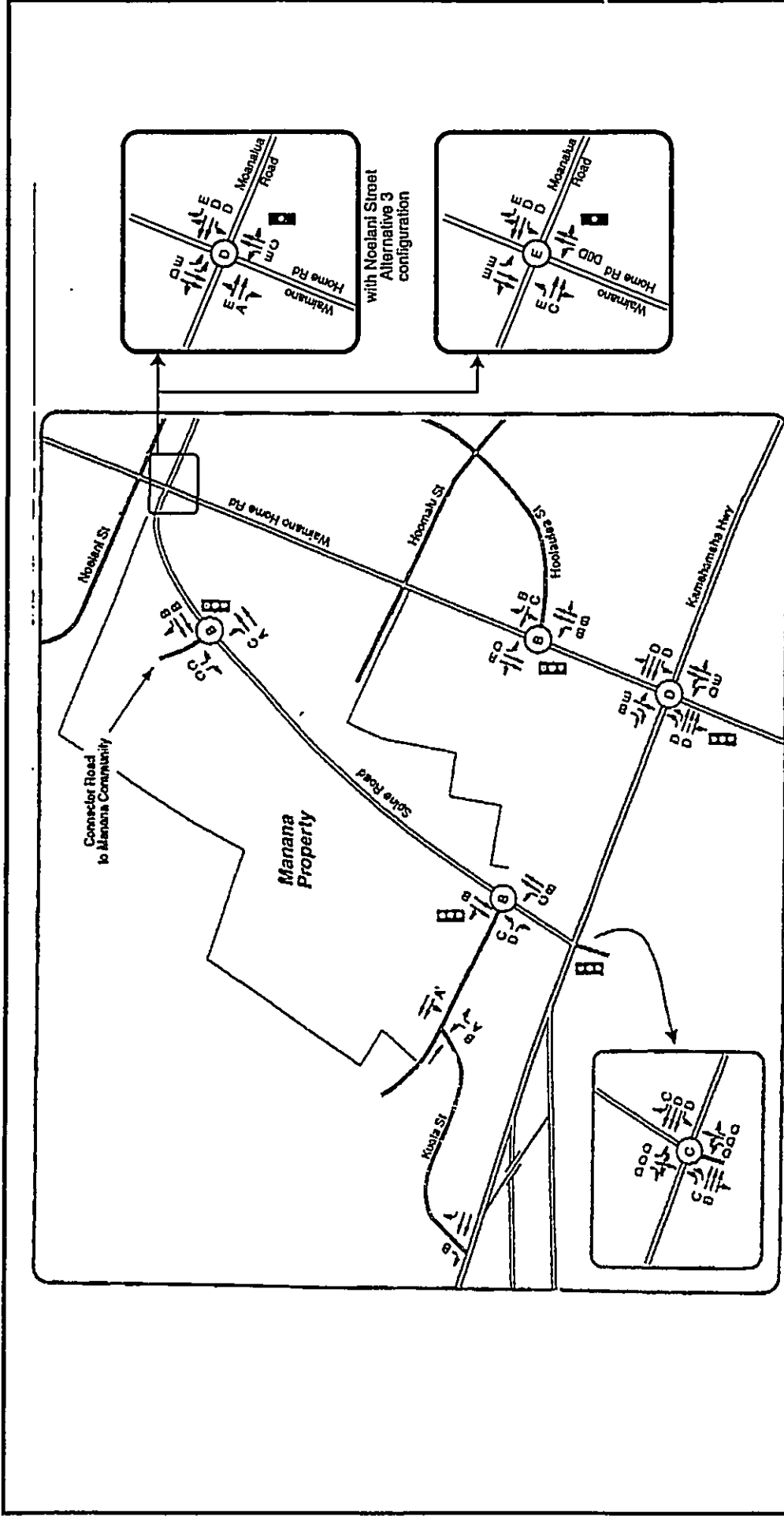
NOT TO SCALE

▲

**Manana Development Spine Road
Environmental Assessment**

SOURCE:
Pacific Planning & Engineering, Inc.
Jan. 12, 1999

(A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)



LEGEND:

X Movement LOS

(X) Overall LOS

NOT TO SCALE

▲

FIGURE 4-13:
Year 2020 Afternoon Peak Hour LOS:
Alternative Alignment

Manana Development Spine Road
Environmental Assessment

SOURCE:
Pacific Planning & Engineering, Inc.
Jan 12, 1999

Manana Development Spine Road, Pg 4-13 Year 2020 Peak Hour LOS, 1-9-99

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Table 4-5 summarizes the results of the traffic engineers' evaluation; a higher score is better than a lower score. The rating scheme assigns a "2" to the best alternative and a "1" to the other. The score was derived by multiplying the score for each criteria by the relative importance (i.e., the "weight") of the criteria. The City concluded that the preferred alignment is slightly superior to the alternative alignment when evaluated using the specified criteria and weighting scheme.

Table 4-5. Comparative Analysis of Spine Road Alternatives

Criteria	Weight	Preferred Alignment		Alternative Alignment	
		Rating Scale	Score	Rating Scale	Score
Compatibility with the master plan in the approved FEIS	4	2	8	1	4
Access to Manana Storage Area Development	3	1	3	2	6
Least Problems created by each Alternative	2	2	4	1	2
LOS at study intersections	2	2	4	1	2
Alternate route to Waimano Home Road	1	1	1	2	2
	Total	1	20	2	16

Source: Pacific Planning & Engineering, December 29, 1998: Table 5

4.6.6 SAFETY AND SECURITY

The proposed Spine Road is designed to promote safety for motorists, bicyclists, and pedestrians. Specific features included in the conceptual plan are summarized below.

- Dedicated bicycle lanes would be provided to minimize conflicts between vehicles and bikes.
- Wide sidewalks would encourage safe pedestrian use.
- Road lighting is intended to provide sufficient illumination to maintain pedestrian, bicyclist, and motorist safety.
- Pedestrian crosswalks and ADA curb ramps are planned for internal intersections and at the Spine Road termini.
- All intersections would be wired so that they can be easily signalized if that becomes necessary.

4.7 BIOLOGICAL RESOURCES

4.7.1 PREFERRED AND ALTERNATIVE ALIGNMENTS

Demolition of the existing warehouses and construction of a roadway along either roadway alignment would result in destruction of all vegetation that currently exists within the road right-of-way. Impacts would extend beyond the right-of-way as a result of excavation, staging and equipment movement. None of the vegetation is rare or federally protected. It does not provide critical habitat and does not represent an important biological community. Many of the fauna currently using the project site would be permanently displaced. However, these do not include any federally listed or otherwise rare species. The U.S. Fish and Wildlife Service stated that the property does not provide significant habitat for fish and wildlife resources (letter reproduced in the *Manana and Pearl City Junction Development Final EIS*). It has also reconfirmed its position verbally to the City (See Appendix D).

The wider portions of the proposed Spine Road median would be landscaped with appropriate vegetation. Trees would be planted along the sidewalks. The change would represent a net increase in vegetation relative to present conditions.

4.7.2 NO ACTION ALTERNATIVE

The No Action alternative would not directly affect flora or fauna in the area.

4.8 HISTORIC AND ARCHAEOLOGICAL RESOURCES

4.8.1 PREFERRED AND ALTERNATIVE ALIGNMENTS

Neither alignment of the proposed Spine Road is expected to impact historic or archaeological resources. Past site activities, particularly sugar cane cultivation and military activities are believed to have destroyed or removed any historic sites that may have existed. The State Historic Preservation Officer, in reviewing the redevelopment of the former Manana Storage Area, including the proposed Spine Road, concurred with a determination of "no effect" (letter reproduced in the *Manana and Pearl City Junction Development Final EIS*). This was reconfirmed in writing by the State Historic Preservation Division during the course of this project's early consultation with various agencies (Appendix D). Nevertheless, in the event that archaeological or historical resources are discovered in the course of site development, the State Historic Preservation Division would be contacted immediately and consultation begun in accordance with applicable regulations.

4.8.2 NO ACTION ALTERNATIVE

The No Action alternative would not affect historic or archaeological resources.

4.9 SCENIC AND AESTHETIC RESOURCES

4.9.1 PREFERRED AND ALTERNATIVE ALIGNMENTS

Both alignments of the proposed road would improve views of the coast and Pearl Harbor by opening up an unobstructed *mauka-makai* corridor. The road itself, with wide sidewalks, bicycle lanes, and appropriate landscaping along the median and sidewalks, constitutes an improvement over the existing view of old warehouses and chain link fences.

4.9.2 NO ACTION ALTERNATIVE

The No Action alternative would have no immediate effect on scenic or aesthetic resources.

4.10 IMPACTS ON PUBLIC SERVICES AND FACILITIES

4.10.1 RECREATIONAL FACILITIES

4.10.1.1 Preferred and Alternative Alignment

Both alignments of the proposed Spine Road are intended to access the City's proposed Pearl City Neighborhood Park within the former Manana Storage Area property. In addition, the road would also provide access to the proposed Family Entertainment Center. The new park and Entertainment Center would provide additional recreational opportunities to community residents, particularly youth.

The preferred alignment approaches within 100 feet of the boundary of the existing Manana Kai Park. At its closest, the alternative alignment is approximately 240 feet from the Manana Kai Park boundary. The park would be separated from the road by a commercial parcel. Depending upon the manner in which the commercial parcel is developed, the road may or may not be visible from the park. Traffic noise levels within the park will be consistent with applicable land-use compatibility guidelines.

Pacheco Park, at the intersection of Kamehameha Highway and Waimano Home Road, would be 1,000 feet from the Kamehameha Highway terminus of the alternative Spine Road alignment and approximately 2,000 feet from the Spine Road/Acacia Road intersection for the preferred alignment. Both intersections would be separated from the park by Pearl City Elementary School, the Post Office and, in the case of the preferred alignment, the Pearl Highlands Center. Pacheco Park would not be significantly impacted by either Spine Road alternatives.

Other parks in the area are distant enough from both Spine Road alternatives. Consequently, they would not be impacted by construction or use of the proposed roadway.

4.10.1.2 No Action Alternative

The No Action alternative would prevent the City from developing the proposed Pearl City Neighborhood Park and the Manana Family Entertainment Center.

4.10.2 LIBRARIES AND SCHOOLS

4.10.2.1 Preferred and Alternative Alignments

In general, the use of the proposed Spine Road is not expected to generate long-term impacts to the Pearl City Regional Library, located on Waimano Home Road, or to any of the nearby schools. Pearl City Highlands Elementary School is located *mauka* of the intersection of Waimano Home Road and Noelani Street. The traffic analysis indicates that the overall level of service at the Moanalua/Waimano Home Road intersection would improve from E to D in the morning peak hour for either road alignment (Table 4-3). The morning peak hour coincides with the start of classes. The analysis projects a decrease in the level of service (from B to D) in the evening peak hour, but this peak occurs after the school has recessed for the day.

Pearl City Elementary School on Kamehameha Highway is near the proposed *makai* terminus of the alternative alignment. The overall level of service at this intersection is expected to increase slightly in the future, although the LOS would decrease for some traffic movements.

4.10.2.2 No Action Alternative

The No Action alternative would have no immediate effect on libraries or schools.

4.10.3 OTHER PUBLIC SERVICES

4.10.3.1 Preferred and Alternative Alignments

The two acute-care hospitals in the general area (Kapiolani Medical Center at Pali Momi and St. Francis West Medical Center) are too far away to be directly affected by the proposed road. The impacts of relocating the Department of Health's ambulance service from the former Manana Storage Area are unknown, since its eventual location has not been chosen. Either alignment of the Spine Road would provide an alternative route for emergency vehicles (ambulances, police, fire) serving the residential and commercial uses in the Pearl City area.

The alternative alignment would require acquisition of a portion of the existing post office property at the corner of Acacia Road and Kamehameha Highway. This alternative would also exacerbate the facility's existing access problems. The property and its users would also be directly impacted by construction, including noise, dust, and traffic-related impacts.

4.10.3.2 No Action Alternative

The No Action alternative would have no direct impact on public services or facilities.

4.11 INFRASTRUCTURE IMPACTS

4.11.1 PREFERRED AND ALTERNATIVE ALIGNMENTS

The proposed Spine Road would facilitate redevelopment of the former Manana Storage Area by providing access and utilities to each parcel. Internal roads are planned for the future. Neither of the alignments would consume significant quantities of water or electricity. No

wastewater would be produced directly by the road; the effects on stormwater drainage are discussed in Section 4.3.1.2.

4.11.2 NO ACTION ALTERNATIVE

The No Action alternative would have no direct impact on public utility infrastructure. If the City wished to continue to use the existing structures on the former Manana Storage Area parcel, it would have to maintain the utility systems that it obtained from the Navy.

4.12 CONSTRUCTION IMPACTS

4.12.1 PREFERRED AND ALTERNATIVE ALIGNMENTS

Construction activities associated with either of the road alignments would result in temporary impacts, including:

- Noise from construction activities;
- Impacts associated with construction-related traffic;
- Air emissions;
- Visual impacts; and
- Costs.

Other projects in the former Manana Storage Area may be under construction at the same time as the Spine Road. Therefore, it is virtually impossible to quantify the intensity and duration of construction impacts experienced in nearby areas. Nevertheless, the City intends to undertake mitigation measures to reduce impacts.

The Department of Design and Construction will, to the extent possible, coordinate its construction activities with other overlapping or coinciding construction projects that may be ongoing in the overall Manana Storage Area in order to minimize construction-related impacts on the surrounding community.

4.12.1.1 Construction Noise.

Earthmoving equipment, e.g., bulldozers and diesel-powered trucks, would probably be the loudest equipment used during construction (assuming that pile driving will not be required).

In cases where construction noise exceeds, or is expected to exceed, the Department of Health's (DOH) "maximum permissible" property line noise levels, a permit must be obtained from the DOH to allow the operation of vehicles, construction equipment, power tools, etc., which emit noise levels in excess of "maximum permissible" levels. Specific permit restrictions for construction activities are:

- *No permit shall allow any construction activities which emit noise in excess of the maximum permissible sound levels...before 7:00 a.m. and after 6:00 p.m. of the same day, Monday through Friday.*

- *No permit shall allow any construction activities which emit noise in excess of the maximum permissible sound levels...before 9:00 a.m. and after 6:00 p.m. on Saturday.*
- *No permit shall allow any construction activities which emit noise in excess of the maximum permissible sound levels on Sundays and on holidays.*

In addition, construction equipment and on-site vehicles or devices whose operations involve the exhausting of gas or air, excluding pile hammers and pneumatic hand tools weighing less than 15 pounds, must be equipped with mufflers, and construction vehicles using roadways must satisfy the DOH's vehicular noise requirements (see Section 3.2.4).

Blasting is not expected to be needed to construct the proposed road. However, if this changes, the contractor would be instructed to use numerous small charges detonated with time delays. Blast mats can also be used to assist in directing the explosive energy, control flying debris, and muffle noise.

4.12.1.2 Construction-Related Traffic

Construction vehicle activity may increase traffic congestion and automotive pollutant concentrations along existing streets as well as on the project site itself. Most of the non-signalized intersections in the area are currently operating at good levels of service (LOS) during the peak hours and thus should be able to accommodate temporary construction-related traffic. The larger signalized intersections, however, are experiencing LOS as low as "F" during peak hours, a condition that would be exacerbated by additional construction-related traffic. Impacts could be mitigated by limiting the majority of project-related traffic to off-peak hours.

4.12.1.3 Construction-Related Air Quality Impacts

On-Site Activities The site preparation and earth moving would create particulate emissions, as would vehicle movement on unpaved areas. Using the results of EPA studies and assumptions about construction intensity and soil silt content, fugitive dust emissions from the Spine Road construction were estimated to be on the order of 33 tons per month (Morrow, July 1998). This emission rate was used with EPA's dispersion model to estimate the particulate matter impacts in surrounding areas. The result indicated a worst-case concentration of $28.5 \mu\text{g}/\text{m}^3$, a level well below State and federal standards. Dust control measures such as minimizing the area of ground disturbance, using dust screens, and daily or more frequent watering of exposed areas would be required.

Off-Site Activities In addition to onsite impacts attributable to construction activity, there would also be offsite air quality impacts due to the operation of concrete and asphalt batching plants needed for construction. Such plants routinely emit particulate matter and other gaseous pollutants. The batch plants must be permitted by the Department of Health Clean Air Branch pursuant to state regulations. In order to obtain these permits, they must demonstrate their ability to comply with both emission and ambient air quality standards. Under the recently promulgated federal Title V operating permit requirements, now

incorporated in Hawaii's rules, air pollution sources must regularly attest to their compliance with all applicable requirements.

4.12.1.4 Construction-Related Visual Impacts

Temporary visual impacts during construction would be associated with the movement of heavy vehicles and other equipment, site preparation work (e.g., demolition of existing buildings), and other construction activities (such as installation of utilities, landscape planting, etc.). Much of this activity, however, would be shielded from view by dust barriers installed at the perimeter of the site.

4.12.1.5 Hazardous Materials

Asbestos and lead paint are believed to be present in some of the existing structures that would be demolished. These materials would be removed and disposed in accordance with all applicable laws and regulations.

4.12.1.6 Costs

Preliminary construction costs associated with the preferred alignment are \$9,800.00 (FY 1998). The alternative alignment is estimated to cost approximately \$1.9 million more than the preferred alignment. A primary cause of the difference between the two alignments is the greater length of the alternative alignment and the need to realign Acacia Road. The single most important construction line item contributing to the difference in total costs is grubbing, grading and soil removal. In addition, a grade difference between the alternative alignment's right-of-way and the Post Office property would require excavation and construction of a 20-foot-tall, 210-foot-long retaining wall that would not be necessary in the case of the preferred alignment. Costs associated with utility work would also be higher for the alternative alignment. The estimates do not include the costs of land acquisition and relocation.

4.12.2 NO ACTION ALTERNATIVE

The No Action alternative would have no construction-related impacts. On the other hand, by not developing the former Manana Storage Area property, the area would remain underutilized, the City's debt would continue to grow, and the City would not fulfill its stated purpose of developing the property in a fiscally responsible manner.

4.13 CUMULATIVE AND SECONDARY IMPACTS

4.13.1 CUMULATIVE IMPACTS

A "cumulative impact" is an impact on the environment which results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts include impacts from actions which are individually minor but which, when taken collectively, have the potential to cause substantial change in the environment.

The proposed Spine Road is part of the more extensive redevelopment of the entire former Manana Storage Area. The potential effects of the overall redevelopment were evaluated and

addressed in the *Manana and Pearl City Junction Development FEIS* that was accepted in 1996. The proposed roadway is not intended to facilitate population or business growth beyond that already addressed in Section 6.2 of that *FEIS*.

The *Manana and Pearl City Junction Development FEIS* identified a number of ways in which the redevelopment of that land had the potential for cumulative effects. They include the following:

- Increased traffic from other areas that depend upon the same roadways would mix with traffic generated by new uses brought about by the redevelopment of the former Manana Storage Area.
- Other development would require water from the same BWS system that would serve redevelopment within the former Manana Storage Area.
- Wastewater from redevelopment served by the proposed roadway would combine with that generated by new development elsewhere within the service area of the Honouliuli Wastewater Treatment Plant.
- The Honolulu Police and Fire Departments would need to increase their facilities and staffing to cover not only the proposed redevelopment of the former Manana Storage Area, but development elsewhere on the island as well.
- The same construction firms and construction labor force needed for the proposed project would be called upon to meet the needs of development elsewhere on the island.
- Government agencies must fund projects and activities throughout their jurisdiction. Funding for redevelopment of the former Manana Storage Area would add to these costs.

As noted in earlier chapters, the former Manana Storage Area is surrounded by existing development. The only additional development that might occur in the vicinity (and that might, therefore, cause cumulative impacts) is the City's redevelopment of the Manana Junction parcel. The potential effects of that activity were thoroughly evaluated in the aforementioned 1996 *FEIS* for the overall project.

The analysis of the Spine Road's potential impacts presented in this chapter considers the proposed Spine Road in concert with the changes that other anticipated actions are likely to produce. Thus, the consideration of cumulative effects is an integral part of this analysis. This is most evident in the discussions of roadway and traffic impacts (Section 4.6), noise impacts (Section 4.4), and air quality impacts in Section 4.5). However, cumulative issues are addressed elsewhere in this document whenever they are relevant.

4.13.2 SECONDARY IMPACTS

Secondary impacts are effects that have the potential to occur later in time or farther removed in distance from the project site but which are still reasonably foreseeable. The secondary effects of roadway projects are typically those related to the urban or other development that improved access allows.

The Spine Road project is intended to facilitate redevelopment of the Manana Storage Area property. For many years the Navy used the area for activities similar to the commercial and

ENVIRONMENTAL CONSEQUENCES

industrial uses that are proposed as part of the City's redevelopment plan, and those activities continue today under the interim agreements that the City has negotiated with short-term tenants. Consequently, the proposed roadway will not permit a fundamentally different type of use than has existed for the past 50 years.

Construction of the Spine Road will allow more economic use of the property than would be possible if access is limited to existing roadways, however. This, in turn, implies that the use of the 109-acre property is likely to be more intense with the roadway than it would be without it. The traffic, noise, air quality, and other effects associated with this economic activity are described in the *Manana and Pearl City Junction Development Final Environmental Impact Statement*. In view of the already-developed nature of the land surrounding the property, the on-site development that would be served by the Spine Road is not likely to spill over into adjacent areas.

CHAPTER 5

CONFORMANCE WITH APPLICABLE LAND USE POLICIES AND PLANS

5.1 INTRODUCTION

This chapter examines the preferred and alternative alignments' conformance with a number of federal, State and local laws, regulations, policies, guidance and plans. These have been developed to guide physical, social and economic development and to encourage protection of natural and man-made resources.

5.2 CHAPTER 205, HRS - LAND USE LAW

Chapter 205, Hawaii Revised Statutes (HRS), establishes the State Land Use Commission (LUC) and gives this body the authority to designate all lands in the State as Urban, Rural, Agricultural, or Conservation District lands. The Counties make land use decisions within the Urban Districts in accordance with their respective County general plans, development plans, and zoning ordinances.

The project site is located entirely within the State Urban District. Proposed development of the Spine Road is consistent with uses allowed in the State Urban District and will not require any action by the Land Use Commission.

5.3 HAWAII STATE PLAN

The Hawaii State Plan is intended to guide the long-range development of the State of Hawaii by:

- Identifying goals, objectives and policies for the State and its residents;
- Establishing a basis for determining priorities and allocation of resources; and
- Providing a unifying vision to enable coordination between the various counties' plans, programs, policies, projects and regulatory activities to assist them in developing their county plans, programs, and projects and the State's long-range development objectives.

The Plan has three parts: Part I-Overall Theme, Goals, Objectives and Policies; Part II-Planning, Coordination and Implementation; and Part III - Priority Guidelines.

The *Manana and Pearl City Junction Development Final Environmental Impact Statement (FEIS)* examined how the master plan proposed for the redevelopment of the former Manana Storage Area supported applicable objectives and policies of the State Plan. A collector road, approximately in the same location as the preferred alignment was and is an integral part of the redevelopment plan.

The FEIS concluded that the redevelopment was not inconsistent with the State Plan's objectives and policies¹. Additional review of the proposed Spine Road using more detailed, project-specific information concluded that both roadway alignments are consistent with applicable provisions of the State General Plan.

5.4 STATE FUNCTIONAL PLANS

The State also issues twelve functional plans that serve as implementation guides supporting the State Plan. These functional plans are intended to provide guidance on functional implementation to the various County General Plans and Development Plans. According to the *Manana and Pearl City Junction Development Final EIS*, the proposed redevelopment plan was consistent with the objectives in the State's Functional Plans.

5.5 CITY AND COUNTY OF HONOLULU GENERAL PLAN

The *Oahu General Plan* is a comprehensive statement of objectives and policies which sets forth the long-range goals of the City's residents and the strategies to achieve them. General Plan Goals and Policies relevant to the proposed Spine Road are discussed below.

Economic Activity, Objective A - To promote employment opportunities that will enable all the people of Oahu to attain a decent standard of living.

Discussion: The proposed project would facilitate efficient access to the commercial, industrial and public planned for the former Manana Storage Area. The redevelopment represents a net increase in employment opportunities.

Natural Environment Objective B - To preserve and enhance the natural monuments and scenic views of Oahu for the benefit of both residents and visitors.

Discussion: Currently, there are no scenic views from the former Manana Storage Area. Views toward Pearl Harbor and the coastline now obstructed by the existing warehouses would be reestablished by the wide open corridor of either Spine Road alignment.

Transportation and Utilities Objective A - To create a transportation system which will enable people and goods to move safely, efficiently, and at a reasonable cost; serve all people, including the poor, the elderly, and the physically handicapped; and offer a variety of attractive and convenient modes of travel.

Discussion: The first policy of this objective lists a number of transportation features planned to address the objective. Those pertinent to the proposed Spine Road include: public transportation, bikeways and pedestrian walkways. The proposed road would provide dedicated bicycle lanes and wide sidewalks on each side of the street. In addition, buses assigned to the proposed Pearl City Bus Facility would use the Spine Road.

¹ Objectives and policies which were addressed included: population, the economy, physical environment (including land-based, shoreline and marine resources, scenic natural beauty and historic resources), land, air and water quality, and facility systems.

The proposed road is also consistent with the policy stating "Improve roads in existing communities to reduce congestion and eliminate unsafe conditions."

5.6 PRIMARY URBAN CENTER DEVELOPMENT PLAN

The former Manana Storage Area is within the City's Primary Urban Center (PUC). The *Manana and Pearl City Junction Development Final Environmental Impact Statement* included an evaluation of the proposed redevelopment's consistency with the PUC Development Plan Special Provisions. No inconsistencies were noted.

On June 14, 1996, the City Council approved Ordinance 96-36. The ordinance amended the PUC Development Plan Public Facility Map to include a roadway along the proposed Spine Road preferred alignment among other proposed redevelopment projects slated for the area. Subsequently, the City and County of Honolulu's Department of Public Works applied for an amendment to the Primary Urban Center Development Plan Public Facilities Map to reflect the proposed corporation base yards, which were part of the original master plan, as well as some minor adjustments to the parcel sizes of previously approved public facilities. The City Council enacted these amendments by approving Ordinance 98-34 on June 9, 1998.

5.7 LAND USE ORDINANCE

Presently, the former Manana Storage Area parcel is zoned "F-1 Federal". No zoning change would be necessary, as public uses, such as the proposed road, are permitted uses in all zoning districts.

5.8 STATE ENVIRONMENTAL IMPACT STATEMENT LAW (CHAPTER 343, HRS)

The State of Hawaii's Environmental Impact Statement Law, Chapter 343, HRS, lists eight conditions which trigger the environmental review process and compliance with Chapter 343, HRS. For the proposed road, the applicable circumstances are the use of City lands and the use of City funds. According to the Department of Health Rules governing Chapter 343, HRS, if "significant environmental effects" are identified by an Environmental Assessment (EA), preparation of an Environmental Impact Statement (EIS) is required. A full evaluation of the proposed Spine Road and Chapter 343 significance criteria is located in Chapter 6. Based on the information available, the City has determined that the preparation of an EIS is not required.

5.9 NATIONAL ENVIRONMENTAL POLICY ACT OF 1969 (NEPA)

The City intends to apply for federal aid from the Federal Highway Administration (FHWA). If the FHWA approves the application, these funds would be used for construction of the Spine Road. Because of the proposed use of federal aid, an environmental disclosure document satisfying NEPA must be prepared. The Council on Environmental Quality (CEQ) set forth the requirements of NEPA in 40 CFR Parts 1500-1508. In addition, the FHWA's

environmental impact regulations are in 23 CFR Part 771. This EA serves as the NEPA disclosure document. The FHWA and the City's Department of Design and Construction are the joint lead agencies responsible for the preparation of this document while the Hawaii State Department of Transportation is a cooperating agency. For the purposes of NEPA, the Division Administrator for the FHWA will be the accepting authority.

5.10 HAWAII COASTAL ZONE MANAGEMENT PROGRAM

5.10.1 CZM CONSISTENCY ANALYSIS

Federal funding aid of a local project, such as the proposed Spine Road, is considered a federal action under the Coastal Zone Management Act (CZMA). The CZMA mandates that all federal actions be consistent with applicable state Coastal Zone Management (CZM) programs. The objectives of the Hawaii CZM Program are set forth in Chapter 205A, Hawaii Revised Statutes. The objectives of the program are intended to promote the protection and maintenance of valuable coastal resources. All lands in Hawaii are classified as valuable coastal resources. The pertinent CZM objectives and the road's consistency with them are discussed below.

Historic Resources

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

Discussion: Both the preferred and alternative alignment rights-of-way have been extensively disturbed and no known historical or cultural resources remain. The State Historic Preservation Officer concurred that the City's proposed redevelopment of the former Manana Storage Area would have "no effect" on these resources.

Scenic and Open Space Resources

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

Discussion: Both alignment rights-of-way are presently occupied by warehouses which do not constitute coastal scenic or open space resources. Once constructed, however, the proposed road would establish view corridors towards Pearl Harbor and the coast where none presently exist.

Economic Uses

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

Discussion. The proposed Spine Road is a necessary component of the City's redevelopment master plan for the former Manana Storage Area. The master plan was developed as part of an extensive, open public planning process that considered alternative uses for the property.

Managing Development

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

Discussion: The proposed project has been part of a comprehensive master planning process that included extensive public participation and involvement. The FEIS for the redevelopment was disseminated to federal, state, and local agencies, as well as the public and interested groups and individuals. The City has kept the community apprised of updates and revisions to the redevelopment plan. This environmental assessment updates the previous work and provides additional analyses based on more fully developed conceptual plans for the proposed Spine Road.

5.10.2 CZM CONSISTENCY DETERMINATION

Based on the analysis summarized above, the City has certified that the proposed activity complies with the approved Hawaii Coastal Zone Management (CZM) Program and will be conducted in a manner consistent with that Program. Appendix G includes a copy of the letter requesting a CZM consistency determination from the State of Hawaii, Office of Planning.

5.11 49 U.S.C. SECTION 303

The United States Department of Transportation (DOT) Act of 1966 included specific provisions providing special protection to publicly owned parks, recreation areas, wildlife and waterfowl refuges and all historic sites. This provision was set forth in Section 4(f) of the DOT Act and printed in the 49th United States Code (U.S.C.) of Federal Regulations in Section 1652 (f). It was repealed in 1983 and codified without substantive changes in 49 U.S.C. Section 303. These policies, however, are still referred to as "Section 4(f)". Any transportation project requiring federal action such as the granting of a federal permit or receipt of federal aid requires compliance with Section 4(f). It states that any federal agency may approve a transportation program or project that requires the use of a publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of National, State or local significance or land of historic sites of National, State or local significance only if:

- There is no prudent and feasible alternative to using that land; and
- The program or project includes all possible planning to minimize harm to the park recreation area, wildlife and waterfowl refuge, or historic site resulting from the use.

The proposed Spine Road is located near two neighborhood parks both planned and existing. It is not adjacent to or within a wildlife and waterfowl refuge or historic site. Neither park is historically significant.

The existing park (Manana Kai Neighborhood Park) is located about 100 feet from the Spine Road regardless of the alignment chosen. The other park has not been constructed yet but is part of the approved master plan for the former Manana Storage Area.

CONFORMANCE WITH LAND USE POLICIES AND PLANS

Because the Spine Road is an integral part of the approved master plan for the area as is the proposed Pearl City Neighborhood Park no mitigation is required under the requirements of 4(f) since both the proposed park and the Spine Road were planned in conjunction with each other and were deemed to be able to coexist successfully. Traffic noise from vehicles using the Spine Road would not preclude the beneficial use of the Manana Kai Neighborhood Park. The proposed action will not physically encroach and is not expected to have any proximity impacts that would substantially impair the function of these section 4(f) resources. Therefore, the requirements of Section 4(f) are not invoked.

CHAPTER 6

CHAPTER 343 AND NEPA EVALUATIONS

6.1 INTRODUCTION

The City and County of Honolulu (City) Department of Design and Construction (DDC) plans to use both City and federal funds to construct the proposed Spine Road. Consequently, the project must comply with both federal and state environmental impact regulations. Both sets of regulations require evaluations of the significance of the environmental effects of potential actions. The results of these evaluations determine whether a Finding of No Significant Impact (FONSI) is issued or an environmental impact statement (EIS) is prepared.

The National Environmental Policy Act (NEPA) and other federal laws, regulations and executive orders govern the content and processing requirements for federal environmental assessments. The Federal Highway Administration (FHWA) is the agency that would approve a grant for federal funding for the construction of the proposed Spine Road. Hence, the pertinent federal rules include the FHWA's NEPA regulations at 23 Code of Federal Regulations (CFR) Part 771, the Council on Environmental Quality's NEPA regulations at 40 CFR Part 1508, and Executive Order 12898 pertaining to environmental justice.

Chapter 343, Hawaii Revised Statutes (HRS), the State of Hawaii EIS Law, and the implementing rules set forth in Title 11 Chapter 200 Hawaii Administrative Rules (HAR) govern the preparation of State environmental impact documentation. As noted in Chapter 1 of this Environmental Assessment, the Chapter 343 requirements for the overall redevelopment of the former Manana Storage Area were fulfilled through the acceptance of the *Manana and Pearl City Junction Development Final Environmental Impact Statement (FEIS)*. This document addresses the potential impacts of the proposed Spine Road in greater detail than was possible at that time.

State and/or federal regulations require consideration of a number of issues in determining whether or not a FONSI is warranted. These issues do not fall neatly into any other impact categories. They include such things as the benefits of short-term versus long-term uses, the nature of significant unavoidable impacts, considerations of environmental justice, and issues that remain unresolved following preparation of the environmental document.

The remainder of this chapter is divided into the following sections:

- **Section 6.2** reviews the Chapter 343 HRS significance criteria described in Title 11 Chapter 200 HAR as they pertain to the proposed Spine Road to determine if significant impacts are expected to result from the project.
- **Section 6.3** evaluates the proposed road with respect to NEPA significance criteria listed at 40 CFR 1508.27(b).
- **Section 6.4** examines environmental justice issues.

- Sections 6.5 through 6.7 evaluate short-term versus long-term benefits, significant unavoidable impacts, and unresolved issues, respectively.
- Section 6.8 lists permits and approvals that will be needed for the proposed Spine Road.

6.2 EVALUATION BASED ON CHAPTER 343 HRS SIGNIFICANCE CRITERIA

HAR §11-200-11.2 establishes procedures for determining if an environmental impact statement (EIS) should be prepared for actions that may have a significant effect on the environment. HAR §11-200-12 lists the following criteria to be used in making such a determination:

- (1) *Involves an irrevocable commitment to loss or destruction of any natural or cultural resource;*
- (2) *Curtails the range of beneficial uses of the environment;*
- (3) *Conflicts with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders;*
- (4) *Substantially affects the economic or social welfare of the community or State;*
- (5) *Substantially affects public health;*
- (6) *Involves substantial secondary impacts, such as population changes or effects on public facilities;*
- (7) *Involves a substantial degradation of environmental quality;*
- (8) *Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions;*
- (9) *Substantially affects a rare, threatened, or endangered species, or its habitat;*
- (10) *Detrimentially affects air or water quality or ambient noise levels;*
- (11) *Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters;*
- (12) *Substantially affects scenic vistas and viewplanes identified in county or state plans or studies; or*
- (13) *Requires substantial energy consumption.*

The City evaluated the potential effects of the proposed Spine Road using these criteria. The findings with respect to each criterion are summarized below.

6.2.1 IRREVOCABLE LOSS OR DESTRUCTION OF VALUABLE RESOURCES

The proposed project would be constructed on a parcel that has already been substantially altered by cultivation and military activities. Years of agricultural, military, and industrial use have disturbed both the surface and subsurface through grading, plowing, paving and

building. No valuable resources are known or expected to occur on the site. Construction of the proposed roadway does not involve the loss or destruction of any valuable cultural or natural resources.

6.2.2 CURTAILS BENEFICIAL USES

Both proposed road alignments presently contain old warehouses that are being used on a temporary basis under short-term agreements. The tenants understood the limited tenure of their occupancy at the time they moved into the spaces. In view of this, construction and use of the proposed Spine Road would not significantly curtail beneficial uses of the site. On the contrary, the continued presence of the old military warehouses severely constrains the types of beneficial uses now possible. The proposed Spine Road is integral to redevelopment of the former Manana Storage Area, which is considered substantially more beneficial than the existing use.

6.2.3 CONFLICTS WITH LONG-TERM ENVIRONMENTAL POLICIES OR GOALS

The Planning Department determined that the full redevelopment of the former Manana Storage Area was consistent with Chapter 344 HRS (see the *Manana and Pearl City Junction Development Final Environmental Impact Statement*). The proposed Spine Road is an integral part of the redevelopment plans, and its potential effects were addressed during the planning and environmental documentation for the redevelopment.

6.2.4 SUBSTANTIALLY AFFECTS ECONOMIC OR SOCIAL WELFARE

The proposed road is intended to facilitate commercial, industrial and public uses planned as part of the redevelopment of the former Manana Storage Area. The secondary and cumulative effects of the redevelopment are addressed in the *Manana and Pearl City Junction Development FEIS*. The proposed Spine Road would not result in significant adverse impacts to the economic or social welfare of the community.

6.2.5 PUBLIC HEALTH EFFECTS

The proposed project would not have a significant adverse effect on air quality. The design of the proposed road would include traffic signals, crosswalks and ADA curb ramps at all intersections. Bicycle paths and wide sidewalks are intended to facilitate and encourage non-vehicle use of the road. Proper lighting, fire hydrants and other safety measures would be installed. Noise generated by traffic using the road is estimated to be below the range considered harmful to human health.¹

6.2.6 PRODUCES SUBSTANTIAL SECONDARY IMPACTS

The proposed project would not produce significant secondary impacts. It is not designed to foster population growth, but would promote beneficial economic development. The secondary effects of redeveloping the former Manana Storage Area were addressed in the *Manana and Pearl City Junction Development Final Environmental Impact Statement*.

¹ As discussed in Chapter 4, mitigation measures would reduce noise associated with the road to acceptable levels.

6.2.7 SUBSTANTIALLY DEGRADES ENVIRONMENTAL QUALITY

The proposed project would not have significant long-term environmental effects. The roadway right-of-way is already industrial in nature. Noise from traffic, which might otherwise have the potential to affect neighboring properties adversely, would be mitigated as necessary using noise attenuation features. By opening up a visual corridor, views of Pearl Harbor and the coastline would be enhanced. Similarly, impacts associated with construction would be minimized through the use of best management practices and other controls.

6.2.8 CUMULATIVE EFFECTS OR COMMITMENT TO A LARGER ACTION

The proposed Spine Road is one feature of the overall redevelopment plan for the former Manana Storage Area. The cumulative effects of redeveloping the entire former Manana Storage Area were addressed in the *Manana and Pearl City Junction Development FEIS*.

6.2.9 AFFECTS A RARE, THREATENED, OR ENDANGERED SPECIES

No rare, threatened, or endangered species are known to be present on or near the project site. The site does not contain any critical habitat. Therefore, the proposed project would have no effect on these resources.

6.2.10 AFFECTS AIR OR WATER QUALITY OR AMBIENT NOISE LEVELS

Construction and use of the proposed road would not have measurable effects on water quality. Traffic using the road would generate emissions that would modify air pollutant concentrations, but values are predicted to remain within established state and federal standards. Noise levels are expected to increase in some areas because of use of the proposed Spine Road. Adverse impacts would be reduced to less-than-significant levels using appropriate design measures (see Section 4.4). Construction noise would be temporary and compliance with State Department of Health noise regulations would mitigate its effects.

6.2.11 ENVIRONMENTALLY SENSITIVE AREAS

There are no environmentally sensitive areas or resources near the proposed project.

6.2.12 AFFECTS SCENIC VISTAS AND VIEWPLANES

The existing project area does not currently provide any scenic vistas. The proposed project would improve views of Pearl Harbor and the ocean by opening up a visual corridor.

6.2.13 REQUIRES SUBSTANTIAL ENERGY CONSUMPTION

The proposed Spine Road is intended to facilitate access to parcels that are part of the overall redevelopment of the former Manana Storage Area. Energy would be used to construct and maintain the roadway and vehicles using the road would expend energy. However, given the relatively short length of the proposed Spine Road and uncomplicated construction methods, the proposed project is not expected to affect energy consumption significantly.

6.2.14 CHAPTER 343 HRS DETERMINATION

In accordance with Chapter 343, Hawaii Revised Statutes and the significance criteria described above, the DDC has made a determination that the proposed Spine Road would

have no significant adverse impacts on natural or man-made resources. All potential impacts would be mitigated to the extent practicable. No new information became known during public review of the Draft Environmental Assessment. Consequently, on the basis of this Final EA, the DDC has made a Finding of No Significant Impact for the proposed action.

6.3 NEPA SIGNIFICANCE DETERMINATION

The primary federal environmental impact law is the National Environmental Policy Act of 1969, as amended (NEPA). The Council on Environmental Quality (CEQ) set forth the requirements of NEPA in 40 CFR Parts 1500-1508. In addition, each federal agency promulgates regulations implementing NEPA and the CEQ regulations. FHWA's regulations are at 23 CFR Part 771. Although not specifically defined as such, the federal significance criteria are described at 40 CFR 1508.27(b)(1) through (10).

Section 1508.27 requires that the significance of a proposed project's potential effects be judged relative to both its "context" and "intensity". "Context" means the analysis must consider the surroundings within which the action would occur and its scale relative to other factors. In the case of a site-specific action such as the proposed Spine Road, the local area is generally the most important area to consider.

"Intensity" refers to the severity of the impact. The regulations call for the following factors to be considered in evaluating the intensity of effects associated with a proposed project:

- (1) *Impacts may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial;*
- (2) *The degree to which the proposed action affects public health or safety;*
- (3) *Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas;*
- (4) *The degree to which the effects on the quality of the human environment are likely to be highly controversial;*
- (5) *The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks;*
- (6) *The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration;*
- (7) *Whether the action is related to other actions with individually insignificant but cumulatively significant impacts;*
- (8) *The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause the loss or destruction of significant scientific, cultural, or historical resources;*

- (9) *The degree to which the action may adversely affect an endangered or threatened species, or its habitat that has been determined to be critical under the Endangered Species Act of 1973; and*
- (10) *Whether the action threatens a violation of federal, state or local law or requirements imposed for protection of the environment.*

The proposed action relative to each of these ten "significance" factors has been evaluated and the conclusions relative to each are discussed in the following subsections.

6.3.1 BENEFICIAL VERSUS ADVERSE IMPACTS

As described in Chapter 4, the proposed Spine Road is anticipated to result in both beneficial and adverse impacts. The principal benefit would be improved access to parcels on the former Manana Storage Area. However, the new roadway² is also expected to improve traffic congestion at some nearby intersections.

The proposed action would have localized effects on the concentration of automotive air pollutants and on noise levels. The Air Quality Impact Report states that the proposed project's impact on air quality would be minimal and would not cause violations of federal air quality standards. The report predicts that carbon monoxide levels would decrease in the future, partially due to a redistribution of traffic that is anticipated as a result of the use of Spine Road. Some locations near the proposed road are predicted to experience traffic noise impact, as defined by the FHWA's noise abatement criteria. The City proposes to implement mitigation measures that will reduce noise to acceptable levels.

6.3.2 PUBLIC HEALTH AND SAFETY

The proposed road design would include a number of safeguards to ensure that public safety is not compromised. Crosswalks, ADA curb ramps and traffic signals would be provided at each internal intersection and at the two termini. Proper lighting and fire hydrants would be installed. Bicycle paths and wide sidewalks are intended to minimize interactions between vehicles and bicycle riders and pedestrians. Results of the air quality impact analysis conducted for the proposed road show that it would not have a significant adverse effect on public health. With inclusion of mitigation measures, noise generated by traffic using the road is estimated to be below the range considered harmful to human health.

6.3.3 UNIQUE ENVIRONMENT

As discussed in Section 6.2.11, the proposed project area does not constitute or contain environmentally sensitive areas. Neither is it in close proximity to any significant resources. No historic or cultural resources, wetlands, or ecologically critical habitat have been identified anywhere on the former Manana Storage Area property or nearby. No wild and scenic rivers exist in the vicinity. The nearest park, Manana Kai Park, is about 100 feet from the preferred alignment and 240 feet from the alternative alignment. When the City's

² Analyses assumed that unrelated roadway improvements which have been recommended to relieve existing congestion (at Kamehameha Highway/Waimano Home Road, Kamehameha Highway/Acacia Road, Moanalua Road/Waimano Home Road, Waimano Home Road/Noelani Street, and Acacia/Kuala Street intersections) are also implemented.

redevelopment plan for the former Manana Storage Area is implemented, the proposed Spine Road would be separated from the Manana Kai Park by commercial uses.

6.3.4 PRESENCE OF CONTROVERSIAL ISSUES

The local community has taken an active interest in the entire redevelopment of the former Manana Storage Area. Public involvement has been integral to the development planning process. During the review of the Draft Environmental Assessment, the City continued to consult with the neighboring community in order to resolve controversial issues such as the ultimate configuration of Noelani Street intersection with Waimano Home Road. The results of this consultation are reflected in the Final Environmental Assessment. As a result there are no outstanding controversial issues.

6.3.5 UNCERTAINTY AND UNKNOWN RISKS

The proposed Spine Road is not a unique or unusual type of project. The potential impacts associated with construction and use of the road are known with a good degree of certainty and can be mitigated to minimize both short- and long-term effects.

6.3.6 PRECEDENT SETTING

The proposed project is not anticipated to establish any precedents. The proposed Spine Road is part of the comprehensive redevelopment plan for the former Manana Storage Area addressed in the 1996 *Manana and Pearl City Junction Development FEIS*.

6.3.7 CUMULATIVE IMPACTS

The proposed Spine Road is part of the more extensive redevelopment of the entire former Manana Storage Area. The potential effects of the overall redevelopment were evaluated and addressed in the *Manana and Pearl City Junction Development FEIS* that was accepted in 1996. The proposed roadway is not intended to facilitate population or business growth beyond that already addressed in Section 6.2 of that *FEIS*.

The *Manana and Pearl City Junction Development FEIS* identified a number of ways in which the redevelopment of that land had the potential for cumulative effects. They include the following:

- Increased traffic from other areas that depend upon the same roadways would mix with traffic generated by new uses brought about by the redevelopment of the former Manana Storage Area.
- Other development would require water from the same BWS system that would serve redevelopment within the former Manana Storage Area.
- Wastewater from redevelopment served by the proposed roadway would combine with that generated by new development elsewhere within the service area of the Honouliuli Wastewater Treatment Plant.
- The Honolulu Police and Fire Departments would need to increase their facilities and staffing to cover not only the proposed redevelopment of the former Manana Storage Area, but development elsewhere on the island as well.

- The same construction firms and construction labor force needed for the proposed project would be called upon to meet the needs of development elsewhere on the island.
- Government agencies must fund projects and activities throughout their jurisdiction. Funding for redevelopment of the former Manana Storage Area would add to these costs.

As noted in earlier chapters, the former Manana Storage Area is surrounded by existing development. The only additional development that might occur in the vicinity (and that might, therefore, cause cumulative impacts) is the City's redevelopment of the Manana Junction parcel. The potential effects of that activity were thoroughly evaluated in the aforementioned 1996 FEIS for the overall project.

The analysis of the Spine Road's potential impacts presented in Chapter 4 of this report considers the proposed Spine Road in concert with the changes that other anticipated actions are likely to produce. Thus, the consideration of cumulative effects is an integral part of this analysis. This is most evident in the discussions of roadway and traffic impacts (Section 4.6), noise impacts (Section 4.4, and air quality impacts in Section 4.5). However, cumulative issues are addressed elsewhere in this document whenever they are relevant.

6.3.8 IMPACTS TO HISTORICAL AND CULTURAL RESOURCES

Studies have indicated that no historical or cultural resources are present on the project site. No impacts are anticipated.

6.3.9 ENDANGERED OR THREATENED SPECIES

No rare, threatened or endangered species of flora or fauna are known to be present on or near the project site. The site does not contain any critical habitat. Therefore, the proposed project would have no effect on these resources.

6.3.10 COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS

Design, construction and use of the proposed Spine Road would comply with federal, State, and local environmental laws and regulations.

6.4 ENVIRONMENTAL JUSTICE

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations, requires Federal agencies to take appropriate steps to identify and avoid any disproportionately high and adverse human health or environmental effects of Federal programs, policies, or activities on minority and low-income populations. The FHWA's Final Environmental Justice Strategy was published in the *Federal Register* (Volume 60, No. 125) on June 29, 1995. The final DOT Order on compliance (Department of Transportation Actions to Address Environmental Justice in Minority Populations and Low-Income Populations) was published in the April 15, 1997 *Federal Register* (Volume 62, Number 72). The objective of the federal government's environmental justice policy is to ensure that federal agencies' programs, policies and activities do not exclude participation, do not deny benefits, or do not subject persons to discrimination because of their race, national

origin, or income. Another primary goal is to ensure that all citizens are protected from disproportionate exposure to environmental hazards.

The spirit of environmental justice has been an integral part of the Manana and Pearl City Junction Development master planning process. Local community groups were involved early through the establishment of the Pearl City Planning Task Force (PCPTF) which developed the conceptual master plan that was addressed in the City's *Manana and Pearl City Junction Development FEIS*. The PCPTF and its component groups continue to be active participants in the evolving plans for the development, including the proposed Spine Road addressed in this document. The City has encouraged all stakeholders to participate in the planning process, and no person or group has been knowingly excluded.

During the original planning period of January through August 1995, the PCPTF met nine times and held four community meetings. Meeting times and dates were publicized through paid advertisements in *The Leeward Current* (the local area newspaper), the *Ka Leo Lalo* newsletter, community banners, press advisories, and canvassing efforts by the PCPTF and the staff of the former City Department of Housing and Community Development. The PCPTF continues to meet at approximately one-to-two month intervals. All meetings have been open, and the City has endeavored to insure that all members of the community were aware of the options being considered and had an opportunity to have their concerns heard and acted upon.

The PCPTF and other groups, particularly the Pearl City Neighborhood Board, have requested that the redevelopment include a number of community benefits and mitigation measures. Many of these have been incorporated in the design of the Spine Road. For example, the City would provide a landscaped median, bicycle paths, wide sidewalks and crosswalks at intersections. The noise mitigation measures described in Chapter 4 will be implemented as necessary. These measures are intended to minimize potential adverse effects on all members of the communities surrounding the 109-acre redevelopment parcel that would be served by the proposed Spine Road.

Taken as a whole, the areas surrounding the Manana Storage Area redevelopment parcel are generally homogenous, consisting largely of moderately priced single-family homes. Exceptions include the Hale Ola low-density apartments³ directly west of the site, and low-density townhomes *makai* of the site.

In addition, interviews were conducted to determine the presence of low-income and/or minority populations in the neighborhood. Those located near the project site are⁴:

- Hale O' Hauoli, a 100-unit complex for the elderly at 950 Luehu Street, *makai* of the project site (U.S. Department of Housing and Urban Development)

³ Although the Hale Ola complex was HUD-insured, and originally planned for low-cost rentals, it is now a market-priced condominium project, with no income limits or criteria.

⁴ The environmental consultants interviewed members of the Pearl City Neighborhood Board (J. Souza and A. Fukushima, personal communication), the U.S. Department of Housing and Urban Development (M. Flores and R. Dixon, personal communication), the Hawaii Housing Authority (C. Fong, personal communication), the City Planning Department (T. Hata, personal communication), and the former City Department of Housing and Community Development (R. Sakai, personal communication).

- Duplex home for persons with disabilities, 1296 Hooli Circle (U.S. Department of Housing and Urban Development)
- Weinberg Pearl City Complex, a two-story complex for persons with mental disabilities, Waimano Home Road (Harry and Jeanette Weinberg Foundation)
- Manana Gardens, low-income rentals, 929 through 959 Luehu Street (U.S. Department of Housing and Urban Development-associated)

None of these projects is adjacent to the proposed Spine Road or to roadways whose use would be significantly affected by its construction. Implementation of appropriate mitigation measures and operational features such as adequate lighting and speed limits are intended to minimize the potential impacts of the proposed Spine Road to less than significant levels. Finally, the proposed Spine Road is not anticipated to result in any significant environmental hazard exposures in the project vicinity or elsewhere.

In summary, no minority or low-income populations have been identified that would be adversely affected by the proposed project as per Executive Order 12898 regarding environmental justice. Consequently, construction of the proposed roadway along either of the two alignments described in this environmental assessment will not cause disproportionately high and adverse effects on any minority or low-income populations.

6.5 RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

As discussed in previous sections of this document, the existing warehouses on the former Manana Storage Area were present when the City acquired the property from the Navy. City agencies occupy space in eight warehouses and four are leased (three non-profit organizations and one for-profit company). While these temporary uses are beneficial to the City agencies and lessees and provide a small income to the City, they are not, in general, the uses for which the City purchased the property. Moreover, they do not represent an economically viable long-term use of the property. Rather, they are interim arrangements that are appropriate until the redevelopment plans can be implemented.

The native soils have been substantially disturbed through previous use of the site. Soil loss because of wind and water erosion probably occurred during agricultural use of the property. Furthermore, the Navy likely imported coarse-grained fill material for use as road and foundation base-course that is unsuited for agricultural use. It would be virtually impossible to return the property to the state it was in before its use for sugar cane cultivation. In view of this, "long-term productivity" is most appropriately viewed within the context of productive urban uses that would be served by the proposed Spine Road.

Construction of the proposed Spine Road would involve construction activities that generate noise, dust, and traffic. While these have the potential to affect nearby areas adversely, the effects would be temporary and mitigated to the extent practicable. Moreover, construction of the roadway before development of the adjacent parcels would minimize the potential for conflicts and adverse effects.

6.6 SIGNIFICANT UNAVOIDABLE IMPACTS

No significant unavoidable impacts are expected from the construction or use of the proposed road. Where adverse impacts are anticipated, mitigation measures would be implemented to ensure that the effects are less than significant.

6.7 SUMMARY OF UNRESOLVED ISSUES

Because the proposed road is the result of a long-term public planning process that has involved all known stakeholders, most issues have been resolved. Those that remain include the following:

- Funding and jurisdictional limitations are likely to prevent the City and State from implementing all of the recommended transportation improvements at the same time. The exact manner in which these would be accomplished and their timing have not been determined.
- Details regarding proposed noise abatement measures, operational constraints (e.g., signalized internal intersections), retaining walls for grading purposes, and landscaping which currently are not known with certainty would be determined before the start of construction of the proposed Spine Road.

6.8 PERMITS AND APPROVALS NEEDED

- (1) Building permit for building, electrical, plumbing, sidewalk/driveway and demolition work
- (2) Grubbing and grading permit
- (3) Coastal Zone Management federal consistency determination
- (4) NPDES Construction Stormwater permit
- (5) DOH construction noise permit
- (6) Approval from the U.S. Navy for work within Acacia Road
- (7) Variances from design standards (if required)

CHAPTER 7

PARTIES CONSULTED

7.1 PARTIES CONSULTED DURING PREPARATION OF THE MANANA AND PEARL CITY JUNCTION DEVELOPMENT FEIS

Preparation of the *Manana and Pearl City Junction Development FEIS* (May 1996) involved extensive consultation (see Section 1.1.1). Table 7-1 lists the parties contacted, whether they responded, and if their response contained any specific reference to the Spine Road as presented in the previous document. The responses that were specific to the Spine Road have been considered in the preparation of this document and the design of the project.

The proposed Spine Road is a vital component of the preferred master plan for the redevelopment of the former Manana Storage Area. The redevelopment master plan was developed by a 24-member community-based task force (Pearl City Planning Task Force) established for the specific purpose of developing land use recommendations for the Manana and Pearl City Junction Properties. The task force is comprised of representatives of the Pearl City neighborhood Board, several local community associations, city personnel and a number of non-voting elected officials. It is still active in reviewing the details of the individual components that are part of its recommended master plan for the area.

7.2 ADDITIONAL PUBLIC INVOLVEMENT OPPORTUNITIES

As related above, a community-based task force initially developed the preferred master plan for the former Manana Storage Area. The implementation of this master plan required amendments to the Primary Urban Center Development Plan (DP) Public Infrastructure Map. These amendments are discussed in Chapter 5 of this EA. The amendment process provided the public with numerous opportunities to provide input regarding the master plan at public hearings and City Council meetings.

7.3 ADDITIONAL CONSULTATION DURING PREPARATION OF THIS ENVIRONMENTAL ASSESSMENT

The City has continued to consult with the Pearl City Planning Task Force, the Pearl City Neighborhood Board, other community organizations and government agencies during the ongoing planning for redevelopment of the former Manana Storage Area. The Department of Design and Construction (DDC) also invited key agencies and organizations to participate in an early consultation effort to ensure that all issues or concerns would be considered in the preparation of this EA. Agencies and organizations consulted in this fashion and whether or not they responded are shown in Table 7-2. Copies of the consultation letters and any responses received are in Appendix D.

In addition, the DDC and its consultants have attended and/or made presentations at the community meetings and public hearings that were recently held for one of the proposed

projects identified in the preferred master plan - the Pearl City Bus Facility. The DDC did this because it wanted to identify any community issues or concerns that might influence its design for the Spine Road. These meetings included the following:

- July 28, 1998 informational briefing to the Manana Community Association regarding the Pearl City Bus Facility and Manana Development Spine Road projects.
- August 4, 1998, informational briefing to the Pearl City Planning Task Force regarding the Pearl City Bus Facility and Manana Development Spine Road projects.
- August 10, 1998, open house and formal Public Hearing regarding the Pearl City Bus Facility.

Because of the close integration of the two projects and community input received during the above listed meetings, the DDC and its consultants conducted additional analyses on alternative scenarios involving the Noelani Street intersection with Waimano Home Road. Results of these analyses are included in this document.

7.4 CIRCULATION AND PUBLICATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT (DEA)

The DEA was mailed or delivered to 61 agencies, organizations, individuals and elected officials (Table 7-3). The transmittal letter included in the DEA mailing also provided the recipients of the Draft EA details on the public hearing that the DDC expects to hold in November 17, 1998. A legal notice informing the public of the availability of the DEA and the upcoming public hearing was also placed in the *Honolulu Advertiser* on October 16, 1998 and November 10, 1998. In addition and as mandated by state law, a notice of availability of the DEA was published in *The Environmental Notice*¹ on October 23, 1998. It included the public comment deadline and other information related to the project such as a summary, contact names and numbers, name of the approving agency and the tax map key for the proposed project.

7.5 DRAFT EA COMMENTS AND RESPONSES

Table 7-4 lists the parties that commented on the Draft EA. It also indicates whether the comments were substantive and assigns a number to the correspondence. Copies of the comment and response letters are reproduced in Appendix E.

7.6 PUBLIC HEARING

The City held an open house and formal public hearing for the Draft Environmental Assessment at the Pearl City Elementary School on Tuesday, November 17, 1998. The Open House took place from 6:30 p.m. to 7:15 p.m. Representatives of City agencies and the

¹ *The Environmental Notice* is a semi-monthly bulletin of the State Office of Environmental Quality control. The bulletin is mailed to interested individuals, organizations, agencies, developers and elected officials.

consultants who helped the City prepare the Draft Environmental Assessment were present during the Open House to answer questions. The formal public hearing began at approximately 7:30 p.m. Notice of this meeting was given to the public via the placement of an advertisement in the local paper as well as in the transmittal letter that accompanied the DEA.

Copies of the legal notice published in the local paper announcing the public hearing, meeting agenda, the hand-outs, the sign-in sheets, and the single written testimony that was submitted are reproduced in Appendix F. Copies of the transcript are available from the DDC.

At the hearing, 3 people gave oral testimony. Two of these individuals spoke on behalf of the Manana and Century Park Plaza Community Associations respectively, while the other spoke as an individual. Points made in this oral testimony are summarized below:

- The Manana Community Association endorsed the preferred alignment of the proposed Spine Road at its November 9, 1998 board meeting. This endorsement includes the Connector Road as described in this document.
- The Manana Community Association recommends retaining daily mauka-bound left turns from Waimano Home Road onto Noelani Street except during the weekday morning peak hours when the Manana Storage Area becomes more fully developed and increases in traffic volume warrant additional mitigative measures.
- The Manana Community Association favors the imposition of no parking areas and tow away zones on the proposed Spine Road. Similar restrictions should be imposed on the Connector Road, Acacia and Kuala Roads, and internal project roadways in the Manana Development Area.
- The Manana Community Association would like to know about proposed improvements to the Waimano Home Road and Acacia Road intersections at Kamehameha Highway; and any mitigative measures for potential air and noise impacts to the two parcels on the *makai*-side of Moanalua Road affected by the acquisition of additional right-of-way.
- The Century Park Plaza Community Association is concerned about left-hand turns out of their 4 condominium driveways onto Kamehameha Highway. Increased traffic flows resulting from the development of the proposed Spine Road could make this exit more difficult especially since the driveways are located on a blind curve. The Century Park Plaza Community Association recommends that a bridge be built to allow condominium residents to access Kamehameha Highway going in *Diamond Head* direction without negotiating a left-hand turn out of the four driveways. Alternatively, it recommends that a traffic light be installed at one of their driveways to allow residents to leave their complex.
- The Century Park Plaza Community Association is opposed to restriction on on-street parking in the area surrounding their condominium since guests of residents use on-street parking.
- The proposed Spine Road should be extended to Kuahaka Street.
- There is already existing traffic congestion in the area where the proposed Spine Road intersects with Waimano Home Road.

PARTIES CONSULTED

Table 7- 1. Parties Consulted During Preparation of the Manana and Pearl City Junction Development Final Environmental Impact Statement

Federal Agencies	
U.S. Department of Agriculture, Natural Resources Conservation Service	<input type="checkbox"/>
U.S. Army Corps of Engineers, Pacific Ocean Division	<input type="checkbox"/>
U.S. Department of the Interior, Fish & Wildlife Service	<input type="checkbox"/>
U.S. Department of the Interior, National Park Service	
U.S. Department of the Interior, U.S. Geological Survey	<input type="checkbox"/>
U.S. Department of Commerce, National Marine Fisheries Service	
U.S. Department of Transportation, Federal Aviation Administration	
U.S. Department of the Navy, Facilities Engineering	<input type="checkbox"/>
U.S. Department of the Navy, Commander, Naval Base Pearl Harbor	<input type="checkbox"/>
State Agencies	
Department of Accounting & General Services	<input type="checkbox"/>
Department of Agriculture	
Department of Business, Economic Development, and Tourism	<input type="checkbox"/>
Department of Defense	<input type="checkbox"/>
Department of Education	<input type="checkbox"/>
Department of Hawaiian Home Lands	<input type="checkbox"/>
Department of Land & Natural Resources	<input type="checkbox"/>
Department of Land & Natural Resources, Historic Preservation Division	<input type="checkbox"/>
Department of Health, Environmental Management Division	<input type="checkbox"/>
Department of Transportation	<input type="checkbox"/>
Office of Planning	<input type="checkbox"/>
Office of Hawaiian Affairs	
University of Hawaii, Water Resources Research Center	<input type="checkbox"/>
University of Hawaii, Environmental Center	<input type="checkbox"/>
Housing Finance and Development Corporation	<input type="checkbox"/>
State Energy Office	<input type="checkbox"/>
Office of Environmental Quality Control	<input type="checkbox"/>
State Land Use Commission	<input type="checkbox"/>
<input type="checkbox"/> = Comment Received ✓ = Comment Received Specifically Mentions Spine Road	

Source: *Manana and Pearl City Junction Development Final Environmental Impact Statement*

Table 7-1. Parties Consulted During Preparation of the Manana and Pearl City Junction Development Environmental Final Impact Statement (continued)

City & County of Honolulu Agencies	
Department of Land Utilization	<input type="checkbox"/>
Planning Department	<input type="checkbox"/>
Building Department	<input type="checkbox"/>
Department of Transportation Services	<input checked="" type="checkbox"/>
Department of Parks and Recreation	<input type="checkbox"/>
Department of Public Works	<input type="checkbox"/>
Board of Water Supply	<input type="checkbox"/>
Honolulu Public Transit Authority	<input type="checkbox"/>
Honolulu Fire Department	<input type="checkbox"/>
Honolulu Police Department	<input type="checkbox"/>
Department of Wastewater Management	<input type="checkbox"/>
Department of Finance	<input type="checkbox"/>
Other Parties Consulted	
U.S. Congressman Neil Abercrombie	<input type="checkbox"/>
State Senator David Ige	<input checked="" type="checkbox"/>
State Senator Cal Kawamoto	<input type="checkbox"/>
State Representative Mark K. Takai	<input type="checkbox"/>
State Representative Roy Takumi	<input type="checkbox"/>
State Representative Noboru Yonamine	<input type="checkbox"/>
Councilmember Mufi Hannemann	<input type="checkbox"/>
Oahu Metropolitan Planning Organization	<input type="checkbox"/>
Hawaiian Electric Company	<input checked="" type="checkbox"/>
Pearl City Neighborhood Board	<input checked="" type="checkbox"/>
Pearl City Community Association	<input type="checkbox"/>
Manana Community Association	<input type="checkbox"/>
American Lung Association	<input type="checkbox"/>
Monroe Friedlander Management, Inc.	<input type="checkbox"/>
Pearl Highlands Center Associates	<input type="checkbox"/>
Ms. Sherry Aquino	<input type="checkbox"/>
<input type="checkbox"/> = Comment Received <input checked="" type="checkbox"/> = Comment Received Specifically Mentions Spine Road	

Name of Agency/Organization	Response Received?
Environmental Protection Agency, Region IX	Yes
Coastal Zone Management Program Office, State of Hawaii	No
Highways Administrator, Hawaii State Department of Transportation	No
Department of Planning and Permitting, City & County of Honolulu	No
Planning Department, City & County of Honolulu	No
Chairperson, Honolulu City Council	No
Manana Community Association	Yes ²
Pearl City Community Association	No
Pearl City Neighborhood Board No. 21	No
State Historic Preservation Officer, State of Hawaii	Yes
Operations Branch, U.S. Army Corps of Engineers	Yes
Fish & Wildlife Service, U.S. Department of the Interior	Yes ³

² Provided verbally³ Provided verbally

Table 7-3. Parties to Whom the DEA was Sent

Federal Agencies
U.S. Department of Agriculture, Natural Resources Conservation Service
U.S. Army Corps of Engineers, Pacific Ocean Division
U.S. Department of the Interior, Fish & Wildlife Service
U.S. Department of Commerce, National Marine Fisheries Service
U.S. Department of Transportation, Federal Transit Administration
U.S. Department of Transportation, Federal Highway Administration Region IX
U.S. Department of the Navy, Facilities Engineering
U.S. Department of the Navy, Commander, Naval Base Pearl Harbor
State Agencies
Department of Business, Economic Development, and Tourism
Department of Education
Department of Land & Natural Resources
Department of Land & Natural Resources, Historic Preservation Division
Department of Health
Department of Transportation
Office of Planning
Office of Hawaiian Affairs
Office of Environmental Quality Control
City & County of Honolulu Agencies
Department of Planning and Permitting
Planning Department
Department of Budget and Fiscal Services
Department of Community Services
Department of Facility Management
Department of Transportation Services
Department of Parks and Recreation
Department of Environmental Services
Board of Water Supply
Honolulu Public Transit Authority
Honolulu Fire Department
Honolulu Police Department
Department of Wastewater Management
Department of Finance
Municipal Reference and Records Center

Table 7-3. Parties to Whom the DEA was Sent (continued).

Other Parties
U.S. Senator Daniel Inouye
U.S. Senator Daniel Akaka
U.S. Congressman Neil Abercrombie
State Senator David Ige
State Senator Cal Kawamoto
State Representative Mark K. Takai
State Representative Roy Takumi
State Representative Noboru Yonamine
Councilmember Mufi Hannemann
Oahu Metropolitan Planning Organization
GTE Hawaiian Telephone
Oceanic Cablevision
Hawaiian Electric Company
The Gas Company
Pearl City Neighborhood Board
Pearl City Community Association
Manana Community Association
Century Park Plaza Association
Hale Ola Association
Pacific Palisades Community Association
Momilani Community Association
Wailuna Recreation Association
American Lung Association
Transportation Commission
Pearl Highlands Center Associates
Pearl City Regional Library
Sierra Club Hawaii Chapter
Aiea and Pearl City Business Association
Other Parties
Pearl City Regional Library
Transportation Commission
Pearl Highlands Center Associates
Sierra Club Hawaii Chapter
Aiea and Pearl City Business Association

PARTIES CONSULTED

Table 7-4. Parties Commenting on the DEA

<i>Letter No.</i>	<i>Individual/Organization</i>	<i>Comment Letter Date</i>	<i>Substantive Comment</i>	<i>Response Date</i>
1	Department of Facility Maintenance, City & County of Honolulu	10/23/98	No	11/19/98
2	Department of Land and Natural Resources, State of Hawaii	10/28/98	No	n/a
3	Fish & Wildlife Service, U.S. Department of the Interior	10/29/98	No	n/a
4	Fire Department, City & County of Honolulu	10/29/98	No	11/18/98
5	Corps of Engineers, U.S. Army Engineer District, Honolulu	10/30/98	No	11/24/98
6	Department of Environmental Services, City & County of Honolulu	11/4/98	Yes	11/24/98
7	Office of Planning, Department of Business, Economic Development, & Tourism, State of Hawaii	11/17/98	No	n/a
8	Department of Parks and Recreation, City and County of Honolulu	11/17/98	No	n/a
9	Planning Department, City & County of Honolulu	11/18/98	Yes	1/14/99
10	Hawaii State Public Library System, Department of Education, State of Hawaii	11/18/98	No	n/a
11	Susan Everett	11/18/98	Yes	2/9/99
12	Commander, Naval Base Pearl Harbor, Department of the Navy	11/19/98	No	n/a
13	Land Division, Department of Land & Natural Resources, State of Hawaii	11/20/98	No	n/a
14	Department of Transportation Services, City & County of Honolulu	11/23/98	No	1/14/99

PARTIES CONSULTED

Table 7-4. Parties Commenting on the DEA

<i>Letter No.</i>	<i>Individual/Organization</i>	<i>Comment Letter Date</i>	<i>Substantive Comment</i>	<i>Response Date</i>
15	Department of Planning and Permitting, City and County of Honolulu	11/24/98	Yes	1/13/99
16	Pearl City Neighborhood Board No. 21	11/25/98	Yes	2/9/99
17	Board of Water Supply, City and County of Honolulu	11/25/98	No	n/a
18	Department of Community Services, City and County of Honolulu	11/27/98	No	n/a
19	Department of Health, State of Hawaii	11/27/98	No	n/a
20	Police Department, City & County of Honolulu	11/13/98	Yes	11/27/98
21	Natural Resource Conservation Service, U.S. Department of Agriculture	12/2/98	No	n/a
22	Infrastructure Provisioning Department, GTE Hawaiian Telephone Company	11/11/98	No	12/2/98

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TRAFFIC ASSESSMENT

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TRAFFIC IMPACT ASSESSMENT REPORT

FOR

MANANA SPINE ROAD

December 28, 1998

Pearl City, Oahu, Hawaii

Prepared for:

Engineering Concepts, Inc.

Prepared By:

**Pacific Planning & Engineering, Inc.
1221 Keppolani Boulevard, Suite PH 60
Honolulu, Hawaii 96814**

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FOREWORD

The report deals with traffic volumes and roadway capacity, and is not a design document. No conclusions of traffic safety are stated or implied. Recommendations of mitigation actions relate solely to capacity improvements to reduce or minimize traffic delays. Analytical methods are based on the 1994 edition of the Highway Capacity Manual.

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EXECUTIVE SUMMARY

Pacific Planning & Engineering, Inc. (PPE) was engaged to identify and assess potential future traffic impacts that would be caused by the proposed Manana Storage Area development and Spine Road in the year 2020. This report will also recommend a preferred alignment alternative based on traffic operations.

Project Description

The City and County of Honolulu is proposing to develop the 109 acre Manana Storage Area and 14 acre Pearl City Junction properties and is identified by TMK 9-27-24: 6 & 41 and TMK 9-7-23:01, respectively. The master plan for the site was developed jointly by the City Department of Housing and Community Development and the Pearl City Planning Task Force. The Pearl City Task Force Final Report: Recommended Land Use Alternative for the Manana and Pearl City Junction Properties" included a development plan consisting of commercial (retail/office) space, public facilities, a community park, a family entertainment center, medical facilities and light-industrial uses.

As part of the master plan, a new roadway, referred to as the "Spine Road", was proposed to provide access to the development. The Spine Road is envisioned as a four-lane collector road through the Manana Storage Area development area. Figure 1 shows the project location. The two Spine Road alternatives being considered in this report are shown in Figure 2.

The first alternative connects with Moanalua Road to the north, forming the eastbound leg of an existing T-intersection with Waimano Home Road. To the south, the Spine Road forms a southbound leg to the existing intersection of Acacia Road with Kuala Street.

The second alternative is similar to the first in the northern portion near Moanalua Road. However, it traverses a path east of the Alternative 1 alignment forming a direct route to Kamehameha Highway. In order to accomplish this, Acacia Road needs to be modified as shown on Figure 2 which forms a new T-intersection with the Spine Road.

This report will identify and assess potential future traffic impacts that would be caused by the proposed Manana Storage Area development in the year 2020. In addition, a preferred Spine Road alignment alternative will be recommended based on traffic operations.

Methodology

Traffic analysis was conducted at the following intersections to determine the impact of the proposed project on the adjacent roadways:

- Waimano Home Road with Noelani Street,
- Waimano Home Road with Moanalua Road,
- Waimano Home Road with Hoolauluca Street,
- Kamehameha Highway with Waimano Home Road,
- Kamehameha Highway with Acacia Road,
- Kamehameha Highway with Kuala Street and
- Kuala Street with Acacia Road.

Future traffic was forecasted by adding the following:

- existing traffic volumes at the study intersections,
- traffic diversions due to the existence of a Spine Road,
- the increase in general traffic and
- traffic generated by surrounding developments in the area.

This study assesses the impact on the study intersections by determining the level-of-service (LOS) for:

- existing traffic,
- Year 2020 forecast without the project and
- Year 2020 forecast with the project (Alternatives 1 and 2).

Conclusions and Recommendations

In the Year 2020 with the Manana Storage Area development project and corresponding Spine Road, there will be an impact on traffic flow at the study intersections. These impacts are the result of two components; 1) new trips generated by the Manana Storage Area development and 2) the construction of the Spine Road.

The development of the Manana Storage Area will generate additional traffic at the study intersections, however, the study roadways, with the preferred Spine Road alignment and other traffic improvement measures described in this report, should be able to accommodate the project. The study area currently operates under congested conditions and is expected to continue to be congested with or without the project. The recommended improvements will slightly improve traffic conditions, however, occasional breakdowns in traffic flow are still expected to occur.

The primary function of the Spine Road is to provide access and traffic circulation to the Manana Storage Area development. However, its location also provides a second north-south travel route to Waimano Home Road for Pearl City motorists. Currently, Waimano Home Road carries significant traffic volumes during the peak hours, especially near Kamehameha Highway. The Spine Road, as a secondary benefit, would provide an alternative means of travel between Moanalua Road and Kamehameha Highway.

Preferred Spine Road Alternative

In order to select a preferred Spine Road alignment, a comparative analysis of the two alternatives was performed using criteria based on the project purpose and need. Table 5 of the report showed the results of the comparative analysis which indicated that the Spine Road Alternative 1 is the preferred alignment.

Other Traffic Improvement Measures

Additional measures to improve traffic flow are shown in Figure 30 and summarized below. These measures are based upon the Alternative 1 Spine Road alignment.

The following existing intersections have the recommended laneages as shown in the following figures:

- Waimano Home Road with Noelani Street (Figure 31),
- Waimano Home Road with Moanalua Road/Spine Road (Figure 31),
- Waimano Home Road with Kamehameha Highway (Figure 32),
- Kamehameha Highway with Acacia Road (Figure 33) and
- Acacia Road with Kuala Street (Figure 34).

The following existing intersections do not require any modifications:

- Waimano Home Road with Hoolaula Street and
- Kamehameha Highway with Kuala Street.

The largest traffic impacts of this project will be felt at the intersections of Waimano Home Road with Moanalua Road and Waimano Home Road with Noelani Street.

The close distance between the intersections require that the traffic operations be coordinated. With the addition of the Spine Road, the current direct access from Moanalua Road to the Manana Community via Noelani Street will be affected. This is required due to the projected increase in future traffic at these intersections with the project.

To mitigate the traffic impacts at the intersections of Waimano Home Road with Moanalua Road and Waimano Home Road with Noelani Street, alternatives were developed to address accessibility for the Manana and Holiday City Subdivisions. These alternatives are described in detail in Appendix C and are as follows:

1. Remove the traffic signals at the intersection of Noelani Street with Waimano Home Road and restrict Noelani Street to a right-turn in and right-turn out operation. Divert existing Noelani Street motorists to Leomele Street.
2. Remove the traffic signals at the intersection of Noelani Street with Waimano Home Road and restrict Noelani Street to a right-turn in and right-turn out operation. Divert existing Noelani Street motorists to a connector road from the Spine Road to a Kualaka Street extension.
3. Remove the traffic signals at the intersection of Noelani Street with Waimano Home Road and restrict Noelani Street to a right-turn in and right-turn out operation. Divert existing Noelani Street motorists to a connector road from the Spine Road to an existing Cane Haul Road. The Cane Haul Road would intersect with Kualaka Street just north of Hoopi Circle.

4. Construct a connector road from the Spine Road to an existing Cane Haul Road between the Manana and Holiday City Subdivisions and leave access to Noelani Street unchanged.

5. Construct a connector road from the Spine Road to an existing Cane Haul Road between the Manana and Holiday City Subdivisions, provide an exclusive left-turn lane on the Spine Road for eastbound traffic and restrict left-turns into Noelani Street.

6. Construct a connector road from the Spine Road to an existing Cane Haul Road between the Manana and Holiday City Subdivisions, provide an exclusive left-turn lane on the Spine Road for eastbound traffic and leave access to Noelani Street unchanged.

Alternative 1 (Leomele Street) does not seem feasible from both a constructability and a traffic operations perspective. Alternative 2 (Spine Road via Kualaka Street extension) requires the use of park land and subsequently may not be possible because of Section 4(f) regulations.

For Alternatives 3, 4, 5 and 6 a summary of the overall intersection LOS during the morning and afternoon peak hours is displayed in Appendix C. Alternative 3 (restricted Noelani Street) results in LOS "D" conditions during both the morning and afternoon peak hours. Alternative 5 (Noelani Street restricted to through movements) also results in LOS "D" conditions during both peak hours. However, Alternative 4 (Noelani Street open) and Alternative 6 (Noelani Street open & modifications to Spine Road) results in LOS "F" conditions in the morning peak hour and LOS "E" conditions during the afternoon peak hour.

From a traffic operations perspective, Alternatives 3 or 5 provides the best operating conditions at the intersection of Waimano Home Road with Moanalua Road/Spine Road. However, Alternative 5 requires the acquisition

of property along the makai side of Moanalua Road, but does allow limited access to Noelani Street.

All alternatives were presented to the affected community through several public meetings with the Pearl City Task Force, the Manana Community Association and the Pearl City Community. Their primary concern was the need for continued access to the Manana community via Noelani Street. As a result, Alternative 6 was selected as the preferred alternative.

To address the poor LOS during the morning peak hour in Alternative 6, additional mitigation measures may need to be implemented. These measures could possibly include contraflow of the northbound left-turn lane on Waimano Home Road at Noelani Street. This would provide double left-turn lanes in the southbound direction onto Moanalua Road, similar to the laneage configuration shown in Alternative 5. Additional signal timing modifications may also be required.

Interim Conditions

The conclusions and recommendations of this report are based on year 2020 build-out conditions. However, it is expected that the project will be developed in several phases, therefore, an interim condition was evaluated. Appendix D provides a discussion of following issues for the interim condition consisting of the Spine Road and development of the City facilities in the year 2000.

- 1) Necessary Laneages at the Intersections of Waimano Home Road with Moanalua Road/Spine Road and Acacia Road with Kuala Street/Spine Road is shown in Appendix D, Figure D3.
- 2) Determine if the existing traffic signal at the intersection of Noelani Street with Waimano Home Road can still be coordinated with the traffic

signal at the new intersection of Waimano Home Road with Moanalua Road/Spine Road under interim conditions. Analysis results indicate that during the interim conditions, these study intersections could still be coordinated similar to existing.

- 3) Determine if the addition of an exclusive westbound right-turn lane on Kamehameha Highway at its intersection with Acacia Road is necessary due to interim project conditions.

Analysis results indicate that the addition of the City facilities and the Spine Road is expected to have a small impact to the intersection of Kamehameha Highway with Acacia Road. This intersection currently operates under congested conditions and is expected to continue to operate under similar conditions in the year 2000. The addition of a westbound exclusive right-turn lane on Kamehameha Highway as recommended for build-out conditions will improve traffic operations at this intersection. However, the need for this improvement is not required due to the interim project.

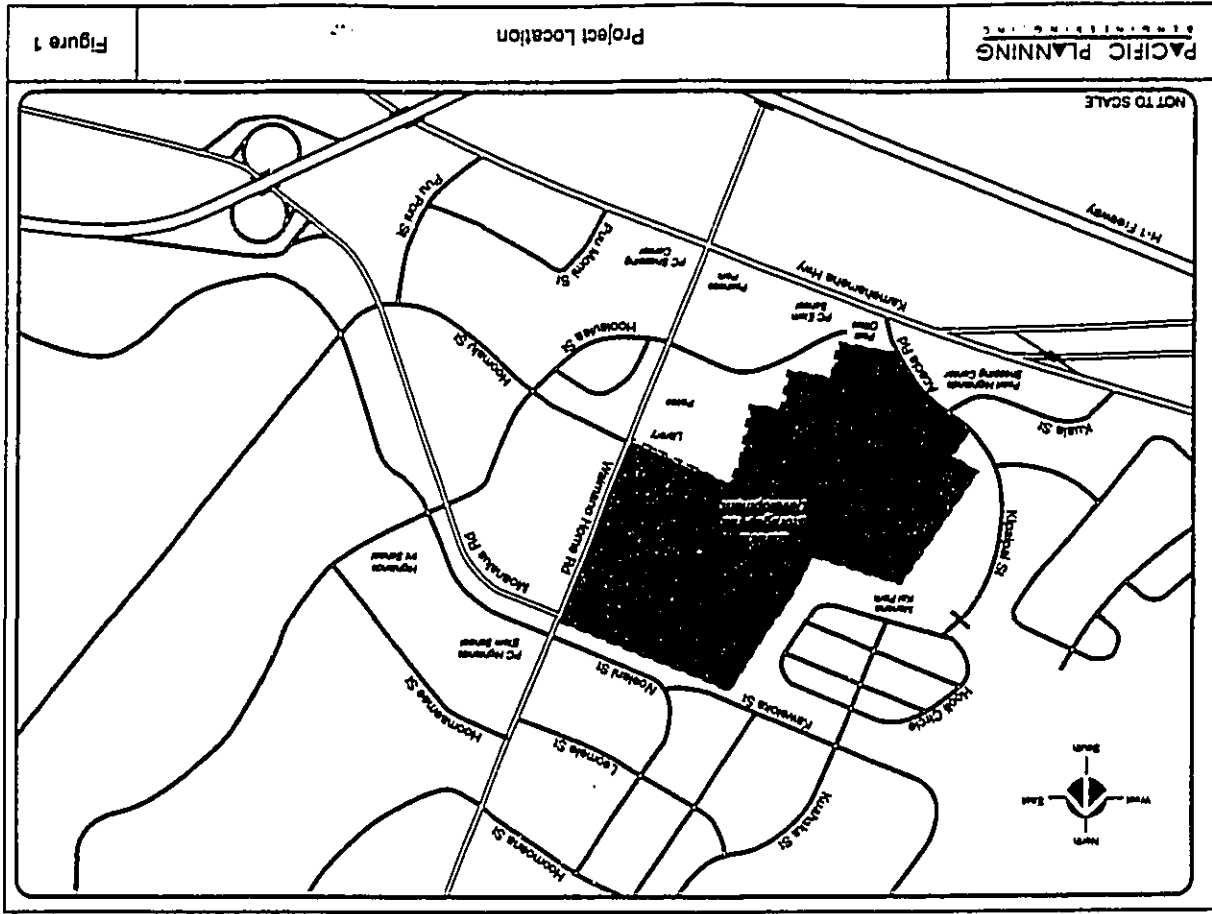
PROJECT DESCRIPTION

The City and County of Honolulu is proposing to develop the 109 acre Manana Storage Area and 14 acre Pearl City Junction properties and is identified by TMK 9-27-24: 6 & 41 and TMK 9-7-23:01, respectively. The master plan for the site was developed jointly by the City Department of Housing and Community Development and the Pearl City Planning Task Force. The "Pearl City Task Force Final Report: Recommended Land Use Alternative for the Manana and Pearl City Junction Properties" included a development plan consisting of commercial (retail/office) space, public facilities, a community park, a family entertainment center, medical facilities and light-industrial uses.

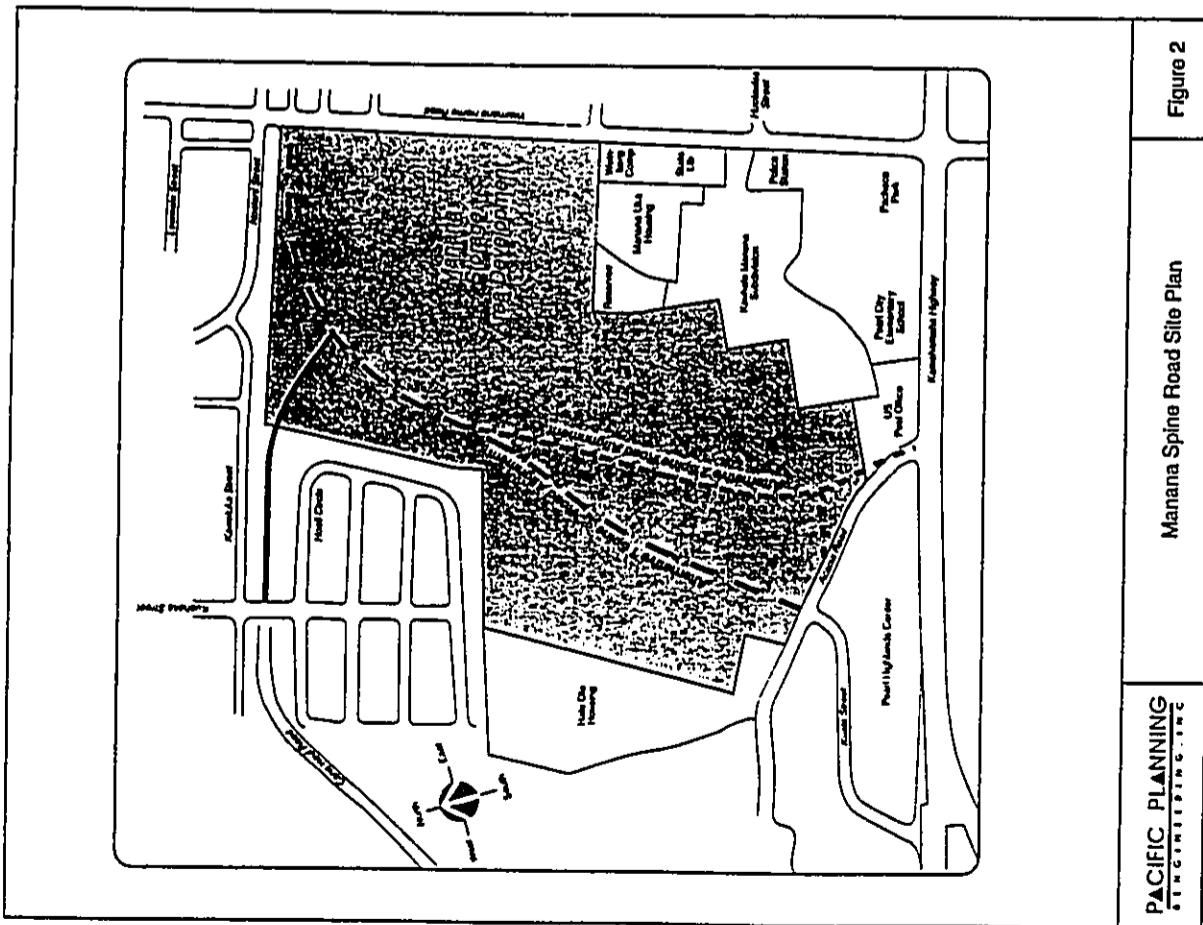
As part of the master plan, a new roadway, referred to as the "Spine Road", was proposed to provide access and circulation to the development. The Spine Road is envisioned as a four-lane collector road through the Manana Storage Area development area. Figure 1 shows the project location. The two Spine Road alternatives being considered in this report are shown in Figure 2.

The first alternative connects with Moanalua Road to the north, forming the eastbound leg of an existing T-intersection with Waimano Home Road. To the south, the Spine Road forms a southbound leg to the existing intersection of Acacia Road with Kuaha Street.

The second alternative is similar to the first in the northern portion near Moanalua Road. However, it traverses a path east of the Alternative 1 alignment forming a direct route to Kamehameha Highway. In order to accomplish this, Acacia Road needs to be modified as shown on Figure 2 which forms a new T-intersection with the Spine Road.



This report will identify and assess potential future traffic impacts that would be caused by the proposed Manana Storage Area development in the year 2020. In addition, a preferred Spine Road alignment alternative will be recommended based on traffic operations.



PACIFIC PLANNING
ENGINEERING, INC.

Manana Spine Road Site Plan

Figure 2

EXISTING CONDITIONS

An inventory of existing conditions was conducted to establish current traffic conditions in the area and to provide a basis for estimating the traffic impact of the proposed project. The review included researching existing land uses in the area, roadway facilities and traffic conditions.

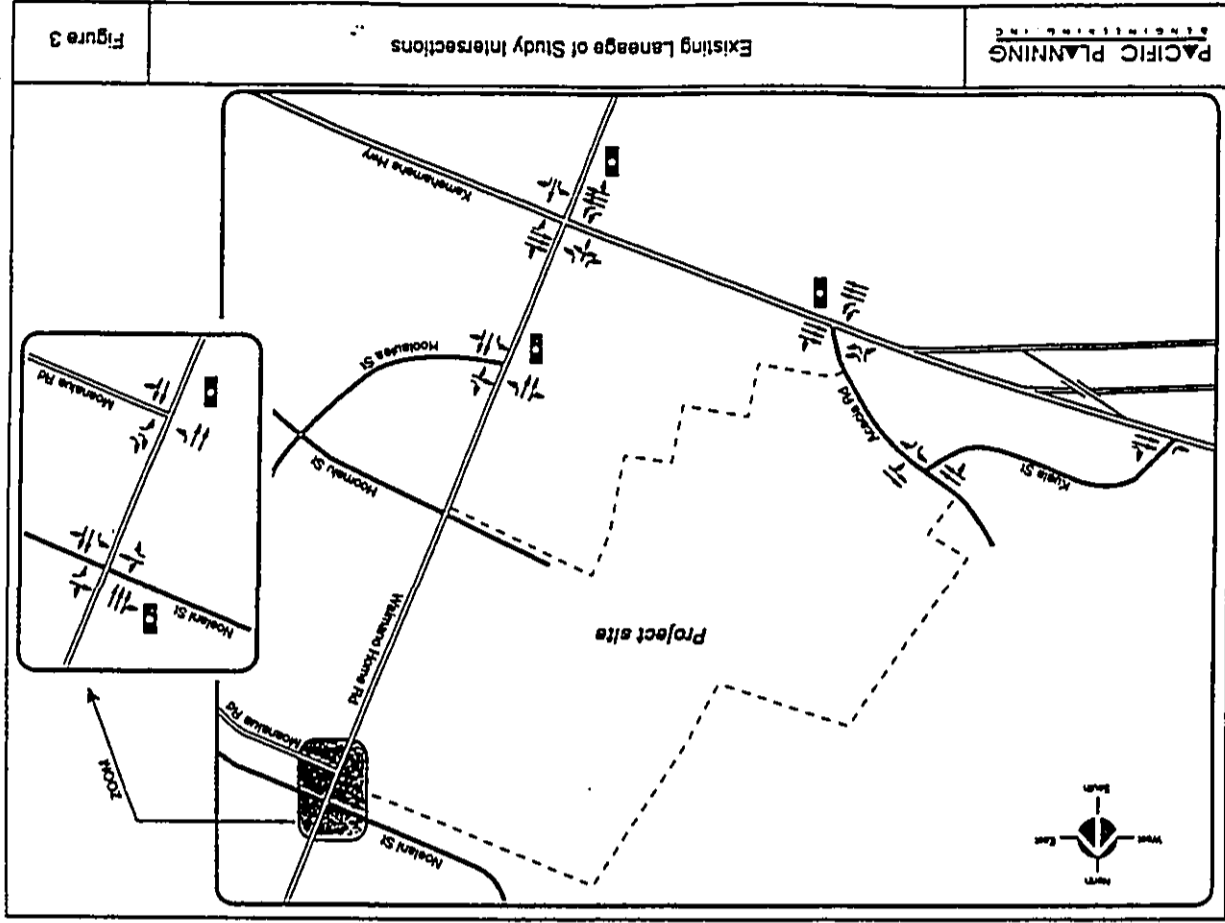
Land Uses

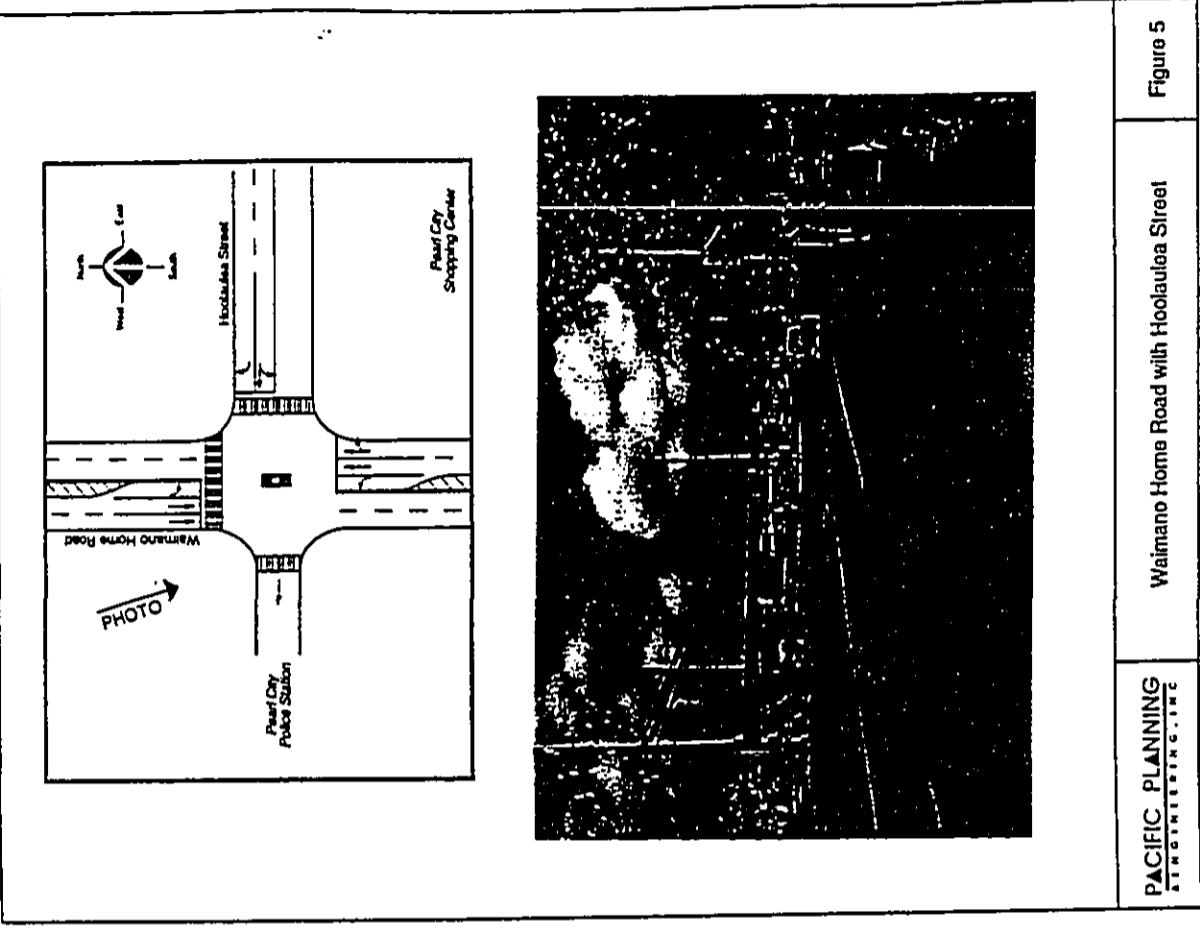
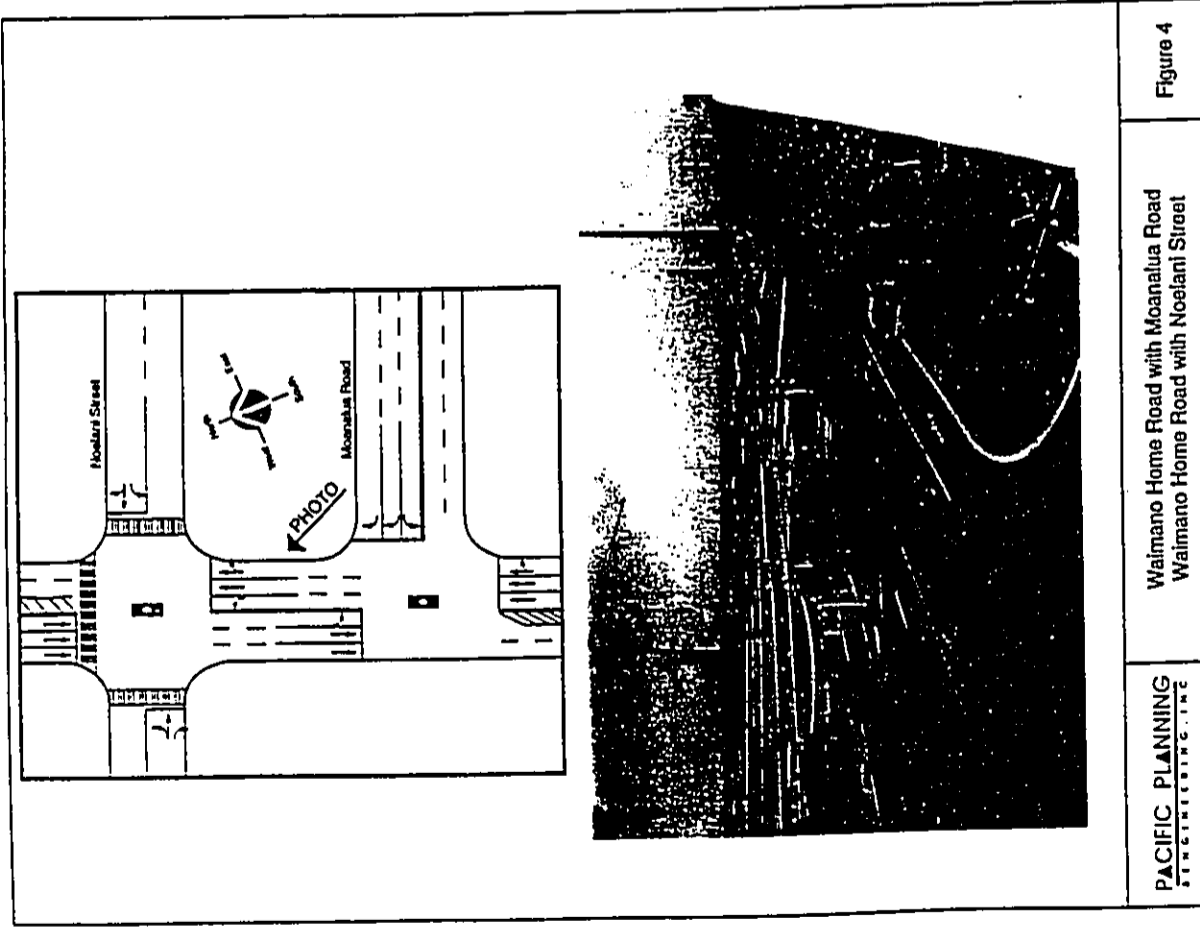
The land uses near the project include residential, commercial and light-industrial areas. The Manana and Holiday City residential communities are located adjacent to the project. Further north are the Pearl City Uplands and Pacific Palisades residential communities. There are several public schools within the study area; Pearl City Elementary, Manana Elementary and Pearl City Highlands Elementary. The major commercial sites near the projects are the Pearl Highlands Center and the Pearl City Shopping Center.

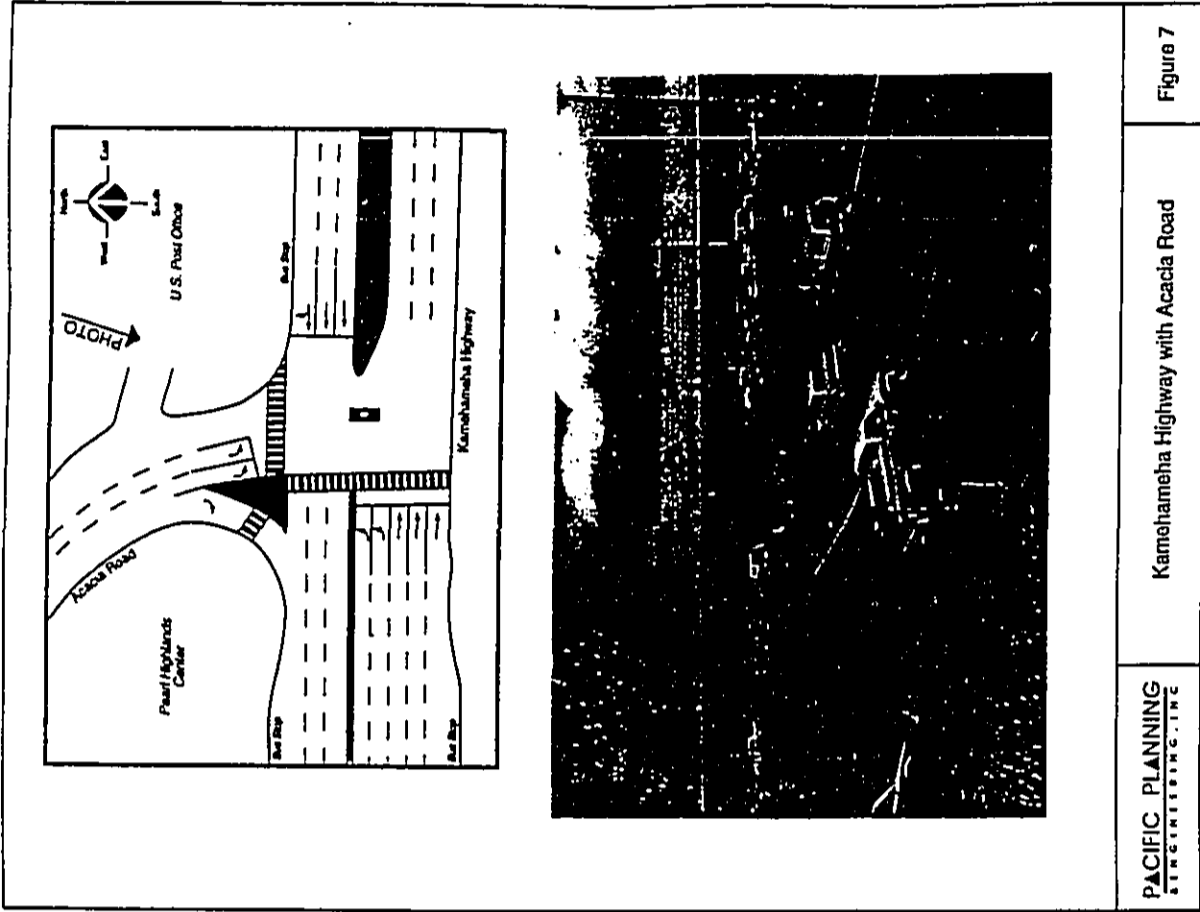
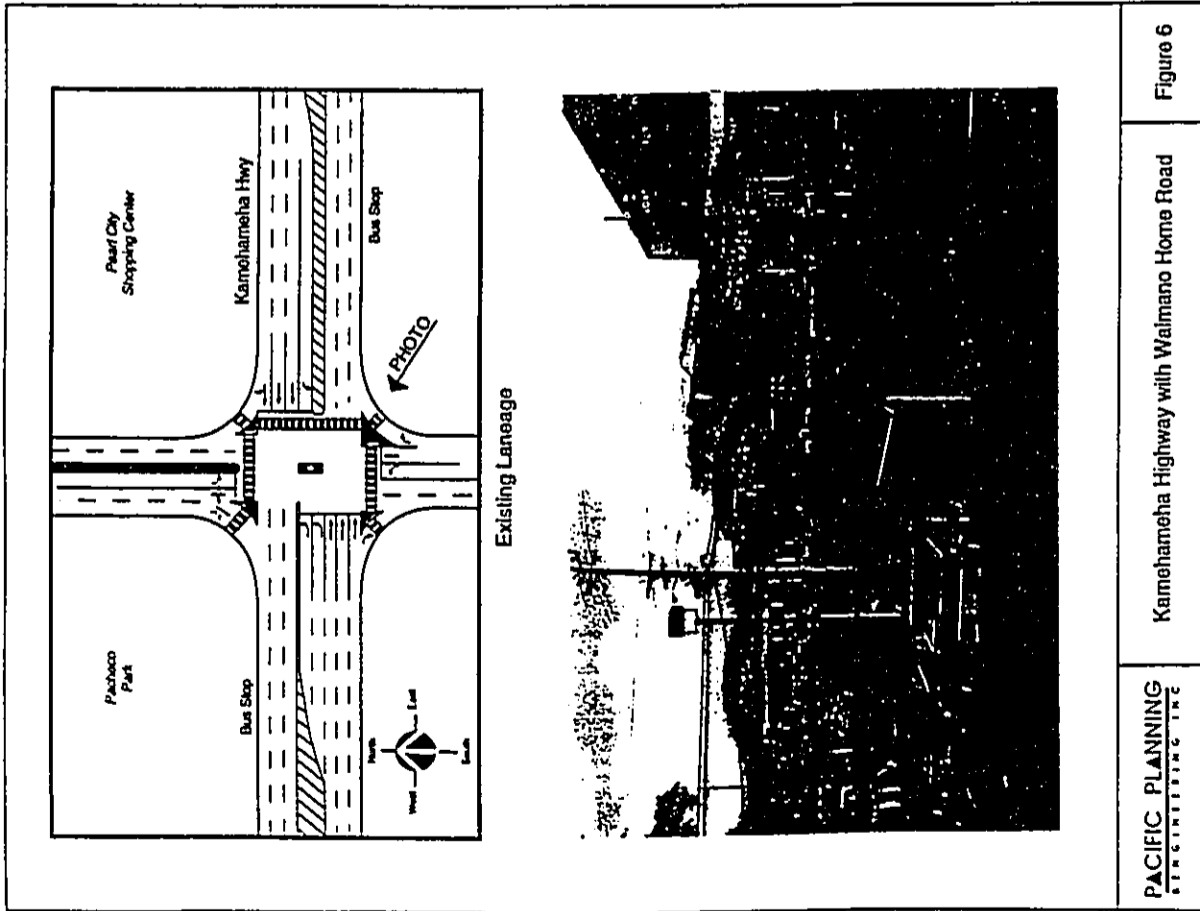
Roadway Facilities

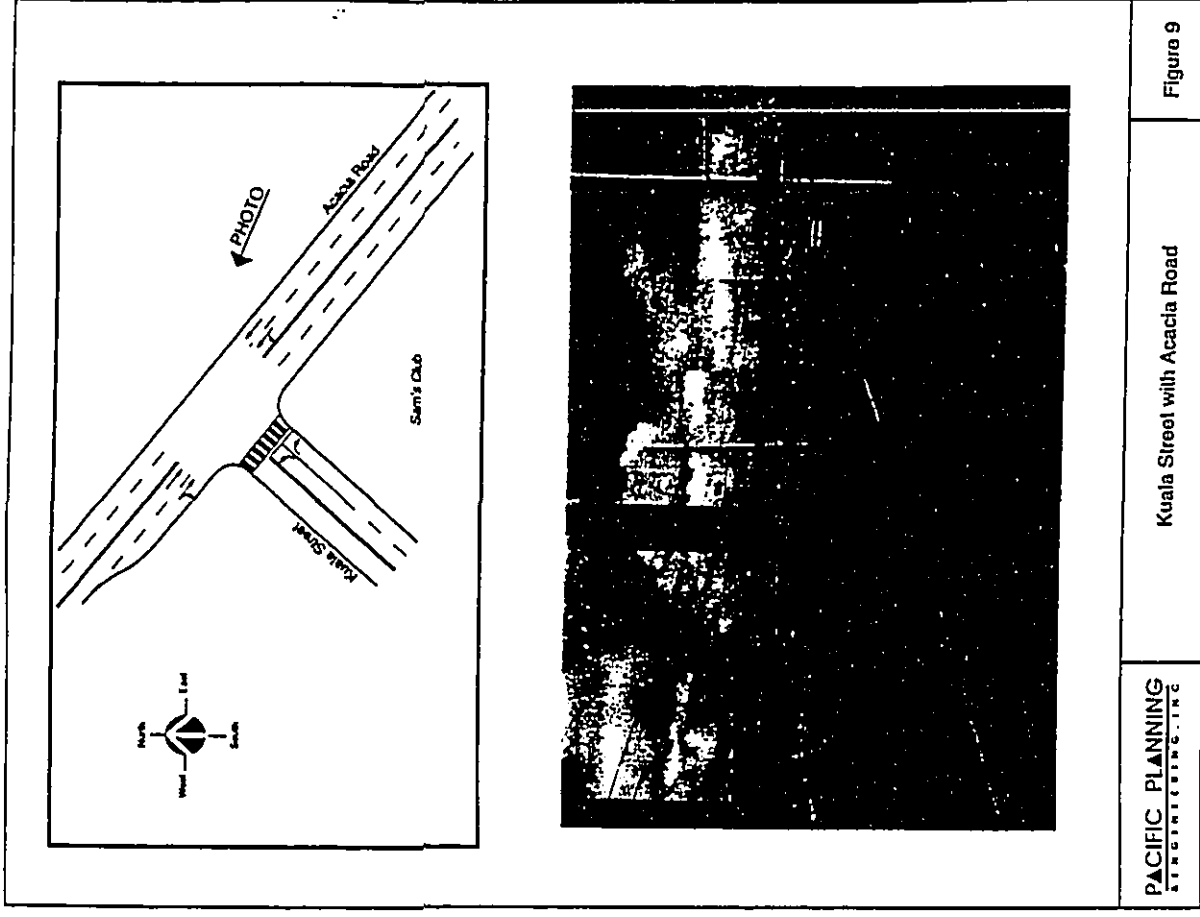
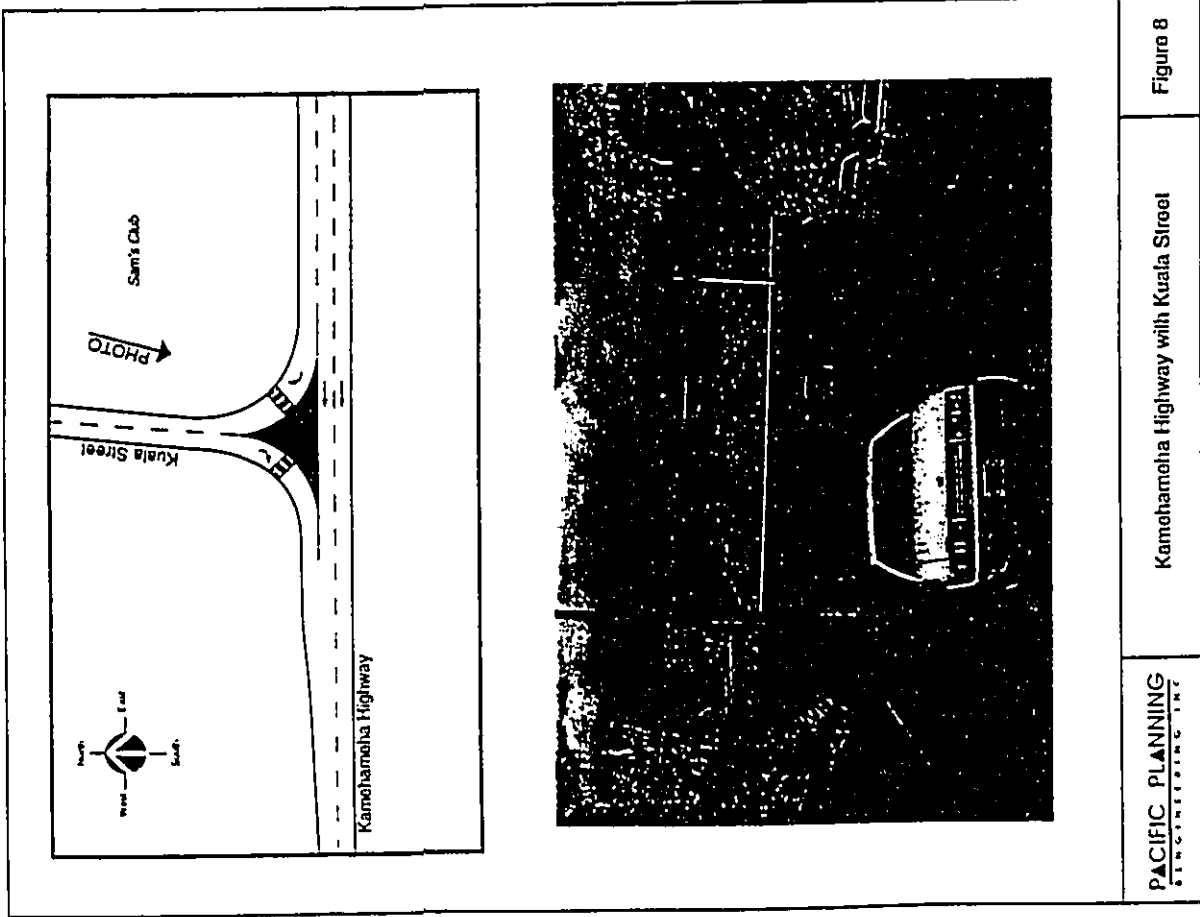
For reference, the existing laneway for the study roadways is shown on Figure 3. In addition, Figures 4 through 9 show schematics and photos of each of the individual study intersections.

Kamehameha Highway, in the vicinity of the project, is a six-lane, divided, major arterial highway. To the west, Kamehameha Highway connects to Farrington Highway and on-ramps to the H-1 and H-2 Freeways. In the east direction, it traverses through the towns of Waimalu and Pearlridge. The posted speed limit is 35 miles per hour (mph) in the vicinity of the project.









Moanalua Road is a two-way four-lane arterial roadway which runs through Pearl City and Aiea. In the vicinity of the study area, it is a four-lane undivided roadway which terminates at Waimano Home Road to the west. The posted speed limit is 25 mph near Waimano Home Road.

Waimano Home Road is a four-lane undivided arterial road which provides north-south circulation from Kamehameha Highway through Pearl City. Within the study area, Waimano Home Road has signalized intersections with Kamehameha Highway, Hoolaulea Street, Moanalua Road and Noelani Street. Left-turn lanes are provided and the posted speed limit varies from 25 to 35 mph.

Acacia Road is a four-lane collector road between Kamehameha Highway and its intersection with Kuala Street. Acacia Road also provides access to the Pearl Highlands Center, Pearl City Post Office, and the Century Park Plaza Condominiums. It intersects Kamehameha Highway at a signalized T-intersection. The posted speed limit is 25 mph.

Kuala Street is a two-lane road which provides connection between Kamehameha Highway and Acacia Road. It also provides access to the Pearl Highlands Center and Century Park Plaza Condominiums. Kuala Street forms an unsignalized, right-turn in/right-turn out intersection with Kamehameha Highway. It also forms an unsignalized T-intersection to the north with Acacia Road. The posted speed limit is 25 mph.

Noelani Street is a two-lane residential street which originates in the Manana sub-division and terminates at Kaahumanu Street in the Waimanu community. In the study area, Noelani Street crosses Waimano Home Road at a signalized intersection. The posted speed limit is 25 mph.

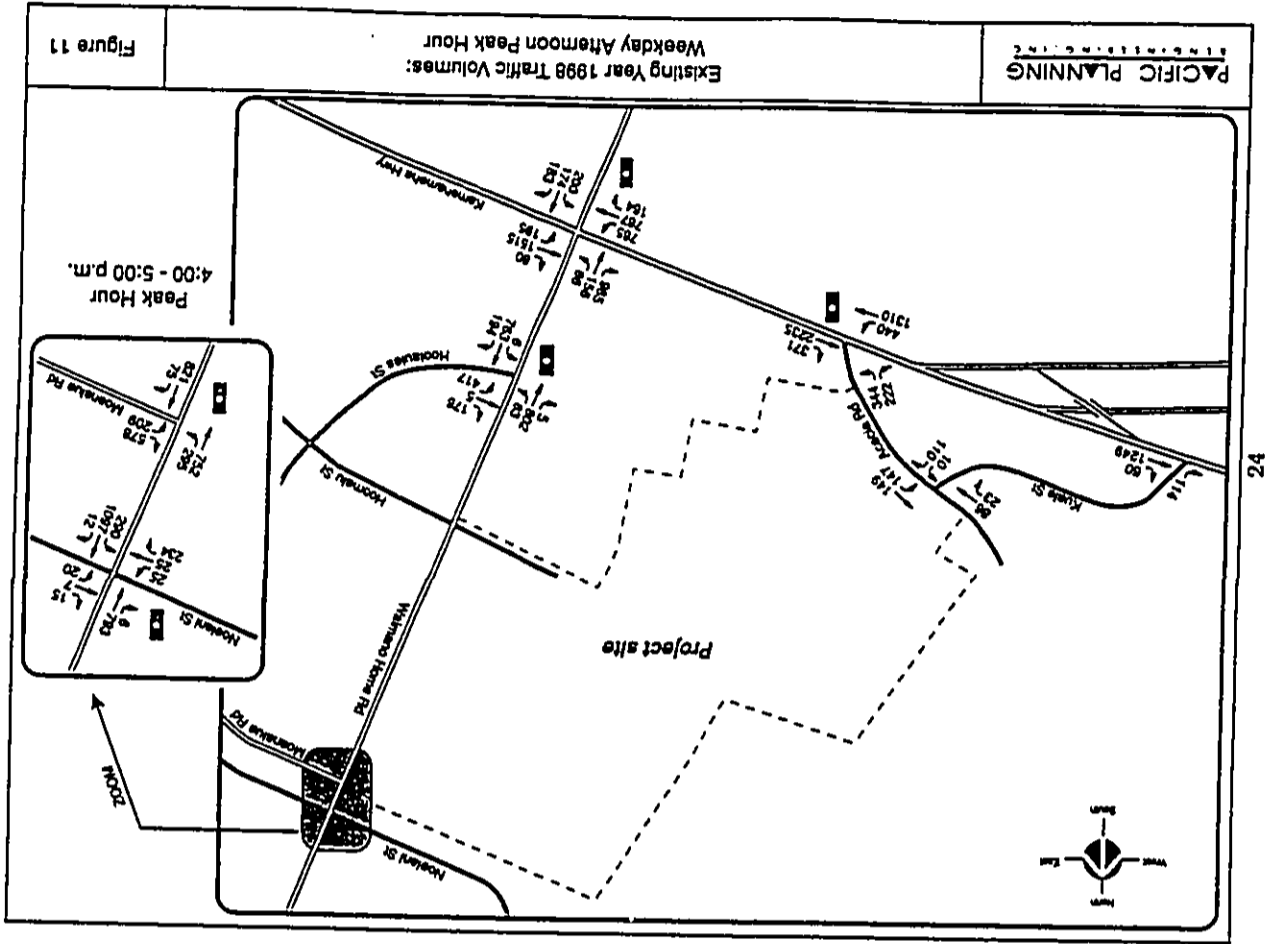
Hoolaulea Street is a residential collector road which intersects Waimano Home Road as a signalized T-intersection. The posted speed limit is 25 mph.

Traffic Conditions

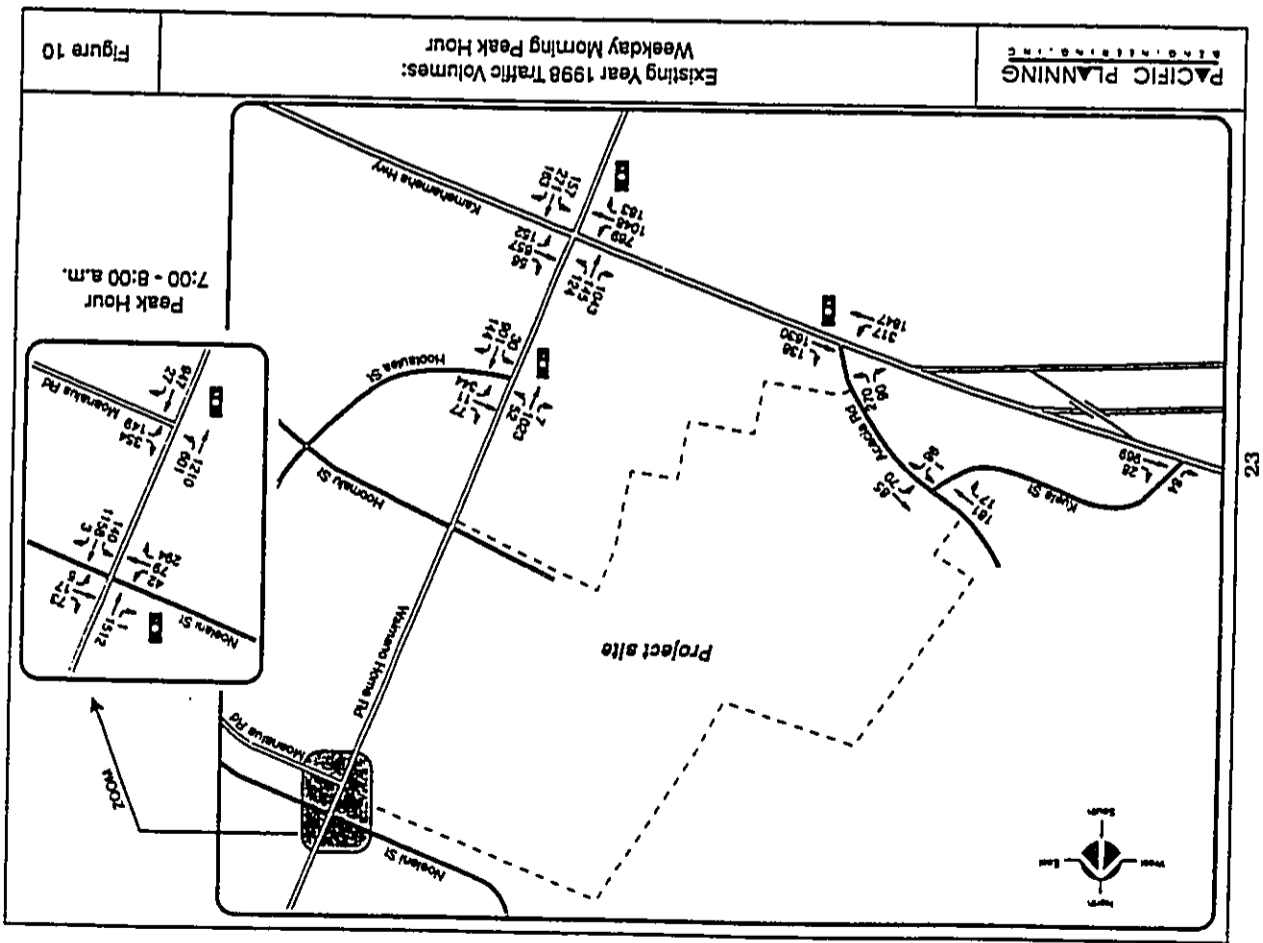
The State Department of Transportation 24-hour count data indicate that the weekday peak traffic periods in the vicinity occur from 6:00 to 8:00 a.m. in the morning and 4:00 to 6:00 p.m. in the afternoon. Manual traffic counts were taken at the study intersections during the above peak hours. This data was used as the baseline condition upon which estimated future traffic volumes were added. Counts were taken at the following locations:

- Waimano Home Road with Noelani Street.
- Waimano Home Road with Moanalua Road.
- Waimano Home Road with Hoolaulea Street.
- Kamehameha Highway with Waimano Home Road.
- Kamehameha Highway with Acacia Road.
- Kamehameha Highway with Kuala Street and
- Kuala Street with Acacia Road.

Manual counts consisted of passenger cars, trucks and buses by turning movements and approaches. During the study periods, the weather was clear, and the roadway pavement was dry. Figures 10 and 11 show the existing traffic volumes at the study intersections. The traffic count data is also tabulated in Appendix A.



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FUTURE CONDITIONS

A survey was conducted of approved planned developments in the immediate area to estimate future traffic conditions at the study intersections.

Land Uses

The Oahu Regional Transportation Plan¹ (ORTP) study does not indicate major traffic growth on roadways in this area. Essentially, the study area consists of developed residential and commercial land uses and the likelihood of further development is small. The largest projected growth in population and employment is expected to occur in the "second city" of Kapolei located several miles west of the study area.

The Pearl City Junction (PCJ) parcel development, located off Kamehameha Highway across the Pearl Highlands Center, is expected to be completed before the year 2020. The PCJ is not dependent on the Manana Storage Area development nor the corresponding Spine Road. The project use for the PCJ is assumed to be a commercial development such as the previous proposal by Home Depot, a home improvement superstore.

Roadway Facilities

There are no known committed roadway improvements planned near the study intersections within the time frame of the project.

¹ 2020 Oahu Regional Transportation Plan, by Kaku Associates, Inc., November 1995.

PROJECTED TRAFFIC CONDITIONS

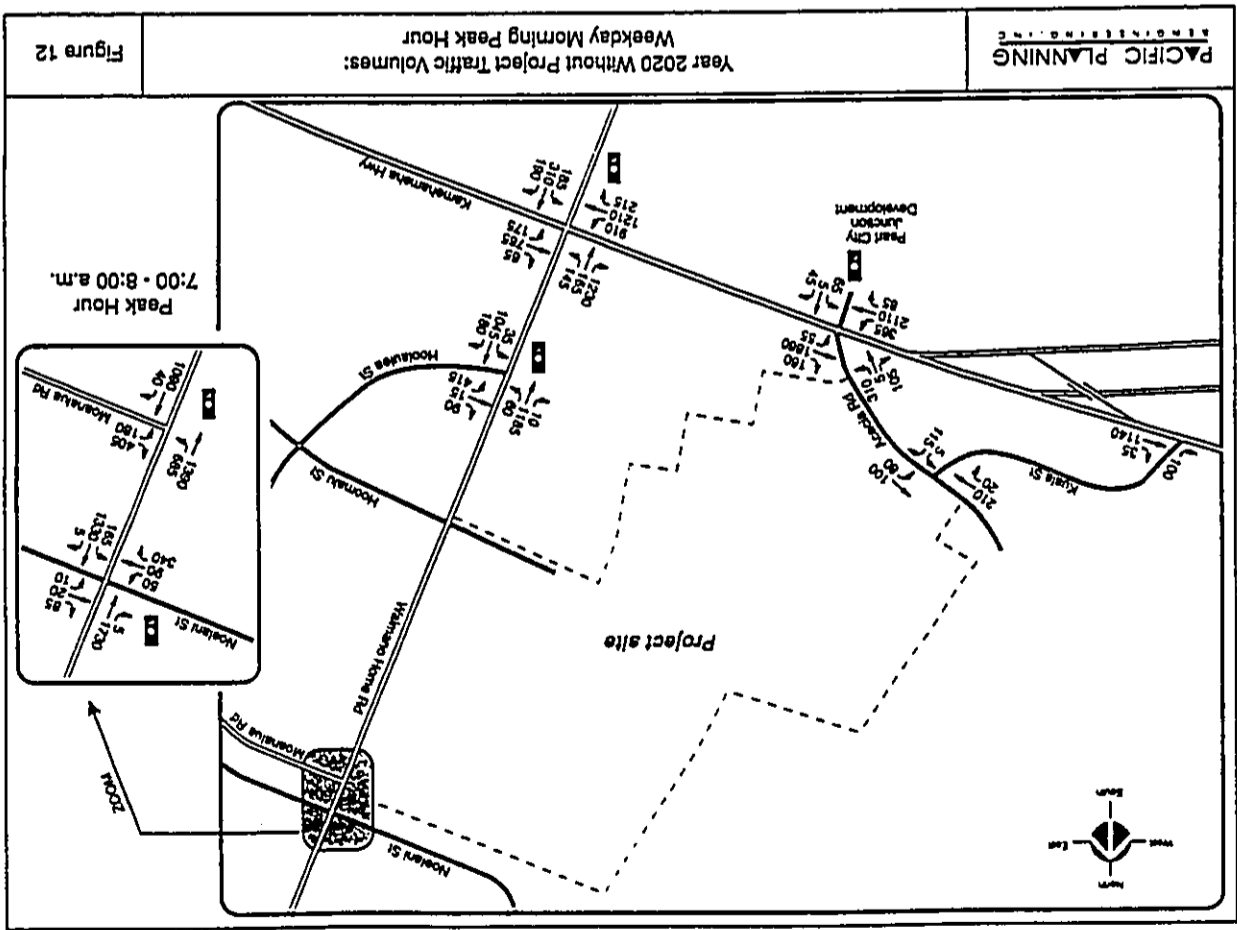
Future traffic was forecasted for the year 2020 for traffic conditions without and with the proposed Manana Storage Area development and corresponding Spine Road. The forecasts consist of weekday morning and afternoon peak hour volumes at the study intersections.

Future Traffic Without Project

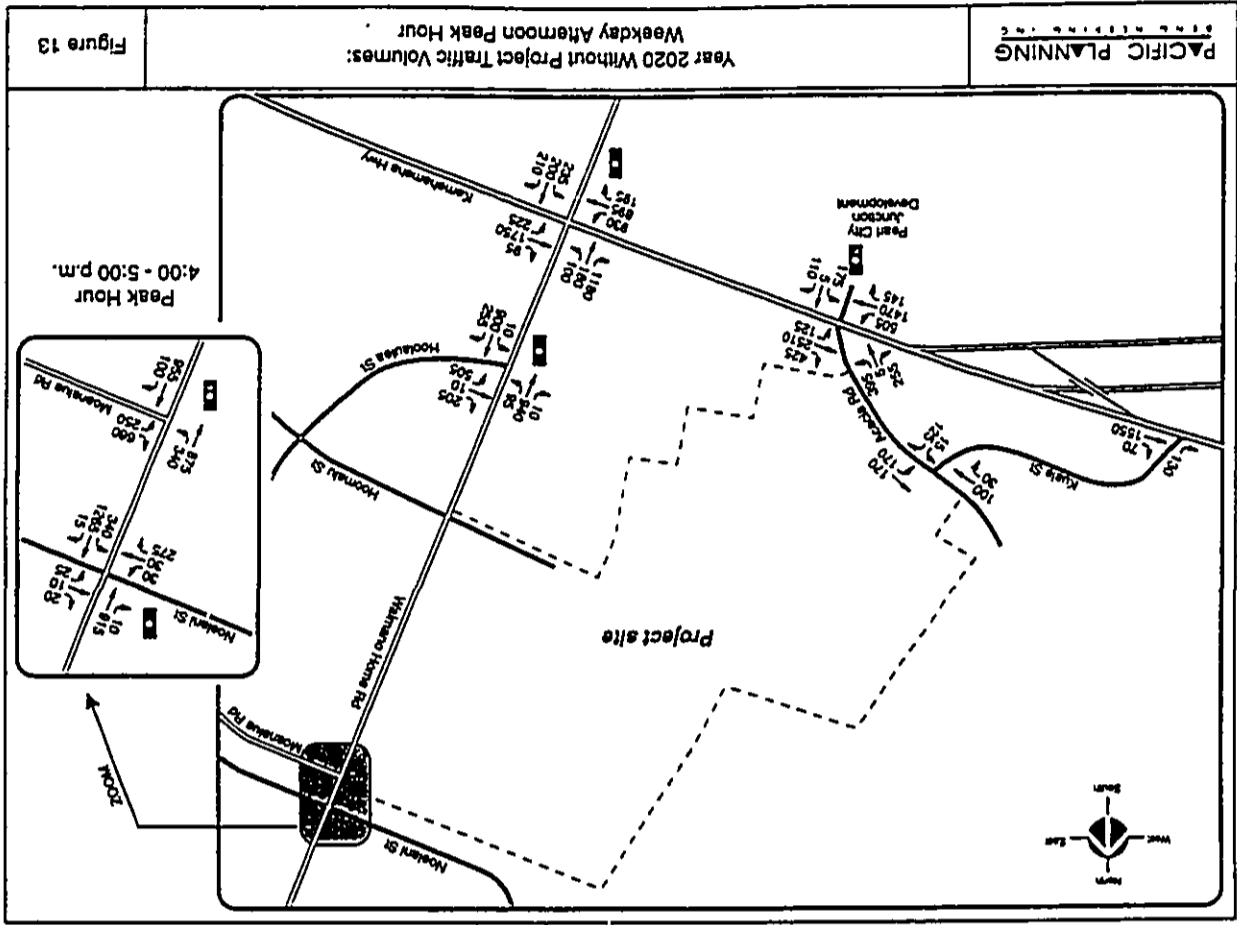
Future traffic without the Project was forecasted by evaluating and adding the following: (1) existing traffic volumes for the weekday morning and weekday afternoon peak periods, (2) the general increase in traffic on the study roadways and (3) traffic generated by nearby proposed developments. The resultant forecasted weekday morning and afternoon peak hour traffic volumes without the project for the year 2020 are shown in Figures 12 and 13.

General Traffic Growth

As discussed previously, the project is located in a community that has already been substantially developed. The likelihood of further development is small and is reflected in the ORTP which does not indicate major traffic growth. Major screening data near the study area indicates an annual growth rate of approximately 0.6% per year. Accordingly, the existing traffic volumes were increased by 14% (0.6% x 23 years) to the year 2020. The growth rate also accounts for future conditions such as other future developments outside of the project study area and future projects which have not been clearly defined yet.



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Traffic From Other Developments

The three-step procedure of trip generation, trip distribution, and traffic assignment was used to forecast traffic for the Pearl City Junction (PCJ) development.

The trip generation step estimates the number of trips that would be generated by the PCJ development during the weekday morning and afternoon peak hours. Trip generation for the PCJ development which is assumed to be a Home Improvement type land use is shown on Table 1. Trip rates for this project were based on data from the ITE Trip Generation Report².

Table 1 - Trip Generation for Pearl City Junction.

Land Use	Morning		Afternoon	
	Enter	Exit	Enter	Exit
Home Improvement Store (145,000 ft ²)	136	109	212	407
Discount Store (30,000 ft ²)				

In the case of shopping centers, trips are attracted from the passing traffic on adjacent streets or traffic that is already "passing-by" the site. A portion of the trips that enter and exit the project site will be "pass-by" trips and therefore, are not new trips. The effect of these types of trips do not increase through-traffic on the road. However, pass-by trips do increase the number of turning movements into and out of the project site. An example of a Pass-by trip is illustrated below:

- John Doe is driving home from work on his usual route along Kamehameha Highway. As he nears Longs Drugs, he decides to pick up the camera his wife wanted him to get on sale. He turns right into the parking lot driveway, goes into the store, buys the camera and leaves the parking lot by turning right via the same driveway back onto Kamehameha Highway.

² Trip Generation Report, by the Institute of Transportation Engineers, Sixth Edition, 1997.

The amount of "Pass-by" trips for the project was based on a previous report for the Home Depot Project³ which used a 25% pass-by rate. This rate was applied only to the afternoon peak hour.

The trip distribution step estimates the distribution of vehicle trips to their predicted destinations and origins. Trips were distributed based on projections of population and employment in the ORTP for the year 2020.

Future traffic from the PCJ site was assigned to a specific route for each origin and destination based on available information and/or estimated shortest distance or travel times.

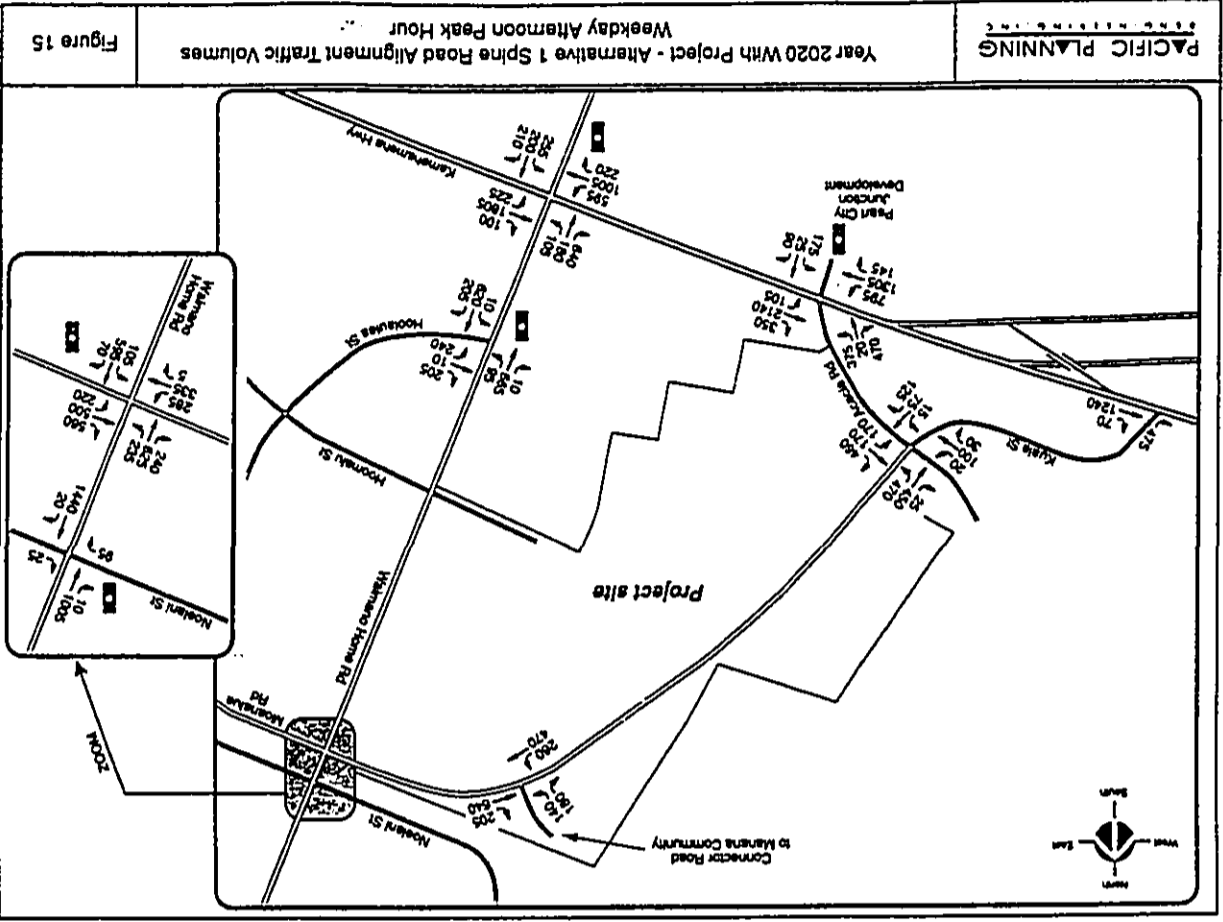
Future Traffic With Project: Alternative 1 Spine Road Alignment

Future traffic with the project and for the Alternative 1 Spine Road alignment was obtained by evaluating and adding the following: 1) traffic forecasts from the without project condition, 2) traffic diversions due to the existence of a Spine Road alignment and 3) traffic generated by the proposed Maunua Storage Area development. The peak hour traffic volume forecasts with the project for the "Alternative 1 Spine Road alignment and Alternative 3 mitigation to Noelani Street" for the year 2020 are shown in Figures 14 and 15.

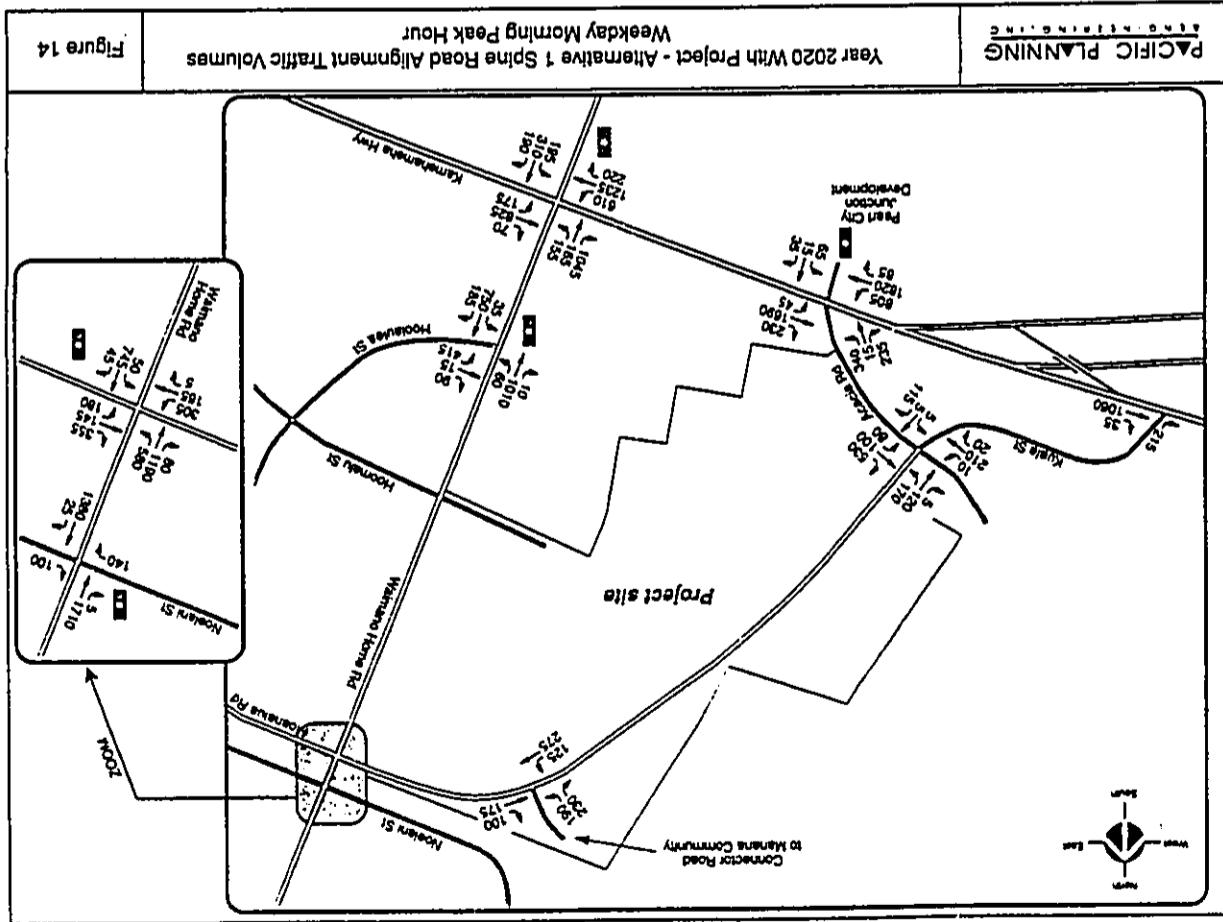
Traffic Diversions

The Spine Road will provide motorists with an alternative travel route from Moanalua Road to Kamehameha Highway. As such, existing travel patterns within and through the study area will change. A portion of motorists traveling through the study area would bypass the congested conditions near

³ Traffic Impact Assessment Report performed for the Home Depot Development, Austin Tausaumi & Associates, Inc., 1997.



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and on Kamehameha Highway and instead use (divert to) the Spine Road. Field observations of existing travel patterns and traffic volume counts were used as a basis to account for this diversion.

The Spine Road will also provide another means of accessing the Pearl Highlands Shopping Center which is a major attraction. The anticipated use of the Spine Road by patrons of the shopping center was also estimated based upon existing traffic volumes at the study intersections.

The existence of a Spine Road will require changes at the intersections of Moanalua Road with Waimano Home Road and Noelani Street with Waimano Home Road. Due to the short distance between these intersections (~100 ft), the signal phasing and timing must be coordinated. With the addition of a Spine Road leg and Manana Storage Area development traffic, coordination between the two intersections will be extremely difficult.

To mitigate the traffic impacts at the intersections of Moanalua Road with Waimano Home Road and Noelani Street with Waimano Home Road, six alternatives were developed. The alternatives were:

1. Remove the traffic signals at the intersection of Noelani Street with Waimano Home Road and restrict Noelani Street to a right-turn in and right-turn out operation. Divert existing Noelani Street motorists to Leomele Street.
2. Remove the traffic signals at the intersection of Noelani Street with Waimano Home Road and restrict Noelani Street to a right-turn in and right-turn out operation. Divert existing Noelani Street motorists to a connector road from the Spine Road to a Kuahaka Street extension.

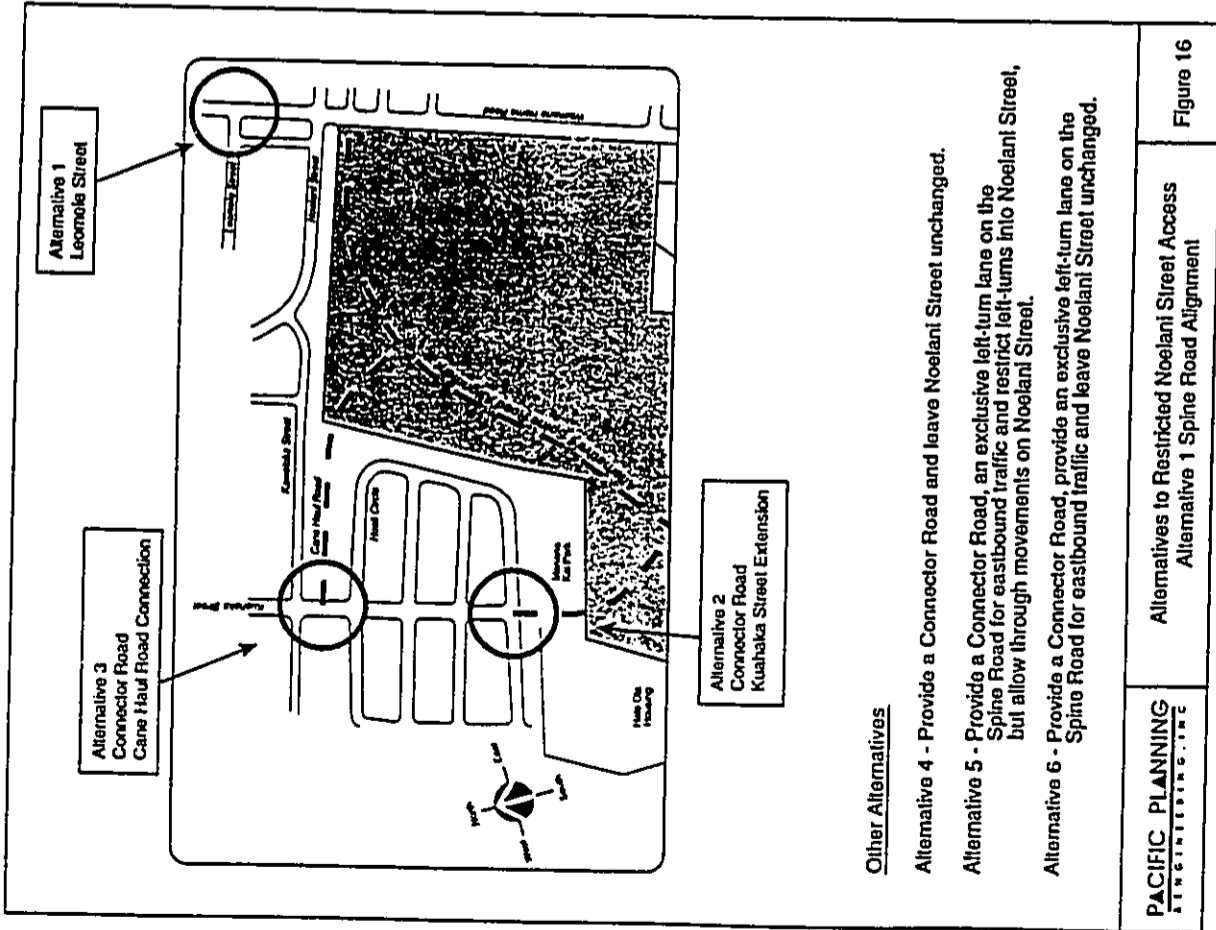
3. Remove the traffic signals at the intersection of Noelani Street with Waimano Home Road and restrict Noelani Street to a right-turn in and right-turn out operation. Divert existing Noelani Street motorists to a connector road from the Spine Road to an existing Cane Haul Road. The Cane Haul Road would intersect with Kuahaka Street just north of Hooli Circle.

4. Construct a connector road from the Spine Road to an existing Cane Haul Road between the Manana and Holiday City Subdivisions and leave access to Noelani Street unchanged.

5. Construct a connector road from the Spine Road to an existing Cane Haul Road between the Manana and Holiday City Subdivisions, provide an exclusive left-turn lane on the Spine Road for eastbound traffic and restrict left-turns into Noelani Street.

6. Construct a connector road from the Spine Road to an existing Cane Haul Road between the Manana and Holiday City Subdivisions, provide an exclusive left-turn lane on the Spine Road for eastbound traffic and leave access to Noelani Street unchanged.

The location of these alternatives are shown on Figure 16. Based on the analysis, Alternative 3 which uses a portion of an existing Cane Haul Road as a connector road from the Spine Road to Kuahaka Street and prohibits left-turns into Noelani Street appears to be the most viable alternative. With the restrictions at Noelani Street, the existing traffic circulation patterns were adjusted. Appendix C describes in detail the developed alternatives.



Other Alternatives

Alternative 4 - Provide a Connector Road and leave Noelani Street unchanged.

Alternative 5 - Provide a Connector Road, an exclusive left-turn lane on the Spine Road for eastbound traffic and restrict left-turns into Noelani Street, but allow through movements on Noelani Street.

Alternative 6 - Provide a Connector Road, provide an exclusive left-turn lane on the Spine Road for eastbound traffic and leave Noelani Street unchanged.

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Alternatives to Restricted Noelani Street Access
Alternative 1 Spine Road Alignment

Figure 16

Manana Storage Area Developments

The standard three step procedure of trip generation, trip distribution and traffic assignment was used to estimate peak hour traffic from the Manana Storage Area developments.

Trips generated by these developments were obtained by using the estimated land uses and trip rates from the ITE Trip Generation Report as well as other reports where applicable. Table 2 shows the number of generated trips.

Table 2 - Trip Generation for Manana Storage Area Developments.

Land Use	Morning		Afternoon	
	Enter	Exit	Enter	Exit
Commercial - Retail (129,285 ft ²)	113	73	357	387
Commercial - Office (64,555 ft ²)	116	16	26	126
Medical Office Building (40,000 ft ²)	78	19	35	96
Family Center/County Park (20.75 acre)	0	0	0	1
Bld. of Water Supply Maint. (7.42 acre)	11	7	1	9
D/IR - Storage & Maintenance (4.56 acre)	7	4	1	5
DTS - Vehicle Maintenance (4.24 acre)	7	4	1	5
Light Industrial (11.14 acre)	70	14	35	121
Bus Facility (21 acres)	41	64	26	38
Totals	443	201	482	790

For retail and office uses, a floor area ratio (FAR) was used to convert acreage to floor areas. The Trip Generation Report uses floor areas as the independent variable and not acreage in its trip generation equations. For the Manana Storage Area development, a FAR of 0.20 was used for retail uses and a FAR of 0.30 was used for office uses.

For the commercial development in the Manana Storage Area, no pass-by trips were assumed for conservatism. As was the case in the PCJ development, for retail centers, trips are attracted from passing traffic on adjacent streets or traffic that is already "passing-by" the site. A portion of the trips that enter and exit the project site will be "pass-by" trips and therefore, are not new trips.

The trip distribution step estimates the distribution of vehicle trips to their predicted destinations and origins. Trips were distributed based on projections of population and employment in the ORTP for the year 2020.

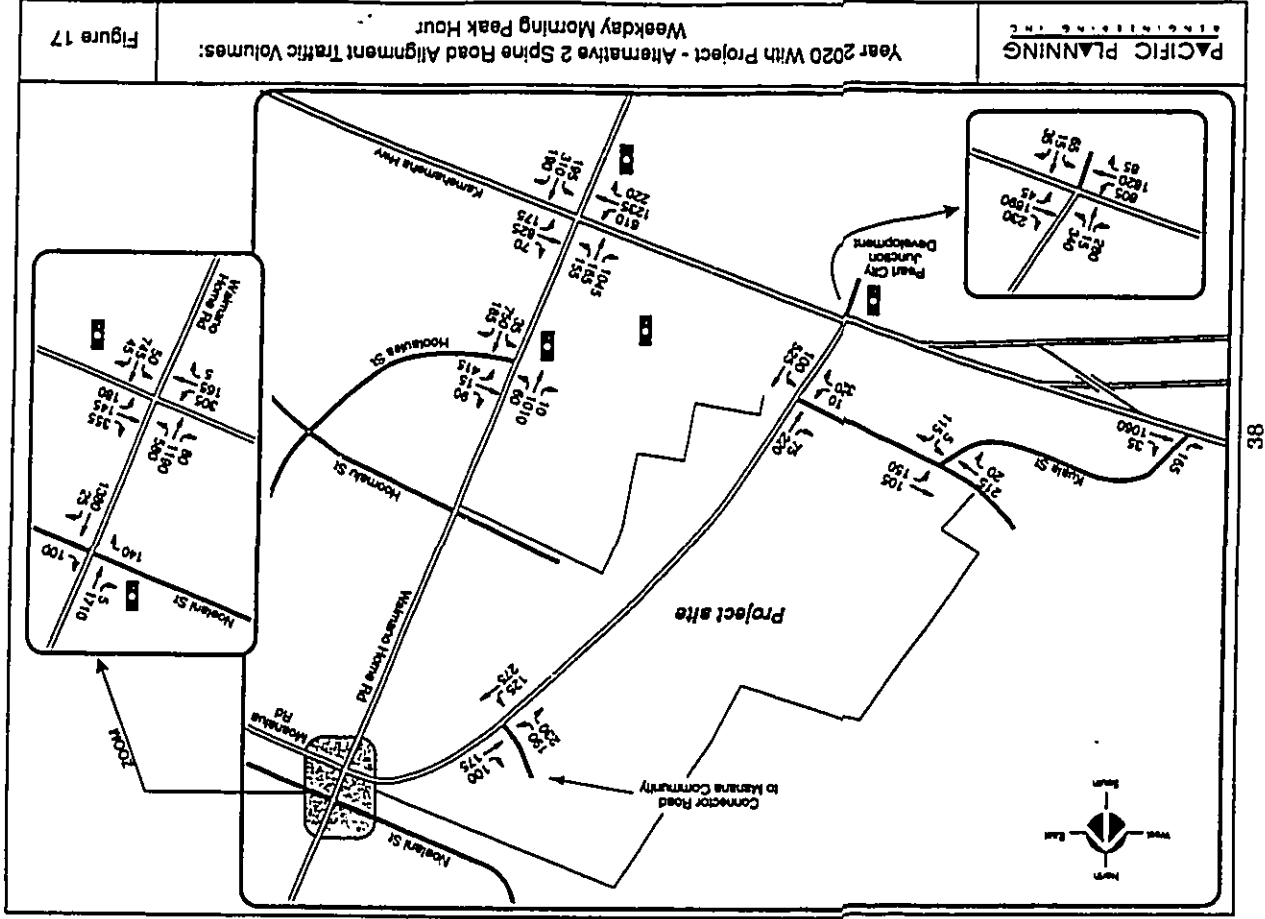
The traffic assignment step assigns vehicle trips to specific routes on the roadway network that will take the driver from origin to destination. Trips were assigned to and from Moanaiua Road/Walmano Home Road/Acacia Road/Kuala Street or Kamehameha Highway via the Alternative 1 Spine Road alignment.

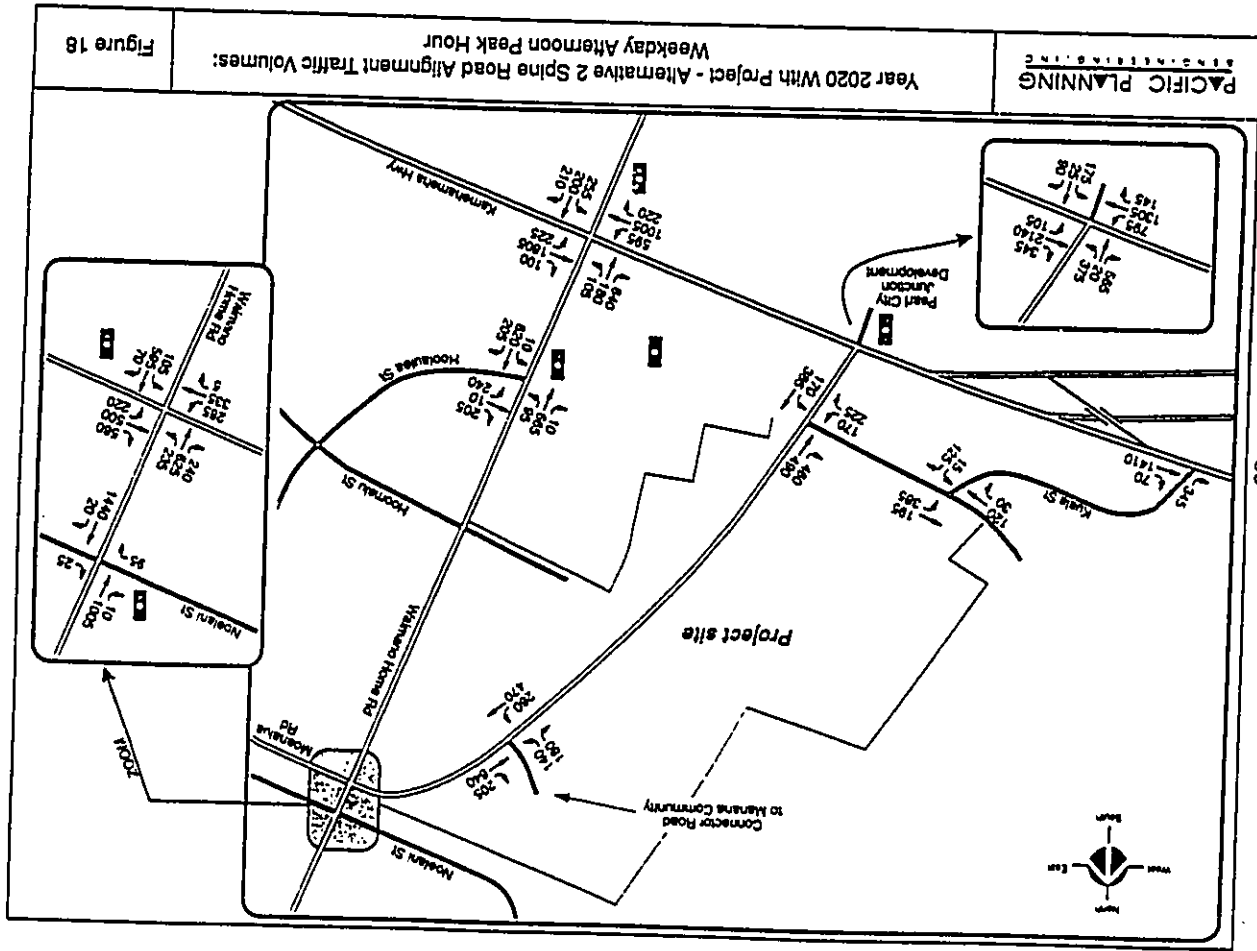
Future Traffic With Project: Alternative 2 Spine Road Alignment

Future traffic for the project and the Alternative 2 Spine Road Alignment was obtained by evaluating and adding the following: 1) traffic forecasts from the with project condition using the Alternative 1 Spine Road alignment and 2) traffic diversions due to the modified southern alignment of Alternative 2. The peak hour traffic volume forecasts for "Alternative 2 Spine Road alignment and Alternative 3 mitigation to Noelani Street" for the year 2020 are shown in Figures 17 and 18.

Traffic Modifications due to Alternative 2

The alignment of the Alternative 2 Spine Road alignment differs from Alternative 1 in that near the southern portion, the Spine Road connects directly to Kamehameha Highway (see Figure 2). In order to provide access to





the communities along Acacia Road and Kuala Street, the alignment of Acacia Road needs to be modified to form a T-intersection with the Spine Road as was shown in Figure 2.

The traffic forecasts along Waimano Home Road will be the same as for Alternative 1. Changes in the forecasts for Alternative 2 will occur at the following intersections:

- Kamehameha Highway with Acacia Road,
- Kamehameha Highway with Kuala Street and
- Kuala Street with Acacia Road
- Acacia Road with Spine Road (new)

The traffic forecasts for the Alternative 2 Spine Road Alignment differ from those in Alternative 1 in the following manner:

- Under Alternative 1, motorists travelling southbound on the Spine Road who wish to go to Kamehameha Highway would turn left on Acacia Road or go through on Kuala Street.

Under Alternative 2, the southbound motorists would stay on the Spine Road to Kamehameha Highway or turn right onto the modified Acacia Road alignment and then turn left onto Kuala Street. Kuala Street then leads to Kamehameha Highway.

- Under Alternative 1, motorists travelling southbound who wish to go to the Pearl Highlands Center would turn left on Acacia Road or through on Kuala Street.

Under Alternative 2, the southbound motorists would have to turn right onto the modified Acacia Road alignment.

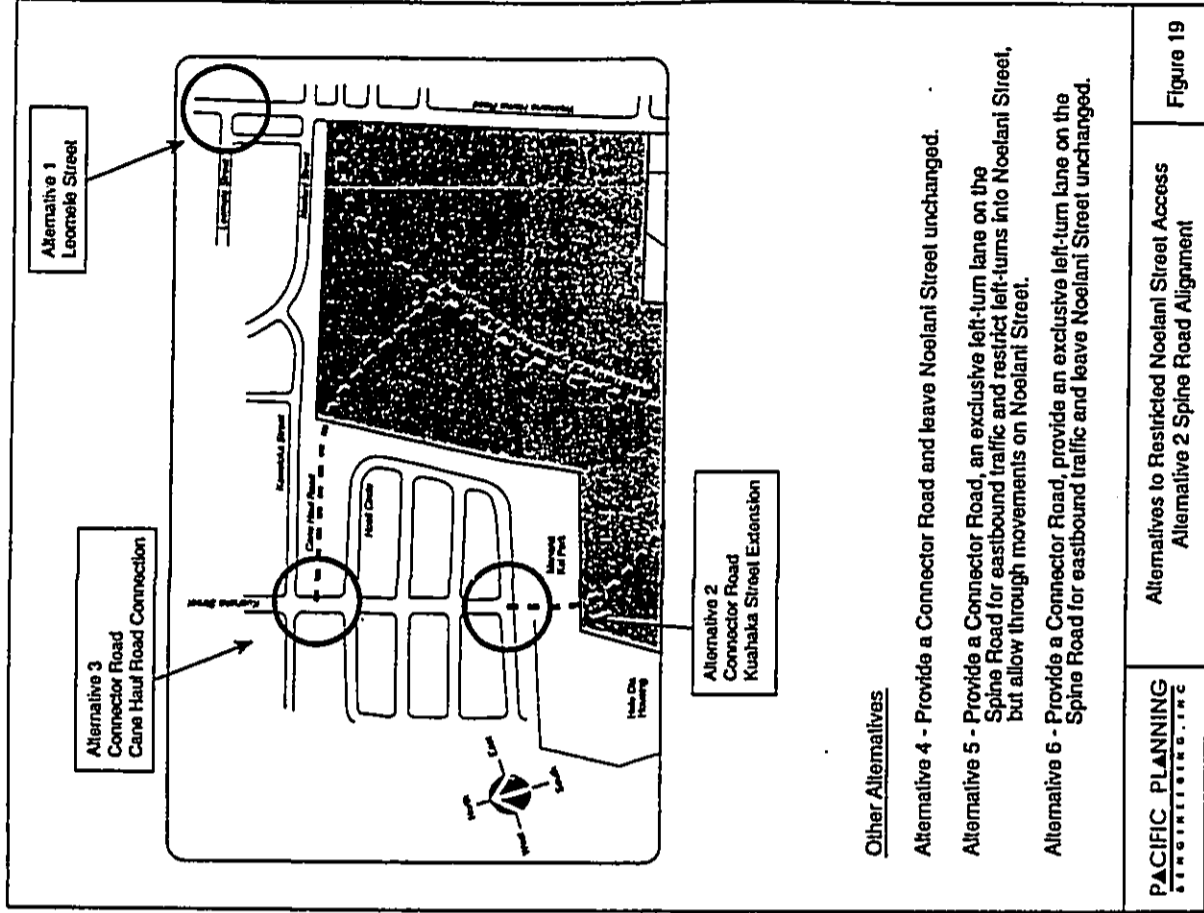
- Under Alternative 1, motorists travelling northbound from Kamehameha Highway onto the Spine Road would turn right from Acacia Road.

Under Alternative 2, the Spine Road would connect to Kamehameha Highway which would provide direct access for northbound motorists.

- Under Alternative 1, motorists travelling northbound who wish to go to the Pearl Highlands Center would continue to do so in the same manner as before.

Under Alternative 2, the northbound motorists would have to turn left from the Spine Road onto the modified Acacia Road alignment.

As in the Spine Road Alignment Alternative 1, to mitigate the traffic impacts at the intersections of Moanua Road with Waimanu Home Road and Noelani Street with Waimanu Home Road, six alternatives were developed. The location of these alternatives are shown on Figure 19. Based on the analysis, Alternative 3 which uses a portion of an existing Cane Haul Road as a connector road from the Spine Road to Kuahaka Street and prohibits left-turns into Noelani Street appears to be the most viable alternative. With the restrictions at Noelani Street, the existing traffic circulation patterns were adjusted. Appendix C describes in detail the developed alternatives.



TRAFFIC ANALYSIS

Analyses were conducted on the following study intersections to determine the relative impact of the proposed Spine Road on the roadway system and to determine improvements to mitigate the impact of the project, if necessary:

- Waimano Home Road with Nuclani Street,
- Waimano Home Road with Moanalua Road,
- Waimano Home Road with Hoolaula Street,
- Kamehameha Highway with Waimano Home Road,
- Kamehameha Highway with Acacia Road,
- Kamehameha Highway with Kuala Street and
- Kuala Street with Acacia Road

Analysis Methods

The study intersections were analyzed using analysis procedures outlined in the Highway Capacity Manual (HCM), Special Report 209, 1994. The methodology for operational analysis measures traffic operations using the "level-of-service" (LOS) rating, which ranges from "A" (best) to "F" (worst). Appendix B provides detailed definitions of the LOS used in this study.

Signalized Intersection Analysis

The LOS for signalized intersections is determined by average stopped delay to measure traffic operational conditions. The LOS for traffic movements is classified into the six letter categories ranging from less than 5 seconds of average stopped delay per vehicle (LOS A) to over 60 seconds of average stopped delay per vehicle (LOS F).

Unsignalized Intersection Analysis

The LOS for unsignalized intersections is determined by average total delay which is defined as the total elapsed time from when a vehicle stops at the end of a queue until the vehicle departs from the stop line. LOS for unsignalized intersections is classified into the six LOS categories ranging from less than 5 seconds of average total delay per vehicle (LOS A) to over 45 seconds of average total delay per vehicle (LOS F).

LOS criteria for signalized and unsignalized intersections are not directly comparable since they are based on different criteria. The primary reason is that motorists, in general, expect different levels of performance from different kinds of transportation facilities.

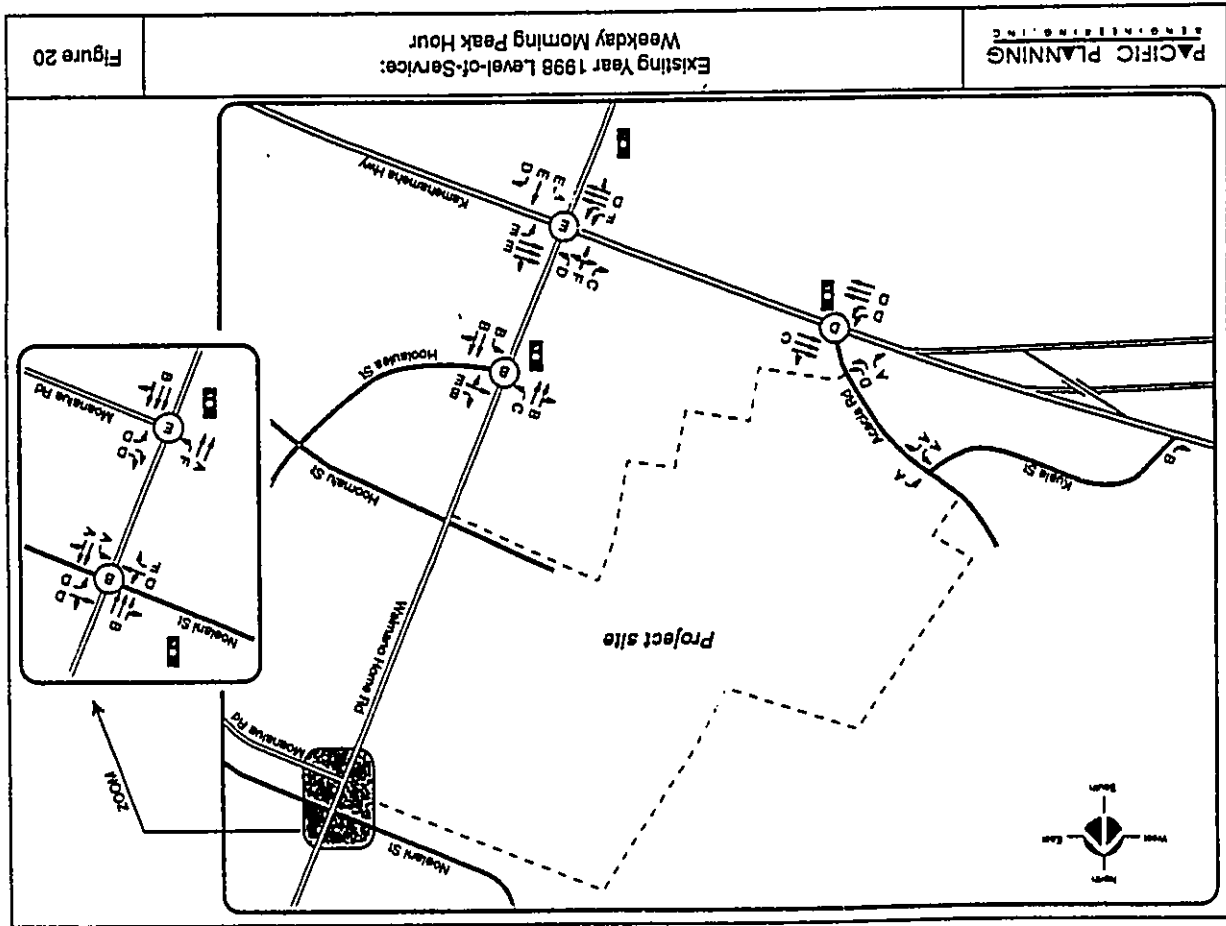
Analysis Results

The results of the analysis for the following study scenarios are shown below.

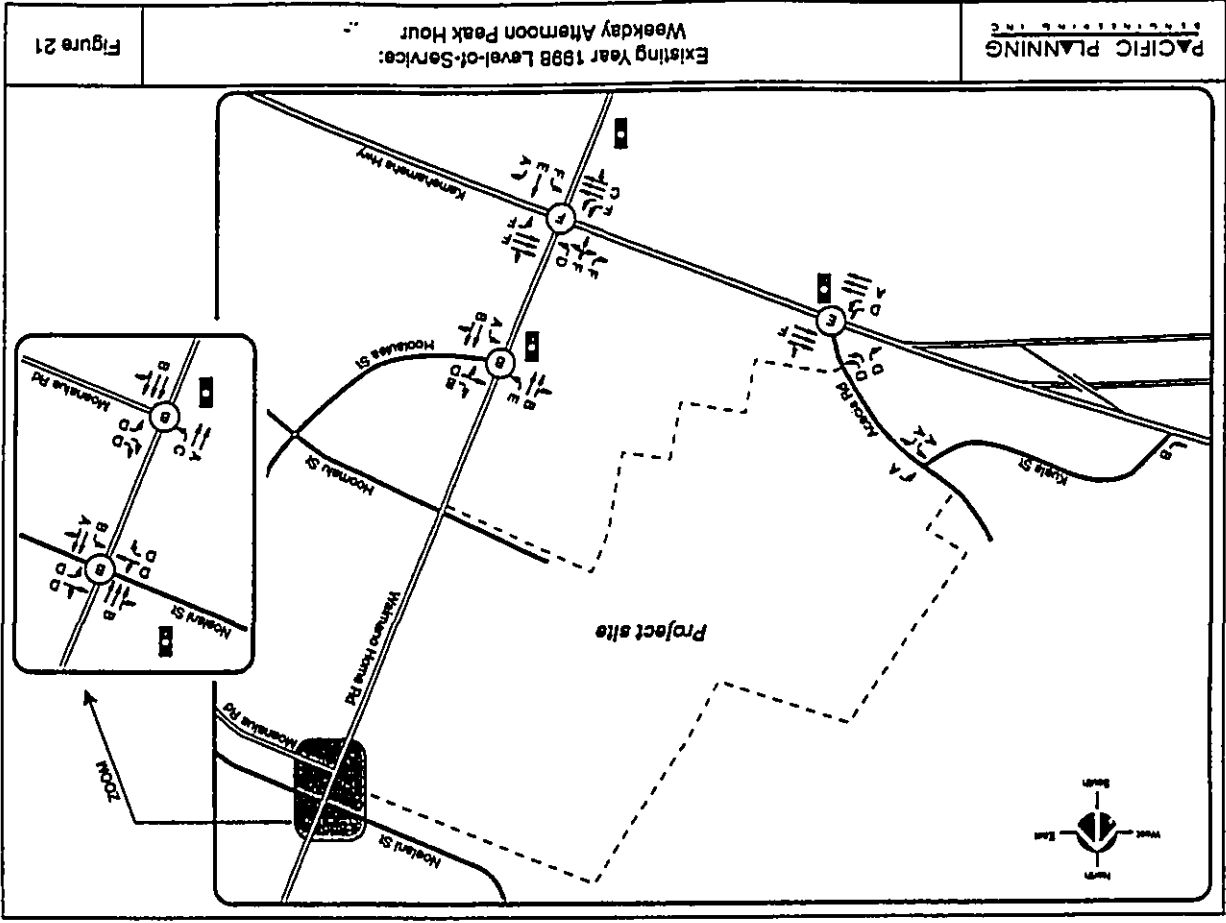
- Existing Year 1998
- Year 2020 Without Project - without general intersection improvements
- Year 2020 Without Project - with general intersection improvements
- Year 2020 With Project - Alternative 1 Spine Road Alignment
- Year 2020 With Project - Alternative 2 Spine Road Alignment

Existing Year 1998

The analysis results are shown on Figures 20 and 21. The following discussion describes the existing conditions for each study intersection based on field observations and analysis results. Appendix E provides the LOS results in tabular form.



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Waimano Home Rd with Moanalua Rd and Waimano Home Rd with Noelani St

Due to the close spacing between the signalized intersections of Noelani Street and Moanalua Road with Waimano Home Road, the traffic signal timing and phasing are coordinated with each other.

- During the morning peak hour, southbound motorists on Waimano Home Road turning left onto Moanalua Road experience long delays (LOS F). Eastbound motorists turning right from Noelani Street also experience long delays (LOS F). Significant queues were observed for these two movements.
- During the afternoon peak hour, these intersections operate at an overall LOS C or better.

Waimano Home Road with Hoolaula Street

- During the morning and afternoon peak hours, the major through traffic movements along Waimano Home Road flowed smoothly. However, motorists turning left from Hoolaula Street experienced long delays (LOS F).

Waimano Home Road/Lehua Avenue with Kamehameha Highway

- The intersection of Waimano Home Road with Kamehameha Highway operates with heavy congestion during both the morning and afternoon peak hours. Long queues were observed for the southbound right-turn movement, the eastbound left-turn and through movements, and westbound through movements. The analysis results indicate that the overall LOS in the morning and afternoon peak hours are LOS E and LOS F, respectively.

Kamehameha Highway with Acacia Road

- During the morning peak hour, downstream conditions at the intersection of Waimano Home Road with Kamehameha Highway contribute to the long delays experienced by eastbound motorists. The analysis results indicate that the overall LOS in the morning and afternoon peak hours are LOS D and LOS E, respectively.

Kamehameha Highway with Kuala Street

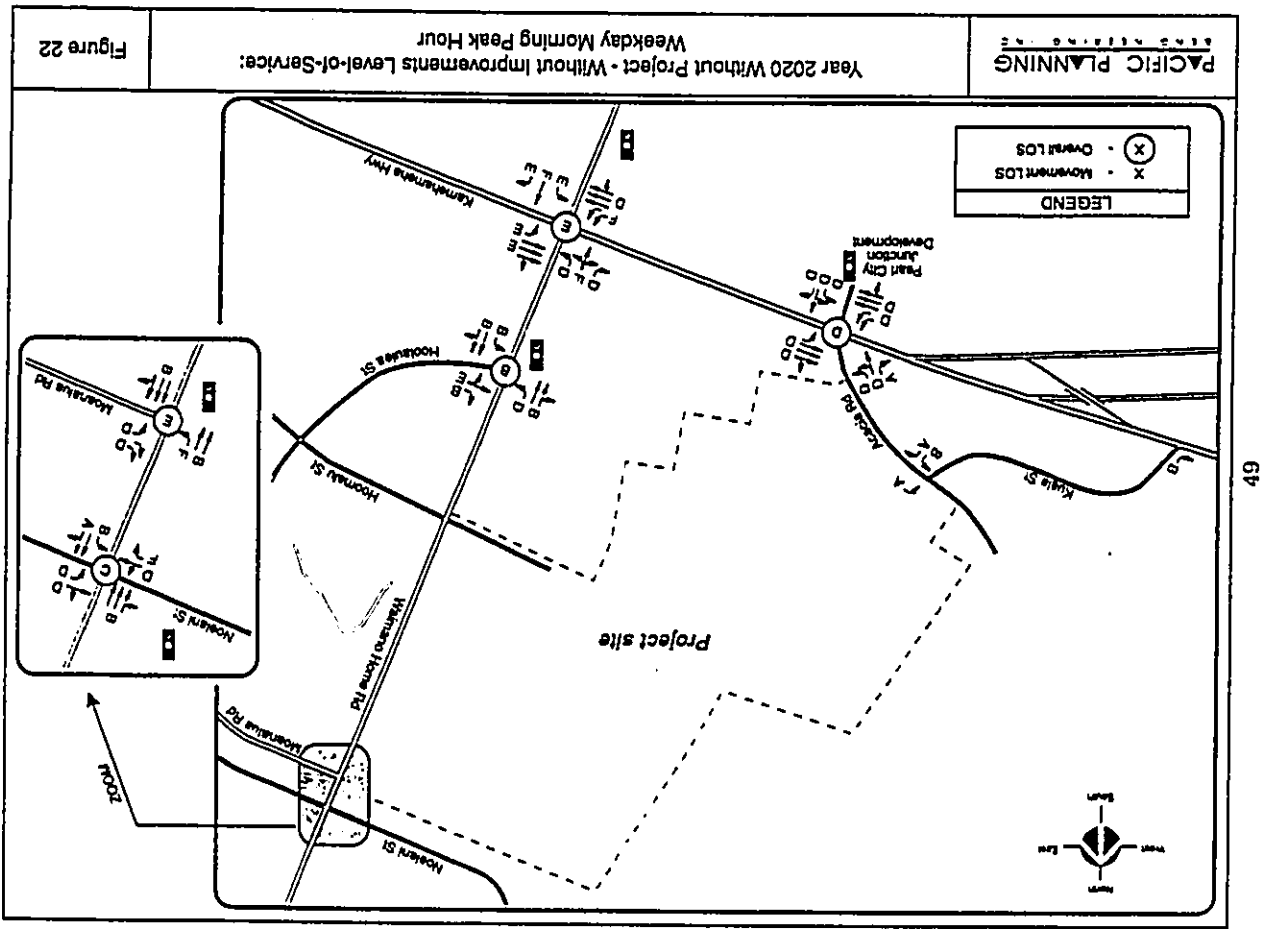
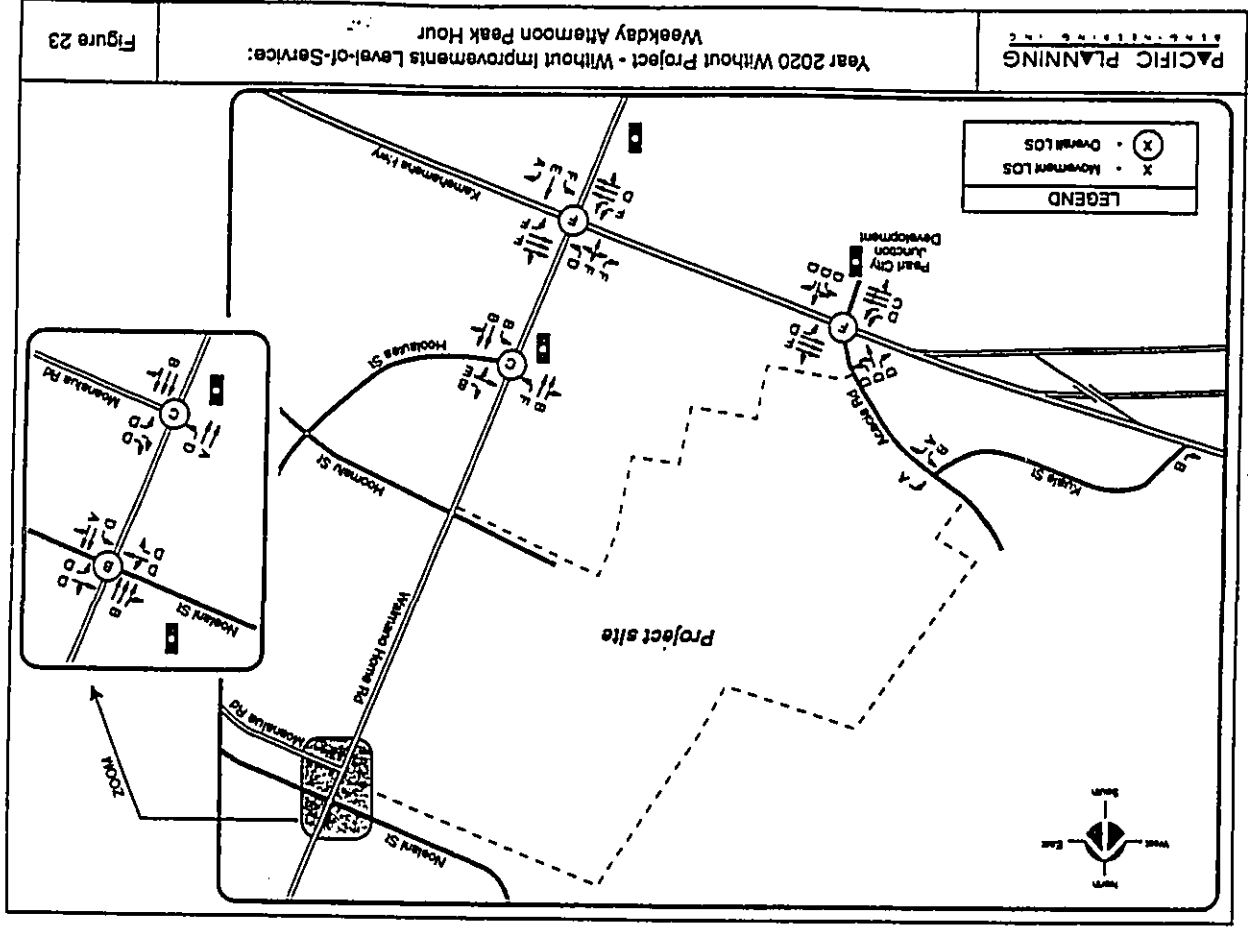
- Motorists making right-turns out of Kuala Street onto Kamehameha Highway experience minimal delays (LOS D) during both peak hours.

Kuala Street with Acacia Road

- This intersection operated very well (LOS A) during both peak hours.

Year 2020 Without Project - Without General Intersection Improvements

The results of the analysis for the study intersections of the Year 2020 Without Project are shown in Figures 22 and 23. The geometry for the study intersections were assumed to be the same as existing except at the entrance to the PCJ site. Modifications at the intersection of Kamehameha Highway with Acacia Road and the PCJ site include an exclusive westbound left turn lane and modification to the traffic signal system to accommodate the PCJ driveway leg. The PCJ access lane consists of an exclusive left-turn lane, a shared left/through lane and an exclusive right turn lane. The southbound lane on Acacia Road consists of an exclusive left-turn lane, a shared left/through lane and an exclusive right turn lane.



Year 2020 Without Project - With General Intersection Improvements

The results of the analysis for the study intersections of the Year 2020 Without Project - With General Intersection Improvements are shown in Figures 24 and 25. These improvements could be done without or with the Manana Storage Area Development. The intersections of Kamehameha Highway with Waimano Home Road and Kamehameha Highway with Acacia Road/PCJ access could be improved with the following modifications.

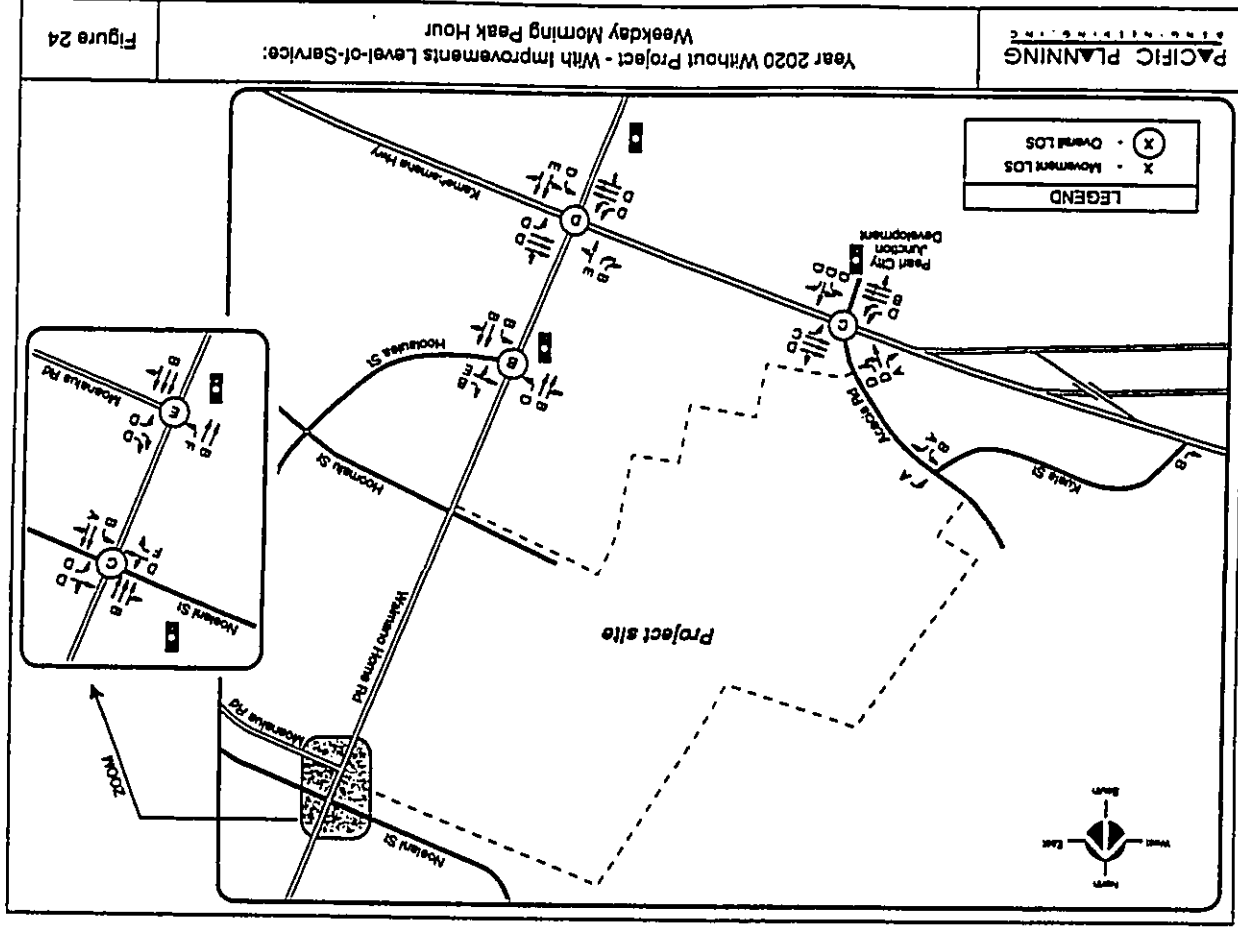
Kamehameha Highway with Waimano Home Road

Provide improvements as follows:

- Northbound approach: modify existing laneway to consist of an exclusive LT lane, shared LT/TH lane, shared TH/RT lane.
- Southbound approach: modify existing laneway to consist of a shared LT/TH lane, double RT lanes.
- Westbound approach: same as existing.
- Eastbound approach: extend LT storage lane to prevent queued vehicles from blocking through vehicles. Prohibit U-turns from the LT lane (this allows the southbound RT movement to proceed at the same time as the eastbound LT movement).
- Modify traffic signals to allow simultaneous movements of the southbound right-turn and eastbound left-turn movements. Modification of the cycle length may also improve traffic operations.

Kamehameha Highway with Acacia Road:

The laneway for this intersection was assumed to be the same as the without project without condition discussed previously, however, modification of the cycle lengths may improve traffic operations.



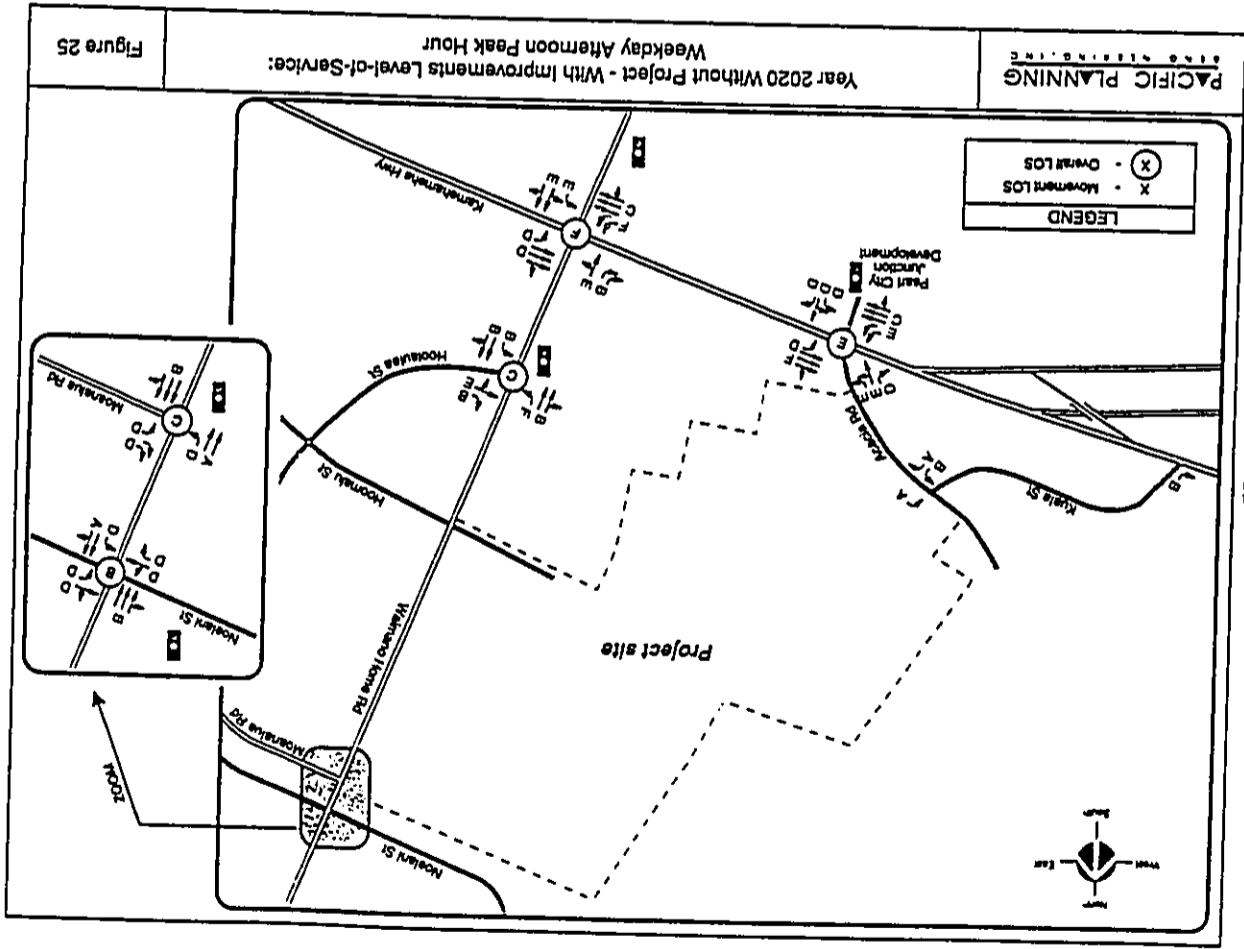


Figure 25

Year 2020 With Project - Alternative 1 Spine Road Alignment

The results of the analysis for the study intersections with the project and the Alternative 1 Spine Road alignment are shown in Figures 26 and 27. The intersection configuration and modifications for Alternative 1 are as follows:

Waimano Home Road with Noelani Street

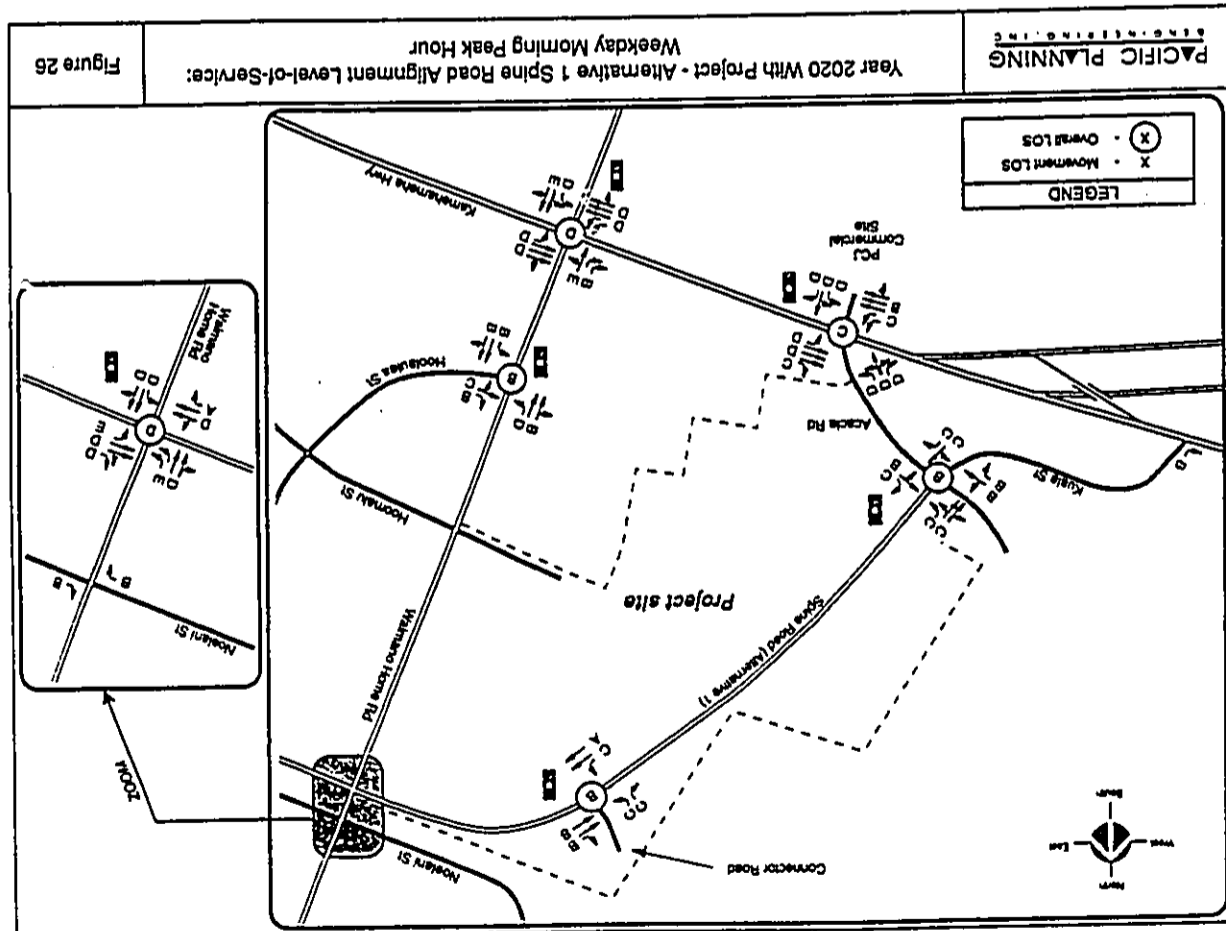
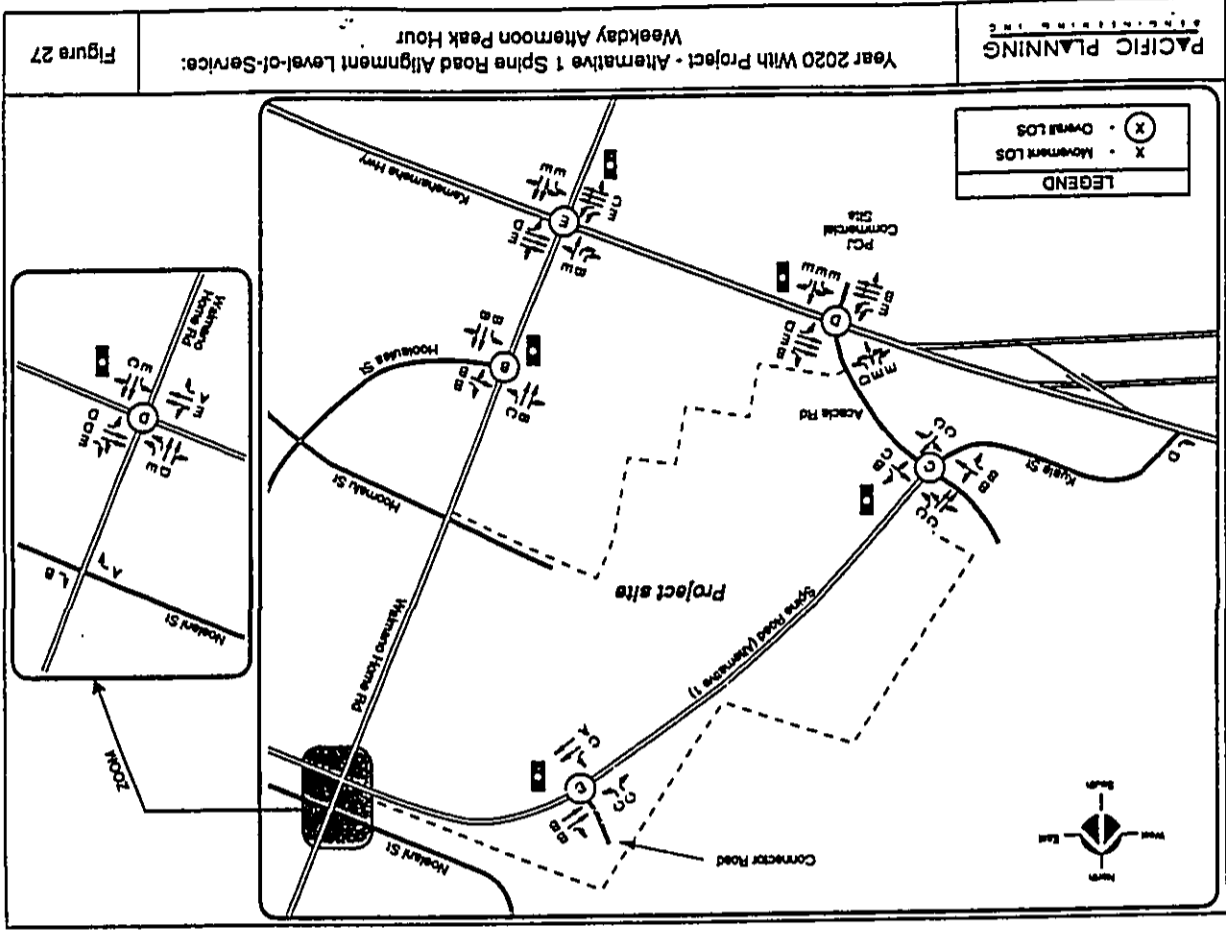
The close distance between the signalized intersections of Noelani Street with Waimano Home Road and Moanalua Road with Waimano Home Road (~100 feet), require that the traffic operations be coordinated. With the addition of the Spine Road (Alternative Alignment 1 or 2) and the projected increase in future traffic at these intersections with the project, the impacts to the intersections of Moanalua Road with Waimano Home Road and Noelani Street with Waimano Home Road are anticipated to be significant.

To mitigate the traffic impacts at the intersections of Moanalua Road with Waimano Home Road and Noelani Street with Waimano Home Road, six alternatives were developed. The location of these alternatives are shown on Figures 16 and 19. Based on the analysis, Alternative 3, which uses a portion of an existing Cane Haul Road as a connector road from the Spine Road to Kuaia Street, removes the traffic signal at the intersection of Waimano Home Road with Noelani Street, and restricts movements to right-turn in and right-turn of Noelani Street, appears to be the most viable alternative. Appendix C describes in detail the developed alternatives.

Waimano Home Road with Moanalua Road/Spine Road:

Provide improvements as follows:

- Northbound approach: exclusive LT lane, TH lane, shared TH/RT lane.
- Southbound approach: double LT lanes, TH lane, shared TH/RT lane.



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

- Westbound approach: exclusive LT lane, TH lane, shared TH/RT lane, exclusive RT lane.
- Eastbound approach: shared LT/TH lane, TH lane, exclusive RT lane.
- Modify traffic signals to accommodate the addition of the Spine Road leg. Due to geometric constraints, separate phasing for the eastbound and westbound movements are needed as well as lead/lag left-turn phasing for the northbound and southbound approaches.

Waimano Home Road with Hoolaulaea Street:

The laneage for this intersection was assumed to be the same as existing.

Kamehameha Highway with Waimano Home Road/Leliua Avenue:

Provide improvements as follows:

- Northbound approach: modify existing laneage to consist of an exclusive LT lane, shared LT/TH lane, shared TH/RT lane.
- Southbound approach: modify existing laneage to consist of a shared LT/TH lane, double RT lanes.
- Westbound approach: same as existing.
- Eastbound approach: extend LT storage lane to prevent queued vehicles from blocking through vehicles. Prohibit U-turns from the LT lane (this allows the southbound RT movement to proceed at the same time as the eastbound LT movement).
- Modify traffic signals to allow simultaneous movements of the southbound right-turn and eastbound left-turn movements. Modification of the cycle length may also improve traffic operations.

Kamehameha Highway with Acacia Road:

The laneage for this intersection was assumed to be the same as the without project condition except for the westbound and southbound approach. An exclusive right-turn lane is recommended for the westbound approach. The southbound approach would also need to be modified to include an exclusive left lane, a shared left/through/right lane and an exclusive right turn lane.

Kamehameha Highway with Kuiala Street:

The laneage for this intersection was assumed to be the same as existing.

Acacia Road with Kuiala Street/Spine Road:

Provide improvements as follows:

- Northbound approach: shared LT/TH lane, exclusive RT lane.
- Southbound approach: exclusive LT lane, shared LT/TH lane, shared TH/RT lane.
- Westbound approach: shared LT/TH lane, exclusive RT lane.
- Eastbound approach: shared LT/TH lane, exclusive RT lane.
- With the project, this intersection meets the minimum requirements for the peak-hour volume warrant for traffic signalization according to the "Manual on Uniform Traffic Control Devices (MUTCD), 1988 Edition". Therefore, signalization was assumed.

Spine Road with Cane Haul Connector Road:

Provide improvements as follows:

- Southbound approach: exclusive LT lane, exclusive RT lane.
- Westbound approach: two TH lanes, exclusive RT lane.
- Eastbound approach: exclusive LT lane, two TH lanes.

- With the project, this intersection meets the minimum requirements for the peak-hour volume warrant for traffic signalization according to the MUTCD. Therefore, signalization was assumed.

Alternative 2 Spine Road Alignment - Analysis Results

The results of the analysis for the study intersections with the project and the Alternative 2 Spine Road alignment are shown in Figures 28 and 29. The geometry for the study intersections were assumed to be the same as Alternative 1 except at the intersections of Kuala Street with Acacia Road and Spine Road with Acacia Road. The intersection configuration and modifications for Alternative 2 are as follows:

Acacia Road with Kuala Street:

The laneage for this intersection is the same as the existing condition.

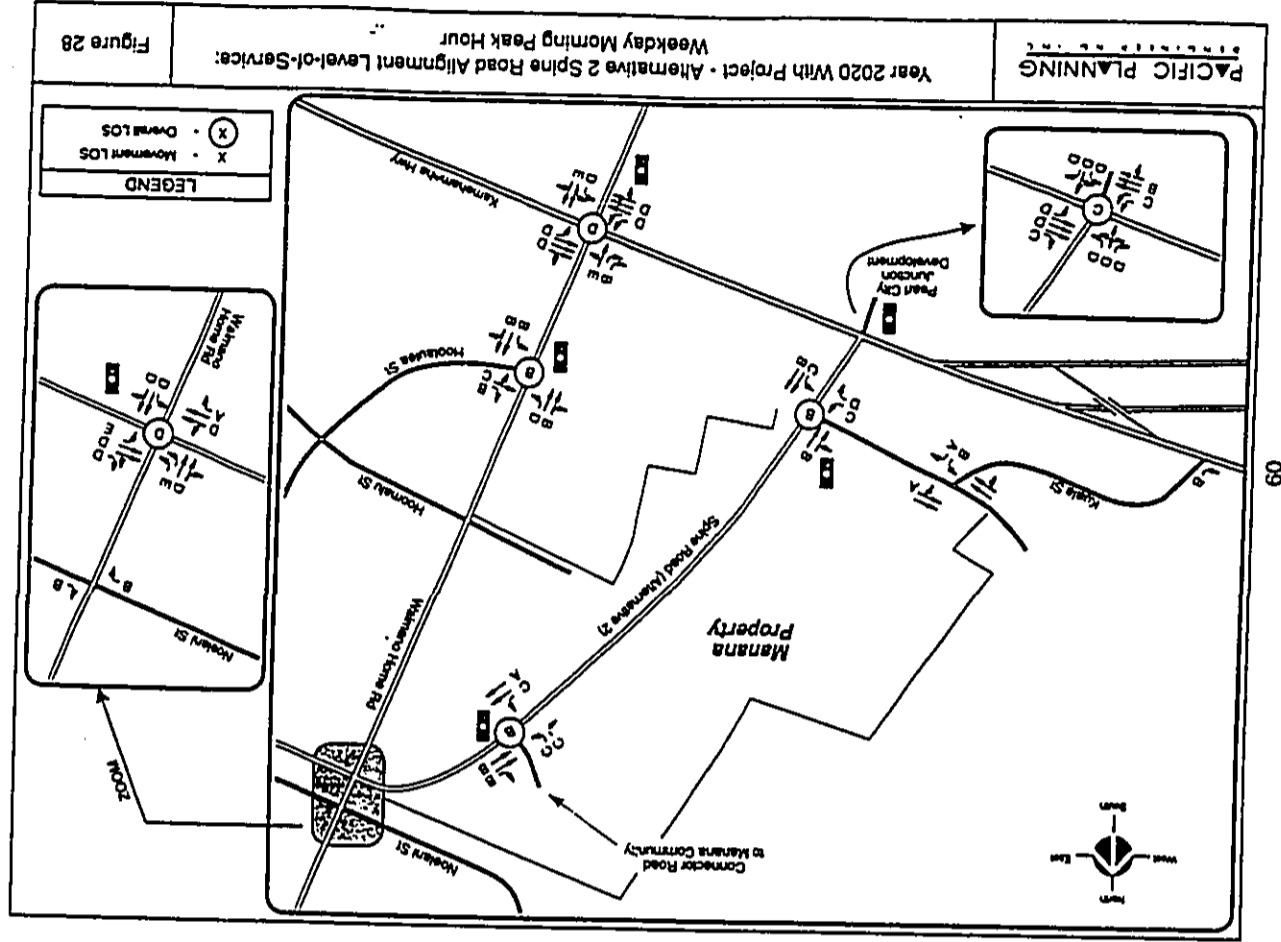
Acacia Road with Spine Road:

Provide improvements as follows:

- Northbound approach: exclusive LT lane, two TH lanes.
- Southbound approach: two TH lanes, exclusive RT lane.
- Eastbound approach: exclusive LT lane, exclusive RT lane.
- With the project, this new intersection meets the minimum requirements for the peak-hour volume warrant for traffic signalization according to the MUTCD. Therefore, signalization was assumed.

Level-of-Service Comparison

For comparison purposes, Tables 3 and 4 shows the overall level-of-service for each condition at the study intersections.



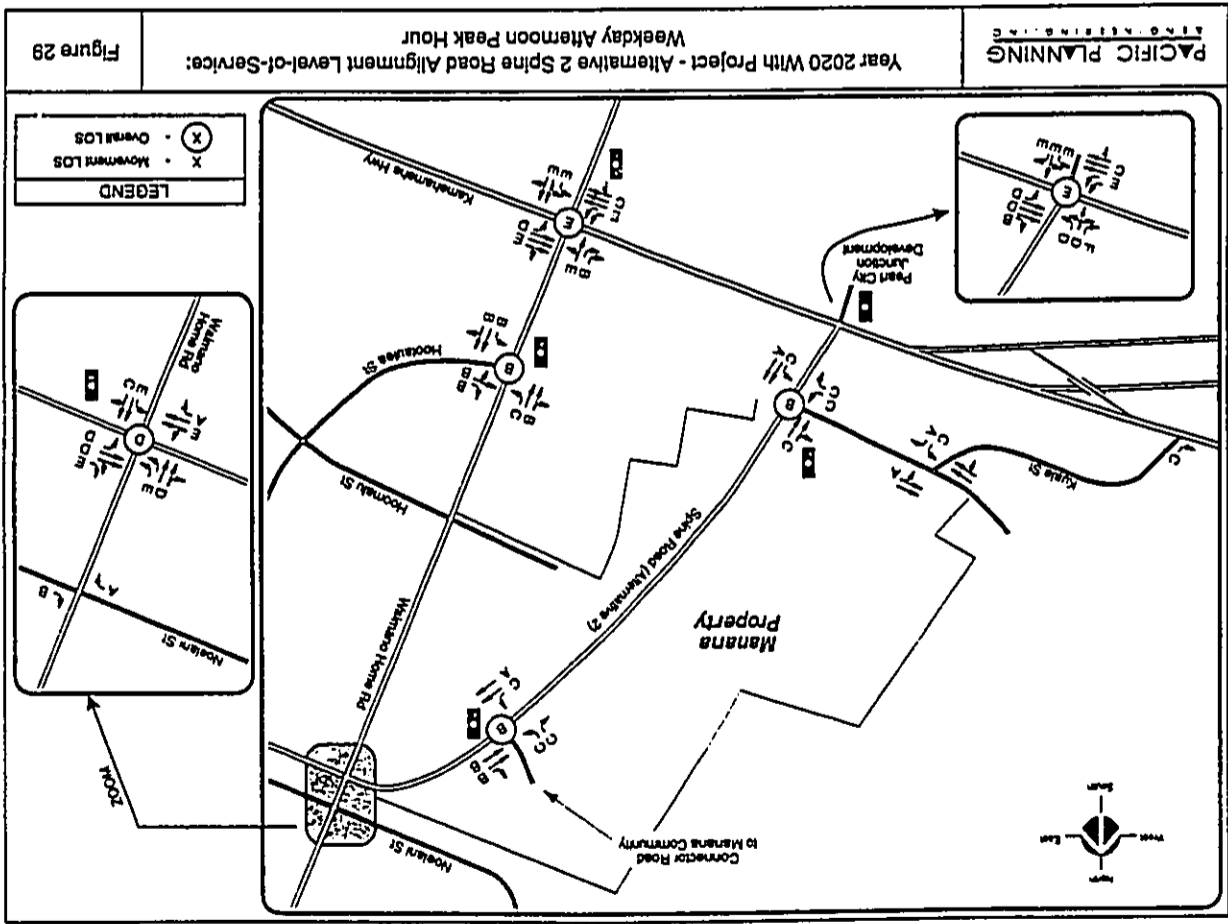


Table 3 - Signalized Intersection Level-of-Service Results (AM Peak Hour)

Intersection	2020 Without Project		2020 With Project	
	Without Imp.	With Imp.	Alt. 1	Alt. 2
Waimano Home Rd with Moanalua Rd	E	E	D	D
Waimano Home Rd with Hoolala St	B	B	B	B
Waimano Home Rd with Kam. Hwy	E	D	D	D
Kamehameha Hwy with Acacia Rd	D	C	C	C
Acacia Rd with Kula St and Spine Rd (Alternative 1)	•	•	B	•
Acacia Rd with Spine Rd (Alternative 2)	•	•	•	B
Manana Connector Rd with Spine Road	•	•	B	B

Table 4 - Signalized Intersection Level-of-Service Results (PM Peak Hour)

Intersection	2020 Without Project		2020 With Project	
	Without Imp.	With Imp.	Alt. 1	Alt. 2
Waimano Home Rd with Moanalua Rd	C	C	D	D
Waimano Home Rd with Hoolala St	C	C	B	B
Waimano Home Rd with Kam. Hwy	F	F	E	E
Kamehameha Hwy with Acacia Rd	E	E	D	E
Acacia Rd with Kula St and Spine Rd (Alternative 1)	•	•	C	•
Acacia Rd with Spine Rd (Alternative 2)	•	•	•	B
Manana Connector Rd with Spine Road	•	•	B	B

The LOS table shows that, with the project under the Alternative 1 or Alternative 2 Spine Road alignments, the study roadways can accommodate the additional traffic volumes.

Preferred Alternative Alignment for Spine Road

A comparative analysis of the two alternative Spine Road alignments was performed using the following criteria:

1. Compatibility with the approved master plan in the *Manana and Pearl City Junction Development Final Environmental Impact Statement, May 1996*
2. Providing access to the Manana Storage Area Development.
3. Problems created by the construction of the Spine Road.
4. Level-of-Service (LOS) at the study intersections.
5. The secondary benefit of providing an alternative north-south travel route to Waimano Home Road for Pearl City motorists.

The criteria were developed based on the project purpose and need. Each criteria was then weighted by importance (4 being the highest) on how well it correlates with the purpose and need. The alternatives were ranked on a rating scale of 1 or 2 (2 being the best). After each alternative was ranked, a weighted score was calculated. Table 5 shows the results of the comparative analysis. Also included is a description of each criteria.

Table 5 - Comparative Analysis of Spine Road Alignments

Criteria	Weight	Alt. 1		Alt. 2	
		Rating Scale	Score	Rating Scale	Score
1. Compatibility with master plan in the approved EIS	4	2	8	1	4
2. Access to Manana Storage Area Development	3	1	3	2	6
3. Least problems created by each Alternative	2	2	4	1	2
4. LOS at study intersections	2	2	4	1	2
5. Alternate Route to Waimano Home Road	1	1	1	2	2
Total			20		16

Criteria 1. Compatibility with the approved master plan in the EIS.

As part of the master plan developed jointly by the City Department of Housing and Community Development and the Pearl City Planning Task Force, a Spine Road traversing through the property was proposed to provide access and circulation to the project. The Alternative 1 alignment is the path that was developed through this master planning process which maximizes the use of the Manana Storage Area development.

An environmental impact statement (EIS) for the redevelopment of the Manana Storage Area was completed and accepted in July 1996. In the completed EIS, the Spine Road path followed the alignment of Alternative 1.

Criteria 2. Access to Manana Storage Area Development.

Alternative 2 appears to provide a somewhat better access to the Manana Storage Area Development for motorists on Kamehameha Highway because of the direct connection to the Spine Road.

Criteria 3. Problems created by each alternative.

Alternative 1 has less problems than Alternative 2 for the following reasons:

- **New Intersections** - Alternative 2 requires realignment of Acacia Road resulting in the creation of new intersection. Since Alternative 1 will hookup to an existing intersection, it just requires providing a southbound leg to the existing intersection of Acacia Road with Kuala Street.
- **New Roadways** - Alternative 2 requires construction of a new roadway to intersect with the Spine Road.
- **Pearl Highlands Shopping Center Access** - Currently, there are two access driveways into the shopping center along Acacia Road. Realignment of Acacia Road may require restricting and/or relocating these driveways.
- **Post Office Impacts** - The alignment of Alternative 2 runs through existing Post Office property. This will require the purchase of additional right-of-way. Since Alternative 1 follows the existing Acacia Road, it will not require the purchase of additional property.

Criteria 4. Level of Service at study intersections.

The level-of-service (LOS) along Waimano Home Road are the same for each alternative. However, at the intersection of Kamehameha Highway with Acacia Road, Alternative 1 would operate at better LOS conditions. The cause of this is that the Alternative 1 alignment connects to Acacia Road in a location that provides motorists with a choice between using Acacia Road or Kuala Street to access Kamehameha Highway. This tends to distribute the right-turning traffic on Kamehameha Highway more evenly.

With Alternative 2 and the direct connection to Kamehameha Highway, the route to Kuala Street is more circuitous and therefore, more motorists will tend to use the intersection of Kamehameha Highway and Acacia Road. With more motorists at this intersection, the delays would increase.

Criteria 5. Alternative Route to Waimano Home Road.

Both alternatives reduce the traffic demand on Waimano Home Road by providing motorists an alternate route to Kamehameha Highway. However, Alternative 2 provides a direct connection to Kamehameha Highway. Therefore, Alternative 2 is ranked better than Alternative 1.

Based on the comparative analysis of the two alternatives, the Alternative 1 Spine Road Alignment is preferred over Alternative 2.

CONCLUSIONS AND RECOMMENDATIONS

In the Year 2020 with the Manana Storage Area development project and corresponding Spine Road, there will be an impact on traffic flow at the study intersections. These impacts are the result of two components; 1) new trips generated by the Manana Storage Area development and 2) the construction of the Spine Road.

The development of the Manana Storage Area will generate additional traffic at the study intersections, however, the study roadways, with the preferred Spine Road alignment and other mitigative measures described in this report, should be able to accommodate the project. The study area currently operates under congested conditions and is expected to continue to be congested with or without the project. The recommended improvements will slightly improve traffic conditions, however, occasional breakdowns in traffic flow are still expected to occur.

The primary function of the Spine Road is to provide access and traffic circulation to the Manana Storage Area development. However, its location also provides a second north-south travel route to Waimano Home Road for Pearl City motorists. Currently, Waimano Home Road carries significant traffic volumes during the peak hours, especially near Kamehameha Highway. The Spine Road, as a secondary benefit, would provide an alternative means of travel between Moanalua Road and Kamehameha Highway.

Preferred Spine Road Alternative

In order to select a preferred Spine Road alignment, a comparative analysis of the two alternatives was performed using criteria based on the project purpose and need. Table 5 of the report showed the results of the comparative

analysis which indicated that the Spine Road Alternative 1 is the preferred alignment.

Other Mitigative Measures

Additional measures to improve traffic flow are shown in Figure 30 and summarized below. These measures are based upon the Alternative 1 Spine Road alignment.

The following existing intersections have the recommended laneages as shown in the following figures:

- Waimano Home Road with Noelani Street (Figure 31).
- Waimano Home Road with Moanalua Road/Spine Road (Figure 31).
- Waimano Home Road with Kamehameha Highway (Figure 32).
- Kamehameha Highway with Acacia Road (Figure 33) and
- Acacia Road with Kuala Street (Figure 34).

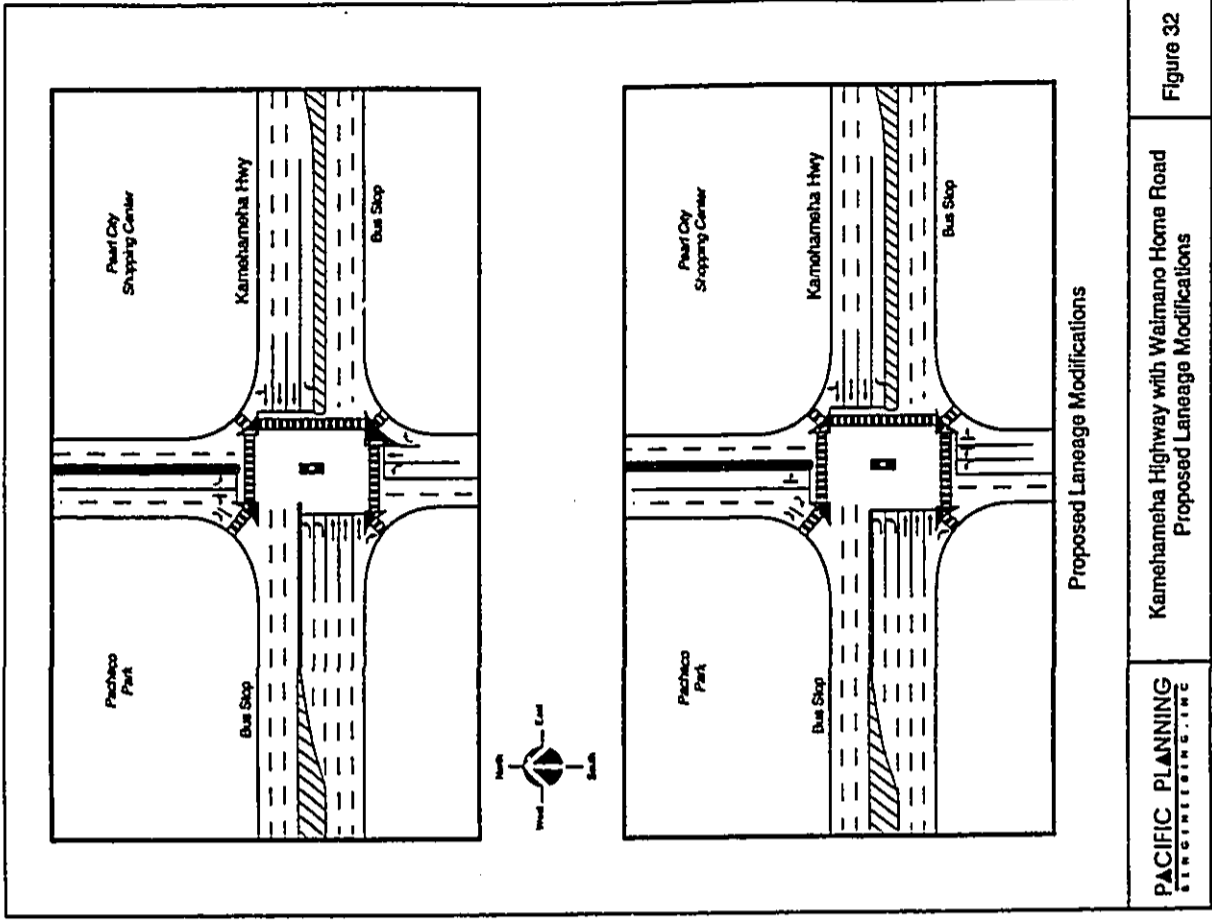
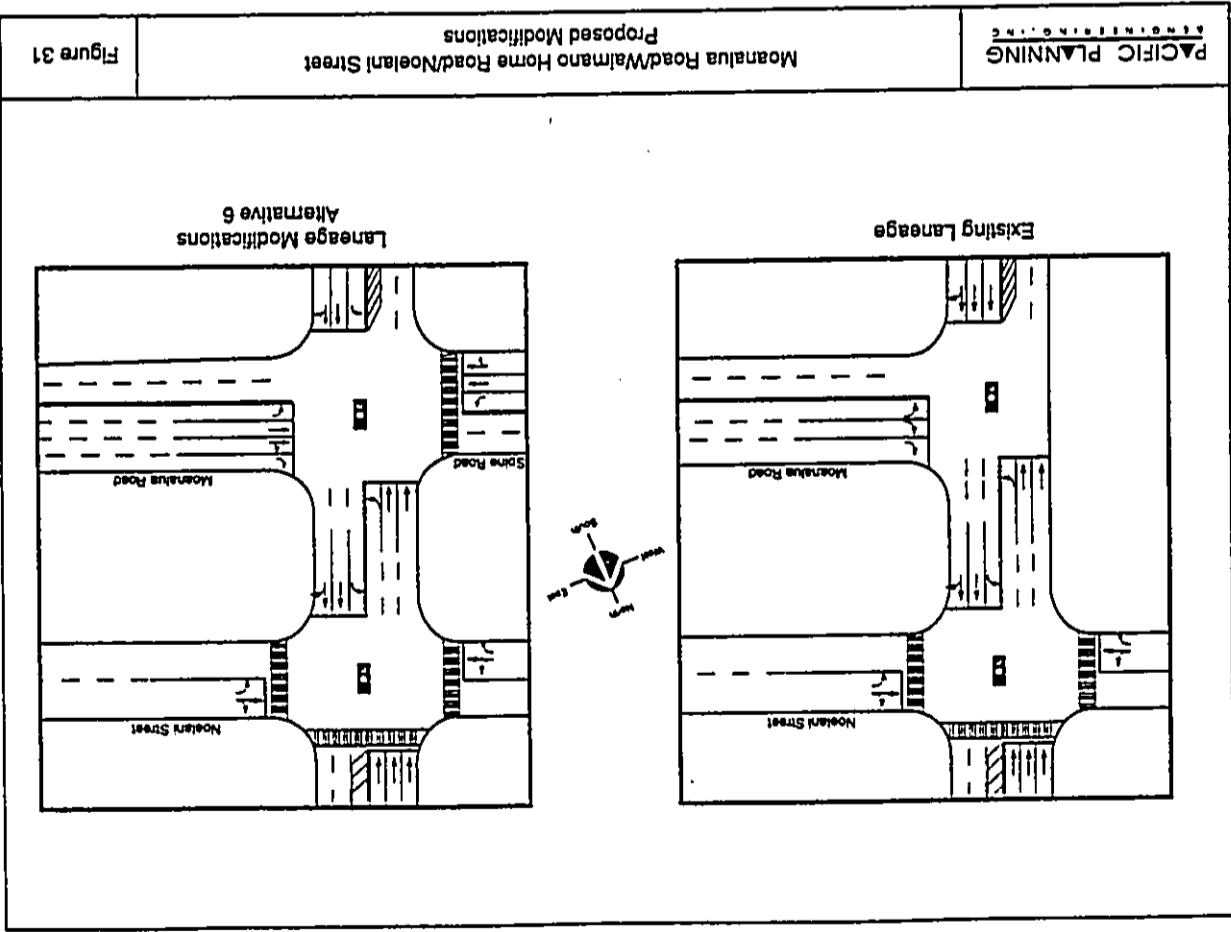
The following existing intersections do not require any modifications:

- Waimano Home Road with Hoolaula Street and
- Kamehameha Highway with Kuala Street.

With the project, a new intersection of the Spine Road with a connector road to the Manana Community is proposed. The connector road alignment follows an existing cane haul road which intersects with Kuahaka Street just above Hooli Circle.

The largest traffic impacts of this project will be felt at the intersections of Waimano Home Road with Moanalua Road and Waimano Home Road with Noelani Street.

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



The close distance between the intersections require that the traffic operations be coordinated. With the addition of the Spine Road, the current direct access from Moanalua Road to the Manana Community via Noelani Street will be affected. This is required due to the projected increase in future traffic at these intersections with the project.

To mitigate the traffic impacts at the intersections of Waimano Home Road with Moanalua Road and Waimano Home Road with Noelani Street, alternatives were developed to address accessibility for the Manana and Holiday City Subdivisions. These alternatives are described in detail in Appendix C and are as follows:

1. Remove the traffic signals at the intersection of Noelani Street with Waimano Home Road and restrict Noelani Street to a right-turn in and right-turn out operation. Divert existing Noelani Street motorists to Leomele Street.
2. Remove the traffic signals at the intersection of Noelani Street with Waimano Home Road and restrict Noelani Street to a right-turn in and right-turn out operation. Divert existing Noelani Street motorists to a connector road from the Spine Road to a Kuahaka Street extension.
3. Remove the traffic signals at the intersection of Noelani Street with Waimano Home Road and restrict Noelani Street to a right-turn in and right-turn out operation. Divert existing Noelani Street motorists to a connector road from the Spine Road to an existing Cane Haul Road. The Cane Haul Road would intersect with Kuahaka Street just north of Hooli Circle.

4. Construct a connector road from the Spine Road to an existing Cane Haul Road between the Manana and Holiday City Subdivisions and leave access to Noelani Street unchanged.

5. Construct a connector road from the Spine Road to an existing Cane Haul Road between the Manana and Holiday City Subdivisions, provide an exclusive left-turn lane on the Spine Road for eastbound traffic and restrict left-turns into Noelani Street.

6. Construct a connector road from the Spine Road to an existing Cane Haul Road between the Manana and Holiday City Subdivisions, provide an exclusive left-turn lane on the Spine Road for eastbound traffic and leave access to Noelani Street unchanged.

Alternative 1 (Leomele Street) does not seem feasible from both a constructability and a traffic operations perspective. Alternative 2 (Spine Road via Kuahaka Street extension) requires the use of park land and subsequently may not be possible because of Section 4(f) regulations.

For Alternatives 3, 4, 5 and 6 a summary of the overall intersection LOS during the morning and afternoon peak hours is displayed in Appendix C. Alternative 3 (restricted Noelani Street) results in LOS "D" conditions during both the morning and afternoon peak hours. Alternative 5 (Noelani Street restricted to through movements) also results in LOS "D" conditions during both peak hours. However, Alternative 4 (Noelani Street open) and Alternative 6 (Noelani Street open & modifications to Spine Road) results in LOS "F" conditions in the morning peak hour and LOS "E" conditions during the afternoon peak hour.

From a traffic operations perspective, Alternatives 3 or 5 provides the best operating conditions at the intersection of Waimano Home Road with Moanalua Road/Spine Road. However, Alternative 5 requires the acquisition

of property along the makai side of Moanalua Road, but does allow limited access to Noelani Street.

All alternatives were presented to the affected community through several public meetings with the Pearl City Task Force, the Manana Community Association and the Pearl City Community. Their primary concern was the need for continued access to the Manana community via Noelani Street. As a result, Alternative 6 was selected as the preferred alternative.

To address the poor LOS during the morning peak hour in Alternative 6, additional mitigation measures may need to be implemented. These measures could possibly include contraflow of the northbound left-turn lane on Waimano Home Road at Noelani Street. This would provide double left-turn lanes in the southbound direction onto Moanalua Road, similar to the laneage configuration shown in Alternative 5. Additional signal timing modifications may also be required.

Interim Conditions

The conclusions and recommendations of this report are based on year 2020 build-out conditions. However, it is expected that the project will be developed in several phases, therefore, an Interim condition was evaluated. Appendix D provides a discussion of following issues for the interim condition consisting of the Spine Road and development of the City facilities in the year 2000.

- 1) Necessary Laneages at the Intersections of Waimano Home Road with Moanalua Road/Spine Road and Acacia Road with Kuala Street/Spine Road is shown in Appendix D, Figure D3.
- 2) Determine if the existing traffic signal at the intersection of Noelani Street with Waimano Home Road can still be coordinated with the traffic

signal at the new intersection of Waimano Home Road with Moanalua Road/Spine Road under interim conditions. Analysis results indicate that during the Interim conditions, these study intersections could still be coordinated similar to existing.

- 3) Determine if the addition of an exclusive westbound right-turn lane on Kamehameha Highway at its intersection with Acacia Road is necessary due to Interim project conditions.

Analysis results indicate that the addition of the City facilities and the Spine Road is expected to have a small impact to the intersection of Kamehameha Highway with Acacia Road. This intersection currently operates under congested conditions and is expected to continue to operate under similar conditions in the year 2000. The addition of a westbound exclusive right-turn lane on Kamehameha Highway as recommended for build-out conditions will improve traffic operations at this intersection. However, the need for this improvement is not required due to the Interim project.

Project : 80.1 Manana Spine Road TIAR
Date: 3/18/98

APPENDIX A

TRAFFIC COUNT DATA

| Start Time | Direction NORTHBOUND | | | Direction SOUTHBOUND | | | |
|------------|----------------------|-------|-------|----------------------|-------|-------|-------|
| | NB-LT | NB-TH | NB-RT | SB-LT | SB-TH | SB-RT | |
| 6:15 AM | 16 | 109 | 0 | 238 | 0 | 0 | |
| 6:30 AM | 25 | 131 | 0 | 378 | 0 | 0 | |
| 6:45 AM | 21 | 168 | 1 | 300 | 0 | 0 | |
| 7:00 AM | 34 | 228 | 2 | 341 | 0 | 2 | |
| 7:15 AM | 48 | 340 | 1 | 368 | 0 | 0 | |
| 7:30 AM | 38 | 369 | 0 | 382 | 1 | 0 | |
| 7:45 AM | 22 | 221 | 0 | 443 | 0 | 0 | |
| 8:00 AM | 26 | 127 | 1 | 253 | 0 | 0 | |
| 8:15 AM | 17 | 109 | 2 | 181 | 0 | 0 | |
| 8:30 AM | | | | | | | |
| PEAK HOUR | NB-LT | NB-TH | NB-RT | SB-LT | SB-TH | SB-RT | Total |
| 7:00 AM | 140 | 1158 | 3 | 0 | 1812 | 1 | 2 |
| 8:00 AM | TOTAL | 1301 | 0.15% | TOTAL | 1513 | 0.13% | 1513 |

| Start Time | Direction EASTBOUND | | | Direction WESTBOUND | | | |
|------------|---------------------|-------|-------|---------------------|-------|-------|-------|
| | EB-LT | EB-TH | EB-RT | WB-LT | WB-TH | WB-RT | |
| 6:15 AM | 6 | 12 | 71 | 0 | 1 | 1 | |
| 6:30 AM | 1 | 21 | 76 | 0 | 1 | 1 | |
| 6:45 AM | 2 | 11 | 63 | 1 | 2 | 3 | |
| 7:00 AM | 4 | 27 | 84 | 0 | 3 | 16 | |
| 7:15 AM | 11 | 12 | 64 | 2 | 2 | 15 | |
| 7:30 AM | 14 | 26 | 71 | 1 | 9 | 24 | |
| 7:45 AM | 13 | 14 | 75 | 2 | 3 | 18 | |
| 8:00 AM | 2 | 3 | 50 | 1 | 1 | 2 | |
| 8:15 AM | 0 | 1 | 55 | 0 | 0 | 0 | |
| 8:30 AM | | | | | | | |
| PEAK HOUR | EB-LT | EB-TH | EB-RT | WB-LT | WB-TH | WB-RT | Total |
| 7:00 AM | 42 | 79 | 294 | 6 | 17 | 73 | 0 |
| 8:00 AM | TOTAL | 415 | 0.00% | TOTAL | 85 | 0.00% | 85 |

Project : 80.1 Manana Spine Road TIAR
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| Start Time | Direction NORTHBOUND | | | Direction SOUTHBOUND | | |
|------------|----------------------|-------|-------|----------------------|-------|-------|
| | MB-LT | MB-TH | MB-RT | SB-LT | SB-TH | SB-RT |
| 6:15 AM | 94 | 8 | 1 | 102 | 108 | 4 |
| 6:30 AM | 124 | 10 | 6 | 134 | 206 | 10 |
| 6:45 AM | 145 | 6 | 10 | 151 | 179 | 7 |
| 7:00 AM | 204 | 6 | 11 | 210 | 235 | 4 |
| 7:15 AM | 269 | 3 | 0 | 272 | 301 | 1 |
| 7:30 AM | 293 | 9 | 3 | 302 | 329 | 3 |
| 7:45 AM | 181 | 9 | 3 | 190 | 345 | 2 |
| 8:00 AM | 100 | 14 | 2 | 114 | 163 | 6 |
| 8:15 AM | 88 | 3 | 7 | 91 | 117 | 7 |
| 8:30 AM | | | | | | |
| PEAK HOUR | 947 | 27 | 17 | 974 | 1210 | 10 |
| 7:00 AM | 0 | 947 | 27 | 601 | 1210 | 0 |
| 8:00 AM | TOTAL | 974 | 1.75% | TOTAL | 1811 | 0.55% |

| Start Time | Direction EASTBOUND | | | Direction WESTBOUND | | |
|------------|---------------------|-------|---------|---------------------|-------|-------|
| | EB-LT | EB-TH | EB-RT | WB-LT | WB-TH | WB-RT |
| 6:15 AM | | | | 26 | 31 | 5 |
| 6:30 AM | | | | 24 | 32 | 4 |
| 6:45 AM | | | | 25 | 44 | 5 |
| 7:00 AM | | | | 27 | 60 | 6 |
| 7:15 AM | | | | 40 | 118 | 3 |
| 7:30 AM | | | | 43 | 114 | 1 |
| 7:45 AM | | | | 39 | 62 | 4 |
| 8:00 AM | | | | 60 | 53 | 9 |
| 8:15 AM | | | | 31 | 38 | 6 |
| 8:30 AM | | | | | | |
| PEAK HOUR | 0 | 0 | 0 | 149 | 0 | 354 |
| 7:00 AM | 0 | 0 | 0 | TOTAL | 503 | 2.78% |
| 8:00 AM | TOTAL | 0 | #DIV/0! | TOTAL | 503 | 2.78% |

Project : 80.1 Manana Spine Road TIAR
Date: 3/18/98

| Start Time | Direction NORTHBOUND | | | Direction SOUTHBOUND | | |
|------------|----------------------|-------|-------|----------------------|-------|-------|
| | NB-LT | NB-TH | NB-RT | SB-LT | SB-TH | SB-RT |
| 5:45 AM | | | | | | |
| 6:00 AM | 3 | 53 | 56 | 14 | 182 | 0 |
| 6:15 AM | 3 | 61 | 45 | 17 | 152 | 1 |
| 6:30 AM | 2 | 159 | 72 | 230 | 153 | 1 |
| 6:45 AM | 5 | 170 | 55 | 230 | 200 | 1 |
| 7:00 AM | 2 | 269 | 48 | 319 | 208 | 0 |
| 7:15 AM | 6 | 276 | 22 | 304 | 244 | 0 |
| 7:30 AM | 9 | 188 | 19 | 214 | 286 | 4 |
| 7:45 AM | 13 | 170 | 55 | 238 | 202 | 3 |
| 8:00 AM | 8 | 102 | 34 | 144 | 205 | 5 |
| 8:15 AM | 4 | 59 | 32 | 95 | 171 | 6 |
| 8:30 AM | | | | | | |
| PEAK HOUR | 30 | 901 | 144 | 52 | 1023 | 7 |
| 7:00 AM | TOTAL | 1075 | 0.00% | TOTAL | 1082 | 0.00% |
| 8:00 AM | TOTAL | 1075 | 0.00% | TOTAL | 1082 | 0.00% |

| Start Time | Direction EASTBOUND | | | Direction WESTBOUND | | |
|------------|---------------------|-------|-------|---------------------|-------|-------|
| | EB-LT | EB-TH | EB-RT | WB-LT | WB-TH | WB-RT |
| 5:45 AM | | | | | | |
| 6:00 AM | 64 | 5 | 5 | | | |
| 6:15 AM | 50 | 0 | 9 | | | |
| 6:30 AM | 71 | 2 | 17 | | | |
| 6:45 AM | 78 | 4 | 11 | | | |
| 7:00 AM | 70 | 2 | 13 | | | |
| 7:15 AM | 97 | 1 | 18 | | | |
| 7:30 AM | 102 | 4 | 24 | | | |
| 7:45 AM | 75 | 4 | 22 | | | |
| 8:00 AM | 79 | 3 | 9 | | | |
| 8:15 AM | 66 | 5 | 12 | | | |
| 8:30 AM | | | | | | |
| PEAK HOUR | 344 | 11 | 77 | 0 | 0 | 0 |
| 7:00 AM | TOTAL | 432 | 0.00% | TOTAL | 0 | 0 |
| 8:00 AM | TOTAL | 432 | 0.00% | TOTAL | 0 | 0 |

Project : 80.1 Manana Spine Road TIAR
Date: 3/18/98

| Start Time | Direction NORTHBOUND | | | North-South Road Waimano/Lehua | | | Direction SOUTHBOUND | | |
|------------|----------------------|-------|-------|--------------------------------|-------|-------|----------------------|-------|-------|
| | NB-LT | NB-TH | NB-RT | Total | SB-LT | SB-TH | SB-RT | Total | T/B |
| 5:45 AM | 21 | 12 | 70 | 103 | 27 | 19 | 108 | 152 | |
| 6:00 AM | 18 | 16 | 58 | 92 | 23 | 14 | 117 | 154 | |
| 6:15 AM | 15 | 31 | 68 | 114 | 22 | 27 | 156 | 205 | |
| 6:30 AM | 34 | 36 | 62 | 132 | 20 | 38 | 178 | 237 | |
| 6:45 AM | 79 | 53 | 49 | 181 | 37 | 29 | 214 | 280 | |
| 7:00 AM | 35 | 52 | 42 | 129 | 25 | 20 | 221 | 288 | |
| 7:15 AM | 45 | 84 | 37 | 166 | 28 | 35 | 259 | 320 | |
| 7:30 AM | 44 | 97 | 38 | 179 | 37 | 43 | 281 | 371 | |
| 7:45 AM | 33 | 38 | 46 | 117 | 36 | 47 | 272 | 355 | |
| 8:00 AM | 28 | 27 | 43 | 98 | 19 | 50 | 284 | 333 | |
| 8:15 AM | 24 | 22 | 49 | 95 | 15 | 22 | 171 | 208 | |
| PEAK HOUR | NB-LT | NB-TH | NB-RT | T/B | SB-LT | SB-TH | SB-RT | T/B | Total |
| 7:00 AM | 157 | 271 | 163 | 0 | 124 | 145 | 1043 | 0 | 1312 |
| 8:00 AM | TOTAL | 591 | | 0.00% | TOTAL | 1312 | | 0.00% | |

| Start Time | Direction EASTBOUND | | | East-West Road Kamehameha Highway | | | Direction WESTBOUND | | |
|------------|---------------------|-------|-------|-----------------------------------|-------|-------|---------------------|-------|-------|
| | EB-LT | EB-TH | EB-RT | Total | WB-LT | WB-TH | WB-RT | Total | T/B |
| 5:45 AM | 137 | 431 | 18 | 586 | 16 | 58 | 8 | 80 | |
| 6:00 AM | 115 | 474 | 13 | 602 | 18 | 74 | 6 | 98 | |
| 6:15 AM | 143 | 362 | 88 | 593 | 24 | 98 | 10 | 132 | |
| 6:30 AM | 153 | 455 | 10 | 618 | 34 | 112 | 7 | 153 | |
| 6:45 AM | 164 | 426 | 18 | 608 | 39 | 127 | 18 | 184 | |
| 7:00 AM | 189 | 353 | 34 | 576 | 23 | 113 | 13 | 149 | |
| 7:15 AM | 197 | 275 | 57 | 529 | 36 | 142 | 15 | 193 | |
| 7:30 AM | 217 | 258 | 53 | 528 | 44 | 200 | 18 | 262 | |
| 7:45 AM | 166 | 162 | 39 | 367 | 49 | 202 | 10 | 261 | |
| 8:00 AM | 107 | 171 | 19 | 297 | 52 | 157 | 13 | 222 | |
| 8:15 AM | 123 | 151 | 28 | 302 | 27 | 141 | 15 | 183 | |
| PEAK HOUR | EB-LT | EB-TH | EB-RT | T/B | WB-LT | WB-TH | WB-RT | T/B | Total |
| 7:00 AM | 769 | 1048 | 183 | 0 | 152 | 657 | 56 | 0 | 865 |
| 8:00 AM | TOTAL | 2000 | | 0.00% | TOTAL | 865 | | 0.00% | |

A - 4

Source: Parson Brinckerhoff

Project : 80.1 Manana Spine Road TIAR
Date: 3/18/98

| Start Time | Direction NORTHBOUND | | | North-South Road Acacia Road | | | Direction SOUTHBOUND | | |
|------------|----------------------|-------|-------|------------------------------|-------|-------|----------------------|-------|-------|
| | NB-LT | NB-TH | NB-RT | Total | SB-LT | SB-TH | SB-RT | Total | T/B |
| 5:45 AM | | | | 0 | 28 | | 2 | 28 | |
| 6:00 AM | | | | 0 | 58 | | 6 | 64 | |
| 6:15 AM | | | | 0 | 90 | | 5 | 95 | |
| 6:30 AM | | | | 0 | 33 | | 7 | 40 | |
| 6:45 AM | | | | 0 | 98 | | 10 | 108 | |
| 7:00 AM | | | | 0 | 85 | | 12 | 97 | |
| 7:15 AM | | | | 0 | 64 | | 22 | 86 | |
| 7:30 AM | | | | 0 | 63 | | 33 | 96 | |
| 7:45 AM | | | | 0 | 58 | | 23 | 81 | |
| 8:00 AM | | | | 0 | 44 | | 11 | 55 | |
| 8:15 AM | | | | 0 | 55 | | 20 | 75 | |
| PEAK HOUR | NB-LT | NB-TH | NB-RT | T/B | SB-LT | SB-TH | SB-RT | T/B | Total |
| 7:00 AM | 0 | 0 | 0 | 0 | 270 | 0 | 90 | 0 | 360 |
| 8:00 AM | TOTAL | 0 | | #DIV/0! | TOTAL | 380 | | 0.00% | |

| Start Time | Direction EASTBOUND | | | East-West Road Kamehameha Highway | | | Direction WESTBOUND | | |
|------------|---------------------|-------|-------|-----------------------------------|-------|-------|---------------------|-------|-------|
| | EB-LT | EB-TH | EB-RT | Total | WB-LT | WB-TH | WB-RT | Total | T/B |
| 5:45 AM | 43 | 380 | | 423 | | 88 | 4 | 92 | |
| 6:00 AM | 22 | 406 | | 428 | | 161 | 17 | 178 | |
| 6:15 AM | 31 | 486 | | 517 | | 287 | 15 | 282 | |
| 6:30 AM | 62 | 583 | | 625 | | 252 | 15 | 267 | |
| 6:45 AM | 73 | 573 | | 646 | | 326 | 22 | 348 | |
| 7:00 AM | 65 | 595 | | 660 | | 340 | 28 | 368 | |
| 7:15 AM | 79 | 521 | | 600 | | 352 | 31 | 383 | |
| 7:30 AM | 81 | 418 | | 499 | | 411 | 32 | 443 | |
| 7:45 AM | 92 | 313 | | 405 | | 527 | 47 | 574 | |
| 8:00 AM | 61 | 230 | | 291 | | 394 | 34 | 428 | |
| 8:15 AM | 52 | 191 | | 243 | | 363 | 43 | 406 | |
| PEAK HOUR | EB-LT | EB-TH | EB-RT | T/B | WB-LT | WB-TH | WB-RT | T/B | Total |
| 7:00 AM | 317 | 1847 | 0 | 0 | 1630 | 138 | 0 | 1768 | |
| 8:00 AM | TOTAL | 2164 | | 0.00% | TOTAL | 1788 | | 0.00% | |

A - 5

Source: Parson Brinckerhoff

Project : 80.1 Manana Spine Road TIAR
Date: 3/19/98

| Start Time | Direction NORTHBOUND | | | | Direction SOUTHBOUND | | | | |
|------------|----------------------|-------|-------|-----|----------------------|-------|-------|-------|-------|
| | NB-LT | NB-TH | NB-RT | T/B | SB-LT | SB-TH | SB-RT | T/B | Total |
| 5:45 AM | | | | | | | 7 | | 7 |
| 6:00 AM | | | | | | | 18 | | 18 |
| 6:15 AM | | | | | | | 12 | | 12 |
| 6:30 AM | | | | | | | 24 | | 24 |
| 6:45 AM | | | | | | | 22 | | 22 |
| 7:00 AM | | | | | | | 25 | | 25 |
| 7:15 AM | | | | | | | 22 | | 22 |
| 7:30 AM | | | | | | | 21 | | 21 |
| 7:45 AM | | | | | | | 18 | | 18 |
| 8:00 AM | | | | | | | 19 | | 19 |
| 8:15 AM | | | | | | | 15 | | 15 |
| 8:30 AM | | | | | | | 0 | | 0 |
| 8:30 AM | | | | | | | 0 | | 0 |
| PEAK HOUR | NB-LT | NB-TH | NB-RT | T/B | SB-LT | SB-TH | SB-RT | T/B | Total |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 84 | 0 | 84 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 84 | 0 | 84 |
| 8:00 AM | TOTAL | 0 | 0 | 0 | TOTAL | 84 | 0 | 0.00% | |

Project : 80.1 Manana Spine Road TIAR
Date: 3/19/98

| Start Time | Direction NORTHBOUND | | | | Direction SOUTHBOUND | | | | |
|------------|----------------------|-------|-------|-------|----------------------|-------|-------|-----|-------|
| | NB-LT | NB-TH | NB-RT | T/B | SB-LT | SB-TH | SB-RT | T/B | Total |
| 5:45 AM | 0 | | 13 | | | | | | |
| 6:00 AM | 0 | | 15 | | | | | | |
| 6:15 AM | 0 | | 24 | | | | | | |
| 6:30 AM | 2 | | 27 | | | | | | |
| 6:45 AM | 0 | | 19 | | | | | | |
| 7:00 AM | 0 | | 38 | | | | | | |
| 7:15 AM | 1 | | 21 | | | | | | |
| 7:30 AM | 0 | | 27 | | | | | | |
| 7:45 AM | 0 | | 12 | | | | | | |
| 8:00 AM | 0 | | 16 | | | | | | |
| 8:15 AM | 0 | | 10 | | | | | | |
| PEAK HOUR | NB-LT | NB-TH | NB-RT | T/B | SB-LT | SB-TH | SB-RT | T/B | Total |
| 7:00 AM | 1 | 0 | 98 | 0 | 0 | 0 | 0 | 0 | 99 |
| 8:00 AM | 0 | 0 | 98 | 0.00% | 0 | 0 | 0 | 0 | 98 |
| 8:00 AM | TOTAL | 0 | 98 | 0.00% | TOTAL | 0 | 0 | 0 | 98 |

A-6

Source: Parson Brinckerhoff

| Start Time | Direction EASTBOUND | | | | Direction WESTBOUND | | | | |
|------------|---------------------|-------|-------|-----|---------------------|-------|-------|-----|-------|
| | EB-LT | EB-TH | EB-RT | T/B | WB-LT | WB-TH | WB-RT | T/B | Total |
| 5:45 AM | | | | | 65 | | 5 | | 70 |
| 6:00 AM | | | | | 148 | | 3 | | 152 |
| 6:15 AM | | | | | 193 | | 5 | | 198 |
| 6:30 AM | | | | | 245 | | 3 | | 248 |
| 6:45 AM | | | | | 258 | | 5 | | 263 |
| 7:00 AM | | | | | 228 | | 11 | | 239 |
| 7:15 AM | | | | | 254 | | 2 | | 256 |
| 7:30 AM | | | | | 252 | | 12 | | 264 |
| 7:45 AM | | | | | 237 | | 3 | | 240 |
| 8:00 AM | | | | | 188 | | 7 | | 195 |
| 8:15 AM | | | | | 171 | | 4 | | 175 |
| 8:30 AM | | | | | | | | | 0 |
| 8:30 AM | | | | | | | | | 0 |
| PEAK HOUR | EB-LT | EB-TH | EB-RT | T/B | WB-LT | WB-TH | WB-RT | T/B | Total |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 969 | 28 | 0 | 997 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 987 | 28 | 0 | 1015 |
| 8:00 AM | TOTAL | 0 | 0 | 0 | TOTAL | 997 | 28 | 0 | 1025 |

A-7

Source: Parson Brinckerhoff

| Start Time | Direction EASTBOUND | | | | Direction WESTBOUND | | | | |
|------------|---------------------|-------|-------|-------|---------------------|-------|-------|-------|-------|
| | EB-LT | EB-TH | EB-RT | T/B | WB-LT | WB-TH | WB-RT | T/B | Total |
| 5:45 AM | | | | | 6 | | 6 | | 12 |
| 6:00 AM | | | | | 8 | | 8 | | 16 |
| 6:15 AM | | | | | 4 | | 10 | | 14 |
| 6:30 AM | | | | | 16 | | 13 | | 29 |
| 6:45 AM | | | | | 9 | | 10 | | 19 |
| 7:00 AM | | | | | 12 | | 14 | | 26 |
| 7:15 AM | | | | | 19 | | 21 | | 40 |
| 7:30 AM | | | | | 18 | | 30 | | 48 |
| 7:45 AM | | | | | 21 | | 20 | | 41 |
| 8:00 AM | | | | | 12 | | 22 | | 34 |
| 8:15 AM | | | | | 13 | | 22 | | 35 |
| PEAK HOUR | EB-LT | EB-TH | EB-RT | T/B | WB-LT | WB-TH | WB-RT | T/B | Total |
| 7:00 AM | 0 | 181 | 17 | 0 | 70 | 85 | 0 | 0 | 263 |
| 8:00 AM | 0 | 188 | 17 | 0.00% | TOTAL | 155 | 0 | 0.00% | 343 |

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Project : 80.1 Manana Spine Road TIAR
Date: 3/18/98

Direction NORTHBOUND SOUTHBOUND
Waimano Home Road Matua Bound

| Start Time | NB-LT | NB-TH | NB-RT | T/B | Total | SB-LT | SB-TH | SB-RT | T/B | Total |
|------------|-------|-------|-------|-----|-------|-------|-------|-------|-----|-------|
| 3:00 PM | 61 | 202 | 1 | | 264 | 197 | | 1 | | 198 |
| 3:15 PM | 72 | 232 | 0 | | 304 | 220 | | 1 | | 221 |
| 3:30 PM | 79 | 175 | 2 | | 256 | 241 | | 0 | | 241 |
| 3:45 PM | 65 | 234 | 1 | | 300 | 201 | | 1 | | 202 |
| 4:00 PM | 59 | 249 | 5 | | 313 | 154 | | 1 | | 155 |
| 4:15 PM | 88 | 293 | 2 | | 383 | 242 | | 1 | | 243 |
| 4:30 PM | 73 | 258 | 3 | | 334 | 200 | | 3 | | 203 |
| 4:45 PM | 70 | 297 | 2 | | 369 | 197 | | 1 | | 198 |
| 5:00 PM | 88 | 245 | 0 | | 333 | 209 | | 0 | | 209 |
| 5:15 PM | 39 | 155 | 0 | | 194 | 105 | | 0 | | 105 |
| 5:30 PM | 76 | 219 | 0 | | 295 | 189 | | 4 | | 203 |
| 5:45 PM | 56 | 229 | 0 | | 285 | 179 | | 2 | | 181 |

| PEAK HOUR | NB-LT | NB-TH | NB-RT | T/B | Total | SB-LT | SB-TH | SB-RT | T/B | Total |
|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 4:00 PM | 290 | 1097 | 12 | 0 | 1399 | 0 | 792 | 6 | 0 | 799 |
| 5:00 PM | TOTAL | 1399 | | 0.00% | | TOTAL | 799 | | 0.00% | |

Direction EASTBOUND WESTBOUND
Noelani Street Ewa Bound

| Start Time | EB-LT | EB-TH | EB-RT | T/B | Total | WB-LT | WB-TH | WB-RT | T/B | Total |
|------------|-------|-------|-------|-----|-------|-------|-------|-------|-----|-------|
| 3:00 PM | 3 | 4 | 57 | | 64 | 0 | 3 | | | 3 |
| 3:15 PM | 2 | 2 | 46 | | 50 | 3 | 2 | | | 5 |
| 3:30 PM | 5 | 4 | 47 | | 56 | 3 | 1 | | | 4 |
| 3:45 PM | 2 | 6 | 44 | | 52 | 9 | 0 | | | 9 |
| 4:00 PM | 6 | 2 | 43 | | 51 | 6 | 0 | | | 10 |
| 4:15 PM | 7 | 8 | 55 | | 70 | 5 | 4 | | | 12 |
| 4:30 PM | 6 | 7 | 78 | | 91 | 7 | 2 | | | 12 |
| 4:45 PM | 6 | 8 | 58 | | 72 | 2 | 1 | | | 8 |
| 5:00 PM | 8 | 10 | 66 | | 84 | 5 | 0 | | | 9 |
| 5:15 PM | 3 | 4 | 39 | | 46 | 7 | 0 | | | 11 |
| 5:30 PM | 5 | 7 | 65 | | 77 | 3 | 3 | | | 8 |
| 5:45 PM | 4 | 8 | 55 | | 67 | 8 | 5 | | | 13 |

| PEAK HOUR | EB-LT | EB-TH | EB-RT | T/B | Total | WB-LT | WB-TH | WB-RT | T/B | Total |
|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 4:00 PM | 25 | 25 | 234 | 0 | 284 | 20 | 7 | 15 | 0 | 42 |
| 5:00 PM | TOTAL | 284 | | 0.00% | | TOTAL | 42 | | 0.00% | |

Project : 80.1 Manana Spine Road TIAR
Date: 3/18/98

Direction NORTHBOUND SOUTHBOUND
Waimano Home Road Matua Bound

| Start Time | NB-LT | NB-TH | NB-RT | T/B | Total | SB-LT | SB-TH | SB-RT | T/B | Total |
|------------|-------|-------|-------|-----|-------|-------|-------|-------|-----|-------|
| 3:00 PM | 162 | 17 | 17 | | 179 | 79 | 175 | | | 254 |
| 3:15 PM | 158 | 24 | 24 | | 182 | 82 | 187 | | | 269 |
| 3:30 PM | 111 | 13 | 13 | | 124 | 74 | 217 | | | 291 |
| 3:45 PM | 159 | 21 | 21 | | 180 | 69 | 185 | | | 254 |
| 4:00 PM | 183 | 17 | 17 | | 200 | 68 | 135 | | | 203 |
| 4:15 PM | 232 | 24 | 24 | | 256 | 80 | 242 | | | 302 |
| 4:30 PM | 181 | 15 | 15 | | 195 | 92 | 193 | | | 285 |
| 4:45 PM | 225 | 19 | 19 | | 244 | 75 | 182 | | | 257 |
| 5:00 PM | 154 | 11 | 11 | | 165 | 76 | 204 | | | 280 |
| 5:15 PM | 106 | 3 | 3 | | 109 | 55 | 96 | | | 151 |
| 5:30 PM | 155 | 5 | 5 | | 160 | 71 | 186 | | | 267 |
| 5:45 PM | 125 | 4 | 4 | | 129 | 69 | 173 | | | 242 |

| PEAK HOUR | NB-LT | NB-TH | NB-RT | T/B | Total | SB-LT | SB-TH | SB-RT | T/B | Total |
|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 4:00 PM | 0 | 821 | 75 | 0 | 896 | 285 | 752 | 0 | 0 | 1047 |
| 5:00 PM | TOTAL | 896 | | 0.00% | | TOTAL | 1047 | | 0.00% | |

Direction EASTBOUND WESTBOUND
Moanaka Road Ewa Bound

| Start Time | EB-LT | EB-TH | EB-RT | T/B | Total | WB-LT | WB-TH | WB-RT | T/B | Total |
|------------|-------|-------|-------|-----|-------|-------|-------|-------|-----|-------|
| 3:00 PM | 0 | 0 | 0 | | 0 | 45 | 102 | | | 147 |
| 3:15 PM | 0 | 0 | 0 | | 0 | 64 | 146 | | | 210 |
| 3:30 PM | 0 | 0 | 0 | | 0 | 54 | 145 | | | 199 |
| 3:45 PM | 0 | 0 | 0 | | 0 | 54 | 141 | | | 195 |
| 4:00 PM | 0 | 0 | 0 | | 0 | 57 | 130 | | | 187 |
| 4:15 PM | 0 | 0 | 0 | | 0 | 55 | 151 | | | 206 |
| 4:30 PM | 0 | 0 | 0 | | 0 | 49 | 153 | | | 202 |
| 4:45 PM | 0 | 0 | 0 | | 0 | 48 | 144 | | | 192 |
| 5:00 PM | 0 | 0 | 0 | | 0 | 61 | 179 | | | 240 |
| 5:15 PM | 0 | 0 | 0 | | 0 | 40 | 88 | | | 128 |
| 5:30 PM | 0 | 0 | 0 | | 0 | 40 | 140 | | | 180 |
| 5:45 PM | 0 | 0 | 0 | | 0 | 37 | 160 | | | 197 |

| PEAK HOUR | EB-LT | EB-TH | EB-RT | T/B | Total | WB-LT | WB-TH | WB-RT | T/B | Total |
|-----------|-------|-------|-------|---------|-------|-------|-------|-------|-------|-------|
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 209 | 0 | 578 | 0 | 787 |
| 5:00 PM | TOTAL | 0 | | #DIV/0! | | TOTAL | 787 | | 0.00% | |

Project : 60.1 Manana Spine Road TIAR
Date: 3/18/98

| Start Time | Direction NORTHBOUND | | | | Direction SOUTHBOUND | | | |
|------------|----------------------|-------|-------|-----|----------------------|-------|-------|-----|
| | MB-LT | MB-TH | MB-RT | T/B | SB-LT | SB-TH | SB-RT | T/B |
| 3:00 PM | 3 | 150 | 38 | | 25 | 180 | 1 | |
| 3:15 PM | 4 | 138 | 37 | | 22 | 170 | 2 | |
| 3:30 PM | 3 | 101 | 26 | | 19 | 152 | 1 | |
| 3:45 PM | 10 | 302 | 57 | | 22 | 182 | 3 | |
| 4:00 PM | 4 | 193 | 55 | | 24 | 185 | 1 | |
| 4:15 PM | 0 | 192 | 59 | | 16 | 158 | 2 | |
| 4:30 PM | 1 | 179 | 37 | | 19 | 217 | 2 | |
| 4:45 PM | 1 | 188 | 43 | | 24 | 232 | 0 | |
| 5:00 PM | 1 | 209 | 34 | | 29 | 239 | 1 | |
| 5:15 PM | 3 | 184 | 35 | | 25 | 144 | 1 | |
| 5:30 PM | 2 | 155 | 31 | | 22 | 200 | 0 | |
| 5:45 PM | 1 | 164 | 45 | | 14 | 132 | 1 | |
| PEAK HOUR | 6 | 762 | 184 | 0 | 83 | 802 | 5 | 0 |
| 4:00 PM | TOTAL | | | | TOTAL | | | |
| 5:00 PM | TOTAL | | | | TOTAL | | | |
| | 0.00% | | | | 0.00% | | | |

| Start Time | Direction EASTBOUND | | | | Direction WESTBOUND | | | |
|------------|---------------------|-------|-------|-----|---------------------|-------|-------|-----|
| | EB-LT | EB-TH | EB-RT | T/B | WB-LT | WB-TH | WB-RT | T/B |
| 3:00 PM | 96 | 1 | 27 | | | | | |
| 3:15 PM | 118 | 0 | 38 | | | | | |
| 3:30 PM | 104 | 5 | 39 | | | | | |
| 3:45 PM | 101 | 1 | 37 | | | | | |
| 4:00 PM | 89 | 4 | 30 | | | | | |
| 4:15 PM | 101 | 0 | 49 | | | | | |
| 4:30 PM | 105 | 0 | 48 | | | | | |
| 4:45 PM | 122 | 1 | 48 | | | | | |
| 5:00 PM | 144 | 0 | 29 | | | | | |
| 5:15 PM | 99 | 1 | 16 | | | | | |
| 5:30 PM | 107 | 2 | 39 | | | | | |
| 5:45 PM | 102 | 1 | 37 | | | | | |
| PEAK HOUR | 417 | 5 | 176 | 0 | 0 | 0 | 0 | 0 |
| 4:00 PM | TOTAL | | | | TOTAL | | | |
| 5:00 PM | TOTAL | | | | TOTAL | | | |
| | 0.00% | | | | 0.00% | | | |

A - 10

Source: Parson Brinckerhoff

Project : 60.1 Manana Spine Road TIAR
Date: 3/18/98

| Start Time | Direction NORTHBOUND | | | | Direction SOUTHBOUND | | | |
|------------|----------------------|-------|-------|-----|----------------------|-------|-------|-----|
| | MB-LT | MB-TH | MB-RT | T/B | SB-LT | SB-TH | SB-RT | T/B |
| 3:00 PM | 61 | 43 | 52 | | 24 | 33 | 243 | |
| 3:15 PM | 58 | 42 | 59 | | 28 | 44 | 267 | |
| 3:30 PM | 26 | 52 | 41 | | 21 | 44 | 278 | |
| 3:45 PM | 44 | 38 | 40 | | 25 | 37 | 248 | |
| 4:00 PM | 50 | 31 | 53 | | 23 | 42 | 244 | |
| 4:15 PM | 58 | 53 | 40 | | 22 | 28 | 198 | |
| 4:30 PM | 45 | 49 | 52 | | 22 | 48 | 259 | |
| 4:45 PM | 47 | 41 | 38 | | 19 | 37 | 284 | |
| 5:00 PM | 47 | 35 | 57 | | 20 | 48 | 248 | |
| 5:15 PM | 38 | 46 | 49 | | 20 | 39 | 268 | |
| 5:30 PM | 38 | 32 | 33 | | 15 | 21 | 282 | |
| 5:45 PM | 40 | 32 | 39 | | 17 | 30 | 243 | |
| PEAK HOUR | 200 | 174 | 183 | 0 | 86 | 156 | 985 | 0 |
| 4:00 PM | TOTAL | | | | TOTAL | | | |
| 5:00 PM | TOTAL | | | | TOTAL | | | |
| | 0.00% | | | | 0.00% | | | |

| Start Time | Direction EASTBOUND | | | | Direction WESTBOUND | | | |
|------------|---------------------|-------|-------|-----|---------------------|-------|-------|-----|
| | EB-LT | EB-TH | EB-RT | T/B | WB-LT | WB-TH | WB-RT | T/B |
| 3:00 PM | 152 | 201 | 44 | | 55 | 320 | 20 | |
| 3:15 PM | 156 | 237 | 32 | | 45 | 397 | 23 | |
| 3:30 PM | 190 | 247 | 38 | | 41 | 371 | 12 | |
| 3:45 PM | 205 | 194 | 46 | | 81 | 350 | 16 | |
| 4:00 PM | 189 | 194 | 49 | | 53 | 387 | 18 | |
| 4:15 PM | 191 | 158 | 48 | | 54 | 400 | 13 | |
| 4:30 PM | 173 | 204 | 30 | | 45 | 391 | 33 | |
| 4:45 PM | 201 | 176 | 41 | | 43 | 337 | 16 | |
| 5:00 PM | 168 | 176 | 32 | | 49 | 379 | 18 | |
| 5:15 PM | 189 | 189 | 36 | | 40 | 384 | 17 | |
| 5:45 PM | 172 | 143 | 48 | | 44 | 378 | 15 | |
| PEAK HOUR | 765 | 767 | 164 | 0 | 185 | 1515 | 80 | 0 |
| 4:00 PM | TOTAL | | | | TOTAL | | | |
| 5:00 PM | TOTAL | | | | TOTAL | | | |
| | 0.00% | | | | 0.00% | | | |

A - 11

Source: Parson Brinckerhoff

Project : 80.1 Manana Spine Road TIAR
Date: 3/18/98

| Start Time | Direction NORTHBOUND | | | Direction SOUTHBOUND | | | Total |
|------------|----------------------|-------|-------|----------------------|-------|-------|-------|
| | NB-LT | NB-TH | NB-RT | SB-LT | SB-TH | SB-RT | |
| 3:00 PM | | | | 87 | | 29 | 96 |
| 3:15 PM | | | | 104 | | 60 | 164 |
| 3:30 PM | | | | 137 | | 68 | 205 |
| 3:45 PM | | | | 83 | | 42 | 125 |
| 4:00 PM | | | | 96 | | 64 | 160 |
| 4:15 PM | | | | 73 | | 51 | 124 |
| 4:30 PM | | | | 85 | | 65 | 150 |
| 4:45 PM | | | | 88 | | 42 | 130 |
| 5:00 PM | | | | 107 | | 60 | 167 |
| 5:15 PM | | | | 74 | | 48 | 122 |
| 5:30 PM | | | | 88 | | 42 | 130 |
| 5:45 PM | | | | 93 | | 51 | 144 |
| PEAK HOUR | NB-LT | NB-TH | NB-RT | SB-LT | SB-TH | SB-RT | Total |
| 4:00 PM | 0 | 0 | 0 | 342 | 0 | 222 | 564 |
| 5:00 PM | TOTAL | 0 | 0 | TOTAL | 564 | 0 | 0.00% |

| Start Time | Direction EASTBOUND | | | Direction WESTBOUND | | | Total |
|------------|---------------------|-------|-------|---------------------|-------|-------|-------|
| | EB-LT | EB-TH | EB-RT | WB-LT | WB-TH | WB-RT | |
| 3:00 PM | 258 | 31 | 31 | 0 | 0 | 0 | 320 |
| 3:15 PM | 530 | 79 | 69 | 47 | 185 | | 801 |
| 3:30 PM | 600 | 89 | 89 | 122 | 387 | | 1198 |
| 3:45 PM | 485 | 96 | 581 | 122 | 328 | | 1432 |
| 4:00 PM | 606 | 108 | 714 | 119 | 373 | | 1700 |
| 4:15 PM | 507 | 87 | 594 | 126 | 280 | | 1494 |
| 4:30 PM | 591 | 90 | 681 | 97 | 287 | | 1656 |
| 4:45 PM | 531 | 86 | 617 | 88 | 380 | | 1602 |
| 5:00 PM | 575 | 87 | 662 | 88 | 361 | | 1673 |
| 5:15 PM | 491 | 92 | 583 | 88 | 290 | | 1464 |
| 5:30 PM | 516 | 91 | 607 | 73 | 277 | | 1563 |
| 5:45 PM | 573 | 107 | 680 | 89 | 274 | | 1643 |
| PEAK HOUR | EB-LT | EB-TH | EB-RT | WB-LT | WB-TH | WB-RT | Total |
| 4:00 PM | 0 | 2235 | 371 | 440 | 1310 | 0 | 2056 |
| 5:00 PM | TOTAL | 2606 | 0 | TOTAL | 1750 | 0 | 0.00% |

Source: Parson Brinckerhoff

A - 12

Project : 80.1 Manana Spine Road TIAR
Date: 3/19/98

| Start Time | Direction NORTHBOUND | | | Direction SOUTHBOUND | | | Total |
|------------|----------------------|-------|-------|----------------------|-------|-------|-------|
| | NB-LT | NB-TH | NB-RT | SB-LT | SB-TH | SB-RT | |
| 3:00 PM | | | | | | 13 | 13 |
| 3:15 PM | | | | | | 33 | 33 |
| 3:30 PM | | | | | | 39 | 39 |
| 3:45 PM | | | | | | 44 | 44 |
| 4:00 PM | | | | | | 28 | 28 |
| 4:15 PM | | | | | | 32 | 32 |
| 4:30 PM | | | | | | 30 | 30 |
| 4:45 PM | | | | | | 24 | 24 |
| 5:00 PM | | | | | | 30 | 30 |
| 5:15 PM | | | | | | 23 | 23 |
| 5:30 PM | | | | | | 27 | 27 |
| 5:45 PM | | | | | | 18 | 18 |
| PEAK HOUR | NB-LT | NB-TH | NB-RT | SB-LT | SB-TH | SB-RT | Total |
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 114 | 114 |
| 5:00 PM | TOTAL | 0 | 0 | TOTAL | 114 | 0 | 0.00% |

| Start Time | Direction EASTBOUND | | | Direction WESTBOUND | | | Total |
|------------|---------------------|-------|-------|---------------------|-------|-------|-------|
| | EB-LT | EB-TH | EB-RT | WB-LT | WB-TH | WB-RT | |
| 3:00 PM | | | | | | 3 | 3 |
| 3:15 PM | | | | | | 14 | 14 |
| 3:30 PM | | | | | | 18 | 18 |
| 3:45 PM | | | | | | 16 | 16 |
| 4:00 PM | | | | | | 12 | 12 |
| 4:15 PM | | | | | | 18 | 18 |
| 4:30 PM | | | | | | 11 | 11 |
| 4:45 PM | | | | | | 19 | 19 |
| 5:00 PM | | | | | | 17 | 17 |
| 5:15 PM | | | | | | 7 | 7 |
| 5:30 PM | | | | | | 13 | 13 |
| 5:45 PM | | | | | | 13 | 13 |
| PEAK HOUR | EB-LT | EB-TH | EB-RT | WB-LT | WB-TH | WB-RT | Total |
| 4:00 PM | 0 | 0 | 0 | 0 | 1248 | 60 | 1309 |
| 5:00 PM | TOTAL | 0 | 0 | TOTAL | 1309 | 0 | 0.00% |

Source: Parson Brinckerhoff

A - 13

Project : 80.1 Manana Spine Road TIAR
 Date: 3/19/98

Direction NORTHBOUND
 North-South Road Kamehameha Hwy
 Direction SOUTHBOUND
 Makal Bound

| Start Time | NB-LT | NB-TH | NB-RT | T/B | Total | SB-LT | SB-TH | SB-RT | T/B | Total |
|------------|-------|-------|-------|-----|-------|-------|-------|-------|-----|-------|
| 3:00 PM | | | | | | 2 | | | | 34 |
| 3:15 PM | | | | | | 1 | | | | 36 |
| 3:30 PM | | | | | | 2 | | | | 37 |
| 3:45 PM | | | | | | 2 | | | | 38 |
| 4:00 PM | | | | | | 1 | | | | 23 |
| 4:15 PM | | | | | | 4 | | | | 25 |
| 4:30 PM | | | | | | 4 | | | | 23 |
| 4:45 PM | | | | | | 1 | | | | 44 |
| 5:00 PM | | | | | | 3 | | | | 16 |
| 5:15 PM | | | | | | 1 | | | | 27 |
| 5:30 PM | | | | | | 4 | | | | 35 |
| 5:45 PM | | | | | | 3 | | | | 28 |
| | | | | | | 4 | | | | 28 |
| | | | | | | 3 | | | | 38 |
| | | | | | | 4 | | | | 42 |
| | | | | | | 3 | | | | 31 |
| | | | | | | | | | | 42 |
| | | | | | | | | | | 34 |

| PEAK HOUR | NB-LT | NB-TH | NB-RT | T/B | Total | SB-LT | SB-TH | SB-RT | T/B | Total |
|-----------|-------|-------|-------|---------|-------|-------|-------|-------|-------|-------|
| 4:00 PM | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 110 | 0 | 120 |
| 5:00 PM | TOTAL | 0 | | #DIV/0! | | TOTAL | 120 | | 0.00% | |

Direction EASTBOUND
 East-West Road Kuala Street
 Direction WESTBOUND
 Ewa Bound

| Start Time | EB-LT | EB-TH | EB-RT | T/B | Total | WB-LT | WB-TH | WB-RT | T/B | Total |
|------------|-------|-------|-------|-----|-------|-------|-------|-------|-----|-------|
| 3:00 PM | | 25 | 5 | | 29 | 25 | | | | 54 |
| 3:15 PM | | 31 | 6 | | 34 | 40 | | | | 74 |
| 3:30 PM | | 26 | 7 | | 43 | 32 | | | | 75 |
| 3:45 PM | | 20 | 4 | | 38 | 39 | | | | 77 |
| 4:00 PM | | 24 | 8 | | 32 | 39 | | | | 71 |
| 4:15 PM | | 22 | 4 | | 41 | 43 | | | | 84 |
| 4:30 PM | | 22 | 9 | | 26 | 35 | | | | 61 |
| 4:45 PM | | 18 | 2 | | 48 | 32 | | | | 80 |
| 5:00 PM | | 20 | 6 | | 26 | 36 | | | | 62 |
| 5:15 PM | | 25 | 2 | | 32 | 31 | | | | 63 |
| 5:30 PM | | 21 | 5 | | 18 | 52 | | | | 68 |
| 5:45 PM | | 27 | 5 | | 41 | 48 | | | | 89 |

| PEAK HOUR | EB-LT | EB-TH | EB-RT | T/B | Total | WB-LT | WB-TH | WB-RT | T/B | Total |
|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 4:00 PM | 0 | 86 | 23 | 0 | 109 | 147 | 149 | 0 | 0 | 296 |
| 5:00 PM | TOTAL | 109 | | 0.00% | | TOTAL | 296 | | 0.00% | |

APPENDIX B

LEVEL-OF-SERVICE DEFINITIONS FOR
SIGNALIZED INTERSECTIONS AND
UNSIGNALIZED INTERSECTIONS

LEVEL-OF-SERVICE FOR SIGNALIZED INTERSECTIONS

Level-of-service for signalized intersections is defined in terms of delay. Delay is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. Specifically, level-of-service criteria are stated in terms of the average stopped delay per vehicle for a 15-minute analysis period. The table to the right gives the Level-of-Service criteria.

| Level of Service | Stopped Delay Per Vehicle (sec/veh) |
|------------------|-------------------------------------|
| A | 5 |
| B | > 5 and 15 |
| C | > 15 and 25 |
| D | > 25 and 40 |
| E | < 40 and 60 |
| F | > 60 |

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

Level-of-service B describes operations with delay in the range of 5.1 to 15.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths or both. More vehicles stop than for LOS A, causing higher levels of average delay.

Level-of-service C describes operations with delay in the range of 15.1 to 25.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.

Level-of-service D describes operations with delay in the range of 25.1 to 40.0 seconds per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or a high v/c ratios (volume of cars to capacity of intersection). Individual cycle failures are noticeable.

Level-of-service E describes operations with delay in the range of 40.1 to 60.0 seconds per vehicle. This is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.

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

REFERENCE: Highway Capacity Manual (Special Report 209, 1994)

LEVEL-OF-SERVICE FOR UNSIGNALIZED INTERSECTIONS

The level of service criteria are given in the table to the right. As used here, total delay is defined as the total elapsed time from when a vehicle stops at the end of a queue until the vehicle departs from the stop line; this time includes the time required for the vehicle to travel from the last-in-queue position.

The proposed level of service criteria are somewhat different from the criteria for signalized intersections. The primary reason for this difference is that drivers expect different levels of performance from different kinds of transportation facilities.

The expectation is that a signalized intersection is designed to carry higher traffic volumes than an unsignalized intersection. Additionally, several driver behavior considerations combine to make delays at signalized intersections less onerous than at unsignalized intersections. For example, drivers at signalized intersections are able to relax during the red interval, whereas drivers on the minor approaches to unsignalized intersections must remain attentive to the task of identifying acceptable gaps and vehicle conflicts. Also, there is often much more variability in the amount of delay experienced by individual drivers at unsignalized than signalized intersections. For these reasons, it is considered that the total delay threshold for any given level of service is less for an unsignalized intersection than for a signalized intersection.

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

APPENDIX C

ALTERNATIVES TO ADDRESS
IMPACTS TO THE INTERSECTIONS OF
WAIMANO HOME ROAD WITH MOANALUA ROAD/SPINE ROAD AND
WAIMANO HOME ROAD WITH NOELANI STREET

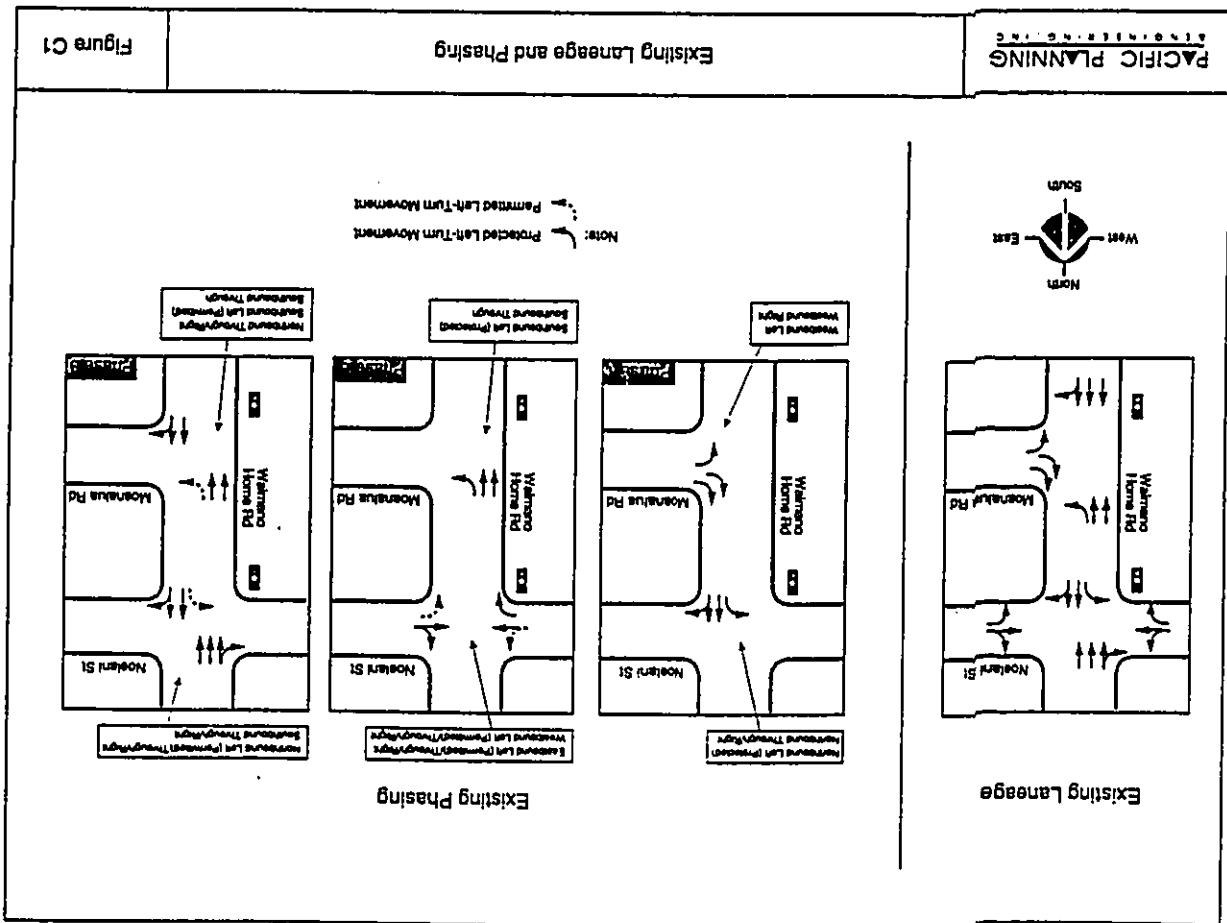
Appendix C - Alternatives to address traffic impacts at the intersections of Waimano Home Road with Moanalua Road/Spine Road and Waimano Home Road with Noelani Street.

The close distance between the signalized intersections of Noelani Street with Waimano Home Road and Moanalua Road with Waimano Home Road (~100 feet), requires that the traffic operations be closely coordinated. This coordination allows motorists to access the Manana and Holiday City Subdivisions more efficiently. The existing laneage and phasing pattern for the two intersections are shown on Figure C1.

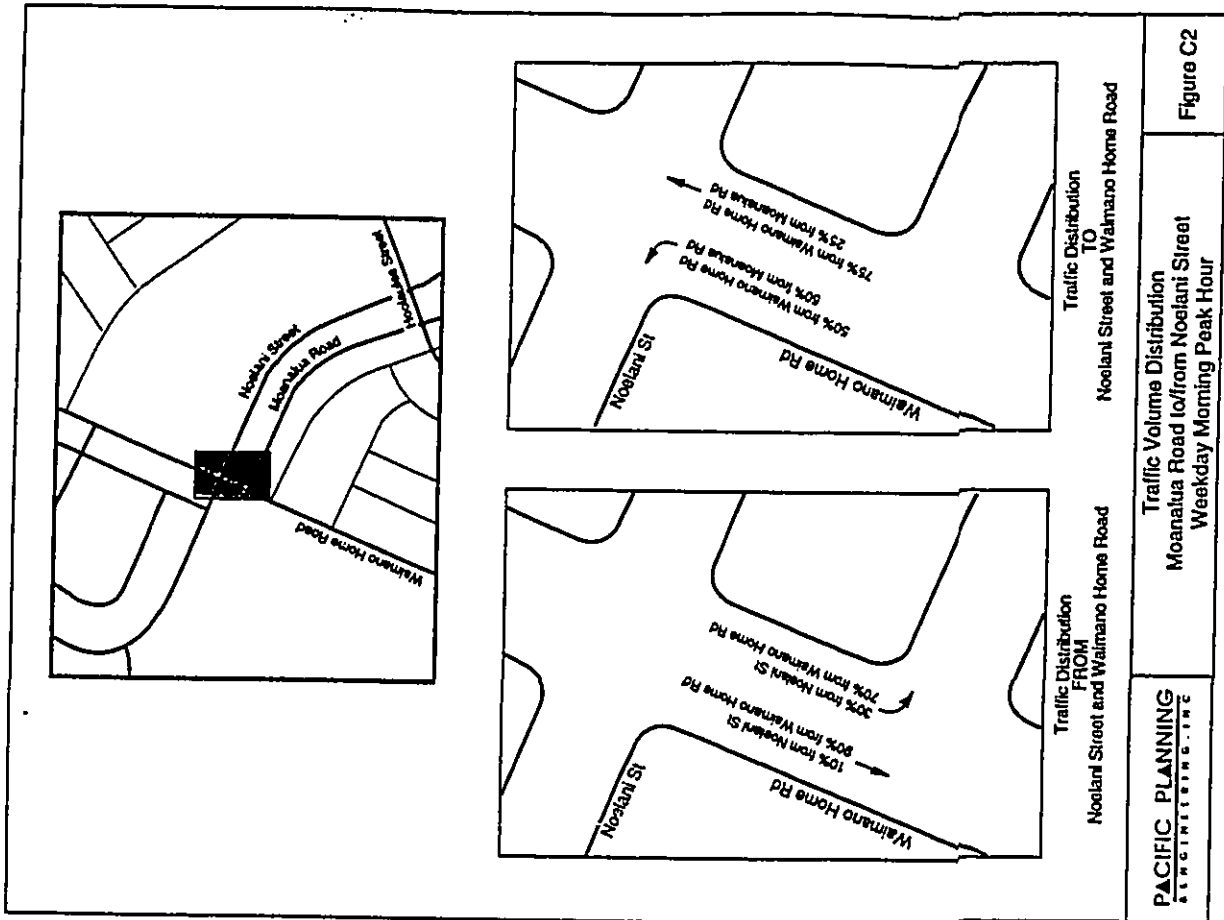
Field observations and manual traffic counts were conducted in January 1998 at the intersections of Waimano Home Road with Noelani Street and Waimano Home Road with Moanalua Road during the morning and afternoon peak hours. These observations were used to determine the traffic percentage distribution of the coordinated traffic movements for Noelani Street users and Upper Pearl City users. Figures C2 and C3 show these distributions.

Additional traffic counts were taken on March 18, 1998 at the intersections along Waimano Home Road at Leomele Street, Hoomoana Street and Kuahaka Street. These counts, shown on Figure C4, were taken to determine vehicle trips entering and exiting the Manana community during the peak hours. The distribution of traffic volumes is shown on Figure C5.

The intersection of Waimano Home Road with Moanalua Road was analyzed using analysis procedures outlined in the Highway Capacity Manual (HCM), Special Report 209, 1994. The methodology for operational analysis measures traffic operations using the "level-of-service" (LOS) rating, which ranges from "A" (best) to "F" (worst). Appendix B provides detailed definitions of the LOS used in this study.

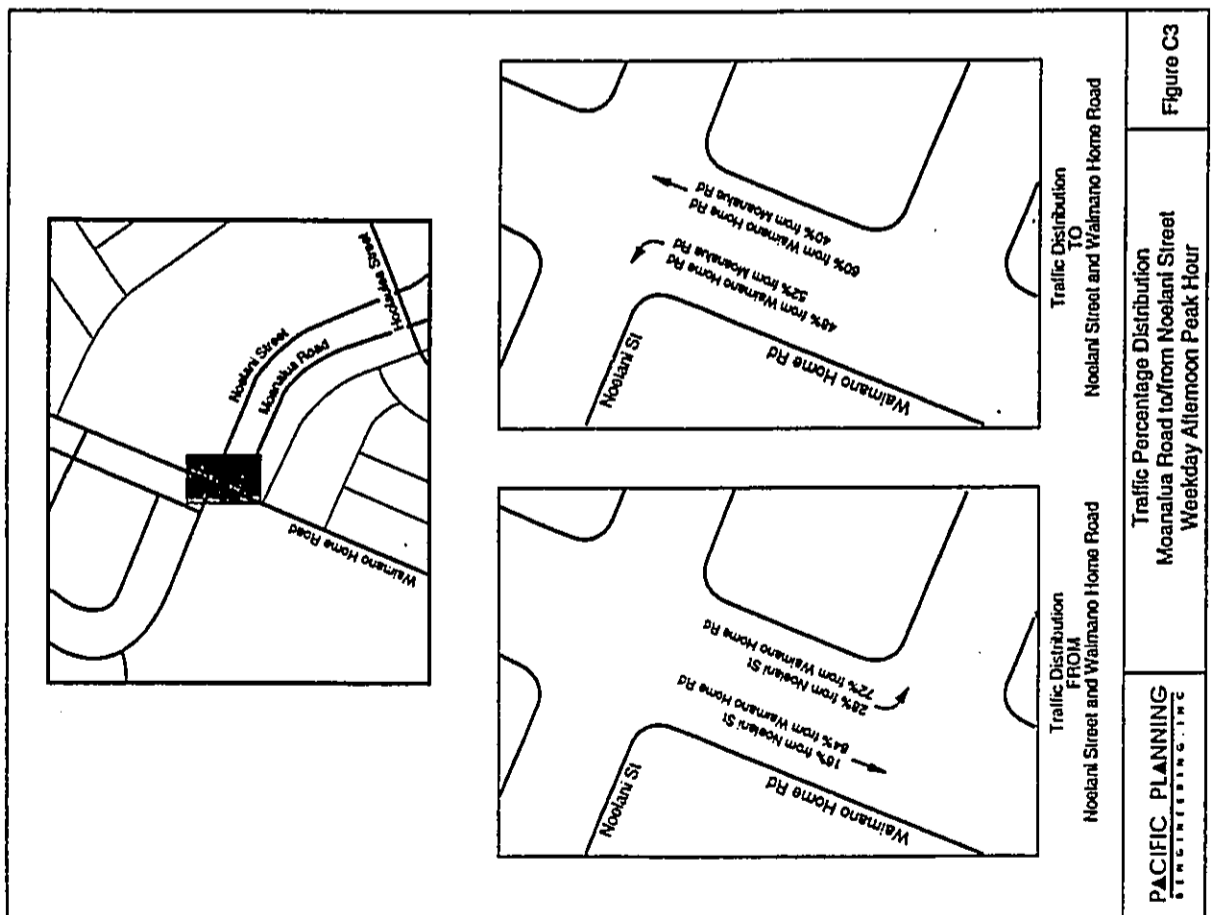


C-2

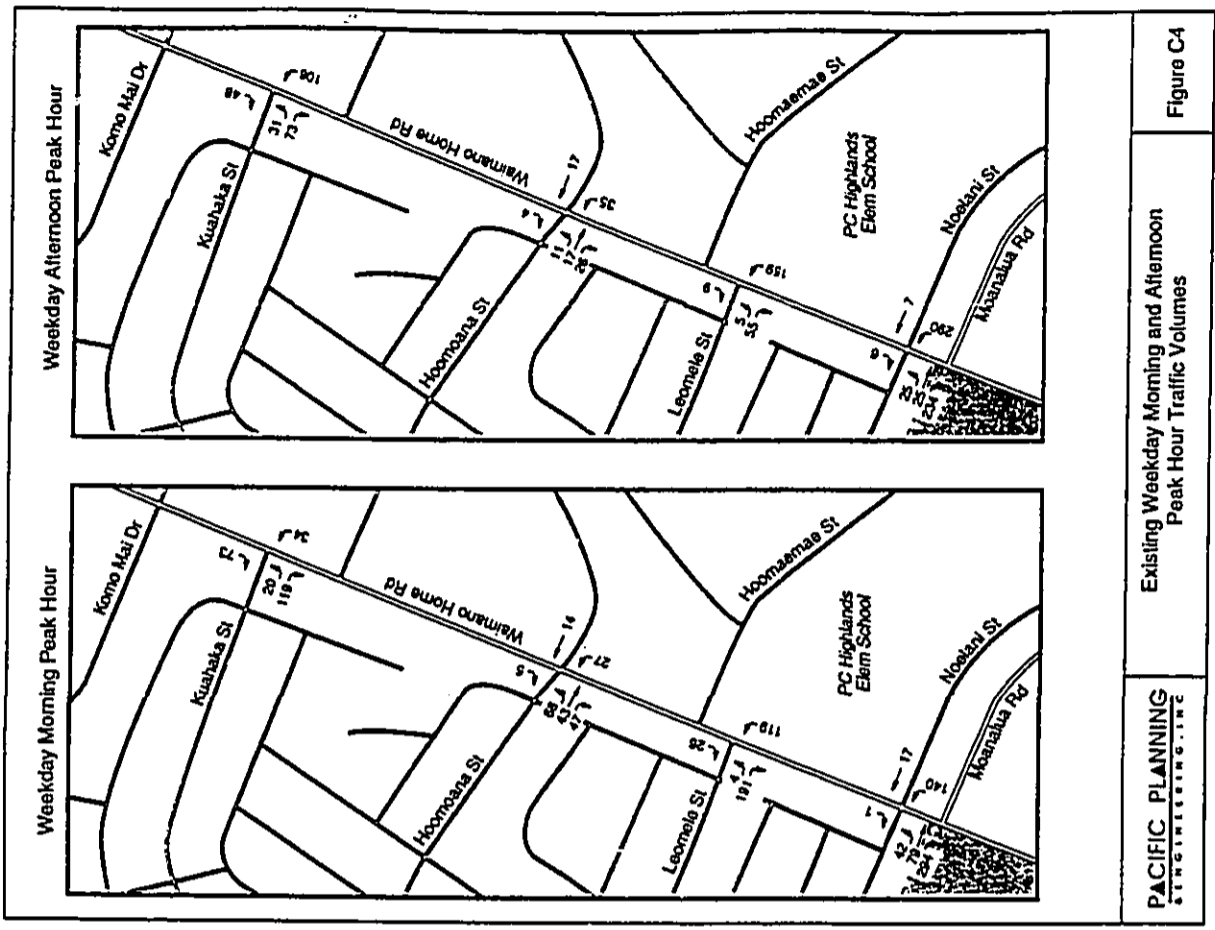


C-3

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



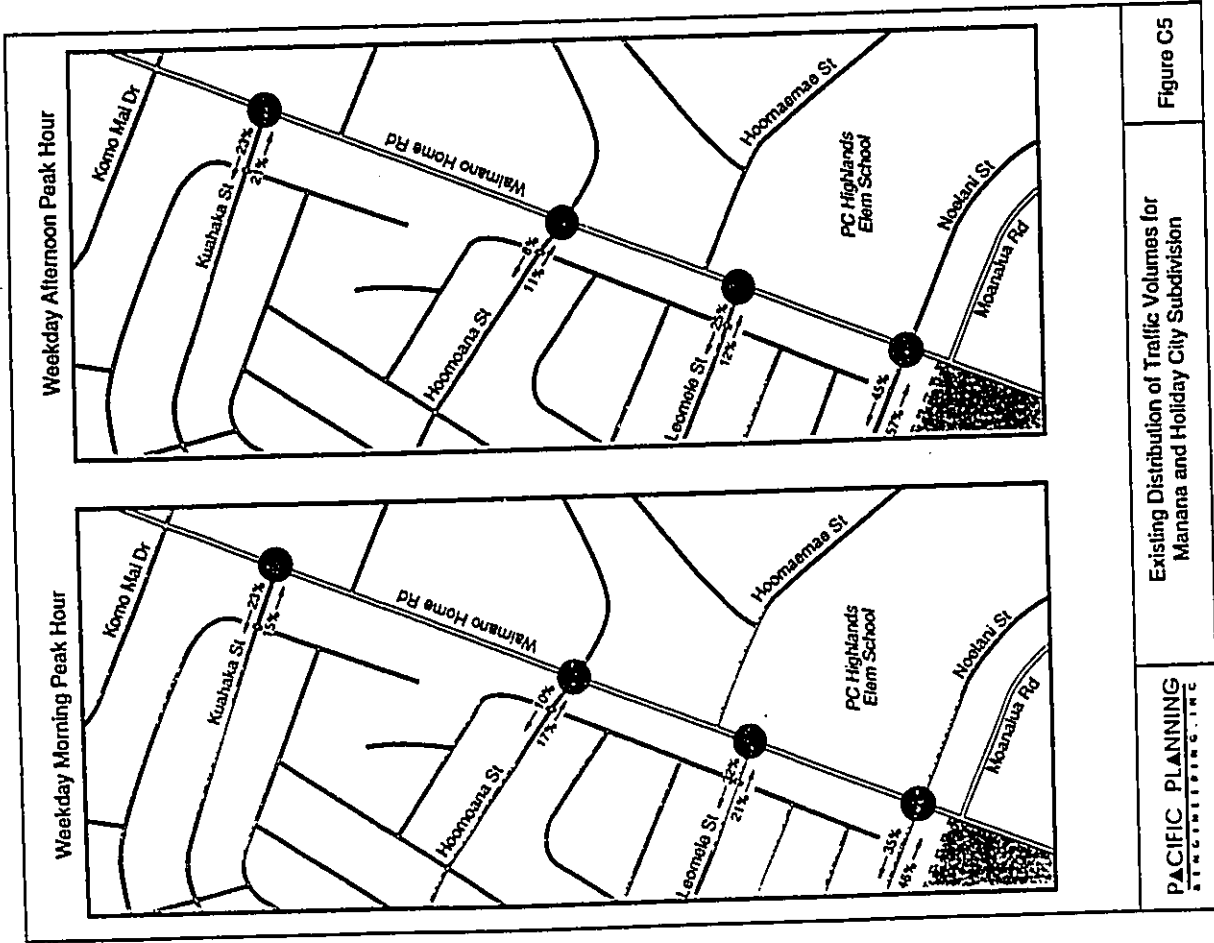
C-4



C-5

Figure C4

Existing Weekday Morning and Afternoon Peak Hour Traffic Volumes



C-6

The results of the analysis during the morning and afternoon peak hours for the existing and year 2020 with the project (no mitigation) conditions are shown in Figure C6. With the projected increase in future traffic and the addition of the Spine Road, the intersection of Waimano Home Road with Moanalua Road/Spine Road is expected to operate at poor level-of-service conditions, especially during the morning peak hour.

The decrease in LOS can be partly attributed to the reduction in green time for each movement due to the addition of a phase for the Spine Road. The existing T-intersection operates on a three-phase cycle of approximately 120 seconds. To accommodate the addition of another phase for the eastbound movement (Spine Road), the available green time from existing phases needs to be reduced. Figure C7 displays graphically the change in available green time from a three-phase signal cycle to a four-phase signal cycle.

Furthermore, the additional traffic generated by the Manana Storage Area Development will increase the need for available green time to the westbound movement at the intersection.

To mitigate the traffic impact at the intersection of Waimano Home Road with Moanalua Road/Spine Road, five alternatives were studied. These alternatives were developed based upon input from the Pearl City Planning Task Force and are as follows:

1. Remove the traffic signals at the intersection of Noelant Street with Waimano Home Road and restrict Noelant Street to a right-turn in and right-turn out operation. Divert existing Noelant Street motorists to Leomele Street.

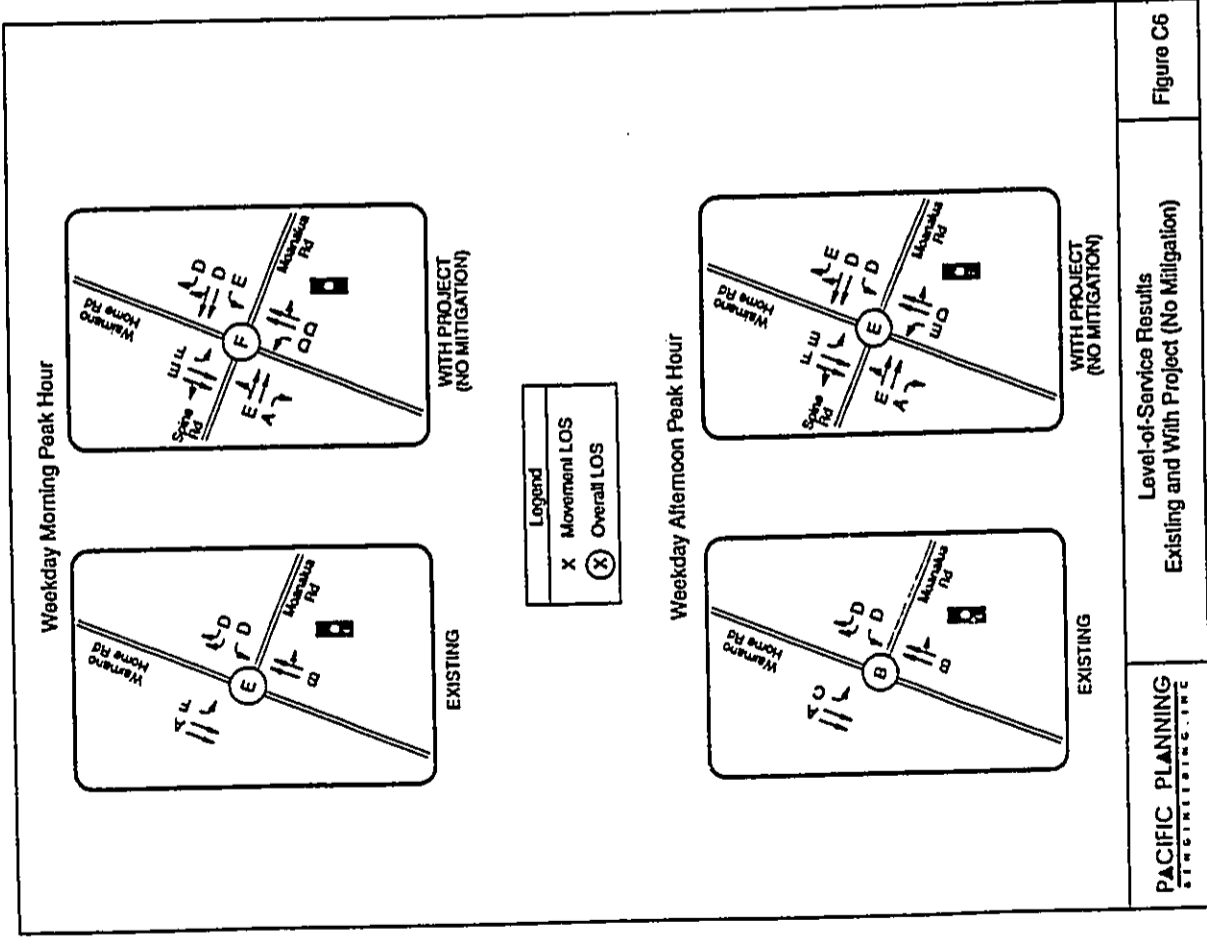
Figure C5

Existing Distribution of Traffic Volumes for Manana and Holiday City Subdivision

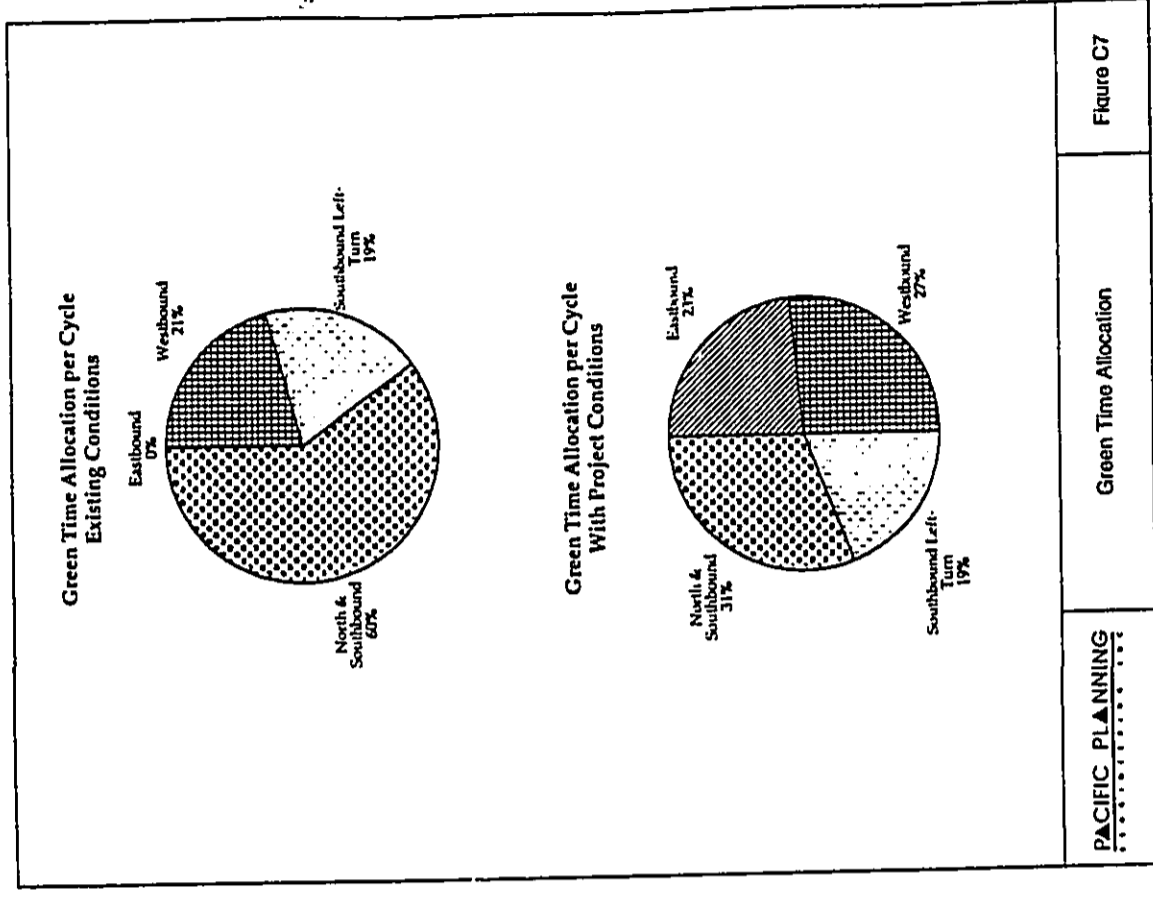
PACIFIC PLANNING
STRUCTURING, INC.

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C-8

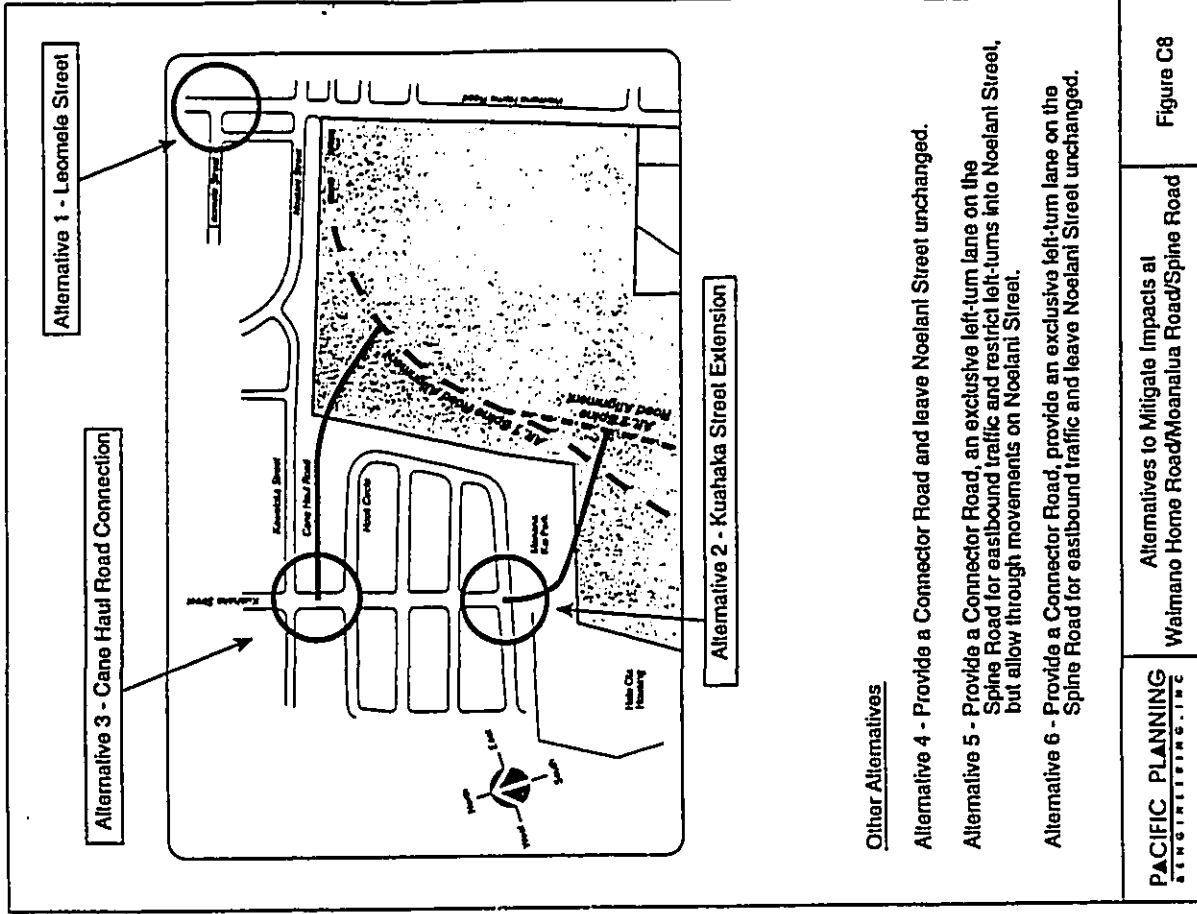


C-9

2. Remove the traffic signals at the intersection of Noelant Street with Waimano Home Road and restrict Noelant Street to a right-turn in and right-turn out operation. Divert existing Noelant Street motorists to a connector road from the Spine Road to a Kuahaka Street extension.
3. Remove the traffic signals at the intersection of Noelant Street with Waimano Home Road and restrict Noelant Street to a right-turn in and right-turn out operation. Divert existing Noelant Street motorists to a connector road from the Spine Road to an existing Cane Haul Road. The Cane Haul Road would intersect with Kuahaka Street just north of Hooli Circle.
4. Construct a connector road from the Spine Road to an existing Cane Haul Road between the Manana and Holiday City Subdivisions and leave access to Noelant Street unchanged.
5. Construct a connector road from the Spine Road to an existing Cane Haul Road between the Manana and Holiday City Subdivisions, provide an exclusive left-turn lane on the Spine Road for eastbound traffic and restrict left-turns into Noelant Street.
6. Construct a connector road from the Spine Road to an existing Cane Haul Road between the Manana and Holiday City Subdivisions, provide an exclusive left-turn lane on the Spine Road for eastbound traffic and leave access to Noelant Street unchanged.

The alternatives are shown schematically on Figure C8.

C-10



C-11

Alternative 1: Restrict Access to Noelani Street and Divert Motorist to Leomele Street

Alternative 1 provides an off-site solution to the traffic impact at the intersection of Waimano Home Road with Moanalua Road/Spine Road. This alternative requires that motorists who usually turn left into and right out of Noelani Street to access Moanalua Road now use Leomele Street.

Leomele Street is currently a two-lane road which is approximately 700 feet north of Noelani Street. Waimano Home Road, at its intersection with Leomele Street consists of four lanes with no left-turn storage lane. The intersection is currently unsignalized.

With restrictions at Noelani Street, there will be a significant increase in traffic due to Noelani Street motorists using Leomele Street. With the increased traffic volumes, the intersection meets the minimum requirements for the peak-hour volume warrant for traffic signalization according to the "Manual on Uniform Traffic Control Devices (MUTCD), 1988 Edition". Therefore, signalization was assumed for this intersection.

Traffic analysis at this intersection indicates that, if signalized, the intersection could accommodate the increase in traffic volume. However, there are several factors which make this alternative undesirable.

1. There would be an estimated increase in the left-turn movement from 160 vehicles to over 400 vehicles in the afternoon peak hour. This is a significant increase of over 250%. During the morning peak hour, there is an increase from 190 vehicles to over 300 vehicles.
2. Currently, there are two northbound through lanes on Waimano Home Road. This alternative would likely result in the left-lane operating as a "de-facto" left-turn lane. Consequently, Waimano Home Road would

then have only one northbound through lane. Although the traffic analysis indicates that overall it could operate acceptably, the result would be a greatly decreased LOS for northbound motorists because of the single through lane.

Adding a left-turn storage lane along Waimano Home Road would be unfeasible since it would require the acquisition of several residential homes and/or construction of a retaining wall on the Pearl City Highlands Elementary School property as well as the relocation of existing overhead utilities. The anticipated acquisition and construction costs could be substantial.

Further modifications would involve providing separate left- and right-turn lanes on Leomele Street. With the large right-turn traffic volume on Leomele Street, much of the right-turn traffic could be moved on the red phase (right-turn on red). However, Leomele Street has only an existing 44-foot right-of-way. Therefore to provide the necessary laneage, Leomele Street would need to be widened.

3. The intersection of Leomele Street with Makamua Street lies very close to the intersection of Waimano Home Road with Leomele Street. Situations could occur where a motorist that had just turned left from Waimano Home Road wishes to then turn left southbound onto Makamua Street. If queues or opposing traffic along Leomele Street prevent this vehicle from immediately turning, it would have to stop, resulting in queues forming behind it. These queues could conceivably reach back into Waimano Home Road given the large number of left-turns and the short distance between intersections. This would be a very undesirable situation and could dramatically affect the traffic operations at the intersection of Waimano Home Road with Leomele Street.

4. Under this alternative, there would be no direct access to the Manana Storage Area Development for the Manana Community.

Alternative 2: Restrict Access to Noelani Street and Divert Motorist to a Spine Road Connection via Kuahaka Street Extension

Alternative 2 provides another solution to the traffic impact at the intersection of Waimano Home Road with Moanalua Road/Spine Road. This alternative requires that motorists who usually turn left into and right out of Noelani Street now use a connection to the Manana Community via the proposed Spine Road. This connector road would start at the Spine Road and connect to the southern Holiday City Community via a Kuahaka Street extension below Hooli Circle.

This alternative has the advantage of providing direct access to the Manana Storage Area Development for the Manana Community as well as reducing Manana based traffic volumes along Waimano Home Road and diverting it to the connector road.

However, the extension requires the taking of a significant portion of Manana Kai Neighborhood Park. If Federal funds are to be used for a project where the use of a public park is required, a Section 4(f) evaluation must be initiated. One of the criteria for approval of the project would be to show that there is "No Feasible and Prudent Alternative" to such use and the project includes all possible planning to minimize harm to the park. This alternative will not be able to meet the criterion of "No Feasible and Prudent Alternative".

This connector road also has a relatively long travel path up towards the rest of the Manana Community. In addition, the potential acquisition of several dwellings may be necessary to extend Kuahaka Street to the connector road.

Alternative 3: Restrict Access to Noelani Street and Divert to Spine Road Connection at Cane Haul Road

The third alternative also provides another solution to address the traffic impact at the intersection of Waimano Home Road with Moanalua Road/Spine Road. This alternative also involves a connection to the Manana Community via the proposed Spine Road. The connector road would start at the Spine Road and follow the path of an existing cane haul road. Connection to the Manana Community would occur where the cane haul road currently intersects Kuahaka Street just below Kaweloka Street as shown on Figure C8.

Traffic forecasts were developed and analyzed for this alternative using the methodology stated in the traffic impact assessment report. The analysis results for the intersection of Waimano Home Road with Moanalua Road are shown in Table C1.

| Movement | Level-of-Service | |
|-------------------------------|------------------|--------------------|
| | Morning Peak Hr. | Afternoon Peak Hr. |
| NB LT from Waimano Home Rd | D | E |
| NB TT/RT on Waimano Home Rd | D | C |
| SB LT from Waimano Home Rd | E | E |
| SB TT/RT from Waimano Home Rd | D | D |
| EB LT/TH from Spine Rd | D | E |
| EB RT from Spine Rd | A | A |
| WB LT from Moanalua Rd | E | D |
| WB TT/RT from Moanalua Rd | D | D |
| WB RT from Moanalua Rd | D | E |
| Overall | D | D |

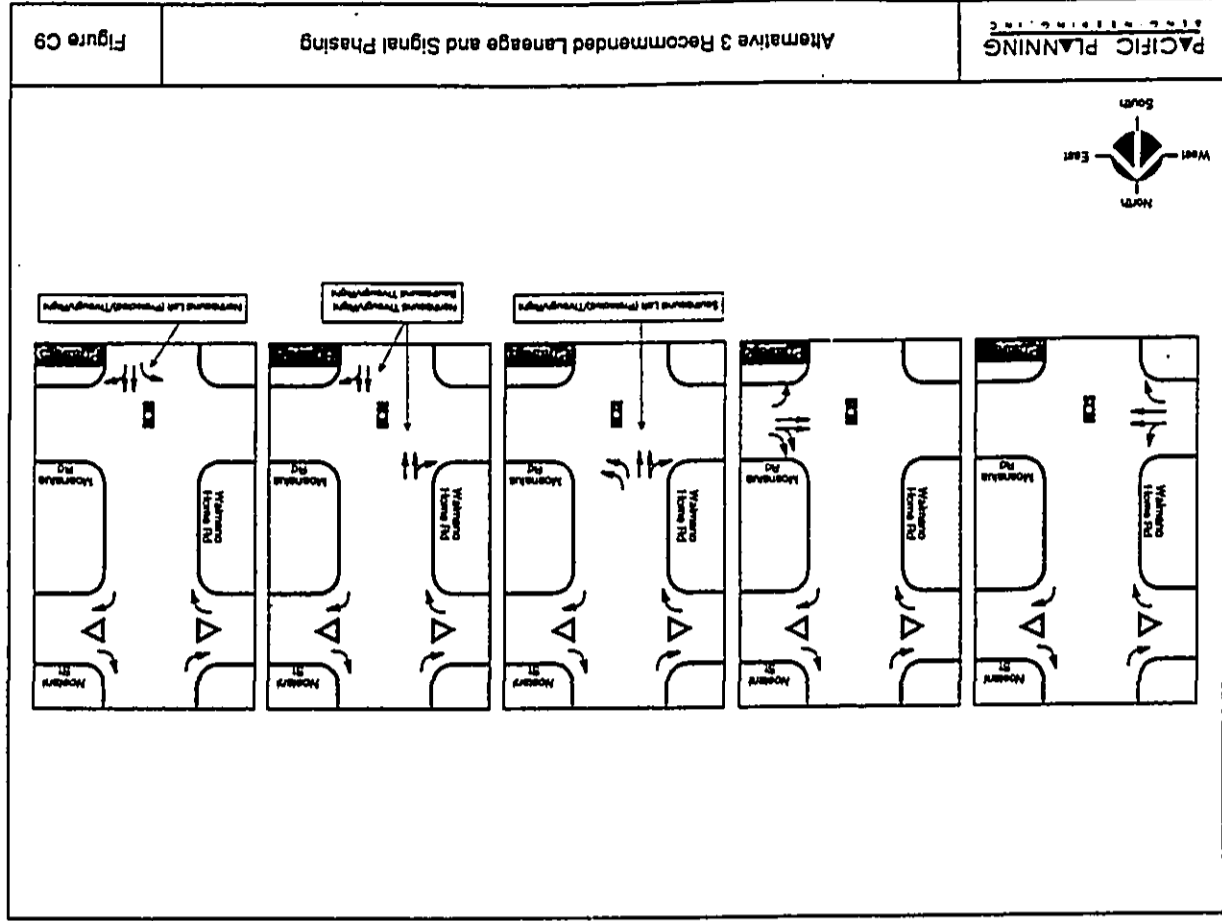
The results show an acceptable LOS D condition for the overall intersection. Alternative 3 attempts to provide some relief in the level-of-service for the

southbound left-turn motorist during the morning peak hour by adding a second left-turn lane on Waimano Home Road. This is possible due to the restricted northbound left-turn movement into Noelani Street and the removal of the traffic signal. The recommended laneage and signal phasing are shown in Figure C9.

Similar to Alternative 2, this alternative provides a direct access to the Manana Storage Area Development. However, using the existing cane haul road appears to be a more direct route to the Manana Community than Alternative 2 and does not require the taking of public park land.

The disadvantage of this alternative is that the cane haul road intersects Kuahaka Street at a location close to the intersections of Kuahaka Street with Hoopi Circle and Kaweloka Street. The approximate centerline to centerline distance between the cane haul road and Hoopi Circle is 150'. The approximate centerline to centerline distance between the cane haul road and Kaweloka Street is 170'.

Another impact of removing traffic signals at Noelani Street is that the existing pedestrian crosswalk crossing Waimano Home Road would need to be removed. To provide a replacement crosswalk, it is proposed that a signalized pedestrian crosswalk be located north of the Pearl City Highlands Elementary School driveway near an existing bus stop. The reason for the crosswalk relocation is due to the separate phasing for eastbound and westbound approaches at the intersection of Waimano Home Road with Moanaiua Road/Spine Road. Because of the separate phasing and close spacing between intersections, there is always a phase where there is significant traffic on Waimano Home Road which does not allow time for a pedestrian walk phase. If the crosswalk is relocated further north, it will allow vehicles to queue on Waimano Home Road during a pedestrian walk phase.



Alternative 3 would also require the acquisition of an existing residential structure which is situated directly on the Cane Haul Road.

Alternative 4: Allow Access to Noelani Street and provide a Spine Road Connection

The fourth alternative would continue to allow access to Noelani Street and provide a connection to the Spine Road for the Manana and Holiday City Subdivisions. The pedestrian crosswalk crossing Waimano Home Road would also not have to be relocated. The synchronized signal phasing between Noelani Street and Moanalua Road/Spine Road is shown in Figure C10.

The synchronized phase for the eastbound right-turn from Noelani Street to southbound left-turn onto Moanalua Road uses the protected left-turn green arrow leaving the southbound left-turn from Waimano Home Road only the permitted phase of the signal phase. This does not provide efficient utilization of the traffic signal for the southbound motorist.

The results of the analysis for Alternative 4 are shown in Table C2. The study intersection was analyzed using the laneage shown in Figure C10.

As shown in Figures C1 and C2, motorists exiting Noelani Street comprises less than 30% of the southbound movement. The remaining 70% of the motorists is presumably from Pacific Fallsades and Upper Pearl City. Because of the protected green phase for the synchronized movements, Noelani Street motorists are expected to continue to experience significantly better level-of-service than the southbound movements along Waimano Home Road. However, the delays are anticipated to increase for the southbound movement along Waimano Home Road.

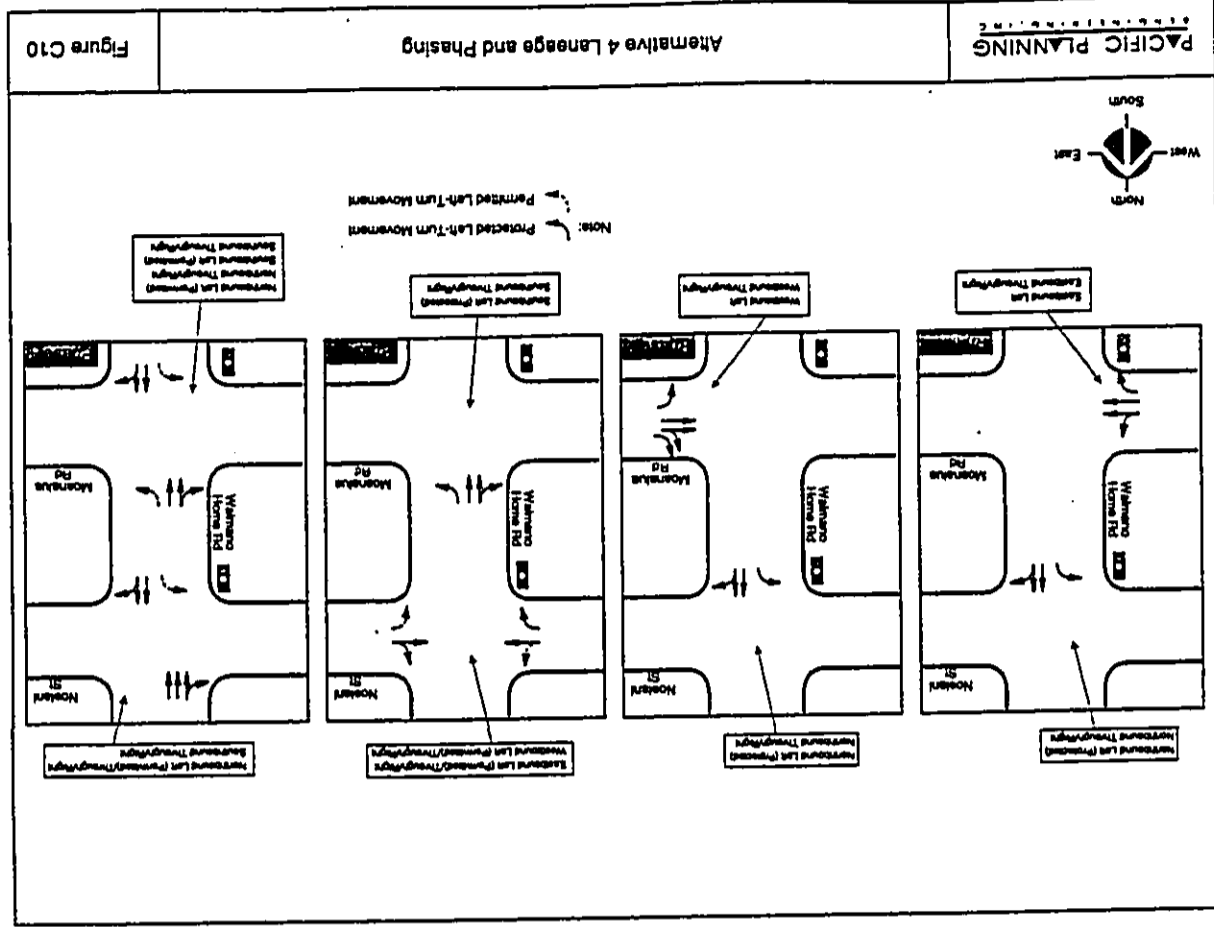


Table C2 Alternative 4 - Waimano Home Road with Moanalua Road/Spine Road

| Movement | Level-of-Service | |
|-------------------------------|------------------|--------------------|
| | Morning Peak Hr. | Afternoon Peak Hr. |
| NB LT from Waimano Home Rd | D | D |
| NB TH/RT on Waimano Home Rd | D | D |
| SB LT from Waimano Home Rd | F | E |
| SB TH/RT from Waimano Home Rd | E | F |
| EB LT/TH from Spine Rd | E | E |
| EB RT from Spine Rd | A | A |
| WB LT from Moanalua Rd | E | D |
| WB TH/RT from Moanalua Rd | D | D |
| WB RT from Moanalua Rd | D | E |
| Overall | F | E |

Currently, the southbound left-turn movement operates at LOS F conditions with an average delay of over 120 seconds per vehicle during the morning peak hour. With the addition of the Spine Road and traffic generated by the Manana Storage Area development, the delays are anticipated to be even worse for the future southbound movement.

Allowing northbound left-turns into Noelani Street will not permit the addition of a second left-turn lane for the southbound movement to Moanalua Road. Without the addition of another southbound left-turn lane and improving the efficiency of the signal phasing by eliminating the synchronized movements, the overall level-of-service is expected to be poor, LOS F and LOS E, during the morning and afternoon peak hours respectively.

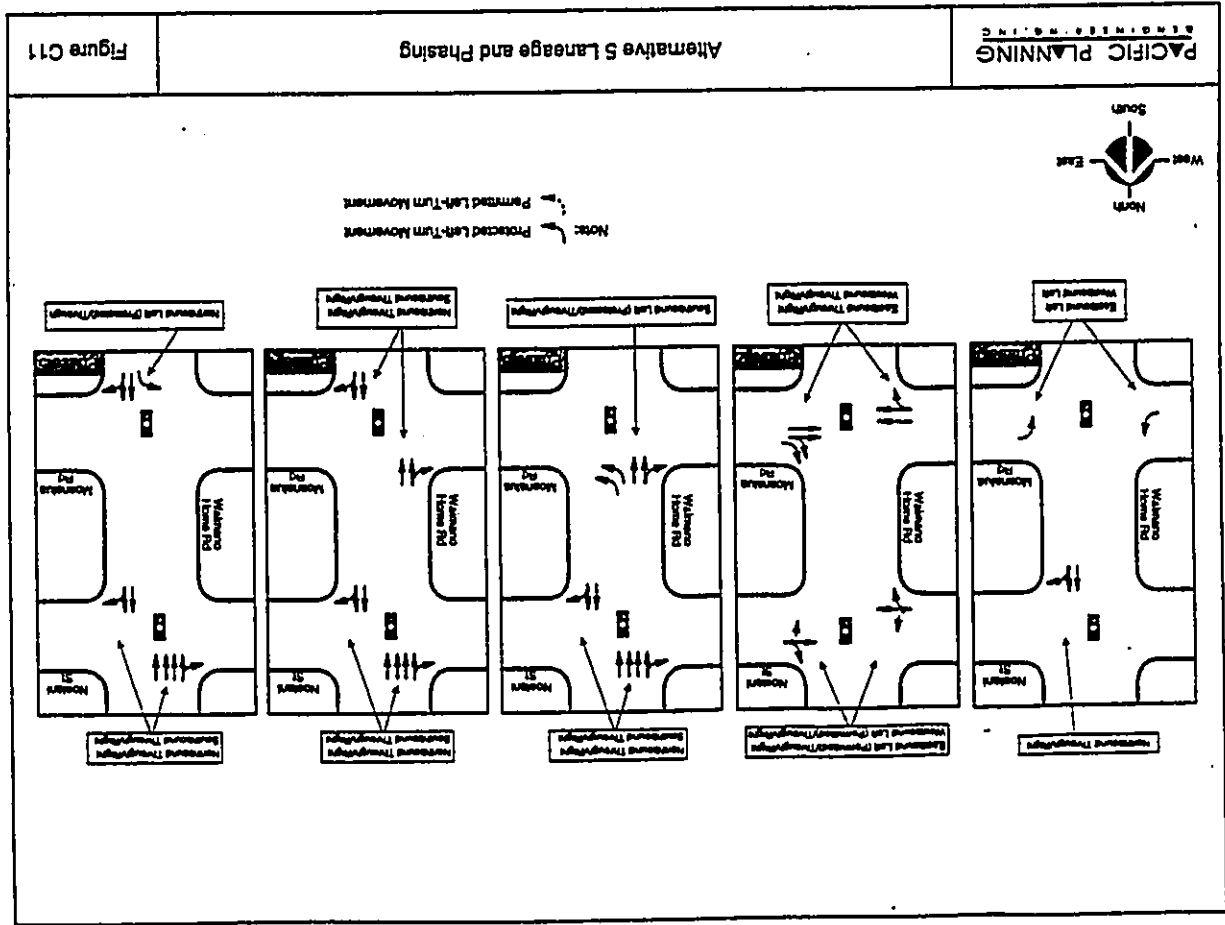
Alternative 5: Restrict left-turns into Noelani Street but allow through movements, provide a Spine Road connection and reconfigure eastbound lanes on the Spine Road

The fifth alternative would provide a connection to the Spine Road for the Manana and Holiday City Subdivisions and allow limited access to Noelani Street. Northbound left-turns into Noelani Street will not be permitted, thus allowing the addition of a second left-turn lane for the southbound movement to Moanalua Road.

Additionally, the eastbound lanes on the Spine Road would be reconfigured to include an exclusive left-turn lane (Spine Road) vs. a shared left-turn/through lane. An exclusive left-turn lane would allow the eastbound and westbound approaches to move simultaneously. The eastbound and westbound through movements on Moanalua Road/Spine Road would then be synchronized with the eastbound and westbound through movements on Noelani Street, thereby allowing a phase when pedestrians can cross Waimano Home Road.

The synchronized signal phasing between Noelani Street and Moanalua Road/Spine Road is shown in Figure C11. The results of the analysis for Alternative 5 are shown in Table C3.

This alternative would provide an acceptable overall LOS D condition for the intersection. Furthermore, the pedestrian crosswalk crossing Waimano Home Road at Noelani Street would not need to be relocated as required in Alternative 3. However, due to the roadway geometrics, additional right-of-way will be required to provide adequate transition for the eastbound through movement crossing Waimano Home Road onto Moanalua Road.



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Table C3 Alternative 5 - Waimano Home Road with Moanalua Road/Spine Road

| Movement | Level of Service | |
|-------------------------------|------------------|--------------------|
| | Morning Peak Hr. | Afternoon Peak Hr. |
| NB LT from Waimano Home Rd | D | D |
| NB TH/RT on Waimano Home Rd | C | C |
| SB LT from Waimano Home Rd | D | D |
| SB TH/RT from Waimano Home Rd | C | D |
| EB LT from Spine Rd | D | D |
| EB TH/RT from Spine Rd | D | C |
| WB LT from Moanalua Rd | D | D |
| WB TH/RT from Moanalua Rd | D | D |
| WB RT from Moanalua Rd | D | D |
| Overall | D | D |

Alternative 6: Allow Access to Noelani Street, provide a Spine Road connection and reconfigure eastbound lanes on the Spine Road

The sixth alternative, which is similar to Alternative 4 and 5, would continue to allow access to Noelani Street, provide a connection to the Spine Road for the Manana and Holiday City Subdivisions and reconfigure the eastbound lanes on the Spine Road to include an exclusive left-turn lane (Spine Road) vs. a shared left-turn/through lane. An exclusive left-turn lane would allow the eastbound and westbound approaches to move simultaneously. The modifications to the signal timing would provide a more efficient use of the signal cycle.

The synchronized signal phasing between Noelani Street and Moanalua Road/Spine Road is shown in Figure C12. The results of the analysis for Alternative 6 are shown in Table C4.

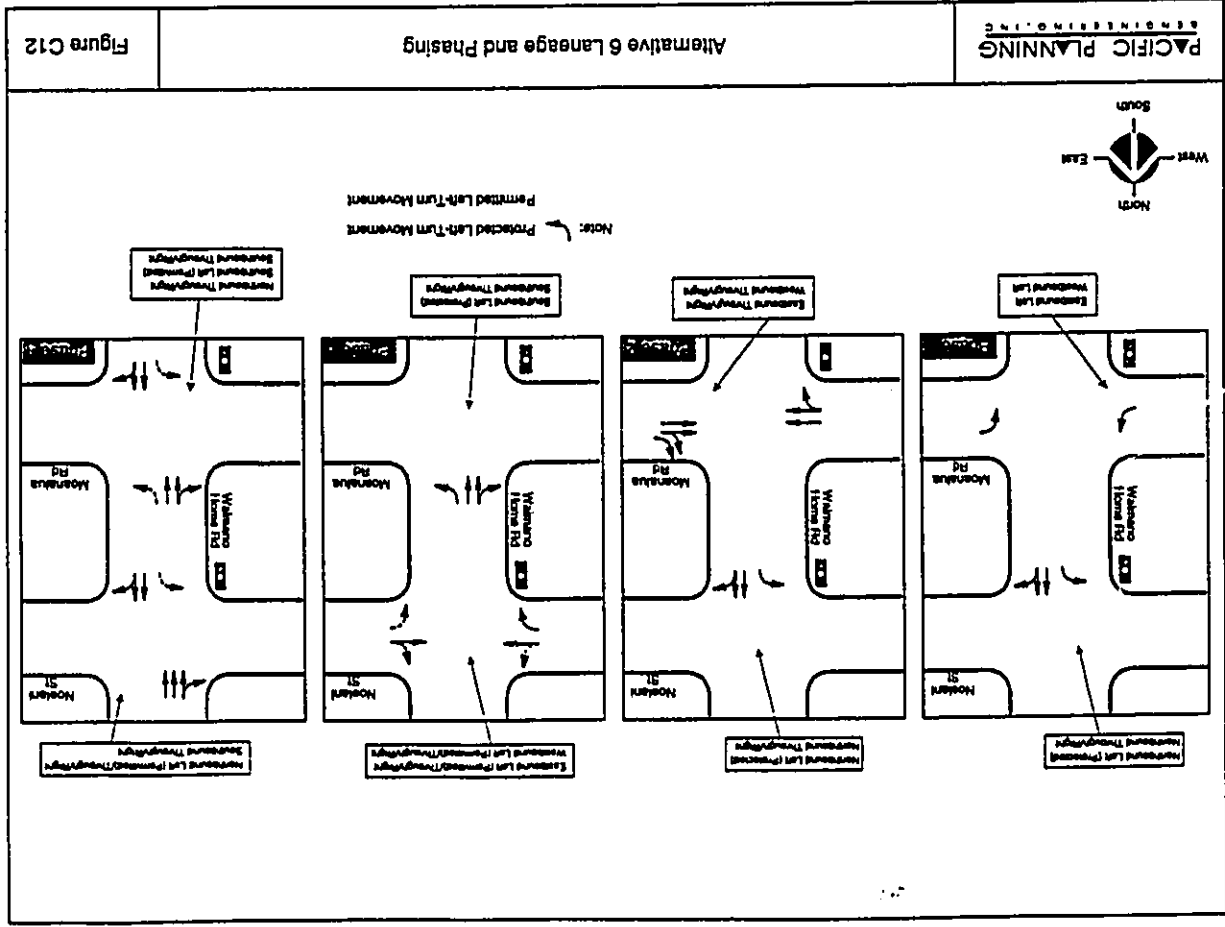


Figure C12

Table C4 Alternative 6 - Waimano Home Road with Moanalua Road/Spine Road

| Movement | Level of Service | |
|-------------------------------|------------------|--------------------|
| | Morning Peak Hr. | Afternoon Peak Hr. |
| NB LT from Waimano Home Rd | D | D |
| NB TH/RT on Waimano Home Rd | C | D |
| SB LT from Waimano Home Rd | F | E |
| SB TH/RT from Waimano Home Rd | E | E |
| EB LT from Spine Rd | D | E |
| EB TH/RT from Spine Rd | D | C |
| WB LT from Moanalua Rd | D | D |
| WB TH/RT from Moanalua Rd | D | D |
| WB RT from Moanalua Rd | D | E |
| Overall | F | E |

Currently, the southbound left-turn movement operates at LOS F conditions with an average delay of over 120 seconds vehicle during the morning peak hour. With the addition of the Spine Road and traffic generated by the Manana Storage Area development, the delays are anticipated to be even worse for the future southbound movement.

Because of the protected green phase for the synchronized movements, Noelani Street motorists are expected to continue to experience significantly better level-of-service than the southbound movements along Waimano Home Road. However, long delays are anticipated for the southbound movement along Waimano Home Road.

As in Alternative 4, allowing northbound left-turns into Noelani Street will not permit the addition of a second left-turn lane for the southbound movement to Moanalua Road. Without the addition of another southbound left-turn lane and improving the efficiency of the signal phasing by eliminating

the synchronized movements, the overall level-of-service is expected to be poor, LOS F and LOS E during the morning and afternoon peak hours respectively. Furthermore, due to the roadway geometrics, additional right-of-way will be required to provide adequate transition for the eastbound through movement crossing Waimano Home Road onto Moanalua Road.

Conclusions

The six alternatives described in this report were studied to determine if they could mitigate the traffic impact at the intersection of Waimano Home Road with Moanalua Road/Spine Road.

Alternative 1 (Leonicle Street) does not seem feasible from both a constructability and a traffic operations perspective. Alternative 2 (Spine Road via Kualaka Street extension) requires the use of park land and subsequently may not be possible because of Section 4(f) regulations.

For Alternatives 3, 4, 5 and 6 a summary of the overall intersection LOS during the morning and afternoon peak hours is displayed in Table C5 (Figures C12 and C13 graphically show the differences in LOS). Alternative 3 (restricted Noelani Street) results in LOS "D" conditions during both the morning and afternoon peak hours. Alternative 5 (Noelani Street restricted to through movements) also results in LOS "D" conditions during both peak hours. However, Alternative 4 (Noelani Street open) and Alternative 6 (Noelani Street open & modifications to Spine Road) results in LOS "F" conditions in the morning peak hour and LOS "E" conditions during the afternoon peak hour.

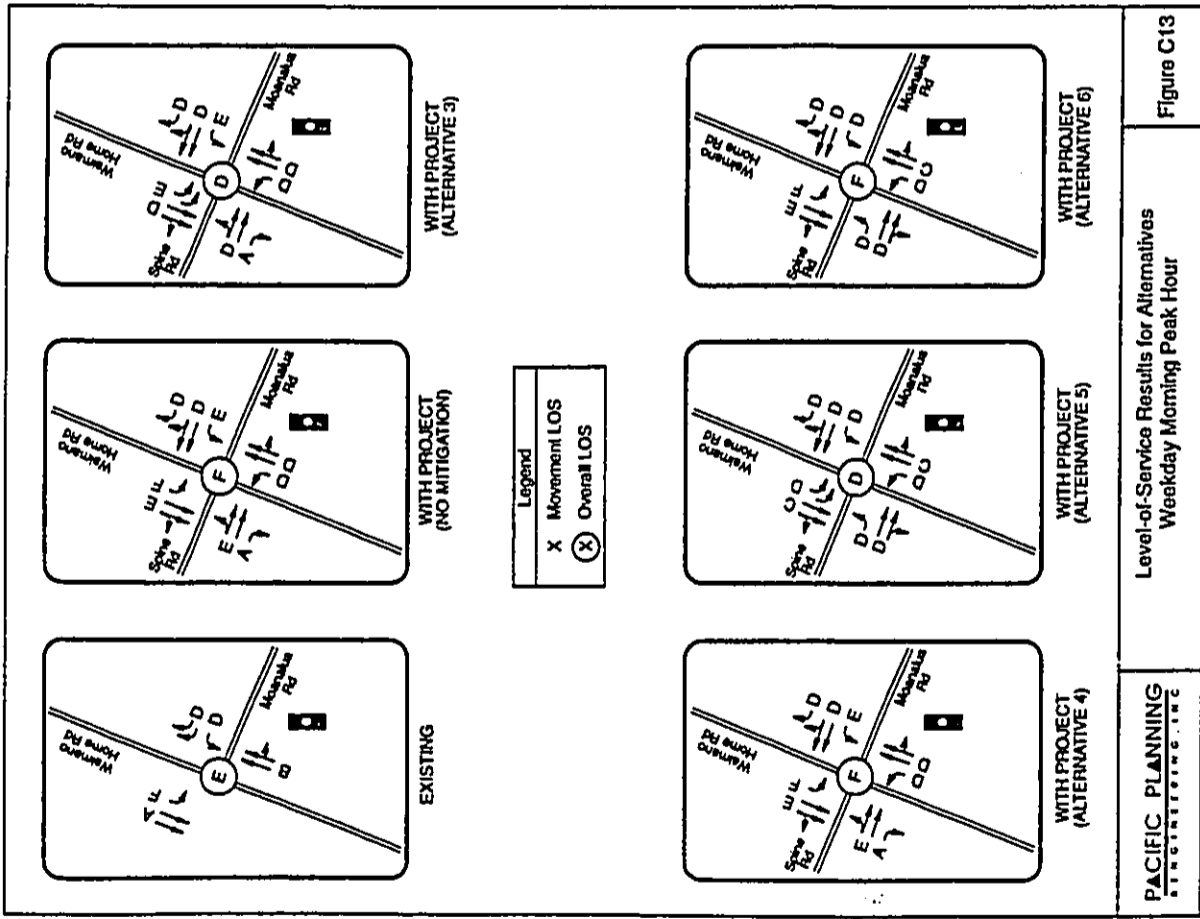
Table C5 Summary of Level-of-Service at Waimano Home Road with Moanalua Road

| Time Period | Overall Intersection Level of Service | | | | |
|---------------------|---------------------------------------|---------------|---------------|---------------|---------------|
| | Existing | Alternative 3 | Alternative 4 | Alternative 5 | Alternative 6 |
| Morning Peak Hour | E | D | F | D | F |
| Afternoon Peak Hour | D | D | E | D | E |

From a traffic operations perspective, Alternatives 3 or 5 provides the best operating conditions at the intersection of Waimano Home Road with Moanalua Road/Spine Road. However, Alternative 5 requires the acquisition of property along the makai side of Moanalua Road, but does allow limited access to Noelani Street.

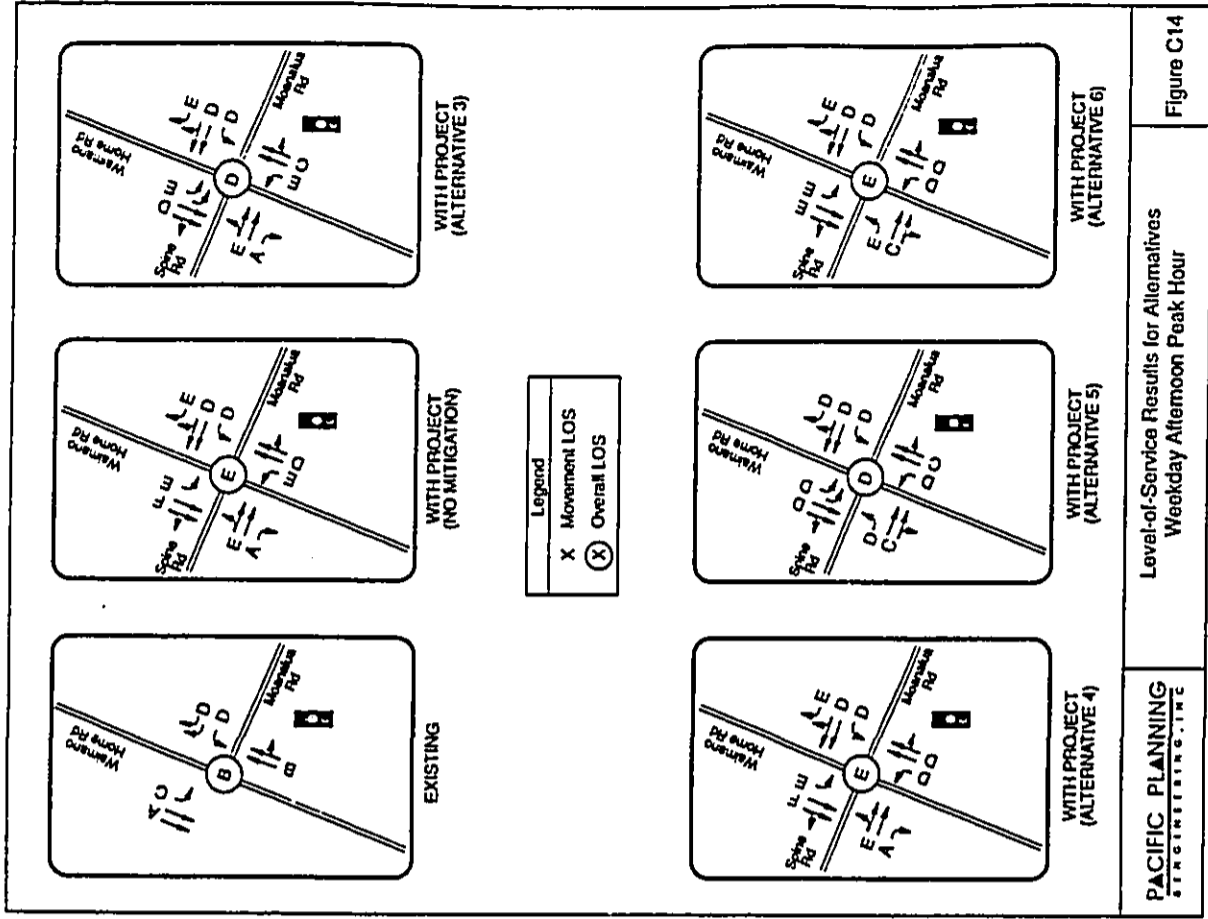
All of these alternatives have been presented to the affected community through several public meetings with the Pearl City Task Force, the Manana Community Association and the Pearl City Community. The primary concern from area residents was the need for access to the Manana community via Noelani Street. As such, Alternative 6 was the preferred alternative by the community residents.

To address the poor LOS during the morning peak in Alternative 6, additional mitigation measures may need to be implemented. These measures could possibly include contraflow of the northbound left-turn lane on Waimano Home Road at Noelani Street. This would provide double left-turn lanes in the southbound direction onto Moanalua Road, similar to the laneage configuration shown in Alternative 5. Additional signal timing modifications may also be required.



PACIFIC PLANNING ENGINEERING, INC. Level-of-Service Results for Alternatives Weekday Morning Peak Hour Figure C13

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PACIFIC PLANNING ENGINEERING, INC. Level-of-Service Results for Alternatives Weekday Afternoon Peak Hour Figure C14

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APPENDIX D

Appendix D - Interim Conditions

The conclusions and recommendations of this report are based on year 2020 build-out conditions. However, it is expected that the Manana Storage Area Development and Spine Road will be constructed in several phases, therefore, analysis of interim conditions were evaluated. The study interim condition is the year 2000 with the assumption that the only completed developments are the City facilities and the Spine Road (Moanalua Road to Acacia Road) is built to provide access to the site. The following issues will also be discussed:

MANANA SPINE ROAD INTERIM CONDITIONS

- 1) Necessary laneways at the intersections of Waimano Home Road with Moanalua Road/Spine Road and Acacia Road with Kuala Street/Spine Road during the study interim conditions.
- 2) Determine if the traffic signal at the intersection of Noelani Street with Waimano Home Road can still be coordinated with the traffic signal at the new intersection of Waimano Home Road with Moanalua Road/Spine Road.
- 3) Determine if the addition of an exclusive westbound right-turn lane on Kamehameha Highway at its intersection with Acacia Road is necessary in the study interim conditions.

Future traffic was forecasted for the year 2000 with the City facilities (Board of Water Supply Maintenance Yard, Department of Parks and Recreation Storage Yard, Department of Transportation Services Maintenance Yard, Pearl City Bus Facility) and the Spine Road. The forecasts for the weekday morning and afternoon peak hour traffic volumes at the study intersections are shown in Figures D1 and D2.

The forecasts developed used the following assumptions:

- Existing 1998 traffic volumes.
- General growth rate of 0.6% per year from year 1998 to year 2000.
- Completed Pearl City Junction Site.
- Traffic diversions due to the Spine Road and
- Trips due to the City Facilities.

City Facilities

The standard three step procedure of trip generation, trip distribution and traffic assignment was used to estimate peak hour traffic from the Manana Storage Area developments City facilities.

Trips generated by these developments were obtained by using the estimated land uses and trip rates from the ITE Trip Generation Report as well as other reports where applicable. Table D1 shows the number of generated trips.

| Land Use | Table D1. Trip Generation for Manana Storage Area Developments. | | | | | |
|---|---|------|-------|-----------|-------|------|
| | Morning | | | Afternoon | | |
| | Enter | Exit | Enter | Exit | Enter | Exit |
| Family Center/County Park (20.75 acre) | 0 | 0 | 0 | 0 | 0 | 1 |
| Bd. of Water Supply Maint. (7.42 acre) | 11 | 7 | 1 | 1 | 1 | 9 |
| DTR - Storage & Maintenance (4.56 acre) | 7 | 4 | 1 | 1 | 1 | 5 |
| DTS - Vehicle Maintenance (4.24 acre) | 7 | 4 | 1 | 1 | 1 | 5 |
| Bus Facility (21 acres) | 41 | 64 | 26 | 26 | 38 | 38 |
| Totals | 66 | 79 | 29 | 29 | 58 | 58 |

The trip distribution step estimates the distribution of vehicle trips to their predicted destinations and origins. Trips were distributed based on projections of population and employment.

The traffic assignment step assigns vehicle trips to specific routes on the roadway network that will take the driver from origin to destination. Trips were assigned to and from Moanalua Road/Waimano Home Road/Acacia Road/Kuala Street or Kamchamecha Highway via the Spine Road.

Issues

1. *Necessary Lanes at the Intersections of Waimano Home Road with Moanalua Road/Spine Road and Acacia Road with Kuala Street/Spine Road during the study interim condition.*

For build-out conditions, it was recommended that an additional lane be provided for the westbound approach at the intersection of Waimano Home Road with Moanalua Road/Spine Road. This laneage is required due to additional traffic generated by the Manana Storage Area development. However, in the interim, it is possible to modify the existing laneage to accommodate the addition of the City Facilities and the Spine Road. The modified laneage for the westbound approach would consist of a shared left/through lane, a shared through/right lane and an exclusive right-turn lane.

The recommendations for the intersection of Acacia Road with Kuala Street/Spine Road at build-out conditions would also be needed during the interim period. This laneage is required to provide access to the City Facilities and the Spine Road.

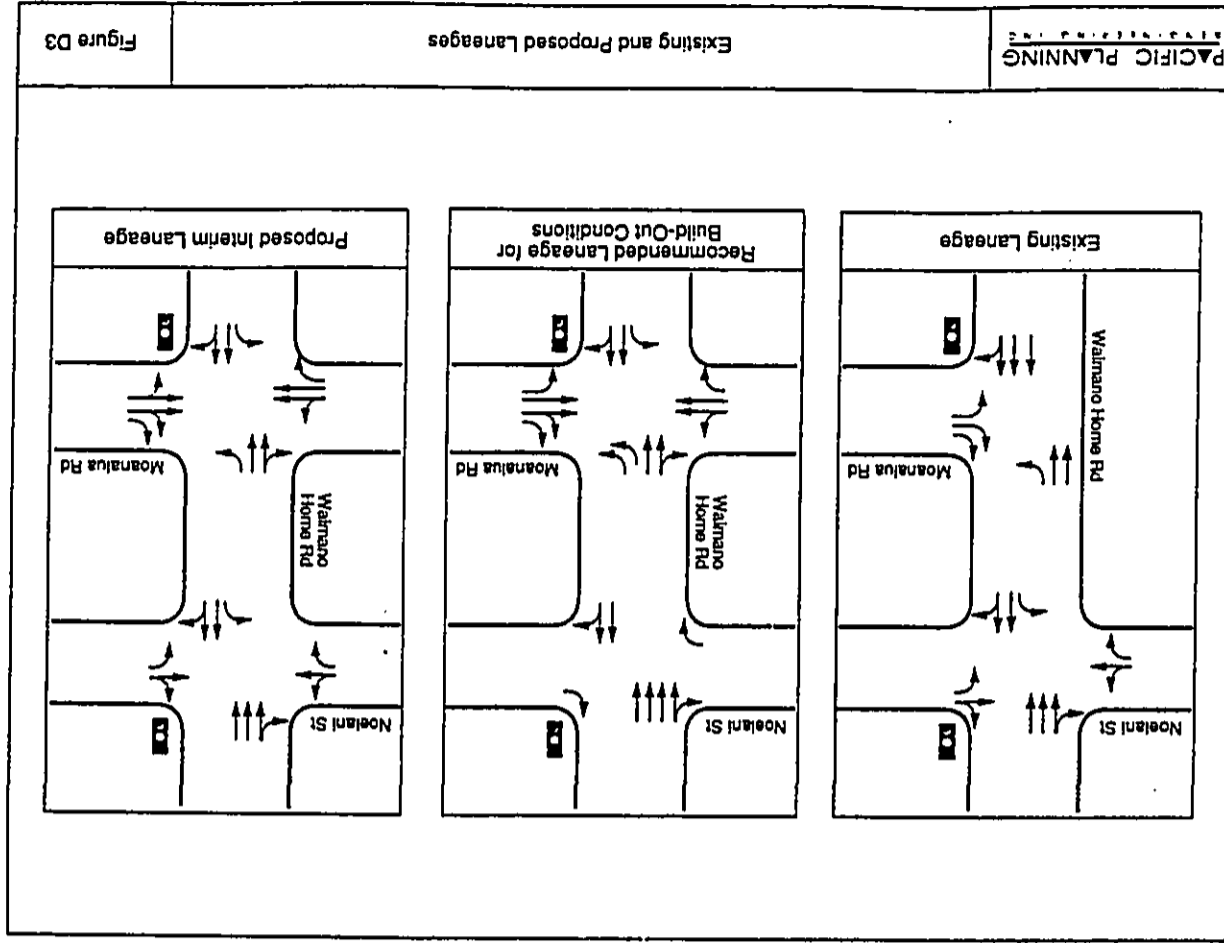
2. Maintenance of existing traffic signal phasing at the intersections of Waimano Home Road with Noelani Street and Waimano Home Road with Moanalua Road/Spine Road.

For build-out conditions, it was recommended that the traffic signals at the intersection of Noelani Street with Waimano Home Road be removed and that access be limited to right-turn in/right-turn out only. This required the construction of a connector road to mitigate the loss of this access. However, in the interim, it is possible to maintain the current access to Noelani Street without having to construct a connector road.

Laneage and Phasing

The laneage for the interim condition needs to be modified to accommodate the spine road. The proposed interim laneage is shown in Figure D3. The modified laneage does not show double left-turn lanes on the southbound approach of Waimano Home Road as recommended for build-out conditions. Only a single southbound left-turn lane can be accommodated if the northbound left-turn into Noelani Street is maintained.

A phasing plan was developed which includes the Spine Road while still allowing motorists to make left-turns into Noelani Street. The plan, shown in Figure D4, consists of an additional phase for the Spine Road movements as well as longer protected green times for the southbound left-turn movement. In addition, the eastbound approach phase is separated from the westbound approach phase because of the potential for numerous crossing movements due to synchronized traffic patterns between Moanalua Road and Noelani Street as well as geometric constraints.

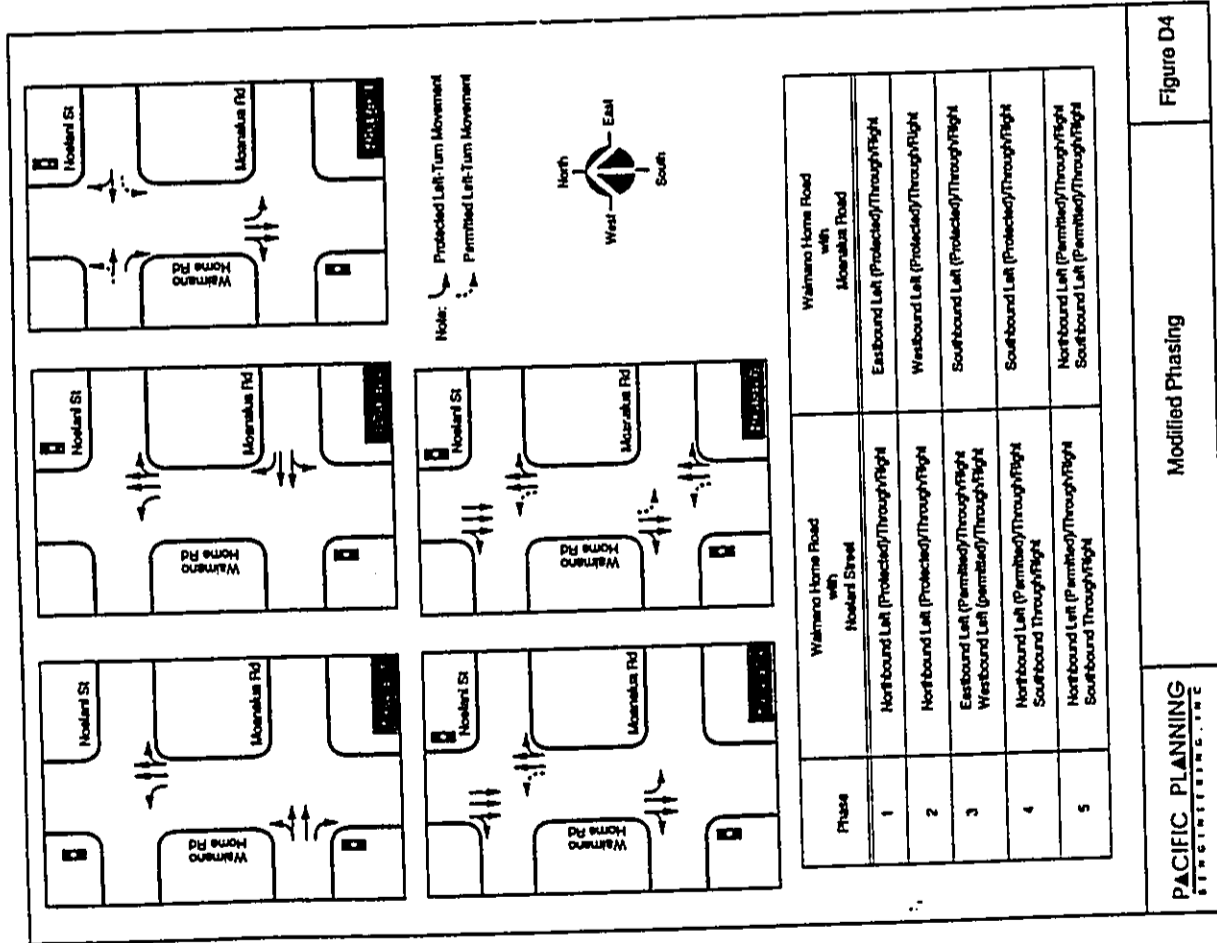


Levels-of-Service

The intersections were analyzed using procedures in the Highway Capacity Manual (HCM), Special Report 209, 1994. The analysis methodology measures traffic operations using the "level-of-service" (LOS) rating, which ranges from A to F. The results are shown in Figure D5.

The results show that the study intersections, with the laneways shown, can accommodate the addition of the Spine Road for the year 2000. However, there will be decreases in LOS for both the north and southbound approaches on Waimano Home Road. This was necessary to "balance" the LOS for each intersection approach.

The existing pedestrian crosswalk across Waimano Home Road at Nociant Street is recommended to be relocated further north in the build-out conditions due to traffic operations. However, in the interim, it is possible to maintain the crosswalk at its present location. The coordination of traffic signals can be maintained with the intersection of Waimano Home Road with Moanalua Road/Spine Road. Therefore, the location of the crosswalk can be maintained in the interim.



3. Addition of a westbound exclusive right-turn lane on Kamehameha Highway.

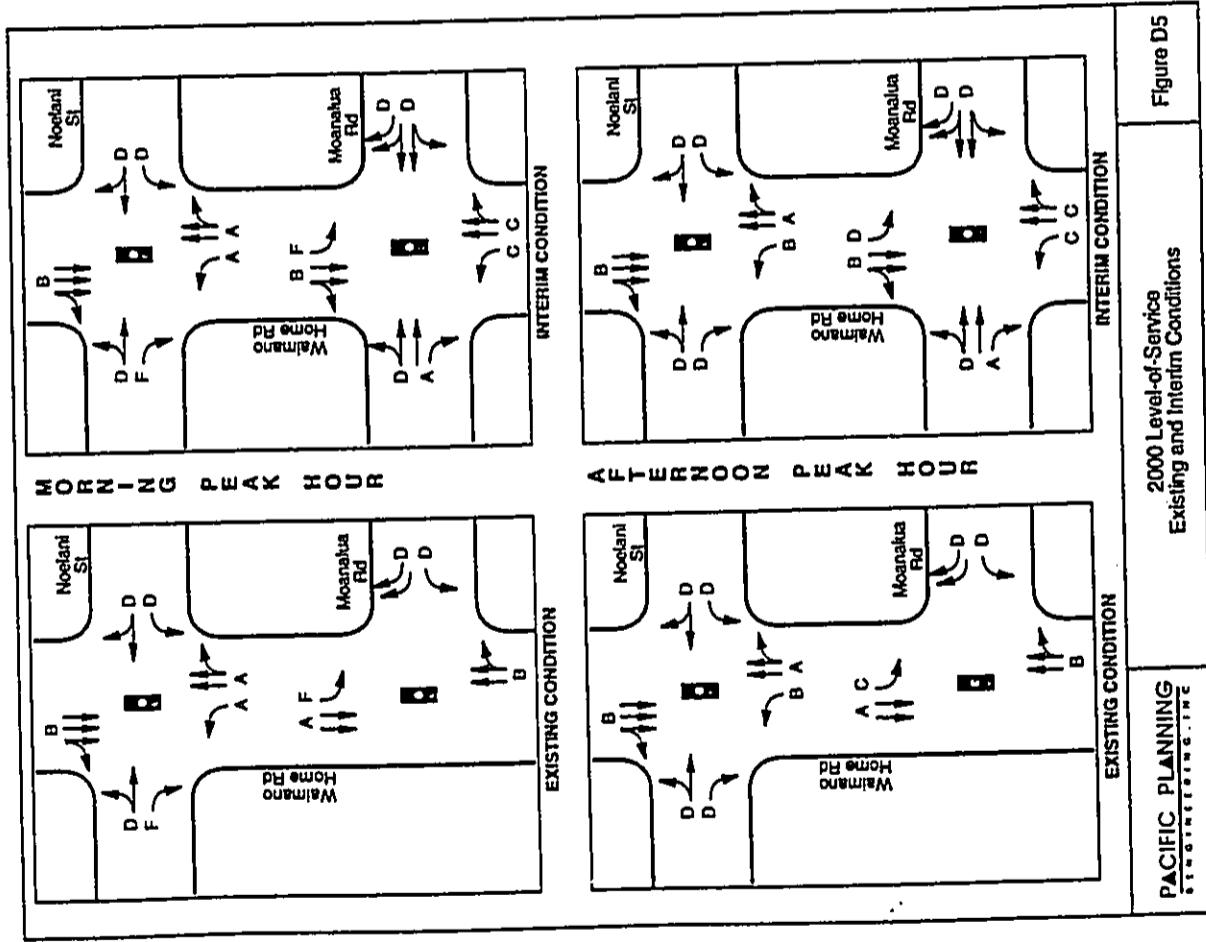
The addition of the City facilities and the Spine Road is expected to have a small impact to the intersection of Kamehameha Highway with Acacia Road. This intersection currently operates under congested conditions and is expected to continue to operate under similar conditions in the year 2000. The addition of a westbound exclusive right-turn lane on Kamehameha Highway as recommended for build-out conditions will improve traffic operations at this intersection. However, the need for this improvement is not required due to the interim project for the following reasons:

First, the trips generated by the facilities are small. Furthermore, these trips are distributed over three access points: Moanalua Road, Waimanu Home Road (Dus Facility) and Kamehameha Highway. The resultant impact of these trips becomes negligible.

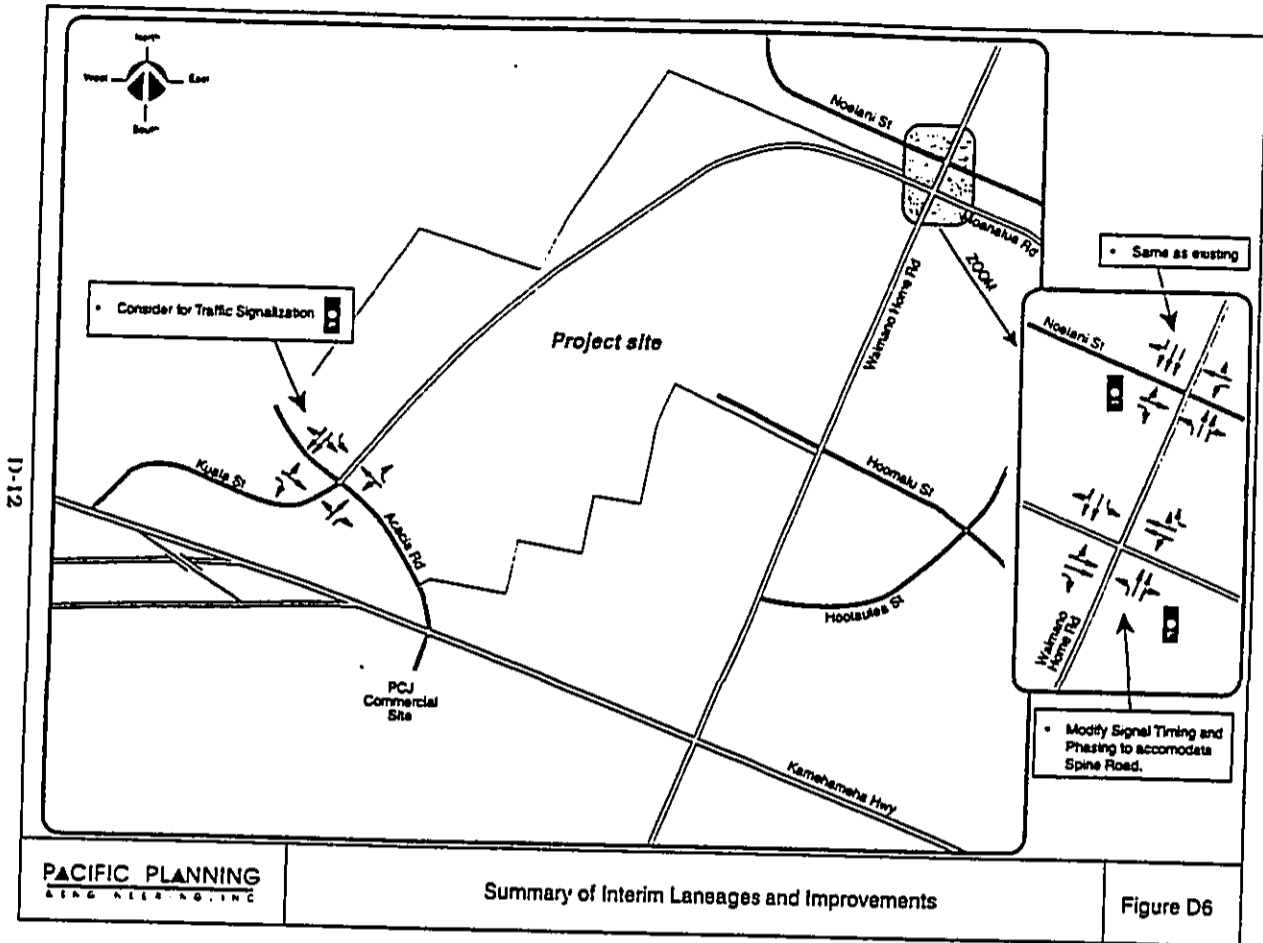
Second, the poor LOS westbound on Kamehameha Highway occurs in the afternoon peak hour. In the afternoon peak hour, most of the facility trips will be exit trips which does not have an impact on the westbound right-turn movement on Kamehameha Highway.

Interim Laneage and Improvements for Year 2000

The study interim condition is for the year 2000 with the assumption that the only completed developments are the City facilities and the Spine Road (Moanalua Road to Acacia Road) is built to provide access to the site. Figure D6 shows the interim laneages and improvements.



PACIFIC PLANNING CONSULTING, INC. 2000 Level-of-Service Existing and Interim Conditions Figure D5



PACIFIC PLANNING
ENGINEERING INC.

Summary of Interim Laneages and Improvements

Figure D6

APPENDIX B
ACOUSTICAL ASSESSMENT

CONTENTS

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Project No. 98-15A

ENVIRONMENTAL NOISE ASSESSMENT STUDY
MANANA SPINE ROAD
PEARL CITY, OAHU, HAWAII

Table

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July, 1998

Prepared for
PLANNING SOLUTIONS
Honolulu, Hawaii

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PAGE:

1.0 SUMMARY

- 1.1 The potential noise impacts due to the proposed Spine Road project, which involves two alternate alignments, were investigated.
- 1.2 Noise sensitive areas which could be impacted by the proposed project include the existing residences along Hooli Circle and Noelani Street that abut the new road's right-of-way. These areas currently experience ambient noise levels ranging from 32 to 54 dBA.
- 1.3 Traffic noise mitigation is recommended to meet the Federal Highway Administration's noise standards and the Hawaii State Department of Transportation, Highways Division's noise policy.
- 1.4 Noise from project construction activities should be relatively short-term, occur during the daytime hours, and must comply with State noise regulations.

2.0 PROJECT DESCRIPTION

The proposed project involves the construction of the Spine Road and Connector Road in Pearl City, Oahu, Hawaii. Two alternate alignments were considered for the Spine Road. Alternate Alignment 1 will extend from Waimano Home Road, opposite Moanalua Road, to Acacia Road, and Alternate Alignment 2 will extend from Waimano Home Road to Kanehameha Highway (see Figures 2-1 and 2-8 in the environmental assessment). In both cases, in addition to through traffic, the new Spine Road will be used for vehicular access to and from the proposed future property developments in Manana, e.g., family entertainment center, park, etc. The new Connector Road, will extend from the new Spine Road to the Cane Haul Road of Manana Community.

The currently designed right-of-way (ROW) for the Spine Road is 92 feet. This entails four, 11-foot wide traffic through lanes, one, 16-foot wide median for a left turn/storage lane, two, six-foot wide bike lanes, and two, eight-foot wide walkways. The proposed posted speed limit for this roadway is 25 mph. The Connector Road is proposed as a two-lane, 60-foot ROW roadway with the same posted speed limit as the Spine Road's.

3.0 NOISE STANDARDS AND GUIDELINES

Various local and federal agencies have established guidelines and standards for assessing environmental noise impacts and set noise limits as a function of land use. A brief description of common acoustic terminology used in these guidelines and standards is presented in Appendix A.

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PAGE 1

3.1 U.S. Federal Highway Administration

The Federal Highway Administration (FHWA) has developed noise abatement criteria in its regulation which constitute the noise standards mandated by 23 U.S.C. 109(i) (Reference 1). The noise abatement criteria is comprised of four land use categories and corresponding maximum hourly equivalent sound levels, L_{eq} , as listed in Table 1. The FHWA noise standards are applicable to Federal or Federal-aid highway project. According to the noise standards, traffic noise impacts "occur when the predicted traffic noise levels approach or exceed the noise abatement criteria (Table 1), or when the predicted traffic noise levels substantially exceed the existing noise level." Furthermore, "all highway projects which are developed in conformance with this regulation shall be deemed in conformance with the Federal Highway Administration (FHWA) noise standards."

3.2 State Department of Transportation, Highways Division

The State Department of Transportation, Highways Division (HDOT) has adopted FHWA's design goals for traffic noise exposure (Section 3.1) in its noise analysis and abatement policy (Reference 2). The policy further defines "approach" the noise abatement criteria (NAC) as being at least 1 dB less than the NAC and "substantially exceed the existing noise levels" as being at least 15 dB.

3.3 U.S. Environmental Protection Agency

The U.S. Environmental Protection Agency (EPA) has identified a range of yearly day-night equivalent sound levels, L_{dn} , sufficient to protect public health and welfare from the effects of environmental noise (Reference 3). The EPA has established a goal to reduce exterior environmental noise to an L_{dn} not exceeding 65 dBA and a future goal to further reduce exterior environmental noise to an L_{dn} not exceeding 55 dBA. Additionally, the EPA states that these goals are not intended as regulations as it has no authority to regulate noise levels, but rather they are intended to be viewed as levels below which the general population will not be at risk from any of the identified effects of noise.

4.0 EXISTING ACOUSTICAL ENVIRONMENT

Ambient noise measurements in the vicinity of the project site were conducted on April 21, 1998, June 17, 1998 and July 17, 1998 in order to assess the existing acoustical environment. The measurement locations are shown in Figure 3-6 of the draft environmental assessment. The measurements were obtained using Larson-Davis Laboratories, Models 700 and 820, Sound Level Meters. The results are expressed in terms of the equivalent continuous noise level, L_{eq} , and in units of A-weighted decibels (dBA). Appendix A provides a brief description of A-weighted sound levels and

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PAGE 2

statistical noise levels commonly used to describe environmental noise.

Fifteen-minute measurements were taken at Locations 1 and 4 on April 21 and July 17, 1998. For Locations 5 and 6, 24-hour measurements were taken and hourly L_{eq} were recorded starting from about 9:00 a.m. on Wednesday, June 17, 1998. Referring to the measurement locations shown in Figure 3-6 of the Draft EA, the following sound levels were measured:

| Measurement Location | L_{eq} (dBA) |
|----------------------|--|
| 1 | 54 |
| 2 | 50 |
| 3 | 71 |
| 4 | 51 |
| 5 | 36 to 44 (between 5:00 a.m. and 10:00 p.m.)
32 to 38 (between 10:00 p.m. and 5:00 a.m.) |
| 6 | 49 to 57 (between 5:00 a.m. and 10:00 p.m.)
41 to 48 (between 10:00 p.m. and 5:00 a.m.) |

Identifiable noise sources at the above locations during the measurement sessions included traffic on local roads, occasional aircraft flyovers, birds, and wind in foliage.

5.0 POTENTIAL NOISE IMPACT DUE TO THE PROJECT AND NOISE MITIGATION

5.1 Traffic Noise

5.1.1 Alternate Alignment 1

The FHWA Traffic Noise Prediction Model (Reference 4) and the predicted traffic volumes (Reference 5) were used to calculate traffic noise level changes, with and without project, along existing roadways in the vicinity of the project. The changes were predicted for morning and afternoon peak traffic hours. The results, as summarized in Table 2, indicate traffic noise level decreases along Waimano Home Road and Kamehameha Highway and an increase of less than 2 dB for Moanalua Road as a result of the project. A traffic noise level increase of less than 3 dB is below the threshold change in noise level that is perceptible to most people with normal hearing and is not considered to be significant.

Existing noise sensitive areas which could be impacted by the proposed roadway include the residences on Noelani Street and Howli Circle that are adjacent to the new Spine Road's and Connector Road's ROW. In

accordance with FHWA's recommended L_{eq} s, as presented in Table 1, an exterior hourly L_{eq} of 67 dBA is applicable to these potentially impacted residences. Using the FHWA Traffic Noise Prediction Model and the traffic flow data provided by others (Reference 5), predicted distances from the edge of the new roadways to the 67 dBA level were calculated as follows:

A. Along Spine Road

1. Between Moanalua Road & Connector Road - 30 feet
2. Between Connector Road & Acacia Road - 30 feet

B. Along Connector Road - 18 feet

It should be noted that the effects of terrain and roadway elevation and any noise shielding afforded by man made structures were not included in the calculations. In addition, vehicle speed of 30 mph and truck mix percentages of 2% for medium trucks (MT) and 1% for heavy trucks (HT) were assumed for the Spine Road in the analysis. For the Connector Road, 1% MT, 0.5% HT and vehicle speed of 30 mph were used.

Even though the results indicate FHWA's noise criteria can be met for the existing residences adjacent to the new roadways, a unique condition exists for these residences. Presently, these homes experience relatively low ambient noise levels (measured hourly L_{eq} s of 32 to 44 dBA) due to the lack of any major through roadways in the area. Background noise level increases greater than or equal to 15 dB are estimated for those residences that are within 30 feet of Spine Road and 18 feet of Connector Road. According to the HDOT Noise Analysis and Abatement Policy (Reference 2), such a substantial increase in noise levels means traffic noise impact has occurred and noise abatement measures should be considered.

Possible noise mitigative measures for the existing residences near the roadway include:

- a) Strictly enforcing the posted speed limit of 25 mph that is currently proposed for the roadways;
- b) Constructing roadside noise barriers, i.e., walls, earthen berms, or a combination of both; and
- c) Altering the alignment to reduce noise level increases; or

d) Providing air-conditioning for the impacted dwellings.

5.1.2 Alternate Alignment 2

With Alternate Alignment 2, the traffic noise impacts and recommended noise mitigative measures for the existing residences along Hooli Circle and Noelani Street, as discussed above remain unchanged. The residences of the Kauhale Manana Subdivision, which is located east of the alignment and abuts the Pearl City Elementary School, however, will not be impacted by the proposed project. Based on an estimated distance of 1,000 feet from the alignment to the nearest residences of this subdivision and the same truck mix percentages assumed for Alternate Alignment 1, future traffic noise level at these residences were calculated to be less than 53 dBA for vehicle speed of 30 mph. Thus, noise mitigation is not required according to both FHWA and HDOT noise standards.

It can be seen from the above results that both alternatives yield the same effects in terms of the number of existing residences adjacent to the new roadways that would be impacted by project generated traffic noise.

5.2 Construction Noise

Development of the project will involve excavation, grading and the construction of infrastructure and buildings. The various construction phases of the project may generate significant amounts of noise, which may impact nearby residential areas. The actual noise levels produced will be a function of the methods employed during each stage of the construction process. Typical ranges of construction equipment noise are shown in the attached graphic. Earthmoving equipment, e.g., bulldozers and diesel-powered trucks, will probably be the loudest equipment used during construction.

In cases where construction noise exceeds, or is expected to exceed the State Department of Health's (DOH) "maximum permissible" property line noise levels (Reference 6), a permit must be obtained from the DOH to allow the operation of vehicles, construction equipment, power tools, etc., which emit noise levels in excess of "maximum permissible" levels. Specific permit restrictions for construction activities are:

"No permit shall allow any construction activities which emit noise in excess of the maximum permissible sound levels...before 7:00 am and after 6:00 p.m. of the same day, Monday through Friday."

"No permit shall allow any construction activities which emit

noise in excess of the maximum permissible sound levels...before 9:00 am and after 6:00 p.m. on Saturday."

"No permit shall allow any construction activities which emit noise in excess of the maximum permissible sound levels on Sundays and on holidays."

In addition, construction equipment and on-site vehicles or devices whose operations involve the exhausting of gas or air, excluding pile hammers and pneumatic hand tools weighing less than 15 pounds, must be equipped with mufflers, and construction vehicles using traffic-way must satisfy the DOH's vehicular noise requirements (Reference 7).

TABLE I

FHWA RECOMMENDED EQUIVALENT HOURLY SOUND LEVEL, $L_{eq,1h}$, BASED ON LAND USE

| Activity Category | $L_{eq,1h}$ in dBA | Description of Activity Category |
|-------------------|--------------------|---|
| A | 57 (Exterior) | Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose. |
| B | 67 (Exterior) | Picnic areas, recreation areas, playgrounds, active sport areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals. |
| C | 72 (Exterior) | Developed lands, properties, or activities not included in Categories A or B above. |
| D | — | Undeveloped lands. |
| E | 52 (Interior) | Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums. |

REFERENCES:

1. Department of Transportation, *Federal Highway Administration Procedures for Abatement of Highway Traffic Noise*, Title 23, CFR, Chapter I, Subchapter J, Part 772.38 FR 15953, June 19, 1973; Revised at 47 FR 29654, July 8, 1982.
2. *Noise Analysis and Abatement Policy*, Department of Transportation, Highways Division, State of Hawaii, June 1997.
3. *Toward a National Strategy for Noise Control*, U.S. Environmental Protection Agency, April 1977.
4. *FHWA Highway Traffic Noise Prediction Model*, FHWA-RD-77-108; U.S. Department of Transportation, December 1978.
5. Traffic Data Received from Pacific Planning Engineering Inc., July 13, 1998.
6. *Chapter 46 - Community Noise Control*, Department of Health, State of Hawaii, Administrative Rules, Title 11, September 23, 1996.
7. *Chapter 42 - Vehicular Noise Control for Oahu*, Department of Health, State of Hawaii, Administrative Rules, Title 11, November 6, 1981.

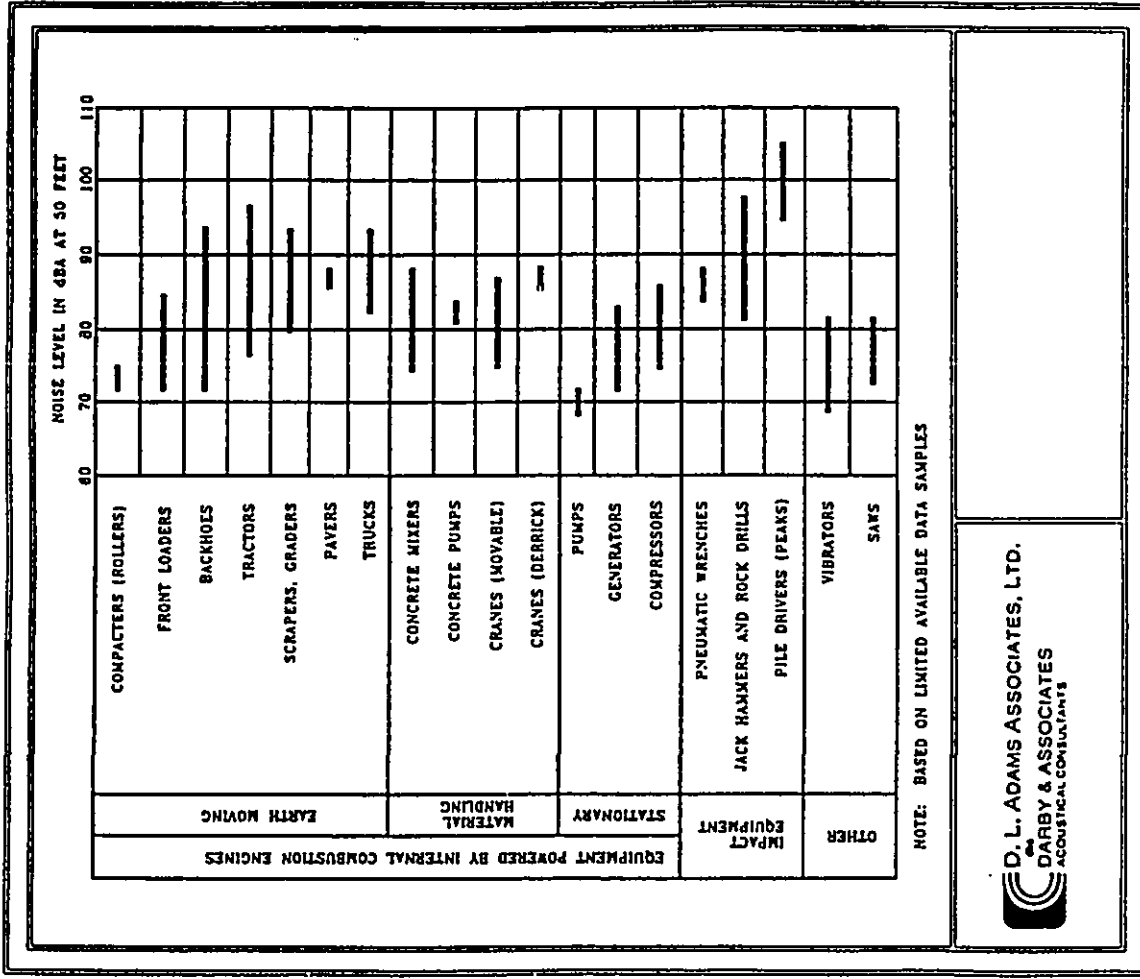
TABLE 2

PREDICTED FUTURE TRAFFIC NOISE LEVEL (L_{eq} in dBA)
CHANGES DURING PEAK TRAFFIC HOURS

| | Roadway | | |
|---|---|---|-----------------|
| | Waimano Home Rd.
(between Hoomalu Sl.
and Moanalua Rd.) | Kamehameha Hwy.
(between Acacia Rd. and
Waimano Home Rd.) | Moanalua
Rd. |
| Future Changes (in dB)
Without Project | | | |
| AM Peak | 0.7 | 0.7 | 0.7 |
| PM Peak | 0.7 | 0.7 | 0.7 |
| Future Changes (in dB)
With Project | | | |
| AM Peak | -0.3 | 0.3 | 1.2 |
| PM Peak | -0.6 | 0.1 | 2.2 |
| Future Changes (in dB)
Due to Project | | | |
| AM Peak | -1.0 | -0.4 | 0.5 |
| PM Peak | -1.3 | -0.6 | 1.5 |

Notes:

- Traffic noise levels were assessed at an arbitrary 50-foot distance from edge of nearest traffic through lane and



Appendix A
Acoustical Terminology (Continued)

APPENDIX A
ACOUSTICAL TERMINOLOGY

Sound Pressure Level

Sound or noise consists of minute fluctuations in atmospheric pressure capable of evoking the sense of hearing. It is measured in terms of decibels (dB) using precision instruments known as sound level meters. Noise is defined as "unwanted" sound.

Technically, sound pressure level (SPL) is defined as:

$$SPL = 20 \log (P/P_{ref}) \text{ dB}$$

where P is the sound pressure fluctuation (above or below atmospheric pressure) and P_{ref} is the reference pressure, 20 micropascals, which is approximately the lowest sound pressure that can be detected by the human ear. For example, if P is 20 micropascals, then $SPL = 0 \text{ dB}$, or if P is 200 micropascals, then $SPL = 20 \text{ dB}$. The relation between sound pressure in micropascals and sound pressure level in decibels (dB) is shown in Figure A-1.

The sound pressure level that results from a combination of noise sources is not the arithmetic sum of the individual sound levels, but rather the logarithmic sum. For example, two sound levels of 50 dB produce a combined level of 53 dB, not 100 dB; two sound levels of 40 and 50 dB produce a combined level of 50.4 dB.

Human sensitivity to changes in sound pressure level is highly individualized. Sensitivity to sound depends on frequency content, time of occurrence, duration, and psychological factors such as emotions and expectations. However, in general, a change of 1 or 2 dB in the level of a sound is difficult for most people to detect. A 3 dB change is commonly taken as the smallest perceptible change and a 5 dB change corresponds to a noticeable change in loudness. A 10 dB increase or decrease in sound level corresponds to an approximate doubling or halving of loudness, respectively.

A-Weighted Sound Level

The human ear is more sensitive to sound in the frequency range of 250 Hertz (Hz) and higher, than in frequencies below 250 Hz. Due to this type of frequency response, a frequency weighting system, was developed to emulate the frequency response of the human ear. This system expresses sound levels in units of A-weighted decibels (dBA). A-weighted sound levels de-emphasizes the low frequency portion of the spectrum of a signal. The A-weighted level of a sound is a good measure of the loudness of that sound. Different sounds having the same A-weighted sound level are perceived as being about equally loud. Typical values of the A-weighted sound level of various noise sources are shown in Figure A-1.

Statistical Sound Levels

The sound levels of long-term noise producing activities, such as traffic movement, aircraft operations, etc., can vary considerably with time. In order to obtain a single number rating of such a noise source, a statistically-based method of expressing sound or noise levels developed. It is known as the Exceedance Level, L_x . The Exceedance Level, L_x , represents the sound level which is exceeded for x% of the measurement time period. For example, $L_{10} = 60 \text{ dBA}$ indicates that for the duration of the measurement period, the sound level exceeded 60 dBA 10% of the time. Commonly used Exceedance Levels include L_1 , L_{10} , L_{50} and L_{90} which are widely used to assess community and environmental noise. Figure A-2 illustrates the relationship between selected statistical noise levels.

Equivalent Sound Level

The Equivalent Sound Level, L_{eq} , represents a constant level of sound having the same total acoustic energy as that contained in the actual time-varying sound being measured over a specific time period. L_{eq} is commonly used to describe community noise, traffic noise, and hearing damage potential. It has units of dBA and is illustrated in Figure A-2.

Day-Night Equivalent Sound Level

The Day-Night Equivalent Sound Level, L_{dn} , is the Equivalent Sound Level, L_{eq} , measured over a 24-hour period. However, a 10 dB penalty is added to the noise levels recorded between 10 pm and 7 am to account for people's higher sensitivity to noise at night when the background noise level is typically lower. The L_{dn} is a commonly used noise descriptor in assessing land use compatibility, and is widely used by federal and local agencies and standards organizations. Qualitative descriptions, as well as local examples of L_{dn} , are shown in Figure A-3.

APPENDIX C
AIR QUALITY ASSESSMENT

AIR QUALITY IMPACT REPORT (AQIR)

**MANAWA REDEVELOPMENT AREA SPINE ROAD
HONOLULU, OAHU, HAWAII**

July 1998

PREPARED FOR:

Planning Solutions, Inc.

PREPARED BY:

J. W. MORROW
Environmental Management Consultant
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Honolulu, Hawaii 96814

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

1. INTRODUCTION

The City & County of Honolulu is proposing to construct a new road in support of its Manana Redevelopment Area at Pearl City on the island of Oahu. Two alternative alignments for this "spine" road are being considered. The first would run along the *ewa* (western) side of the property starting in the northeast at the junction of Moanalua Road and Waimano Home Road and terminating at Acacia road in the southwest. The second alternative would start at the same point but would pass through the middle of the Manana site and proceed directly to the existing Kamehameha Highway intersection with Acacia Road. In this alternative, Acacia Road would also be realigned to run directly into the new spine road instead of Kamehameha Highway (Figure 1).

The purpose of this report is to assess the impact of this proposed road development on air quality on a local and regional scale. The overall project can be considered an "indirect source" of air pollution as defined in the federal Clean Air Act¹ since its primary association with air quality is its inherent attraction for mobile sources, i.e., motor vehicles. Much of the focus of this analysis, therefore, is on the project's ability to generate traffic and the resultant impact on air quality. Air quality impact was evaluated for existing (1998) and future (2020) conditions with and without the proposed road.

Finally, construction-related emissions will be generated *on-site* due to vehicular movement, grading, and general dust-generating as well as *off-site* due to concrete and asphalt batching. These impacts have also been addressed.

2. AIR QUALITY STANDARDS

A summary of State of Hawaii and national ambient air quality standards is presented in Table 1.2. Note that Hawaii's standards are not divided into primary and secondary standards as are the federal standards.

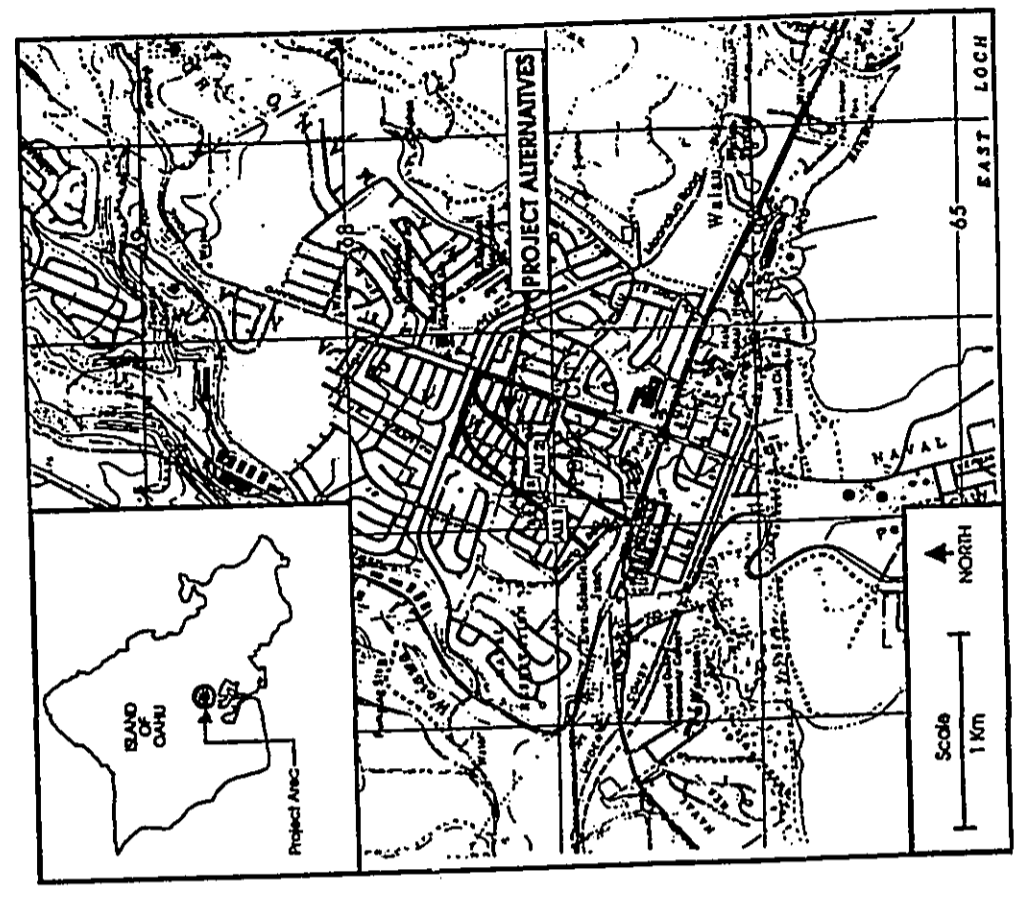
Primary standards are intended to protect public health with an adequate margin of safety while secondary standards are intended to protect public welfare through the prevention of damage to soils, water, vegetation, man-made materials, animals, wildlife, visibility, climate, and economic values³.

Some of Hawaii's standards (CO, NO₂, and O₃) are clearly more stringent than their federal counterparts but, like their federal counterparts, may be exceeded once per year. In the case of the automotive pollutants [carbon monoxide (CO), nitrogen dioxide (NO₂), and ozone (O₃)], there are only primary standards.

Until 1983, there was also a hydrocarbons standard which was based on the precursor role hydrocarbons play in the formation of photochemical oxidants rather than on any unique toxicological effect they had at ambient levels. The hydrocarbons standard was formally eliminated in January 1983⁴.

The U.S. Environmental Protection Agency (EPA) is mandated by Congress to periodically review and re-evaluate the federal standards in light of new research findings⁵. The latest review resulted in an

FIGURE 1 PROJECT LOCATION



EPA proposal to tighten the ozone standard from 235 to 160 micrograms/cubic meter (ug/m³) and also implement PM₁₀ standards for particulate matter⁶. The carbon monoxide (CO), sulfur dioxide (SO₂), and nitrogen dioxide (NO₂) standards have been reviewed in the past, but no new standards have been proposed.

Finally, the State of Hawaii also has fugitive dust regulations for particulate matter (PM) emanating from construction activities⁷. There simply can be no visible emissions from fugitive dust sources.

3. EXISTING AIR QUALITY

3.1 General. The State Department of Health (DOH) maintains a limited network of air monitoring stations around the State to gather data on the following regulated pollutants:

- particulate matter ≤ 10 microns (PM₁₀)
- total suspended particulate matter (TSP)
- sulfur dioxide (SO₂)
- nitrogen dioxide (NO₂)
- carbon monoxide (CO)
- ozone (O₃)
- lead (Pb)

In the case of PM₁₀, measurements are made on a 24-hour basis to correspond with the averaging period specified in state and federal standards. Samples are collected once every six days in accordance with U.S. Environmental Protection Agency (EPA) guidelines. Carbon monoxide, sulfur dioxide, and ozone, however, are measured on a continuous basis due to their short-term (1- and 3-, and 8-hour) standards. Nitrogen dioxide is measured with continuous instruments and averaged over a full year to correspond to its annual standards. Lead concentrations are determined from particulate matter (TSP) samples.

3.2 Department of Health Monitoring. The DOH monitoring station nearest to the project site is located at the Leeward Medical center on Fourth Street in Pearl City. Only PM₁₀ is monitored at this site. A summary of the most recent published air quality data from that station and the nearest other stations measuring pollutants not monitored at Pearl City is presented in Table 2.

3.3 Onsite Carbon Monoxide Sampling. In conjunction with this project, air sampling was conducted on the east (west) side of the Moanaha Road - Waimano Home Road intersection. A continuous carbon monoxide (CO) instrument was set up and operated during the a.m. and p.m. peak traffic hours. An anemometer and vane were also installed to record onsite surface winds during the air sampling period. A simultaneous manual count of traffic was performed. The variability of each of the parameters measured during the peak hours is clearly seen in Figures 3 and 4.

Weather conditions during the morning of 29 May 1998 were characterized by mostly cloudy skies and light northwesterly winds (about 1 mph) which changed to northeasterly trade winds shortly before 8:00 a.m. Total traffic along the segment of Waimano Home Road fronting the sampling site was

TABLE 1
SUMMARY OF STATE OF HAWAII AND FEDERAL
AMBIENT AIR QUALITY STANDARDS

| POLLUTANT | SAMPLING PERIOD | HAWAIIAN STATE STANDARDS | | FEDERAL STANDARDS | |
|------------------|------------------|--------------------------|-----------|-------------------|-----------|
| | | PRIMARY | SECONDARY | PRIMARY | SECONDARY |
| PM ₁₀ | Annual | 50 | 50 | 50 | 50 |
| | 24-hr | 150 | 150 | 150 | 150 |
| SO ₂ | Annual | 80 | — | — | 80 |
| | 24-hr | 365 | — | — | 365 |
| | 3-hr | — | 1,300 | — | 1,300 |
| NO ₂ | Annual | 100 | — | — | 70 |
| | 8-hr | 10 | — | — | 5 |
| CO | 1-hr | 40 | — | — | 10 |
| | 1-hr | 235 | — | — | 100 |
| H ₂ S | 1-hr | — | — | — | 35 |
| Pb | Calendar Quarter | 1.5 | — | — | 1.5 |

KEY: NAAQS - national ambient air quality standards
 PM₁₀ - particulate matter ≤ 10 microns
 SO₂ - sulfur dioxide
 NO₂ - nitrogen dioxide
 CO - carbon monoxide
 O₃ - ozone
 H₂S - hydrogen sulfide
 Pb - lead

All concentrations in micrograms per cubic meter (ug/m³) except CO which is in milligrams per cubic meter.

comparable to the a.m. peak hour volume found in a project-related traffic study⁵. The effects of wind direction were clearly demonstrated in the CO data collected. The northwesterly winds during most of the peak traffic hour put the sampling site *upwind* of the roadway and thus CO levels were very low, i.e., less than 1 mg/m³. However, as soon as the winds shifted to the normal trade wind direction, CO concentrations increased markedly, although they were still below State and federal standards (see Table 1). See Figure 3.

On that same afternoon skies continued to be overcast with northeasterly winds averaging about 6 mph. Total traffic was about 90% of the existing a.m. volume reported in the aforementioned traffic study⁵. The CO level was higher than the a.m., averaging 2.5 mg/m³, due primarily to the steadier wind direction, and despite the lower traffic volume. Again, measured concentrations were below State and federal standards (Table 1). See Figure 4.

3.4 Modeled Carbon Monoxide Concentrations. Existing carbon monoxide concentrations in the vicinity of major intersections which will be affected by the proposed new road were also estimated using U.S. EPA recommended computer modeling methods. The results were comparable to the onsite measurements and the DOH historical data at other sites. The methods and results are discussed in detail in Section 6.

4. CLIMATE AND METEOROLOGY

4.1 Temperature and Rainfall. Temperatures in the project area are expected to be similar to those found elsewhere in Hawaii. The nearest long-term weather station operated by the National Weather Service is located at the Honolulu International Airport some six miles southeast of the project site. Data from that station indicate that the range of temperatures is only about eight (8) degrees between the warmest months (August and September) and the coolest months (January and February). As an annual average, the day/night variation is about 14 degrees. Daily maxima range from the low 80's in the winter to the high 80's in the summer. Daily minima ranged from the mid-60's to the low 70's. The historical high at the airport is 95 degrees while the low is 53¹⁸.

Historical data from the National Weather Service at Honolulu International Airport indicate that annual rainfall on the leeward side of Oahu averages 22.0 inches¹⁸. In accordance with Thornthwaite's scheme for climatic classification¹¹, the area would therefore be considered semi-arid with a precipitation/evaporation (P/E) Index = 26.9.

4.2 Surface Winds. Meteorological data records were reviewed from the Honolulu International Airport and Hickam Air Force Base. The annual prevalence of northeasterly trade winds is clearly shown in Table 3. A closer examination of the data, however, indicates that low velocities (less than 10 mph) occur frequently and that the "normal" northeasterly trade winds tend to break down in the Fall giving way to more light, variable wind conditions through the Winter and on into early Spring. It is during these times that Honolulu generally experiences elevated pollutant levels. This seasonal difference in wind conditions can be easily contrasted by comparing August and January wind roses (Figures 5 and 6).

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TABLE 2
AIR QUALITY DATA
DEPARTMENT OF HEALTH MONITORING SITES
1996

| Pollutant | Concentration (µg/m ³) |
|---|------------------------------------|
| Particulate matter ≤ 10 microns (PM ₁₀) | 26 |
| 24-hr (max) Annual | 14 |
| Sulfur dioxide (SO ₂) | 73 |
| 3-hr (max) | 18 |
| 24-hr (max) Annual | 3 |
| Carbon monoxide (CO) | 4,509 |
| 1-hr (max) | 2,127 |
| 8-hr (max) Annual | 936 |
| Ozone (O ₃) | 92 |
| 1-hr (max) Annual | 27 |
| Nitrogen dioxide (NO ₂) | 2 |
| Annual | |
| Lead (Pb) | 0.0 |
| Quarterly (max) Annual | 0.0 |

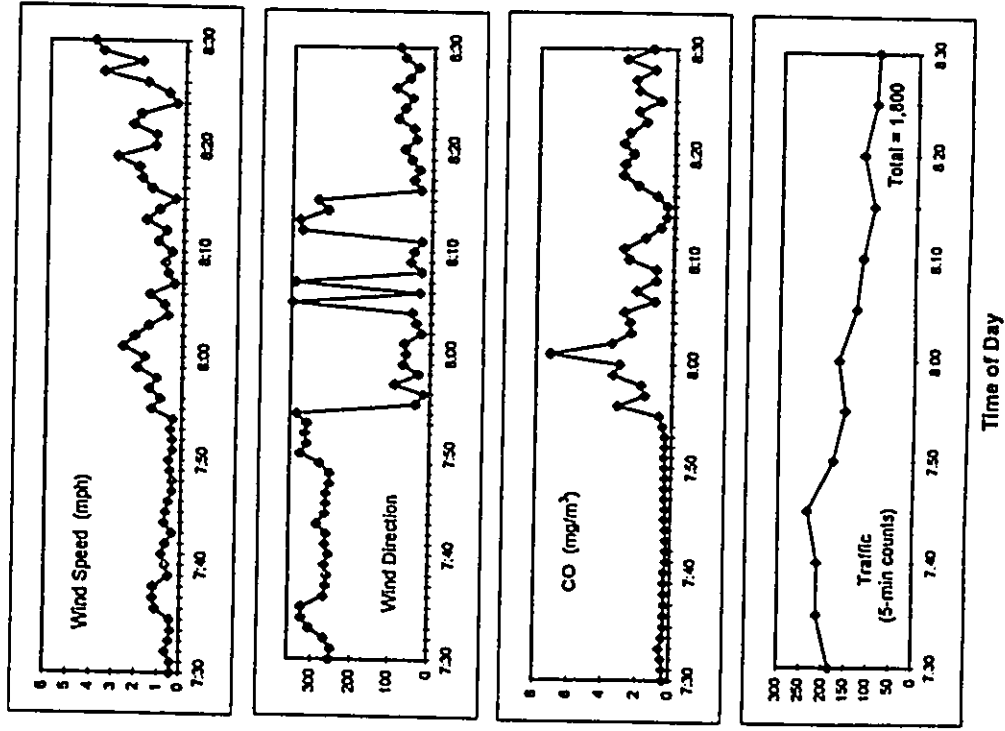
Notes: 1. PM₁₀ data are from the Pearl City site.
2. CO, SO₂, and Pb are from the DOH building in downtown Honolulu.
3. O₃ data are from the Sand Island site.
4. NO₂ data are from the Kapolei site.

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FIGURE 2

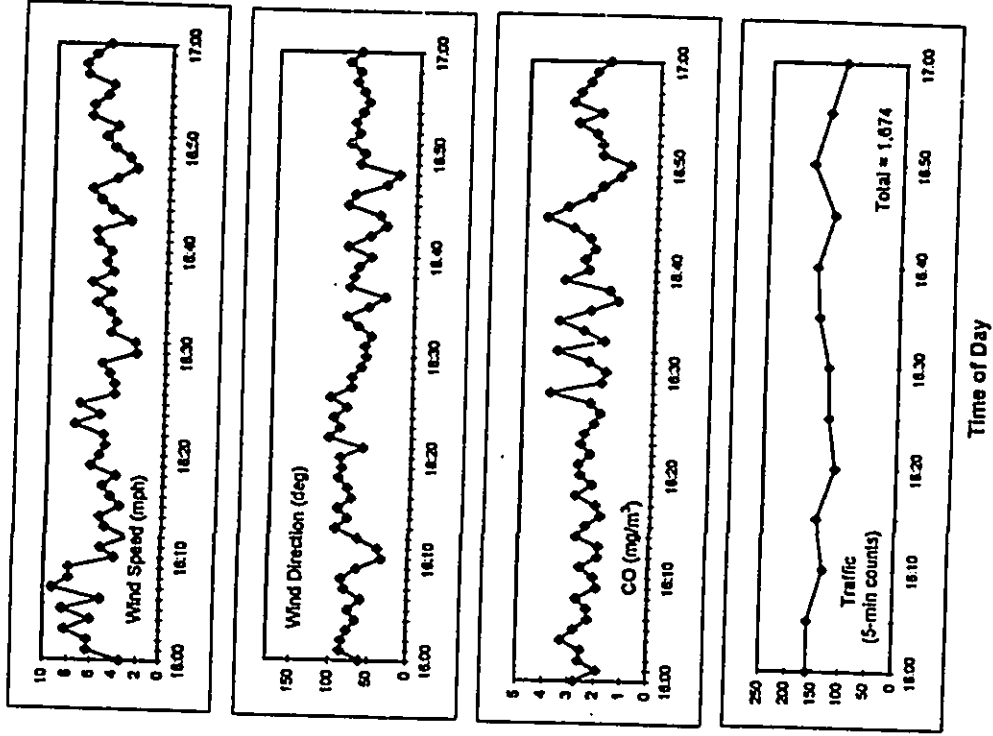
A.M. PEAK HOUR CONDITIONS
MOANALUA ROAD AT WAIMANO HOME ROAD
29 MAY 1998



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FIGURE 3

P.M. PEAK HOUR CONDITIONS
MOANALUA ROAD AT WAIMANO HOME ROAD
29 MAY 1998



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MOANALUA ROAD AT WAIMANO HOME ROAD

Because this study focused on peak traffic hours, a special analysis of wind data during a.m. and p.m. peak hours was also conducted to identify prevailing directions and speeds. Twelve months of hourly weather data were collected and reviewed for that purpose. A summary of the results of that analysis is presented in Table 4.

Of particular interest from an air pollution standpoint were the stability wind roses prepared for Hickam Air Force Base ¹⁵. These data indicated that stable conditions, i.e., Pasquill-Gifford stability categories E and F ¹⁵, occur about 28% of the time on an annual basis and 36% of the time during the peak winter month (January). Our own more recent analysis of five years of meteorological data from the Honolulu International Airport (1987 - 91) revealed a 32.7% annual frequency of E and F stabilities. It is under such conditions that the greatest potential for air pollutant buildup from groundlevel sources, e.g., motor vehicles, exists.

5. SHORT-TERM IMPACTS

5.1 Onsite Impacts. The principal source of short-term air quality impact will be construction activity. Construction vehicle activity may increase automotive pollutant concentrations along the existing streets as well as on the project site itself. Most of the non-signalized intersections in the area are currently operating at good levels of service (LOS), i.e., "A" to "C" during the peak hours and at higher levels during offpeak hours and thus should be able to accommodate the temporary construction-related traffic. The larger intersections, however, are experiencing LOS as low as "F" during peak hours and would be further exacerbated by additional traffic.

The site preparation and earth moving will create particulate emissions as will construction of the buildings. Construction vehicle movement on unpaved on-site areas will also generate particulate emissions. EPA studies on fugitive dust emissions from construction sites indicate that about 1.2 tons/acre per month of activity may be expected under conditions of medium activity, moderate soil silt content (30%), and a precipitation/evaporation (P/E) index of 50 ^{16,17}. If the full length of the proposed road was under construction, that rate would equate to approximately 9.8 tons per month, 0.49 ton per day based on a 5-day work week, and 15 pounds per acre per hour based on an 8-hour work day.

Onsite soils are predominantly silty clay loams which suggests silt content of about 55% ¹⁸, significantly greater than the "moderate" silt content cited above. In conjunction with the semi-arid local climate (P/E Index = 26.9), this suggests a potential for greater fugitive dust emissions than estimated by the EPA. With the following "worst-case" adjustments for soil and climate, the revised emission rates becomes:

$$55/30 \times 50/26.9 \times 9.8 = 33.2 \text{ T/mo or } 51 \text{ lb/acre per hour}$$

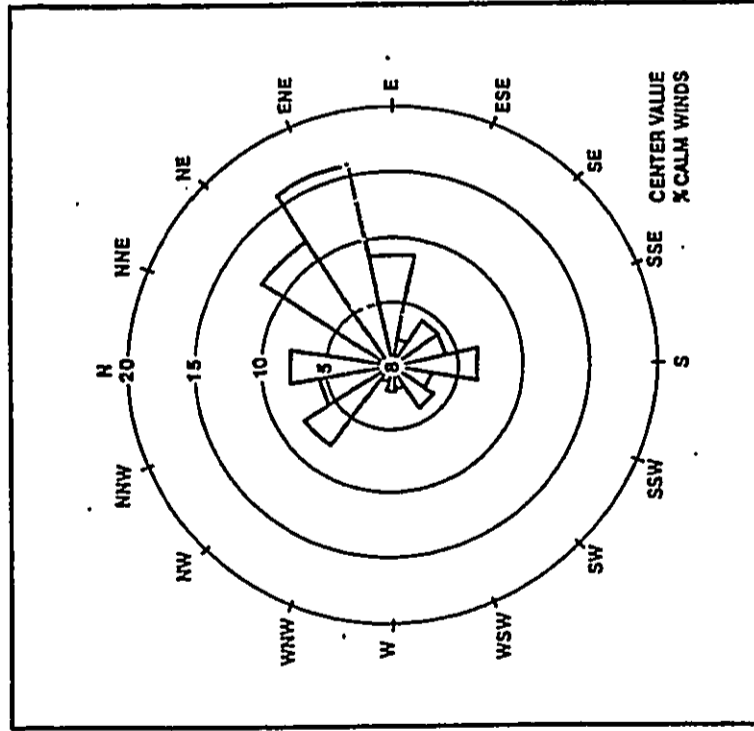
Using this adjusted emission rate, the EPA guideline dispersion model, ISC3 ^{16, 17}, and one year of Honolulu meteorological data, an analysis was conducted to estimate the particulate matter impacts in the surrounding area. Eight-hour concentrations were computed, mathematically combined with

TABLE 3
ANNUAL JOINT FREQUENCY DISTRIBUTION
OF WIND SPEED AND DIRECTION
HONOLULU INTERNATIONAL AIRPORT

| Dir. (deg) | Wind Speed (m/sec) | | | | | | Δf |
|------------|--------------------|--------|--------|--------|--------|--------|--------|
| | ≤ 3.1 | ≤ 4.5 | ≤ 5.8 | ≤ 7.2 | ≤ 8.5 | ≥ 9.5 | |
| 10 | 0.0065 | 0.0038 | 0.0023 | 0.0016 | 0.0009 | 0.0001 | 0.0151 |
| 20 | 0.0082 | 0.0041 | 0.0025 | 0.0023 | 0.0011 | 0.0001 | 0.0183 |
| 30 | 0.0100 | 0.0061 | 0.0051 | 0.0038 | 0.0028 | 0.0007 | 0.0286 |
| 40 | 0.0188 | 0.0157 | 0.0258 | 0.0222 | 0.0174 | 0.0040 | 0.1039 |
| 50 | 0.0288 | 0.0290 | 0.0449 | 0.0385 | 0.0307 | 0.0054 | 0.1762 |
| 60 | 0.0344 | 0.0289 | 0.0436 | 0.0273 | 0.0238 | 0.0041 | 0.1621 |
| 70 | 0.0250 | 0.0181 | 0.0197 | 0.0122 | 0.0096 | 0.0008 | 0.0855 |
| 80 | 0.0113 | 0.0081 | 0.0065 | 0.0039 | 0.0009 | 0.0003 | 0.0310 |
| 90 | 0.0073 | 0.0040 | 0.0040 | 0.0009 | 0.0008 | 0.0000 | 0.0179 |
| 100 | 0.0031 | 0.0016 | 0.0014 | 0.0006 | 0.0002 | 0.0000 | 0.0068 |
| 110 | 0.0027 | 0.0019 | 0.0010 | 0.0007 | 0.0005 | 0.0001 | 0.0069 |
| 120 | 0.0027 | 0.0013 | 0.0019 | 0.0009 | 0.0003 | 0.0003 | 0.0075 |
| 130 | 0.0022 | 0.0032 | 0.0018 | 0.0015 | 0.0007 | 0.0002 | 0.0098 |
| 140 | 0.0034 | 0.0033 | 0.0039 | 0.0018 | 0.0011 | 0.0006 | 0.0141 |
| 150 | 0.0022 | 0.0030 | 0.0019 | 0.0003 | 0.0002 | 0.0005 | 0.0081 |
| 160 | 0.0024 | 0.0033 | 0.0023 | 0.0010 | 0.0005 | 0.0000 | 0.0094 |
| 170 | 0.0031 | 0.0046 | 0.0023 | 0.0007 | 0.0003 | 0.0000 | 0.0109 |
| 180 | 0.0055 | 0.0042 | 0.0018 | 0.0008 | 0.0005 | 0.0000 | 0.0128 |
| 180 | 0.0065 | 0.0038 | 0.0013 | 0.0002 | 0.0000 | 0.0000 | 0.0117 |
| 200 | 0.0057 | 0.0032 | 0.0011 | 0.0001 | 0.0000 | 0.0000 | 0.0101 |
| 210 | 0.0076 | 0.0038 | 0.0016 | 0.0001 | 0.0000 | 0.0000 | 0.0131 |
| 220 | 0.0083 | 0.0077 | 0.0016 | 0.0001 | 0.0001 | 0.0000 | 0.0179 |
| 230 | 0.0078 | 0.0049 | 0.0014 | 0.0001 | 0.0001 | 0.0000 | 0.0141 |
| 240 | 0.0042 | 0.0018 | 0.0013 | 0.0000 | 0.0000 | 0.0000 | 0.0071 |
| 250 | 0.0040 | 0.0010 | 0.0003 | 0.0000 | 0.0000 | 0.0000 | 0.0054 |
| 260 | 0.0084 | 0.0023 | 0.0005 | 0.0000 | 0.0000 | 0.0000 | 0.0091 |
| 270 | 0.0065 | 0.0010 | 0.0005 | 0.0002 | 0.0000 | 0.0000 | 0.0082 |
| 280 | 0.0099 | 0.0005 | 0.0002 | 0.0000 | 0.0000 | 0.0000 | 0.0106 |
| 280 | 0.0123 | 0.0003 | 0.0002 | 0.0001 | 0.0000 | 0.0000 | 0.0130 |
| 300 | 0.0167 | 0.0018 | 0.0011 | 0.0000 | 0.0000 | 0.0000 | 0.0197 |
| 310 | 0.0235 | 0.0022 | 0.0015 | 0.0001 | 0.0000 | 0.0000 | 0.0272 |
| 320 | 0.0200 | 0.0022 | 0.0013 | 0.0006 | 0.0001 | 0.0000 | 0.0241 |
| 330 | 0.0121 | 0.0023 | 0.0011 | 0.0005 | 0.0000 | 0.0000 | 0.0159 |
| 340 | 0.0094 | 0.0010 | 0.0003 | 0.0001 | 0.0000 | 0.0000 | 0.0109 |
| 350 | 0.0082 | 0.0025 | 0.0016 | 0.0002 | 0.0000 | 0.0000 | 0.0125 |
| 360 | 0.0093 | 0.0027 | 0.0022 | 0.0006 | 0.0005 | 0.0001 | 0.0154 |
| All | 0.3537 | 0.1888 | 0.1917 | 0.1240 | 0.0932 | 0.0174 | 0.9698 |
| | | | | | | Calms: | 0.0302 |

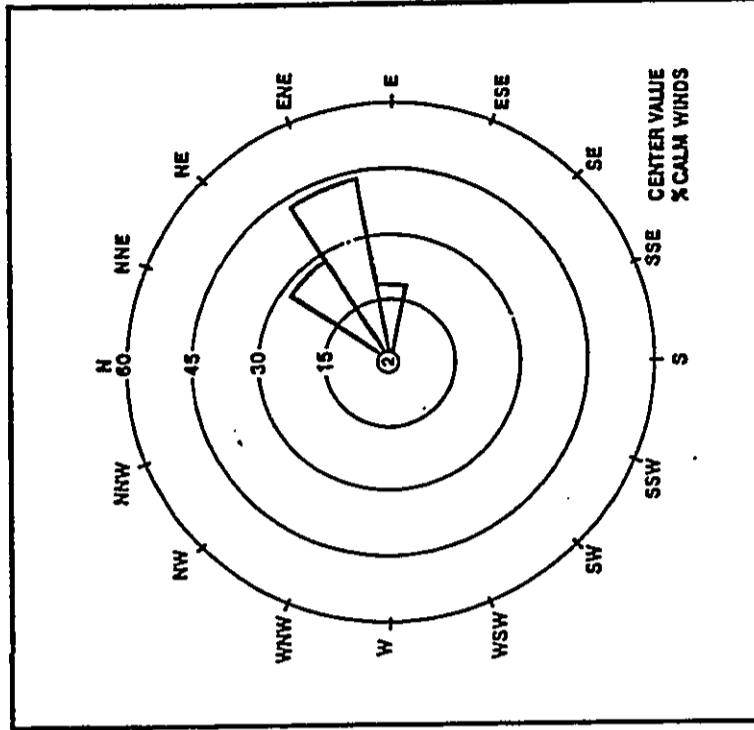
SOURCE: National Weather Service, 1992

FIGURE 4
JANUARY WIND ROSE
HONOLULU INTERNATIONAL AIRPORT



SOURCE: National Weather Service
Historical Records, 1940-57

FIGURE 5
AUGUST WIND ROSE
HONOLULU INTERNATIONAL AIRPORT



SOURCE: National Weather Service
Historical Records, 1940-57

6. MOBILE SOURCE IMPACTS

6.1 Mobile Source Activity. The traffic study prepared for the proposed project served as the basis for this mobile source impact analysis. Existing peak-hour traffic volumes and projections for 2020 for the principal intersections serving the project area were provided. This analysis focused on the four intersections with the greatest potential for air pollution impacts due to their traffic volumes, level of service, and proposed changes. Existing conditions at these intersections are depicted in Figures 6 - 9.

- Moanalua Road at Waimano Home Road
- Waimano Home Road at Kamehameha Highway
- Kamehameha Highway at Acacia Road (Alternative 2: Spine Road)
- Acacia Road at Kusia Street (Alternative 2: Spine Road)

6.2 Emission Factors. Automotive emission factors for carbon monoxide (CO) were generated for calendar years 1998 and 2020 using the Mobile Source Emissions Model (MOBILE5B)¹⁰. To localize the emission factors as much as possible, the March 1992 age distribution for registered vehicles in the City & County of Honolulu was used in lieu of national statistics. That same age distribution was the basis for the distribution of vehicle miles traveled as well.

6.3 Peak Hours Modeling. Due to the present state-of-the-art in air quality modeling, analyses such as this generally focus on estimating concentrations of non-reactive pollutants. For projects involving mobile sources as the principal source, carbon monoxide is normally selected for modeling because it has a relatively long half-life in the atmosphere (about 1 month)¹¹, and it comprises the largest fraction of automotive emissions.

Using the traffic and intersection signalization data provided in the traffic study⁸, a peak hours analysis was performed for the aforementioned intersections for 1998 and 2020 (two alternatives and "no build"). One year of Honolulu meteorological data pre-processed with EPA's PCRAMMET¹² program was used along with a revised version of EPA's guideline model CAL3QHC v. 2.1 to estimate near-intersection carbon monoxide concentrations. An array of 40 receptor sites at a distance of 10 meters from the street edge and spaced at 10 meter intervals were entered in the model. Because the area is suburban, a background CO concentration of 0.1 milligrams per cubic meter (mg/m³) was assumed.

6.4 Results: 1-Hour Concentrations. Results of modeling are presented in Figures 9 - 13. Each figure depicts locations of the 40 receptor sites around the respective intersections along with the maximum estimated concentrations in milligrams per cubic meter (mg/m³) for each of the evaluated scenarios as well as the particular receptor locations at which they were predicted.

The modeling indicates that the federal 1-hour CO standard is currently being met at all four intersections and will continue to be met with or without the proposed project. The results with regard

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TABLE 4
SUMMARY OF TYPICAL WIND CONDITIONS
DURING PEAK TRAFFIC HOURS
HONOLULU, OAHU

| Period | Direction | Annual Frequency (%) | Mean Wind Speed (m/sec) |
|-------------------------------|-----------|----------------------|-------------------------|
| A.M. Peak
7:00 - 8:00 a.m. | NE | 67.1 | 4.1 |
| | SE | 4.8 | 3.9 |
| | SW | 3.3 | 2.9 |
| | NW | 24.4 | 1.8 |
| P.M. Peak
4:00 - 6:00 p.m. | NE | 78.8 | 6.0 |
| | SE | 7.1 | 4.2 |
| | SW | 10.1 | 3.3 |
| | NW | 3.9 | 4.8 |

- Notes: 1. Frequencies may not total 100% due to rounding.
 2. Based on 1991 Honolulu International Airport data.
 3. A.M. frequency for winds 1.5 m/s = 3.7%
 4. P.M. frequency for winds 1.5 m/s = 0.27%
 5. Wind speeds not reported at 1.0 m/s.

the maximum 24-hour concentration reported at the DOH's Pearl City monitoring site (Table 2), and then compared with State and federal 24-hour standards. The result indicated a worst-case total concentration of 28.5 µg/m³, a level well below standards (Table 1).

5.2 Offsite Impacts. In addition to the onsite impacts attributable to construction activity, there will also be offsite air quality impacts due to the operation of concrete and asphalt batching plants needed for construction. Such plants routinely emit particulate matter and other gaseous pollutants. It is too early, however, to identify the specific facilities that will be providing these materials and thus the discussion of air quality impacts is necessarily generic. The batch plants which will be producing the concrete for foundations, curbing, etc. and the asphalt for roadways must be permitted by the Department of Health Clean Air Branch pursuant to state regulations¹³. In order to obtain these permits, they must demonstrate their ability to continuously comply with both emission¹⁴ and ambient air quality¹⁵ standards. Under the recently promulgated federal Title V operating permit requirements¹⁶, now incorporated in Hawaii's rules¹⁷, air pollution sources must regularly attest to their compliance with all applicable requirements.

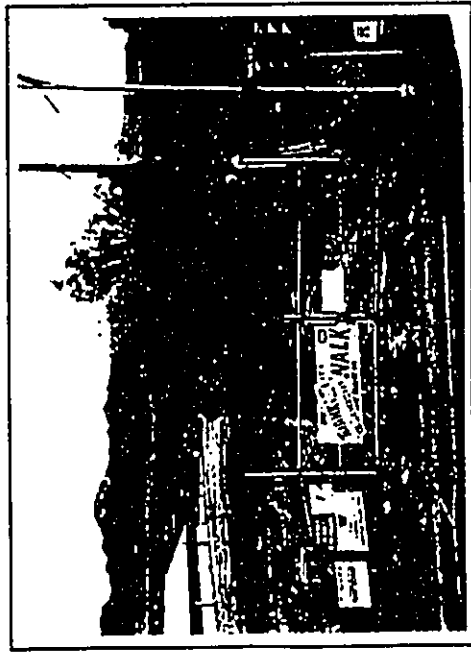
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FIGURE 6

EXISTING SITE CONDITIONS
MOANALUA ROAD AT WAIMANO HOME ROAD



Moanalua Road Approach to
Waimano Home Road
(facing southeast)



Proposed Spine Road Intersection
with Waimano Home Road
(facing northwest)

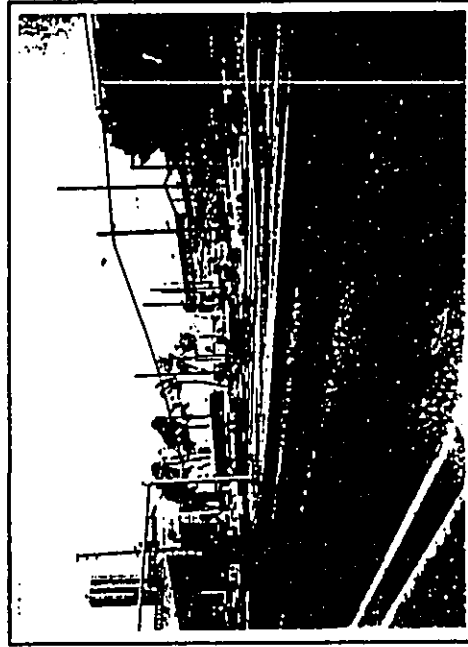
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FIGURE 7

EXISTING CONDITIONS
ACACIA ROAD AT KUALA STREET AND KAMEHAMEHA HIGHWAY



Kuala Street at Acacia Road
(facing northeast)

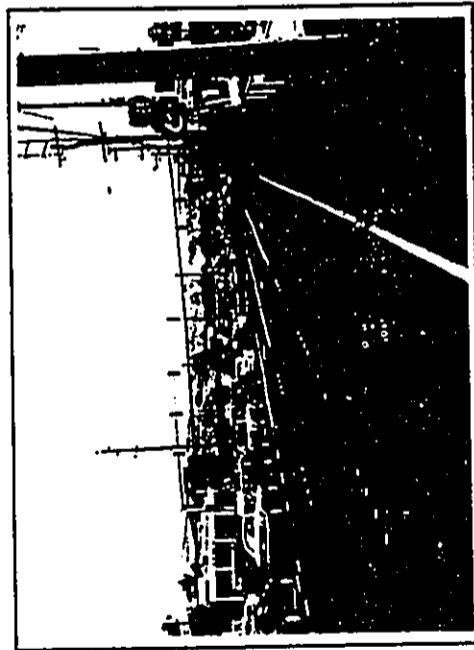


Kamehameha Highway at
Acacia Road
(facing north)

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FIGURE 8

EXISTING CONDITIONS
WADMANO HOME ROAD AT KAMEHAMEHA HIGHWAY



Kamehameha Highway
(facing southwest)



Kamehameha Highway
(facing northwest)

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to compliance with the more stringent State standard are mixed. The standard is met at the Moanalua Road and Kula Street intersections (Figures 9 and 12) both presently and in the future. It is also met at the proposed intersection of the Spine Road and a realigned Acacia Road (Figure 13). At the Kamehameha Highway - Waimano Home Road intersection (Figure 10), modeling suggests that the standard may currently be exceeded on a few days out of the year during the a.m. peak hour. However, in the future with the project concentrations drop back down to about the level of the standard. Afternoon concentrations were in compliance.

At the Kamehameha Highway - Acacia Road intersection (Figure 11), the afternoon CO levels demonstrated the same behavior as the a.m. values described above, i.e., currently above but later dropping back to the level of the State standard. The existing morning values were just beneath the standard and were predicted to rise to it by 2020 with or without the project. Concentrations were slightly higher if the Spine Road connected directly to Kamehameha Highway where Acacia Road currently joins.

6.5 Results: 8-Hour Concentrations. Estimates of 8-hour CO concentrations can be derived by applying a "persistence" factor to the maximum 1-hour concentrations. This "persistence" factor accounts for the fact that the worst-case 1-hour meteorology and traffic volumes do not persist for 8 hours. EPA recommends calculation of a persistence factor based on actual 1-hour and 8-hour CO measurements. A local persistence factor was computed from Department of Health data for a recent project in the Honolulu area and used here to estimate 8-hour concentrations by applying it to the higher of the a.m. or p.m. peak hour concentrations.

The results, also included in Figures 9 - 13, are very similar to the 1-hour results with the federal standard being met at all locations, but the State standard being approached or exceeded in close proximity to Kamehameha Highway intersections. Modeling indicated possible exceedance under present conditions followed by a decline to levels hovering about the State standard with or without the project.

7. DISCUSSION, CONCLUSIONS AND MITIGATION

7.1 Short-Term Impacts: Since, as noted above, the development area is considered semi-arid by Thornthwaite's classification system and local soils have a high silt content, there is an increased potential for fugitive dust. Despite the low predicted impact cited in Section 5.1, the potential for localized impact on dry, windy days should not be ignored. It will be very important to employ adequate dust control measures throughout the construction period. Dust control can be accomplished through frequent watering of unpaved roads and areas of exposed soil. The EPA estimates that twice daily watering can reduce fugitive dust emissions by as much as 50%. The soonest possible landscaping of completed areas will also help.

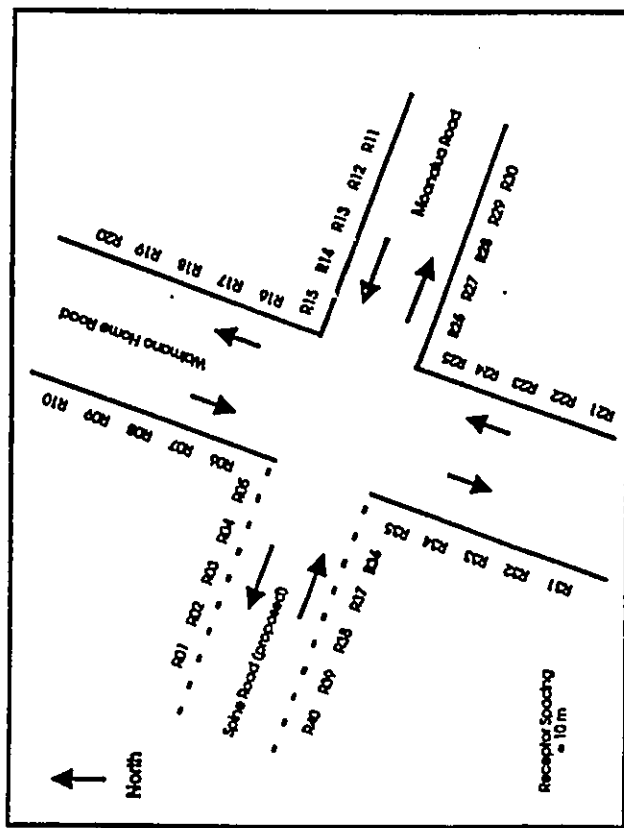
If construction vehicle activity is limited to offpeak hours, then its effects of lowering average travel speeds, reducing LOS, and increasing vehicle emissions, can be greatly diminished.

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FIGURE 9

ESTIMATES OF MAXIMUM 1- AND 8-HOUR
CARBON MONOXIDE CONCENTRATIONS
Moanaiua Road at Waimano Home Road
Peak Traffic Hours
1998 - 2020

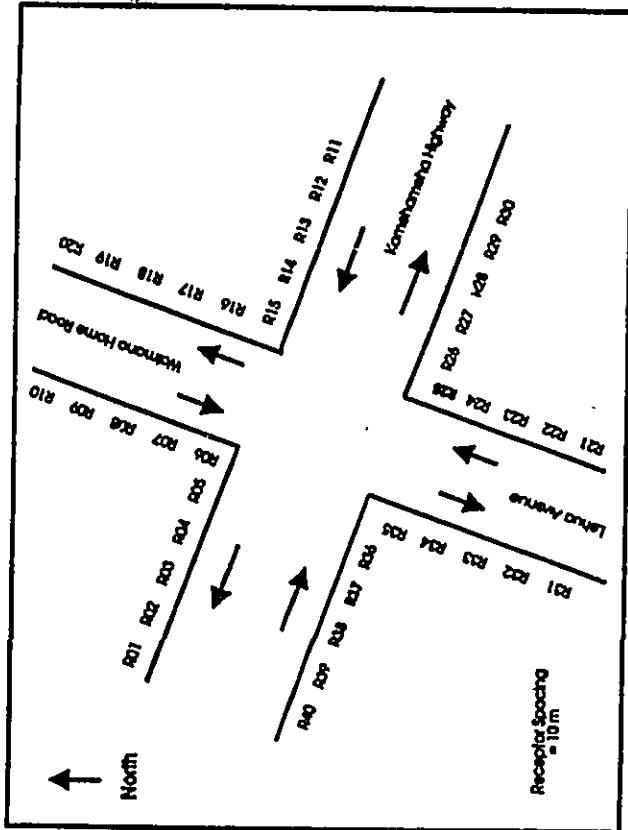


| Period | Estimated Maximum Concentrations (mg/m ³) | | | Receptor |
|--------|---|------------------|---------------|---------------|
| | 1998 | 2020 w/o project | 2020 w/AI.1.2 | |
| A.M. | 9.0 | 8.7 | 9.6 | R26, 28, R36 |
| P.M. | 6.0 | 5.1 | 5.0 | R14 |
| 8-Hr | 4.2 | 4.1 | 4.5 | R26, R28, R36 |

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FIGURE 10

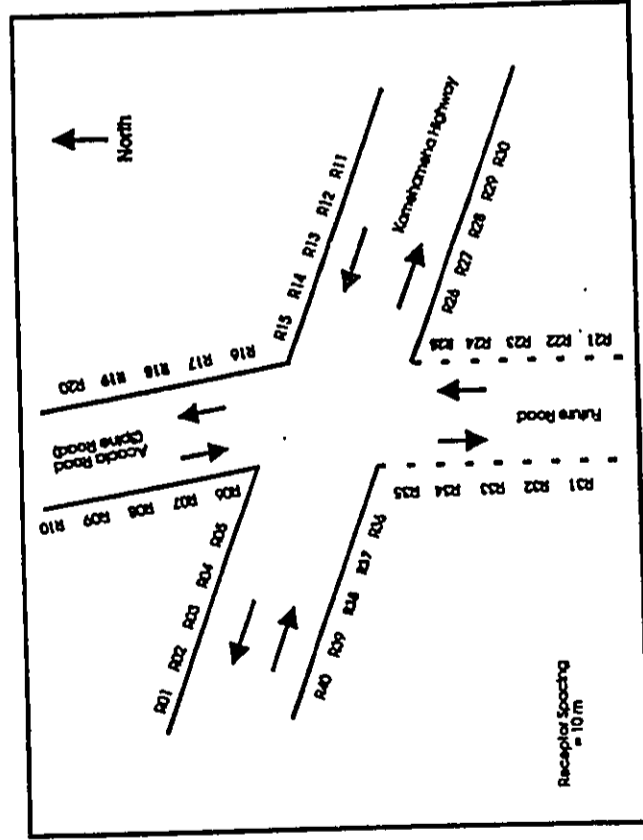
ESTIMATES OF MAXIMUM 1- AND 8-HOUR
CARBON MONOXIDE CONCENTRATIONS
Kamehameha Highway at Waimano Home Road
Peak Traffic Hours
1998 - 2020



| Period | Estimated Maximum Concentrations (mg/m ³) | | | Receptor |
|--------|---|------------------|---------------|----------|
| | 1998 | 2020 w/o project | 2020 w/AI.1.2 | |
| A.M. | 15.2 | 11.2 | 10.4 | R25 |
| P.M. | 6.5 | 5.1 | 5.0 | R14, R37 |
| 8-Hr | 7.1 | 5.3 | 4.9 | R25 |

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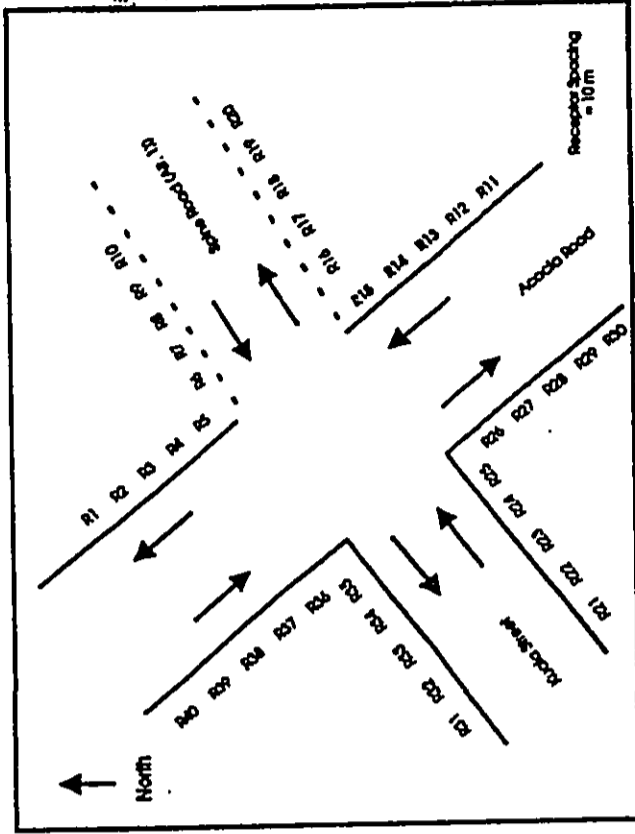
FIGURE 11
ESTIMATES OF MAXIMUM 1- AND 8-HOUR
CARBON MONOXIDE CONCENTRATIONS
 Kamohameha Highway at Acacia Road (Spine Road)
 Peak Traffic Hours
 1998 - 2020



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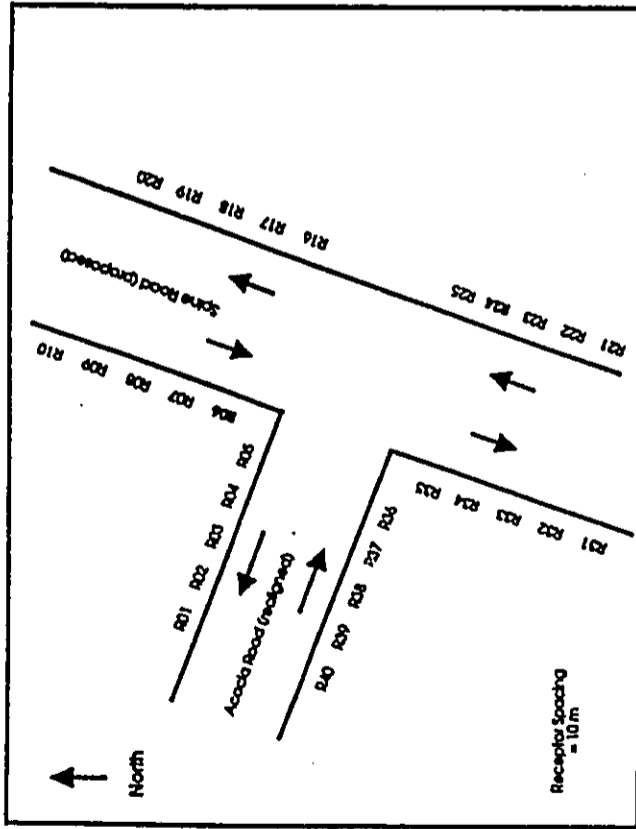
FIGURE 12

ESTIMATES OF MAXIMUM 1- AND 8-HOUR
CARBON MONOXIDE CONCENTRATIONS
 Acacia Road at Kuala Street
 Peak Traffic Hours
 1998 - 2020



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FIGURE 13
ESTIMATES OF MAXIMUM 1- AND 8-HOUR
CARBON MONOXIDE CONCENTRATION
Acacia Road at Proposed Spine Road (Alternative 2)
Peak Traffic Hours
2020



| Period | Estimated Maximum Concentrations (mg/m ³) | | | Receptors |
|--------|---|------------------|------------|-----------|
| | 1998 | 2020 w/o project | 2020 w/AL2 | |
| A.M. | n/a | n/a | 6.3 | R24 |
| P.M. | n/a | n/a | 5.2 | R6 |
| 8-hr | n/a | n/a | 2.9 | R24 |

7.2 Mobile Source Impacts. The proposed project appears to have little or no impact on traffic-related emissions and air quality. Federal air quality standards appear to be met at all times. State standards, which may be exceeded at the present, appear to be met in the future. The predicted air quality in the vicinity of traffic impacted intersections varied from no change to slight increases to slight decreases in CO levels. Due to the proposed Spine Road, CO increased significantly at the Acacia Road - Kuala Street intersection but remained below State standards. Predicted decreases at other intersections were the result of re-distribution of traffic due to the proposed new road, revised signalization, and simple attrition of older, higher emitting vehicles which are replaced by newer, lower emitting vehicles. This latter effect is the result of the ongoing EPA motor vehicle control program which mandates increasingly more stringent emission standards for new vehicles.

It should also be emphasized that the receptors in these analyses are all quite close to the streets, i.e., 10 meters, and that the CO concentrations drop off sharply with distance away from the traffic lanes. The concentrations under discussion and the potential for violations all apply to these close proximity locations. Compliance is not likely to be an issue at distances beyond 10 meters.

7.3 Conclusions. The following conclusions may be drawn from the foregoing analysis:

- The short-term construction related impacts on air quality can be adequately mitigated to prevent violations of standards or air pollution control rules.
- Existing CO levels may exceed State 1-hour and 8-hour standards in close proximity to Kamehameha Highway intersections; however, those levels tend to go down in the future partially due to a redistribution of traffic attributable to the proposed new road.
- The project's impact on air quality in the vicinity of major intersections serving the project area will be minimal and not cause violations of federal air quality standards, but will contribute to levels close to the State standards at a few locations in close proximity to Kamehameha Highway intersections.

REFERENCES

1. Clean Air Act, 42 U.S.C.A. §7409 (CAA §109), National primary and secondary ambient air quality standards.
2. Code of Federal Regulations, Title 40, Protection of Environment, Part 50, *National Primary and Secondary Ambient Air Quality Standards*.
3. State of Hawaii. Title 11, Administrative Rules, Chapter 59, *Ambient Air Quality Standards*, as amended, November 1993.
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J. W. MORROW

25

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J. W. MORROW

26

J. W. MORROW

Environmental Management
Consultant

December 4, 1998

MEMORANDUM

To: Esme
Planning Solutions, Inc.

From: Jim 

Subject: Spine Road Ultimate Condition - Alternative 6

Thank you for your 3 Dec 98 fax explaining the adoption of the community-preferred Alternative 6 and asking for my thoughts regarding its air quality impact. Based on the drawings and description you provided, the changes appear to be insignificant in terms of their impact on local air quality. The estimated CO levels should still be in the same range indicated in my original report and well within the normal range of accuracy of the EPA-recommended model.

Please call me at 942-9096 if you have any further questions concerning this issue.

JWM:jm
981204a

APPENDIX D
CONSULTATION LETTERS and RESPONSES

FEBRUARY 1999

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 2ND FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-5284 • Fax: (808) 523-4567



JEREMY HARRIS
MAYOR

RANDALL K. FUJIKI, MA
DIRECTOR

HOWARD D. LUBBY, JR., MA
DEPUTY DIRECTOR

IDEB 98-0324

September 21, 1998

Mr. George Young
Chief, Operations Branch
U.S. Army Corps of Engineers
Honolulu Engineer District
Building 230
Fort Shafter, Hawaii 96858

Dear Mr. Young:

Subject: Request for Consultation, Manana Development Spine Road Environmental Assessment

The City Department of Design and Construction (DDC) proposes to construct a collector road through the former Mauna Storage Area (Tax Map Key: 9-7-24: 41) in Pearl City, Oahu. The road is intended to serve the planned redevelopment of the parcel. A brief description of the proposed road is attached.

DDC has hired Engineering Concepts, Inc. (ECI), as its prime consultant directing the work effort required to plan, design, and prepare the environmental documentation for the proposed project. ECI has engaged Planning Solutions, Inc., to prepare an Environmental Assessment (EA) that would fulfill the requirements of both the National Environmental Policy Act (NEPA) and Chapter 343, Hawaii Revised Statutes, Hawaii's Environmental Impact Statement rules.

As part of this effort, we are undertaking an early consultation process, similar to "scoping" as defined in NEPA, with pertinent agencies, individuals, and organizations to ensure that their important issues and concerns are addressed in the EA. Therefore, we are respectfully requesting that you provide our consultants with any written concerns or comments that your agency may have with respect to this project.

Mr. George Young
Page 2
September 21, 1998

Mr. Perry White of Planning Solutions, Inc., will be directing the early coordination for DDC. Please call him to discuss your concerns at 593-1288 or write to him at Planning Solutions, Inc., 1210 Auahi Street, Suite 221, Honolulu, Hawaii 96814. We will assume that if we do not hear from you within 14 days that you have no comments regarding the proposed project at this time.

Should you have any questions, please call Robert Sarae of the Division of Infrastructure Design and Engineering at 523-4071.

Very truly yours,


RANDALL K. FUJIKI
Director

Attach.

cc: Mr. Kay Muranaka, Engineering Concepts
Mr. Perry White, Planning Solutions, Inc.



DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER CENTER, HONOLULU
FORT SHAFTER, HAWAII 96814-4448

DATE
10/01/98

October 1, 1998

Operations Branch

Mr. Randall K. Fujiki
Department of Design
and Construction
City and County of Honolulu
650 South King Street, 2nd Floor
Honolulu, Hawaii 96813

Dear Mr. Fujiki:

This is in regard to your letter of September 21, 1998, requesting comments on the proposed Manara Development Spine Road, Pearl City, Oahu, Hawaii. Based on the information provided in the Environmental Assessment, I have determined that the proposed road construction project will not impact waters of the U.S., including wetlands, and will not require a Department of the Army permit.

If you have any questions regarding this determination, please contact Mr. Peter Galloway of my staff at 438-9258, extension 15. Please refer to File No. 98000325.

Sincerely,


George F. Young, P. E.
Chief, Operations Branch

10/01/98 10:00 AM

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

830 SOUTH KING STREET, 2ND FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-1504 • Fax: (808) 523-4587



JEREMY HARRIS
MAYOR

RANDALL K. FUJIKI, MA
DIRECTOR
ROLAND D. LIBBY, JR., MA
DEPUTY DIRECTOR

IDEB 98-0325

September 21, 1998

Mr. Don Hibbard
State Historic Preservation Officer
Department of Land and Natural Resources
33 South King Street, 6th Floor
Honolulu, Hawaii 96813

Dear Mr. Hibbard:

Subject: Request for Consultation, Manana Development Spine Road Environmental Assessment

The City Department of Design and Construction (DDC) proposes to construct a collector road through the former Manana Storage Area (Tax Map Key: 9-7-24: 41) in Pearl City, Oahu. The road is intended to serve the planned redevelopment of the parcel. A brief description of the proposed road is attached.

DDC has hired Engineering Concepts, Inc. (ECI), as its prime consultant directing the work effort required to plan, design, and prepare the environmental documentation for the proposed project. ECI has engaged Planning Solutions, Inc., to prepare an Environmental Assessment (EA) that would fulfill the requirements of both the National Environmental Policy Act (NEPA) and Chapter 343, Hawaii Revised Statutes, Hawaii's Environmental Impact Statement rules.

As part of this effort, we are undertaking an early consultation process, similar to "scoping" as defined in NEPA, with pertinent agencies, individuals, and organizations to ensure that their important issues and concerns are addressed in the EA. Therefore, we are respectfully requesting that you provide our consultants with any written concerns or comments that your agency may have with respect to this project.

Mr. Perry White of Planning Solutions, Inc., will be directing the early coordination for DDC. Please call him to discuss your concerns at 593-1288 or write to him at Planning

Mr. Don Hibbard
Page 2
September 21, 1998

Solutions, Inc., 1210 Auahi Street, Suite 221, Honolulu, Hawaii 96814. We will assume that if we do not hear from you within 14 days that you have no comments regarding the proposed project at this time.

Should you have any questions, please call Robert Sarae of the Division of Infrastructure Design and Engineering at 523-4071.

Very truly yours,


RANDALL K. FUJIKI
Director

Attach.

cc: Mr. Kay Muranaka, Engineering Concepts
Mr. Perry White, Planning Solutions, Inc.

REYNOLDS J. GATTAPONE
GOVERNOR OF HAWAII



NOELANI B. WELDON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
SERVICES
SUITE 201 COLLEGE AVENUE
HONOLULU, HAWAII 96813
AGRICULTURAL DEVELOPMENT
PLANNING
ADULTS RESOURCES
CONSULTATION AND
RESOURCES DEVELOPMENT
CONVENTIONS AND VISITORS
HISTORIC PRESERVATION
DIVISION
LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813
WATER AND LAND DEVELOPMENT

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

September 24, 1998

Mr. Perry White
Planning Solutions, Inc.
1210-Awahii Street, Suite 221
Honolulu, Hawaii 96814

LOG NO: 22283
DOC NO: 9809SC26

Dear Mr. White:

SUBJECT: Chapter 6E-9 Historic Preservation Comment on the Proposed Construction of
a Collector Road at the Former Manana Storage Area in Pearl City
Manana, Ewa, Oahu. TMK: 2-1-574: 041

Thank you for the opportunity to comment on the proposed construction of a collector road through the former Manana Storage Area in Pearl City, Oahu. When constructed, the road will serve the planned redevelopment of the parcel. Our review is based on historic reports, maps, and aerial photographs maintained at the State Historic Preservation Division; no field inspection was made of the subject parcel.

According to our records, there are no known historic sites on the subject parcel, and the land has been extensively modified through grading and development for the former Manana Storage area. Consequently, it is highly unlikely that significant historic sites are still present in the subsurface areas of the property. The buildings that are currently on the parcel were built as temporary structures and are covered under the Programmatic Memorandum of Agreement among the US Department of Defense, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers. Since the proper documentation of similar buildings has already been carried out by the Department of Defense, demolition of these WW II-era structures may occur.

In view of these facts, therefore, we believe that the proposed construction of the Manana Development Spine Road will have "no effect" on significant historic sites.

Should you have any questions, please feel free to call Sara Collins at 587-0013.

Aloha,

DON HIBBARD, Administrator
State Historic Preservation Division

SC:je

U.S. GOVERNMENT PRINTING OFFICE: 1997 O-451-111



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IX

75 Hawthorne Street
San Francisco, CA 94105-3901

September 24, 1998

Mr. Perry White
Planning Solutions
1210 Auahi Street, Suite 221
Honolulu, HI 96814

Dear Mr. White:

I received the information you submitted on the proposed Manana Spine Road project and its potential to impact the Southern Oahu Basal Aquifer (SOBA), which was designated an EPA Sole Source Aquifer in 1987. Under provisions of the Safe Drinking Water Act, Section 1424(e), EPA is charged with review of projects that receive federal financial assistance and are located in Sole Source Aquifer areas. This program was designed by Congress to assure that projects receiving federal financial assistance are constructed to prevent contamination of drinking water sources.

The information you provided suggests that potential threats to water quality, such as contamination of the aquifer from road runoff, landscaping, or chemical releases, will not occur as a result of this project. Therefore, under provisions of the Safe Drinking Water Act, Section 1424(e), we approve this project.

Please call me at (415) 744-1831 if you have further questions.

Sincerely,

Wendy L. Meigin

Wendy L. Meigin
Regional Hydrologist

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 2ND FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-1564 • Fax: (808) 523-4547



JEREMY HARRIS
MAYOR

RANDALL K. FUJIKI, MA
DIRECTOR

ROLAND D. LIBBY, JR., MA
DEPUTY DIRECTOR

IDEB 98-0323

September 21, 1998

Mr. Robert Smith
Pacific Island Administrator
Fish and Wildlife Services
Department of the Interior
P.O. Box 50156
Honolulu, Hawaii 96850

Dear Mr. Smith:

Subject: Request for Consultation, Manana Development Spine Road Environmental Assessment

The City Department of Design and Construction (DDC) proposes to construct a collector road through the former Manana Storage Area (Tax Map Key: 9-7-24: 41) in Pearl City, Oahu. The road is intended to serve the planned redevelopment of the parcel. A brief description of the proposed road is attached.

DDC has hired Engineering Concepts, Inc. (ECI), as its prime consultant directing the work effort required to plan, design, and prepare the environmental documentation for the proposed project. ECI has engaged Planning Solutions, Inc., to prepare an Environmental Assessment (EA) that would fulfill the requirements of both the National Environmental Policy Act (NEPA) and Chapter 343, Hawaii Revised Statutes, Hawaii's Environmental Impact Statement rules.

As part of this effort, we are undertaking an early consultation process, similar to "scoping" as defined in NEPA, with pertinent agencies, individuals, and organizations to ensure that their important issues and concerns are addressed in the EA. Therefore, we are respectfully requesting that you provide our consultants with any written concerns or comments that your agency may have with respect to this project.

Mr. Robert Smith
Page 2
September 21, 1998

Mr. Perry White of Planning Solutions, Inc., will be directing the early coordination for DDC. Please call him to discuss your concerns at 593-1288 or write to him at Planning Solutions, Inc., 1210 Auahi Street, Suite 221, Honolulu, Hawaii 96814. We will assume that if we do not hear from you within 14 days that you have no comments regarding the proposed project at this time.

Should you have any questions, please call Robert Sarae of the Division of Infrastructure Design and Engineering at 523-4071.

Very truly yours,


RANDALL K. FUJIKI
Director

Attach.

cc/attach: Mr. Kay Muranaka, Engineering Concepts
Mr. Perry White, Planning Solutions, Inc.

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 2ND FLOOR
HONOLULU, HAWAII 96813
PHONE: (808) 523-4564 • FAX: (808) 523-4587



JEREMY HARRIS
MAYOR

RANDALL K. FUJIKI, AIA
DIRECTOR
ROLAND G. LIBBY, JR., AIA
DEPUTY DIRECTOR

IDEB 98-0127

August 14, 1998

Mr. Doug Tom, Director
Coastal Zone Management Program Office
Office of State Planning
State of Hawaii
P. O. Box 3540
Honolulu, Hawaii 96811-3540

Dear Mr. Tom:

Subject: Request for Consultation, Manana Development Spine Road
Environmental Assessment

The City Department of Design and Construction (DDC) proposes to construct a collector road through the former Manana Storage Area (Tax Map Key: 9-7-24: 41) in Pearl City, Oahu. The road is intended to serve the planned redevelopment of the parcel.

DDC has hired Engineering Concepts, Inc. (ECI) as our prime consultant directing planning, design and environmental documentation for the proposed project. ECI has engaged Planning Solutions, Inc. To prepare an Environmental Assessment (EA) for the proposed road that would fulfill the requirements of the National Environmental Policy Act (NEPA) and Chapter 343 HRS, Hawaii's Environmental Impact Statement Rules.

As part of this effort, we are undertaking an informal early coordination process, similar to "scoping" described in NEPA, which includes coordination with pertinent agencies to ensure that important issues and concerns are addressed in the EA. This letter is a formal request that your agency provide our consultants with any comments you have on the proposed project. A brief description of the proposed road is attached.

The Office of State Planning's response to the EIS that was prepared for the full Manana Storage Area redevelopment in 1996 (Manana and Pearl City Junction Development FEIS) indicated that they had no comments to offer at that time (letter

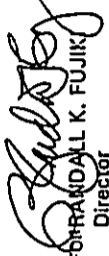
Mr. Doug Tom
Page 2
August 7, 1998

attached). However, because we are expecting to receive federal funding for the project, we and the Federal Highway Administration (the federal funding agency) will be requesting a federal consistency review.

Ms. Kathleen Dadey, of Planning Solutions, Inc., will be directing the early coordination for DDC. Please call her at 593-1288 to arrange a mutually convenient time to discuss the project. If we do not hear from you within seven days of the date of this letter, we will assume that you have no comments at this time.

Should you have any questions, please call Robert Sarao of the Division of Infrastructure Design and Engineering at 523-4071.

Very truly yours,


RANDALL K. FUJIKI
Director

Attachment

cc: Engineering Concepts, Inc.
Ms. Kathleen Dadey, Planning Solutions, Inc.

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH LEWIS STREET, 2ND FLOOR
HONOLULU, HAWAII 96813
PHONE: (808) 523-4364 • FAX: (808) 523-4367



JEREMY HARRIS
MAYOR

MANDALL K. RUIZEL, AIA
DIRECTOR

ROLAND D. LIBBY, JR., AIA
DEPUTY DIRECTOR

IDEB 98-0125

August 14, 1998

Mr. Jerry Souza
Pearl City Neighborhood Board No. 21
P.O. Box 1025
Pearl City, Hawaii 96782

Dear Mr. Souza:

Subject: Request for Consultation, Manana Development Spine Road
Environmental Assessment

You and other Neighborhood Board members are invited to participate in "pre-assessment" consultation activities associated with the proposed Manana Development "Spine Road". The City Department of Design and Construction (DDC) proposes to construct a collector road through the former Manana Storage Area (Tax Map Key: 9-7-24: 41) in Pearl City, Oahu. The road is intended to serve the planned redevelopment of the parcel.

DDC has hired Engineering Concepts, Inc. (ECI) as our prime consultant directing planning, design and environmental documentation for the proposed project. ECI has engaged Planning Solutions, Inc. to prepare an Environmental Assessment (EA) for the proposed road that would fulfill the requirements of the National Environmental Policy Act (NEPA) and Chapter 343 HRS, Hawaii's Environmental Impact Statement Rules.

As part of this effort, we are undertaking an informal early coordination process, similar to "scoping" described in NEPA, which includes coordination with pertinent organizations to ensure that important issues and concerns are addressed in the EA. Attached is a brief description to re-acquaint and update you and other board members with the project.

Ms. Kathleen Dadey, of Planning Solutions, Inc., will be directing the consultation for DDC. Please call her at 593-1288 to arrange a mutually convenient time to discuss the project. If we do not hear from you within seven days of the date of

Mr. Jerry Souza
Page 2
August 7, 1998

this letter, we will assume that your organization has no comments at this time.
Should you have any questions, please call Robert Saraa of the Division of Infrastructure Design and Engineering at 523-4071.

Very truly yours,


RANDALL K. FUJIKI
Director

Attachment

cc: Engineering Concepts, Inc.
Ms. Kathleen Dadey, Planning Solutions, Inc.
Mr. David Z. Arakawa, Mayor's Representative
Council Chair Mufi Hanneman

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 2ND FLOOR
HONOLULU, HAWAII 96813
PHONE: (808) 523-4364 • FAX: (808) 523-4367



JEREMY HARRIS
MAYOR

MANDALL K. FUJIKI, AIA
DIRECTOR
ROLAND D. LIBBY, JR., AIA
COUNTY DIRECTOR

IDEB 98-0124

August 14, 1998

Mr. Bob Kubo
Pearl City Community Association
P.O. Box 284
Pearl City, HI 96782

Dear Mr. Kubo:

Subject: Request for Consultation, Manana Development Spine Road
Environmental Assessment

You and other members of your association are invited to participate in "pre-assessment" consultation activities associated with the proposed Manana Development "Spine Road". The City Department of Design and Construction (DDC) proposes to construct a collector road through the former Manana Storage Area (Tax Map Key: 9-7-24: 41) in Pearl City, Oahu. The road is intended to serve the planned redevelopment of the parcel.

DDC has hired Engineering Concepts, Inc. (ECI) as our prime consultant directing planning, design and environmental documentation for the proposed project. ECI has engaged Planning Solutions, Inc. to prepare an Environmental Assessment (EA) for the proposed road that would fulfill the requirements of the National Environmental Policy Act (NEPA) and Chapter 343 HRS, Hawaii's Environmental Impact Statement Rules.

As part of this effort, we are undertaking an informal early coordination process, similar to "scoping" described in NEPA, which includes coordination with pertinent organizations to ensure that important issues and concerns are addressed in the EA. Attached is a brief description to re-acquaint and update you and other association members with the project.

Ms. Kathleen Dadey, of Planning Solutions, Inc., will be directing the consultation for DDC. Please call her at 593-1288 to arrange a mutually convenient time to discuss the project. If we do not hear from you within seven days of the date of

Mr. Bob Kubo
Page 2
August 7, 1998

this letter, we will assume that your organization has no comments at this time. Should you have any questions, please call Robert Sarae of the Division of Infrastructure Design and Engineering at 523-4071.

Very truly yours,

RANDALL K. FUJIKI
Director

Attachment

cc: Engineering Concepts, Inc.
Ms. Kathleen Dadey, Planning Solutions, Inc.
Council Chair Mufi Hanneman

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 2ND FLOOR
HONOLULU, HAWAII 96813
PHONE: (808) 522-1804 • FAX: (808) 522-4587



JEREMY HARRIS
SAYOR

RANDALL E. FURUKI, AIA
DIRECTOR

ROLAND D. LIBBY, JR., AIA
COUNTY DIRECTOR

IDEB 98-0120

August 19, 1998

The Honorable Mufi Hannemann
Council Chair
City Council
530 South King, Room 202
Honolulu, HI 96813

Dear Chair Hannemann:

Subject: Request for Consultation, Manana Development Spine Road
Environmental Assessment

The City Department of Design and Construction (DDC) proposes to construct a collector road through the former Manana Storage Area (Tax Map Key 9-7-24: 41) in Pearl City, Oahu. The road is intended to serve the planned redevelopment of the parcel.

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We will contact your office in a week to confirm if you have any comments at this time.

The Honorable Mufi Hannemann
Page 2
August 19, 1998

Should you have any questions, please call Robert Sarae of the Division of Infrastructure Design and Engineering at 523-4071.

Very truly yours,

RANDALL K. FUJIKI
Director

Attachment

cc: Mayor Jeremy Harris
Engineering Concepts, Inc.
Mrs. Kathleen Dadey, Planning Solutions, Inc.

FORWARDED:

AUG 31 1998

BENJAMIN B. LEE
Acting Managing Director

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 2ND FLOOR
HONOLULU, HAWAII 96813
PHONE: (808) 523-4564 • FAX: (808) 523-4567



SCHEMPT HARRIS
MAYOR

RANDALL K. FUJIKI, AIA
DIRECTOR
ROLAND D. LIRBY, JR., AIA
DEPUTY DIRECTOR

August 7th, 1998

IDEB 98-0126


Ms. Jan Naoe Sullivan
Page 2
August 7, 1998

days of the date of this letter, we will assume that you have no comments at this time.

Should you have any questions, please call Robert Saraa of the Division of Infrastructure Design and Engineering at 523-4071.

MEMORANDUM

TO: MS. JAN NAOE SULLIVAN, DIRECTOR
DEPARTMENT OF PLANNING AND PERMITTING

FROM:  RANDALL K. FUJIKI, DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

SUBJECT: REQUEST FOR CONSULTATION, MANANA DEVELOPMENT SPINE
ROAD ENVIRONMENTAL ASSESSMENT

The City Department of Design and Construction (DDC) proposes to construct a collector road through the former Manana Storage Area (Tax Map Key 9-7-24:41) in Pearl City, Oahu. The road is intended to serve the planned redevelopment of the parcel.

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Ms. Kathleen Dadey, of Planning Solutions, Inc., will be directing the early coordination for DDC. Please call her at 593-1288 to arrange a mutually convenient time to discuss the project. If we do not hear from you within seven

Attachment

cc: Engineering Concepts, Inc.
Mrs. Kathleen Dadey, Planning Solutions, Inc.

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
850 SOUTH KING STREET, 2ND FLOOR
HONOLULU, HAWAII 96813
PHONE: (808) 521-3184 • FAX: (808) 523-4587



JEREMY HARRIS
MAYOR

RANDALL K. FUJIKI, AIA
DIRECTOR
ROLAND O. LIBBY, JR., AIA
DEPUTY DIRECTOR

August 7, 1998


IDEB 98-0123

Mr. Patrick Onishi
Page 2
August 7, 1998

Should you have any questions, please call Robert Sarae of the Division of Infrastructure Design and Engineering at 523-4071.

MEMORANDUM

TO: MR. PATRICK T. ONISHI, CHIEF PLANNING OFFICER
PLANNING DEPARTMENT

FROM:  RANDALL K. FUJIKI, DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

SUBJECT: REQUEST FOR CONSULTATION, MANANA DEVELOPMENT SPINE
ROAD ENVIRONMENTAL ASSESSMENT

The City Department of Design and Construction (DDC) proposes to construct a collector road through the former Manana Storage Area (Tax Map Key 9-7-24:41) in Pearl City, Oahu. The road is intended to serve the planned redevelopment of the parcel.

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Attachment

cc: Engineering Concepts, Inc.
Ms. Kathleen Dadey, Planning Solutions, Inc.

PROJECT DESCRIPTION

PROPOSED MANANA DEVELOPMENT SPINE ROAD

City and County of Honolulu Department of Design and Construction
Federal Highway Administration

BACKGROUND

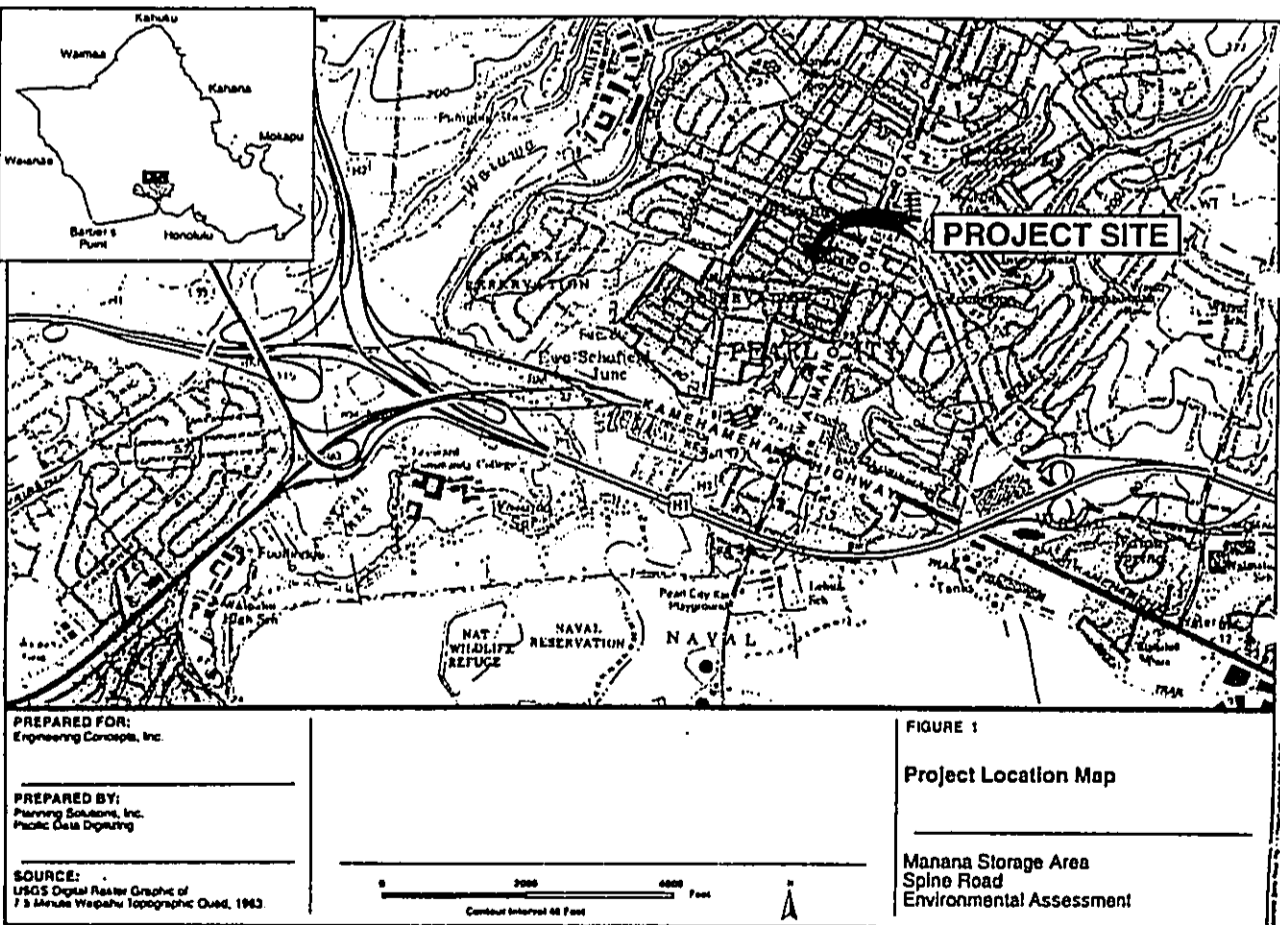
The City and County of Honolulu purchased the 109-acre former Manana Storage Area and 14-acre Pearl City Junction properties (Figure 1) from the U.S. Navy with plans for a mixed use, master-planned development. The original conceptual redevelopment master plan for the Manana parcel was developed jointly by the City Department of Housing and Community Development and the Pearl City Planning Task Force. The latter was established for the purpose of developing community-based land use recommendations for the properties. Included in the conceptual master plan were commercial (retail and office) and light industrial sites, public facilities, a community park, a family entertainment center, and medical facilities. The redevelopment master plan specifically included provisions for a "spine road" through the former Manana Storage Area to serve as the major collector road for the development, with connections to the existing road system at the Waimano Home Road/Aoanahua Road and Acacia Road/Kuala Street intersections.

The conceptual redevelopment plan has been revised and refined in the years since its completion. For example, several City agencies have modified and/or added projects. In addition, the recent reorganization of City agencies has resulted in transfers of responsibility. The City Department of Design and Construction (DDC) is now responsible for the planning, design, and construction of all City roads, highways, streets, and walkways, including the proposed road.

DESIGN REQUIREMENTS

The proposed Spine Road is designed to comply with guidelines and standards established by recognized agencies and organizations. These include:

- American Association of State Highway and Transportation Officials (AASHTO) guidelines,
- Federal Highway Administration guidelines,
- State Department of Transportation (DOT) guidelines, standards and criteria,
- Americans with Disabilities Act (ADA) Accessibility Guidelines, and
- City and County of Honolulu policies, criteria and standards.



PURPOSE AND NEED

The State Department of Transportation (DOT) and the FHWA have designated the proposed Spine Road as a "collector" road. As such, the road is integral to the City's redevelopment plans for the former Manana Storage Area and is needed to provide access to the proposed commercial and industrial areas, neighborhood park, family entertainment center, and medical facilities included in the master plan. In addition, more recently planned uses, such as City corporation yards, would also be accessed via the Spine Road.

PREFERRED ALTERNATIVE

Road Design

The City's preferred alignment for the Spine Road traverses the former Manana Storage Area from the existing Moanaiua/Waimano Home Road intersection to Acacia Road at Kuala Street (Figure 2). The total length of the preferred alternative is approximately 3,800 feet. The road would transition smoothly from the Waimano Home Road intersection, running for a short distance along the existing cane haul road at the *manuka* (north) boundary of the former Manana Storage Area property. The posted speed limit on the Spine Road would be 25 miles per hour.

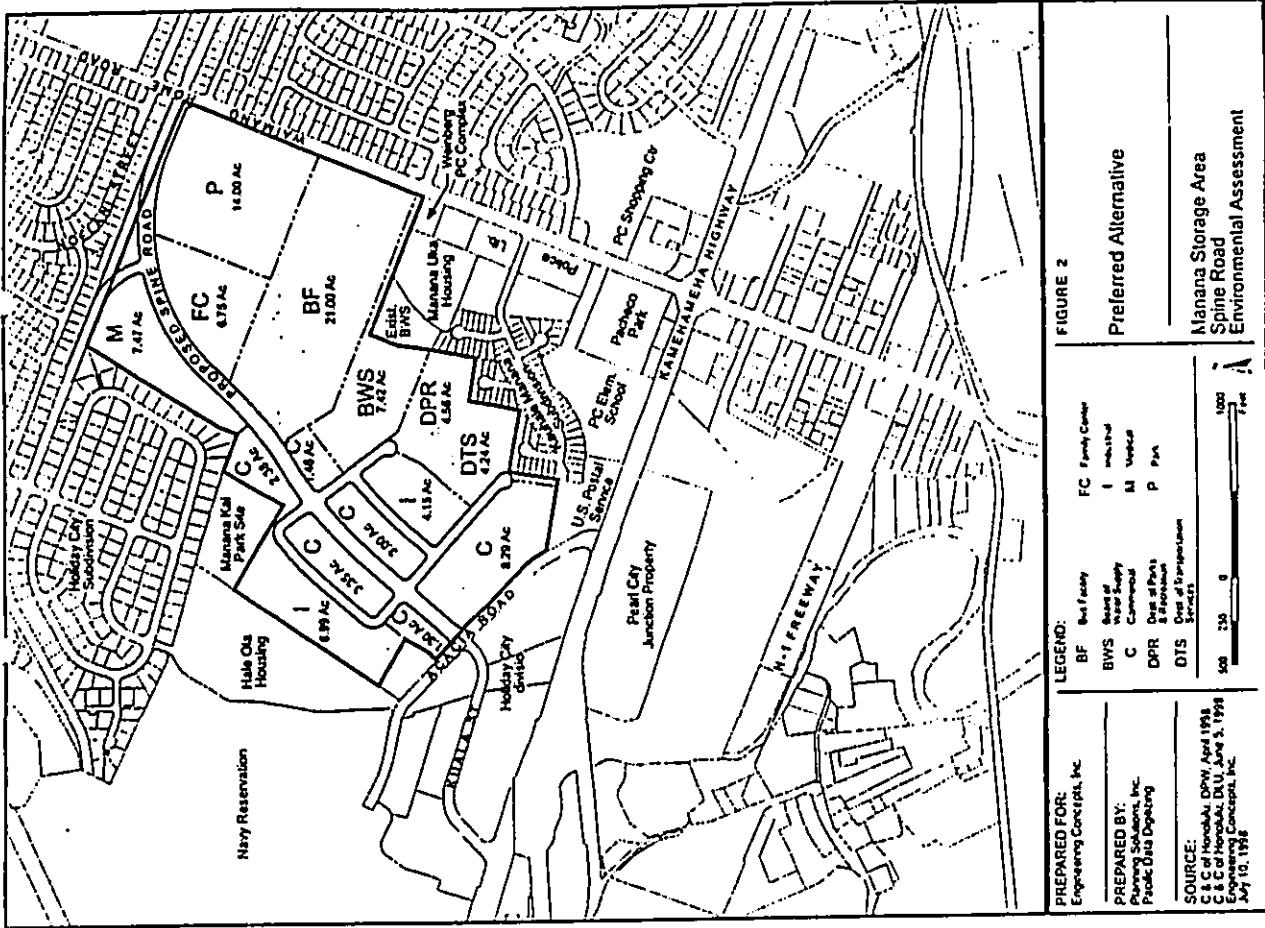
The proposed design includes a connector road between the Spine Road and the Holiday City and Manana subdivisions. This access is intended as mitigation for modifications required at the Noelani Street - Waimano Home Road intersection.

The roadway would have two 11-foot wide vehicle lanes, a six-foot wide bicycle lane, and an eight-foot wide sidewalk on each side of the street. Two different roadway pavement designs are being considered. One would use asphaltic concrete, the other Portland cement concrete. An aggregate sub-base would be provided in either case to facilitate adequate drainage. Sidewalks, curbs and drainage gutters would be constructed of Portland cement concrete.

The design includes a median strip that ranges from 4 to 16 feet wide. The width would change gradually, with 90-foot long transitional areas designed to accommodate left-turn lanes planned at all internal intersections, driveways and at Acacia Road. The left-turn storage lanes would range in length from a minimum of 50 feet at internal driveways to 180 feet at the Acacia Road intersection. All intersections and median openings would be equipped for traffic signals. The wider portions of the median would be landscaped with appropriate vegetation.

The Spine Road intersection with Waimano Home Road would include two westbound and three eastbound lanes. The most *manuka* eastbound lane would provide for left turns and through movements. The most *manuka* (south) lane would be a right-turn-only lane. The Acacia Road intersection would include a dedicated left-turn lane and two lanes for both turns and through movements. Both termini would be signalized.

- Collector roads are intended to serve the areas through which they pass, as opposed to "arterial" roadways, which are designed to move traffic through an area.



The roadway would be constructed so that surface drainage flows away from the center of the road toward two-foot wide concrete swale-like gutters adjacent to the sidewalk curbs. Storm drain catch basins would be constructed at appropriate intervals and at road intersections. Proposed road grades would generally vary between about one- to two-percent, but would increase to five percent in the 30 feet just *manaka* of the intersection with Acacia Road.

Pedestrian crosswalks and Americans with Disabilities Act (ADA) ramps are proposed at each corner of internal intersections. Crosswalks and ramps would also be constructed at the intersection of the Spine Road and Acacia Road. One crosswalk, with two ADA ramps, would be provided for pedestrian crossing of the Spine Road at the intersection with Waimano Home Road.

Utility lines would be installed underground within the Spine Road right-of-way. These include pipes for water, sanitary sewer, and storm drainage. Ducts for electrical and communication lines would be installed within the road right-of-way as well. Stub-outs¹ from the utility lines would be provided to each lot within the former Manana Storage Area. The actual connections would be made at the time these lots are developed.

Construction

The preferred alternative right-of-way traverses land that presently contains portions of 11 warehouses formerly used by the Navy for storage. Six of these warehouses are currently occupied by temporary tenants. Once the warehouses are vacated, they would be demolished and removed before site work begins on the Spine Road². The structures may contain asbestos and lead-based paint. Demolition and disposal would be in accordance with all applicable federal, state and county laws and regulations.

Construction on the proposed road would begin with grubbing and grading. Overall, more material would be excavated than placed. The contractor would remove excess soil to a proper location, either within the former Manana Storage Area or off-site. In addition, the contractor would employ best management practices throughout the construction period. These would include, as appropriate, silt fences, diversion berms, daily watering for dust control, temporary siltation basins, and revegetation of disturbed areas as soon as practicable.

Project Schedule and Costs

The City anticipates starting construction in mid-1999. It estimates that the road, associated utilities, lighting and landscaping would be completed within approximately 12 months. Preliminary project costs for the preferred alternative and the alternative alignment described below are shown in Table 1.

¹ A "stub-out" is a short connection from the main utility line to the boundary of a parcel. The parcel owner/developer is responsible for extending the utility service within the parcel.

² The Spine Road right-of-way contains portions of existing warehouses that are also within the area that would be developed for the proposed Pent City Bus Facility (preferred alternative, one warehouse; alternative alignment, two warehouses). Depending upon the timing of the two projects, it is possible that these two warehouses could be removed before work begins on the Spine Road. In addition, because only parts of the various warehouses are within the road rights-of-way, the City may opt to demolish only portions of the affected structures.

ALTERNATIVE ALIGNMENT

The alternative alignment has the same roadway design (e.g., intersections, connector road, lane widths, traffic signals, crosswalks and ramps) as the preferred alternative. The alternative alignment essentially overlays the preferred alternative for approximately 800 feet from the Waimano Home Road intersection. (Figure 3).

Table 1. Preliminary Cost Estimates (in 1998 Dollars)

| | Preferred Alternative | Alternative Alignment |
|--|-----------------------|-----------------------|
| Building Demolition and Removal | \$798,000 | \$798,000 |
| Grubbing, Grading and Soil Removal | \$1,140,000 | \$1,320,000 |
| Roadway, Sidewalk and Median Construction ¹ | \$1,995,000 | \$2,320,000 |
| Storm Drain System | \$1,370,000 | \$1,450,000 |
| Sanitary Sewer System | \$485,000 | \$500,000 |
| Water System | \$510,000 | \$574,000 |
| Electrical System | \$2,018,000 | \$2,202,000 |
| Telecommunications Systems | \$689,000 | \$851,000 |
| Street Lighting | \$279,000 | \$332,000 |
| Traffic Signal Upgrades | \$135,000 | \$135,000 |
| Retaining Wall | N/A | \$327,000 |
| Grubbing and Grading of Acacia Road Realignment | N/A | \$5,000 |
| TOTAL | \$9,419,000 | \$11,314,000 |

Source: Engineering Concepts, Inc. July 10, 1998

The *manaka* portion of the alternative alignment differs from the preferred alternative both in terms of its general location (more through the center of the former Manana Storage Area) and in its *manaka* terminus (approximately at the existing intersection of Acacia Road and Kanehamaha Highway). The alternative alignment would be about 500 feet longer than the preferred alternative (4,300 feet versus 3,800 feet). In addition, a portion of Acacia Road would have to be realigned to connect with the alternative alignment in a T-intersection.

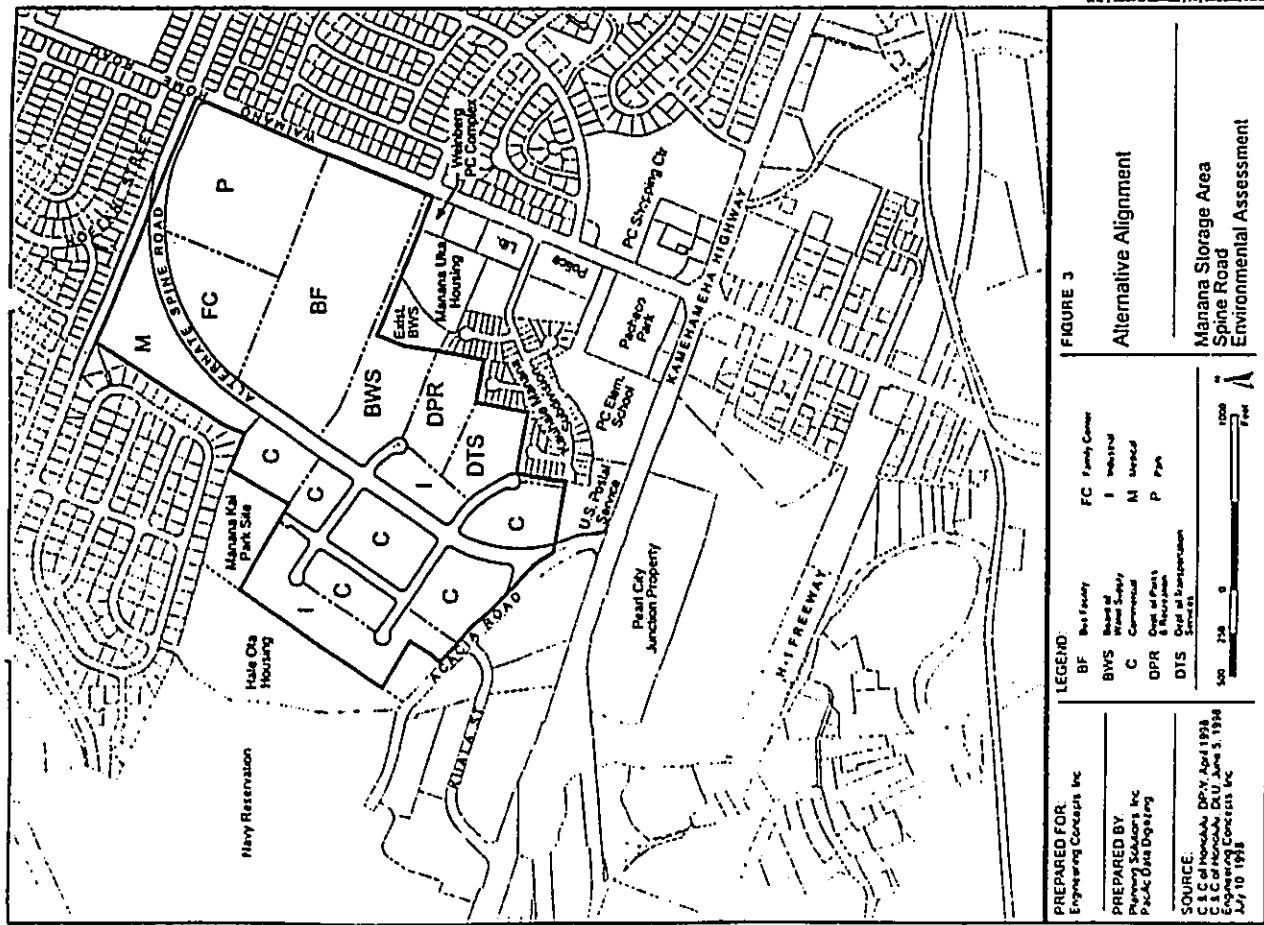
¹ Includes base courses, pavement, sidewalks, landscaping, and roadway striping.

The intersection of the rerouted Acacia Road with the alternative alignment Spine Road would be signalized. *Mauka*-bound traffic on the Spine Road would be provided with a dedicated left-turn lane and two through lanes; two *makai*-bound lanes would include a through lane and a shared right turn/through lane. Acacia Road would have one dedicated left-turn and one dedicated right-turn lane. The alternative alignment would tie into the existing Acacia Road just *maka* of the existing intersection with Kamehameha Highway. The intersection laneage, signal cycling and other operational characteristics would be the same as the preferred alternative.

A grade difference between the alternative alignment's tie-in and the adjacent Post Office property would require excavation and construction of a 210-foot long retaining wall along the road right-of-way. This wall would be approximately 20 feet in total height and its top would be about 15 feet above the road grade. This alignment would also necessitate acquisition of portions of the Post Office property. The City has begun negotiations with the Post Office regarding potential options, including purchase of the entire parcel and construction of a new post office within the former Mamana Storage Area.

The alternative road alignment would also result in an excess of excavated material. A total of 91,000 cubic yards (versus a total of 57,000 cubic yards of excavation for the preferred alternative). The road grade would generally be two percent or less, but includes an 80-foot long portion along its *maka* section with a six-percent grade).

The right-of-way for this alternative contains portions of nine warehouses, seven of which are currently occupied. As with the preferred alternative, these would be vacated, demolished and removed before the start of construction work. The construction schedule and other aspects of the work are comparable to that of the preferred alternative. Cost estimates are shown in Table 1. Total cost of the alternative alignment exceeds that of the preferred alternative by \$1,895,000.



APPENDIX E
DEA COMMENT LETTERS AND RESPONSES

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
630 SOUTH KING STREET, 2ND FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-1561 • Fax: (808) 523-4387



JERRY HARRIS
Mayor

RAMULLU K. FUJIKI, JIA
Director
ROLAND O. LARRY, JR., JIA
Deputy Director

IDEB 98-0396

RECEIVED
DEPARTMENT OF
FACILITY MAINTENANCE
OCT 23 2 45 PM '98

October 23, 1998

Dear Interested Party:

Subject: Manana Development Spine Road
Review of Draft Environmental Assessment

The City and County of Honolulu, Department of Design and Construction, in cooperation with the State Department of Transportation and the Federal Highway Administration, is providing you with a copy of the Draft Environmental Assessment (EA) for the Manana Development Spine Road project. An announcement of availability of the Draft EA appeared in the October 23, 1988, issue of *The Environmental Notice*, published by the State Office of Environmental Quality Control and in the Legal Advertisement section of the October 16, 1988, Honolulu Advertiser.

Please review the Draft EA and address your written comments to:

Department of Design and Construction, IDEB
City and County of Honolulu
630 South King Street, 15th Floor
Honolulu, Hawaii 96813

Attention: Mr. Robert Sarne (phone: 523-4071; FAX: 527-6103)

Copies of your comments should also be furnished to the following parties:

Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

(phone: 586-4185; FAX: 586-4186)

Interested party
Page 2
October 23, 1998

Planning Solutions, Inc.
1210 Auahi Street, Suite 221
Honolulu, Hawaii 96814

Attention: Mr. Perry White (phone: 593-1288; FAX: 593-1956)

A public hearing has been scheduled on Tuesday, November 17, 1998, at 7:30 p.m., in the Pearl City Elementary School's cafeteria (1090 Waimano Home Road, Pearl City) to provide the community and all interested persons an opportunity to present comments. An "open house" will precede the hearing from 6:30 p.m. to 7:15 p.m. to provide information on the project.

The comment period ends on November 23, 1998. Written comments must be received by 4:30 p.m. or postmarked by that date.

Very truly yours,

RAYMOND K. FUJIKI
Director

October 26, 1998

We have no comments. If you have any questions, please call Laverne Higa at 527-6246.

Jonathan K. Shimada, PhD
Director and Chief Engineer
Department of Facility Maintenance

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

850 SOUTH KING STREET, 2ND FLOOR
HONOLULU, HAWAII 96813
PHONE: (808) 523-5544 • FAX: (808) 523-4387



JEREMY HARRIS
SAYOR

RANDALL K. FUJIKI, MA
DIRECTOR
ROLAND D. LIBBY, JR., MA
DEPUTY DIRECTOR

IDEB 98-0485

November 19, 1998

MEMORANDUM

TO: DR. JONATHAN K. SHIMADA, DIRECTOR AND CHIEF ENGINEER
DEPARTMENT OF FACILITY MAINTENANCE

FROM: RANDALL K. FUJIKI, DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

SUBJECT: MANANA DEVELOPMENT SPINE ROAD: DRAFT ENVIRONMENTAL
ASSESSMENT

Thank you for your October 26, 1998, response to the October 1998 *Draft Environmental Assessment* for this department's proposed Manana Development Spine Road project. We appreciate the time you and your staff spent reviewing the document.

Should you have any questions, please call Robert Sarae of the Division of Infrastructure Design and Engineering at Extension 4071.

cc: Office of Environmental Quality Control
Mr. Perry White, Planning Solutions
Mr. Kenneth Ishizaki, Engineering Concepts, Inc.

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FEBRUARY 1999

1



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 8TH FLOOR
HONOLULU, HAWAII 96813

October 28, 1998

Randall K. Fujiki
Department of Design and Construction
City and County of Honolulu
650 South King Street, 2nd Floor
Honolulu, Hawaii 96813

Dear Mr. Fujiki:

SUBJECT: Chapter 6E-8 Historic Preservation Review -- Draft Environmental Assessment Manana Development Spine Road Manana, Ewa, O'ahu
TMK: 9-7-24:41

LOG NO: 22458
DOCNO: 9810EJ30

The DEA correctly incorporates in Appendix D our comments that this project will have "no effect" on historic sites.

If you have any questions please call Sara Collins at 587-0013 or Elaine Jourdana at 587-0014.

Aloha,

Don Hibbard, Administrator
Historic Preservation Division

E:jk

c: OEQC, 235 South Beretania Street, Suite 702, Hon, HI 96813
Perry White, Planning Solutions, 1210 Auahi Street, Suite 221, Hon, HI 96814

INCLUDE IN RELIANT CHALLENGER BOARD OF LAND AND NATURAL RESOURCES

OPORTES

SUBJECT COLOMA-AMANA

AGRICULTURE DEVELOPMENT PROGRAM

AGRI-RESOURCES CONSERVATION AND

RESOURCES IMPROVEMENT

CONSERVATION AND

WILDLIFE AND WILDLIFE

HISTORIC PRESERVATION

LAND DIVISION

STATE PARKS

WATER AND LAND DEVELOPMENT

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2

NOV-16-98 MON 15:53
FDU-16-1998 15:53

ENGR. CONCEPTS
DEVELOPING
FAX NO. 8085918010

P. 02/03

DEPARTMENT OF DESIGN AND CONSTRUCTION

CITY AND COUNTY OF HONOLULU

630 SOUTH KING STREET, 2ND FLOOR
HONOLULU, HAWAII 96819
PHONE: (808) 525-4281 • FAX: (808) 525-4277

RECEIVED
NOV 16 1998



CHARLES E. PALMER, AIA
DIRECTOR
POLYMER D. LEMAY, JR., AIA
DEPUTY DIRECTOR
ID/FEB 98-0483

TELECON MEMORANDUM

Date: October 29, 1998
Subject: Manana Development Spine Road: Draft Environmental Assessment (DEA)
Prepared By: Robert Sime (Received Call)
Outside Party: Mr. Chris Swenson, Wildlife Biologist
U. S. Department of the Interior
Fish and Wildlife Service
Pacific Islands Eco-region
Ph. No. 541 3441

Summary of Conversation:

Mr. Swenson said that the U. S. Fish and Wildlife Service (Service) has reviewed the DEA for the proposed Manana Development Spine Road, Oahu, Hawaii. The Service does not anticipate significant adverse impacts to fish and wildlife resources to result from the Manana Development Spine Road project. The Service will not provide any written comments.

RMS:LC:clj
6-1

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3

3
F E B R U A R Y 1 9 9 9

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU
3273 COPPER STREET, SUITE 4032
HONOLULU, HAWAII 96818-1889



JEFFREY HARRIS
MAYOR

ATTILIO K. LEONARDI
FIRE CHIEF
JOHN CLARE
DEPUTY FIRE CHIEF

SPROCK HARRIS
MAYOR

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
800 SOUTH KING STREET, 2ND FLOOR
HONOLULU, HAWAII 96813
PHONE: (808) 523-8844 • FAC: (808) 523-6887



RANDALL K. FUJIKI, MA
DIRECTOR
ROLAND D. LIBBY, JR., MA
DEPUTY DIRECTOR

IDEB 98-0486

November 18, 1998

MEMORANDUM

TO: MR. ATTILIO K. LEONARDI, FIRE CHIEF
HONOLULU FIRE DEPARTMENT

FROM: RANDALL K. FUJIKI, DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

SUBJECT: MANANA DEVELOPMENT SPINE ROAD: DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your October 26, 1998, letter regarding the October 1998 *Draft Environmental Assessment* for this department's proposed Manana Development Spine Road project. We appreciate the time you and your staff spent reviewing the document.

In accordance with your request, we will route a complete set of plans to your department for your review and approval during the detailed design phase.

Should you have any questions, please call Robert Sarae of the Division of Infrastructure Design and Engineering at Extension 4071.

October 29, 1998

TO: RANDALL K. FUJIKI, DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

ATTN: ROBERT SARAE, CIVIL ENGINEER

FROM: ATTILIO K. LEONARDI, FIRE CHIEF

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT
PROJECT : MANANA DEVELOPMENT SPINE ROAD
LOCATION : PEARL CITY, OAHU
TMK : 9-7-24-41
HFD INTERNAL NO. OL 98-363

We received your memorandum of October 23, 1998, regarding the Manana Development Spine Road project. We appreciate the opportunity to review the Draft Environmental Assessment and have no adverse comments to make regarding this project. However, we request that a full set of plans be routed to the respective agencies prior to actual construction.

Should you have any questions, please call Battalion Chief Charles Wassman of our Fire Prevention Bureau at 831-7778.

ATTILIO K. LEONARDI
Fire Chief

AKL/LN:bh

cc: Gary Gill, Director, Office of Environmental Quality Control
Perry White, Planning Solutions, Inc.

cc: Office of Environmental Quality Control
Mr. Perry White, Planning Solutions, Inc.
Mr. Kenneth Ishizaki, Engineering Concepts, Inc.

NOV-18-98 WED 15:35

ENGR. CONCEPTS

FAX NO. 8085919010

P. 02/02



RECEIVED

NOV 18 10 00 PM '98

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT HONOLULU
FT. SHAFTER, HAWAII 96813

October 30, 1998

Civil Works Branch

Mr. Robert Sarae
City and County of Honolulu
Department of Design and Construction
650 South King Street, 15th Floor
Honolulu, Hawaii 96813

Dear Mr. Sarae:

Thank you for the opportunity to review and comment on the Draft Environmental Assessment for the Manana Development Spine Road Project, Pearl City, Oahu (TRK 9-7-24: 41). We do not have any additional comments to offer beyond those previously provided in our letter dated October 1, 1998.

Due to the recent 1998 reorganization of the local U.S. Army Corps of Engineers office, all correspondence concerning comments to environmental and planning documents should be sent to the Honolulu Engineer District, Attention: CEPOH-ED-C. Thank you for your attention to this matter.

Sincerely,

Paul Mizue, P.E.
Chief, Civil Works Branch

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 15th FLOOR
HONOLULU, HAWAII 96813
PHONE: (808) 523-8861 • FAX: (808) 523-8867



SPURDY HARRIS
MAYOR

RANDALL K. FUJIKI, AIA
Director
ROLAND D. LEMAY, JR., AIA
Deputy Director

IDEB 98-0503

November 24, 1998

Mr. Paul Mizue, P.E., Chief
Civil Works Branch
U.S. Army Engineer District, Honolulu
Building 230
Fort Shafter, Hawaii 96858-5440

Attention: CEPOH-ED-C

Dear Mr. Mizue:

Subject: Manana Development Spine Road: Draft Environmental Assessment

Thank you for your October 30, 1998, response to the October 1998 *Draft Environmental Assessment* for this department's proposed Manana Development Spine Road project. We appreciate the time you and your staff spent reviewing the document.

Should you have any questions, please call Robert Sarae of the Division of Infrastructure Design and Engineering at 523-4071.

Very truly yours,

RANDALL K. FUJIKI
Director

cc: Office of Environmental Quality Control
Mr. Perry White, Planning Solutions, Inc.
Mr. Kenneth Ishizaki, Engineering Concepts, Inc.

TOTAL P. 03

5

FILE COPY

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
600 SOUTH KING STREET, 2ND FLOOR
HONOLULU, HAWAII 96813
PHONE: (808) 522-4341 • FAX: (808) 522-4977



SEBASTIAN HARRIS
MAYOR

RANDALL K. FUJIKI, AIA
DIRECTOR
ROLAND D. LIBBY, JR., AIA
DEPUTY DIRECTOR

IDEB 98-0502

ENV 98-205

November 24, 1998

November 4, 1998

MEMORANDUM

TO: MR. RANDALL K. FUJIKI, DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

ATTENTION: MR. ROBERT SARAE
INFRASTRUCTURE DESIGN AND ENGINEERING BRANCH
CHERYL K. CHURCH-COPE

FROM: KENNETH E. SPRAGUE, DIRECTOR
DEPARTMENT OF ENVIRONMENTAL SERVICES

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (DEA)
MANANA DEVELOPMENT SPINE ROAD
TMK: 9-7-24:41

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

1. During construction, best management practices (BMPs) should be applied to reduce and control discharge of pollutants.
2. Should construction dewatering activity take place, construction dewatering permits will be required by the State Department of Health and the City Department of Environmental Services.

Should you have any questions, please contact Alex Ho at extension 4150.

cc: DEGC
PLANNING SOLUTIONS, INC.

AH:di

MEMORANDUM

TO: DR. KENNETH E. SPRAGUE, DIRECTOR
DEPARTMENT OF ENVIRONMENTAL SERVICES

FROM: RANDALL K. FUJIKI, DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

SUBJECT: MANANA DEVELOPMENT SPINE ROAD: DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your November 4, 1998, letter regarding the October 1998 *Draft Environmental Assessment* for this department's proposed Manana Development Spine Road project. We appreciate the time you and your staff spent reviewing the document.

Thank you for reminding us that if dewatering is undertaken during this project, construction dewatering permits must first be obtained from your department and the State Department of Health. In addition, we will require the successful contractor to follow Best Management Practices (BMPs) during construction as you suggested in your letter.

Should you have any questions, please call Robert Sarae of the Division of Infrastructure Design and Engineering at Extension 4071.

cc: Office of Environmental Quality Control
Mr. Perry White, Planning Solutions, Inc.
Mr. Kenneth Ishizaki, Engineering Concepts, Inc.

BERNARD L. CALETANO
GOVERNOR
SEIJI F. NAYA
DIRECTOR
BRADLEY J. MOSSMAN
DEPUTY DIRECTOR
ROCK EGGOLD
DIRECTOR, OFFICE OF PLANNING

Tel.: (808) 587-2848
Fax: (808) 587-2824

**DEPARTMENT OF BUSINESS,
ECONOMIC DEVELOPMENT & TOURISM**

OFFICE OF PLANNING
235 South Beretania Street, 6th Fl., Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Ref. No. P-7808

November 17, 1998

Mr. Randall K. Fujiki
Director
Department of Design and Construction
City and County of Honolulu
650 S. King Street
Honolulu, Hawaii 96813

Attention: Mr. Robert Sarac

Dear Mr. Fujiki:

Subject: Draft Environmental Assessment - Manana Development Spine Road

We have reviewed the proposed Spine Road alignment that would traverse the former Manana storage area property in Pearl City, Oahu. We do not have concerns relative to the programs of the Office of Planning and the Department of Business, Economic Development, and Tourism.

If there are any questions, please contact Christina Meller of our Coastal Zone Management Program at 587-2845.

Sincerely,

Mary Ann Kachayacki
Bradley J. Mossman
Director
Office of Planning

cc: Planning Solutions, Inc. (Attn: Perry White)
Gary Gill, OEQC
Seiji F. Naya

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NOV-23-98 MON 11:44 ENGR. CONCEPTS
102-23-1998 09:45 DEPT. OF PARKS AND RECREATION

FAX NO. 8085919010

P. 02/03

DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU
100 SOUTH KING STREET, SUITE 1000, HONOLULU, HAWAII 96813-2094
PHONE: (808) 525-1100 FAX: (808) 525-2094

FINAL ENVIRONMENTAL ASSESSMENT - MAWANA DEVELOPMENT SPINE ROAD

APPENDIX E



NOV 19 03 24

WILLIAM D. BALFOUR, JR.
DESIGN & CONSTRUCTION
DIV. OF INFRASTRUCTURE & TRANSPORTATION
DESIGN & ENGINEERING

November 17, 1998

TO: RANDALL K. FUJIKI, DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

FROM: WILLIAM D. BALFOUR, JR., DIRECTOR

SUBJECT: MAWANA DEVELOPMENT SPINE ROAD
REVIEW OF DRAFT ENVIRONMENTAL ASSESSMENT

We have reviewed the above-referenced document and find that recreational services to the public will not be adversely affected by the proposed project.

Both alignments of the proposed spine road provide safer ingress and egress to the proposed neighborhood park than Waimano Home Road.

If you have any questions, please contact Mr. John Svealand, Executive Assistant, at 527-6038.

W.D. Balfour, Jr.
WILLIAM D. BALFOUR, JR.
Director

WDB:cu
11/17/98

cc: Office of Environmental Quality Control

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NOV 19 1998
11 18 PM
C&CC

PLANNING DEPARTMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 6TH FLOOR • HONOLULU, HAWAII 96813-2017
PHONE: (808) 522-4533 • FAX: (808) 522-4530



JEREMY HARRIS
MAYOR

PATRICK O'NEIL
CHIEF PLANNING OFFICER
DOUG L. HARRIS
DEPUTY CHIEF PLANNING OFFICER
ET 10/98-2100

November 18, 1998

TO: RANDALL K. FUJIKI, DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

ATTN: ROBERTSARAE

FROM: PATRICK O'NEIL
CHIEF PLANNING OFFICER

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (DEA) FOR THE
PROPOSED MANANA DEVELOPMENT SPINE ROAD,
PEARL CITY, OAHU, HAWAII

This is in response to your letter dated October 23, 1998. We have reviewed the Draft Environmental Assessment (DEA) and have the following comments to offer:

- Section 4.6.3.4 of the DEA identifies two mitigation alternatives (Alternative 3 and Alternative 5) being considered for the Noelani Street intersection. Since the preparation of this report, it is our understanding that Alternative 6 is also being considered as a viable alternative. We recommend that this section in the Final Environmental Assessment (FEA) be revised to include Alternative 6.

The FEA should also address potential impacts to nearby residents if Alternatives 5 or 6 is implemented.

- Before the final alignment of the roadways and subdivision of the land, the project should be evaluated to make maximum use of the land and to avoid the creation of undevelopable pockets of land.

Should you have any questions, please call Eugene Takahashi of our staff at 527-6022.

PTO:lh

c: OEQC
vPlanning Solutions, Inc.
Attn: Mr. Perry White

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 2ND FLOOR
HONOLULU, HAWAII 96813
PHONE: (808) 522-4584 • FAX: (808) 522-4587



JEREMY HARRIS
MAYOR

RANDALL K. FUJIKI, AIA
DIRECTOR
ROLAND D. LIBBY, JR., AIA
DEPUTY DIRECTOR

IDEB 99-0019

January 14, 1999

MEMORANDUM

TO: MS. JAN NAOE SULLIVAN, DIRECTOR
DEPARTMENT OF PLANNING AND PERMITTING

ATTENTION: MR. EUGENE TAKAHASHI
PLANNING DIVISION

FROM: RANDALL K. FUJIKI, DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

SUBJECT: MANANA DEVELOPMENT SPINE ROAD -- DRAFT
ENVIRONMENTAL ASSESSMENT

Thank you for your November 18, 1998, memorandum from the former Planning Department, concerning the Draft Environmental Assessment for this Department's proposed Manana Development Spine Road project. We appreciate the time you and your staff spent reviewing the document. Responses to your comments are as follows:

- The Final Environmental Assessment will assess the probable effects of Alternatives 5 and 6 as you requested. The discussion will include potential impacts on nearby residents.
- We will evaluate the project during the design phase to maximize the use of land and to minimize the creation of undevelopable pockets of land. However, because of the configuration of existing adjoining development, some small remnant areas may be unavoidable.

Should you have any questions, please call Robert Sarae of the Division of Infrastructure Design and Engineering at extension 4071.

LRMS:LCJem
cc: Office of Environmental Quality Control
Mr. Perry White, Planning Solutions, Inc.
Mr. Kenneth Ishizaki, Engineering Concepts, Inc.

9

LET. No. 08-99-152
Victoria Lowell
LIBRARIAN
STATE LIBRARIAN



STATE OF HAWAII
DEPARTMENT OF EDUCATION
HAWAII STATE PUBLIC LIBRARY SYSTEM
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WILLIAM J. CARTER
COMMISSIONER

OFFICE OF THE STATE LIBRARIAN

November 18, 1998

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Mr. Robert Sarae
Department of Design and
Construction
City & County of Honolulu
650 South King Street, 2nd Floor
Honolulu, Hawaii 96813

Dear Mr. Sarae:

Subject: Manana Development Spine Road
Review of Draft Environmental Assessment

We reviewed the draft Environmental Assessment, and have no
comments to offer.

Thank you for the opportunity to review the document.

Very truly yours,

John R. Penebacker
JOHN R. PENEBACKER

Special Assistant to the
State Librarian

cc: Office of Environmental Quality Control
Planning Solutions, Inc.

DEPARTMENT OF DESIGN AND CONSTRUCTION

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 2ND FLOOR
HONOLULU, HAWAII 96813
PHONE: (808) 523-4184 • FAX: (808) 523-4567



SECRETARY
MAYOR

FILE COPY

RANDALL E. FLURE, AIA
DIRECTOR
ROLAND D. LIBBY, AIA
DEPUTY DIRECTOR

Ms. Susan Everett
February 9, 1999
Page 2

volumes and roadway performance to determine if further mitigation measures may be needed, including traffic signals.

Should you have any questions, please call Robert Saraz of the Division of Infrastructure Design and Engineering at 523-4071.

IDEB 99-0014

February 9, 1999

Ms. Susan Everett
Century Park Plaza Community Association
P. O. Box 30094
Honolulu, Hawaii 96820-0094

Dear Ms. Everett:

Subject: Manana Development Spine Road - Draft Environmental Assessment

Thank you for your November 18, 1998, e-mail regarding this Department's proposed Manana Development Spine Road project. We appreciate the time you and other members of the Century Park Plaza Community Association spent reviewing the Draft Environmental Assessment, attending the public hearing, and preparing your comments.

We understand the Association's concerns that the proposed Spine Road will make egress from the condominium driveways harder by increasing the through-traffic on Kuala Street. The traffic impact analyses conducted for the project considered the needs of the Century Park Plaza condominium residents. Although construction of the Spine Road is expected to increase through-traffic past your driveways, the traffic signals that the City plans to install at the Spine Road/Kuala Street/Acacia Road intersection should help mitigate the increase in traffic. The traffic signals should provide adequate gaps in the flow of traffic on Kuala Street for existing Century Park Plaza traffic. Currently, the intersection is unsignalized and does not meter the through-traffic. The City will also consider prohibiting parking in the single space between the second Century Park Plaza driveway and the fire hydrant to improve the sight-distance for vehicles exiting the Century Park Plaza. The removal of a single on-street parking space will not significantly change the parking situation for area residents.

Motorists do sometimes drive faster than the posted speed limit on Kuala Street, thus causing some discomfort to vehicles exiting the Century Park Plaza. After the Spine Road is built, the City will review the situation periodically to determine if traffic-calming measures are warranted to slow drivers to a more reasonable speed. The City will also continue monitoring the traffic

Very truly yours,

RANDALL K. FUJITA
Director

RMS:LC:icm
R-J K S

cc: Office of Environmental Quality Control
Mr. Perry White, Planning Solutions, Inc.
Mr. Kenneth Ishitaki, Engineering Concepts, Inc.



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P.O. BOX 217
HONOLULU, HAWAII 96808
NOV 20 1998

AGRICULTURE DEVELOPMENT
ARCHITECTURE
ARTS AND CULTURE
BOATING AND OCEAN RECREATION
CONSERVATION AND
RECREATION DEVELOPMENT
CORRECTION AND PUBLIC
PROPERTY AND INFRASTRUCTURE
HISTORIC PRESERVATION
LAND MANAGEMENT
WATER RESOURCE MANAGEMENT

Mr. Robert Sarae
Department of Design and Construction
City and County of Honolulu
650 South King Street, 15th Floor
Honolulu, Hawaii 96813

Dear Mr. Sarae: Draft Environmental Assessment Manana Development
Subject: Spine Road

We have reviewed the subject Draft Environmental Assessment and have no comments on the proposed project.

Thank you for the opportunity to review the document.

Very truly yours,

Dean Uchida
Dean Uchida,
Administrator

c.c. OEQC
Planning Solutions, Inc. Atten: Mr. Perry White

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DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
1400 KALANOAUE BLVD. SUITE 1200 • HONOLULU, HAWAII 96813
PHONE: (808) 533-4529 • FAX: (808) 533-4730



JEREMY HARRIS
SAVOR

CHERYL D. SOON
DIRECTOR
JOSEPH M. MAGALAN, JR.
DEPUTY DIRECTOR

November 23, 1998

TPD10/98-06181R

MEMORANDUM

TO: RANDALL K. FUJIKI, DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

ATTN: ROBERT SARAE

FROM: CHERYL D. SOON, DIRECTOR

SUBJECT: MANANA DEVELOPMENT SPINE ROAD

In response to your October 13, 1998 letter, the draft environmental assessment (EA) for the subject project was reviewed.

The draft EA includes a discussion of alternative means of mitigating potential adverse effects on access to the Manana and Holiday City Subdivisions. It is our understanding that Alternatives 3 and 5 are being evaluated and discussed with the community. This department has no objections to either alternative.

Should you have any questions regarding this matter, please contact Faith Miyamoto of the Transportation Planning Division at Local 6976.

cc: Mr. Gary Gill, Office of
Environmental Quality Control
Mr. Perry White, Planning Solutions, Inc.

Cheryl D. Soon
CHERYL D. SOON

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
630 SOUTH KING STREET, 2ND FLOOR
HONOLULU, HAWAII 96813
PHONE: (808) 533-4564 • FAX: (808) 533-4567



JEREMY HARRIS
SAVOR

RANDALL K. FUJIKI, MA
DIRECTOR
ROLAND D. LIBBY, JR., MA
DEPUTY DIRECTOR

IDEB 99-0018

January 14, 1999

MEMORANDUM

TO: MS. CHERYL D. SOON, DIRECTOR
DEPARTMENT OF TRANSPORTATION SERVICES

FROM: RANDALL K. FUJIKI, DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

SUBJECT: MANANA DEVELOPMENT SPINE ROAD: DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your November 23, 1998, memorandum concerning the *Draft Environmental Assessment* for this department's proposed Manana Spine Road project. We appreciate the time you and your staff spent reviewing the document. We understand from your memorandum and from subsequent discussions between members of our respective departments that DTS has no objections to Alternatives 3 or 5.

As you know, we continued to discuss mitigation alternatives with community groups following publication of the *Draft Environmental Assessment*. After considering the results of those discussions and further analyses we conducted in response to public concerns expressed during the consultation process, the Department of Design and Construction has selected Alternative 6 as its Preferred Alternative. Alternative 6 would leave access to Nodiani Street unchanged. This will be reflected in the Final Environmental Assessment.

Six (6) alternatives were developed and evaluated in our efforts to mitigate traffic impacts at the Waimano Home Road/Moanalua Road and Waimano Home Road/Nodiani Street intersections. These alternatives were developed as part of our effort to insure adequate access for residents of the Manana and Holiday City Subdivisions following construction of the Manana Spine Road. All six alternatives were presented to the affected community through several meetings with the Pearl City Task Force, the Manana Community Association, and the Pearl City Community. We appreciate the DTS's staff for attending the presentations and participation in the discussions.

Ms. Cheryl D. Soon
Page 2
January 14, 1999

As explained at those meetings and in the *Draft Environmental Assessment*, from a traffic operations perspective, Alternatives 3 and 5 provide the best operating conditions at the Waimano Home Road/Moanahua Road intersection. However, these alternatives involved some restrictions on access to/from Noelani Street. We ultimately selected Alternative 6 as the Preferred Alternative because it did not restrict the existing access to the Maunaloa Community via Noelani Street.

Alternative 6 does not provide a good Level-of-Service (LOS) during the morning peak hour. Consequently, some additional mitigation measures may eventually be needed to improve the LOS during that period. These measures could include contrailow of the northbound left-turn lane from Waimano Home Road onto Noelani Street. In the morning peak hour, this would provide double left-turn lanes in the southbound direction onto Moanahua Road, similar to the lanes configuration shown in Alternative 5. Additional signal timing modifications may also be required.

Should you have any further questions, please call Robert Sarac of the Division of Infrastructure Design and Engineering at Extension 4071.

RMS:LC:ptd
cc: *[Signature]*
Office of Environmental Quality Control
Mr. Perry White, Planning Solutions, Inc.
Mr. Kenneth Ishizaki, Engineering Concepts, Inc.
DPP - Traffic Review Branch

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DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU

850 SOUTH KING STREET • HONOLULU, HAWAII 96813
PHONE (808) 523-4414 • FAX (808) 527-5733



MEMORANDUM
ACTION

JAN NAOE SULLIVAN
DIRECTOR

LORETTA K.C. CHEE
PLANNING DIRECTOR

98-08114(DT)
'98 EA Comments Zone 9

November 24, 1998

MEMORANDUM

TO: RANDALL K. FUJIKI, DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

ATTN: MR. ROBERT SARAF

FROM: JAN NAOE SULLIVAN, DIRECTOR
DEPARTMENT OF PLANNING AND PERMITTING

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (EA) FOR
MANANA DEVELOPMENT SPINE ROAD, PEARL CITY, OAHU

We have reviewed the above Draft EA and have the following comments:

1. The construction schedule for the roadway should be coordinated with the other planned projects to minimize impacts on the surrounding roadway system during construction. It appears that construction of the roadway will occur at the same time as the bus and Board of Water Supply facilities. Delivery of large quantities of materials and equipment should not occur during the peak traffic periods and should be coordinated to avoid having a number of large vehicles entering or exiting the site at the same time.
2. The traffic study identifies interim roadway improvements that would be required during the initial phases of the development. The roadway improvements that will be ultimately constructed are planned for a period prior to the year 2020 when the site is expected to be fully developed. The study should include an analysis, based on the anticipated build-out of the proposed land uses, to determine when the various roadway improvements would be required.

RANDALL K. FUJIKI, DIRECTOR
Page 2
November 24, 1998

We would like to receive a copy of the Final EA when it becomes available. If you have any questions regarding this letter, please call Mr. Mel Hirayama of our staff at Extension 4119.

JAN NAOE SULLIVAN
Director of Planning
and Permitting

JNS:am

cc: Office of Environmental Quality Control
, Perry White, Planning Solutions, Inc.

Posse doc no. 402

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

610 SOUTH KING STREET, 2ND FLOOR
HONOLULU, HAWAII 96813
PHONE: (808) 523-4564 • FAX: (808) 523-4587



JEREMY HARRIS
MAYOR

RAMONALI E. ELBERL, AIA
DIRECTOR
ROLAND D. LIBBY, JR., AIA
DEPUTY DIRECTOR

IDEB 99-0020

January 13, 1999

MEMORANDUM

TO: MS. JAN NAOE SULLIVAN, DIRECTOR
DEPARTMENT OF PLANNING AND PERMITTING

FROM: RANDALL K. FUJIKI, DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

SUBJECT: MANANA DEVELOPMENT SPINE ROAD - DRAFT ENVIRONMENTAL
ASSESSMENT

Thank you for your November 24, 1998, memorandum concerning the Draft Environmental Assessment for this Department's proposed Manana Development Spine Road project. We appreciate the time you and your staff spent reviewing the document. Responses to your comments are as follows:

- (1) Your observation that work on portions of the proposed roadway is likely to take place at the same time as work on other projects within the Manana Redevelopment Area is correct. We will do our best to see that vehicular traffic associated with construction of the Spine Road does not increase peak-hour congestion on area roadways. In this regard, it is worth noting that construction vehicles traveling to and from the Pearl City Bus Facility and the Board of Water Supply's parcel will generally use Waimano Home Road while much of the vehicular movements associated with construction of the Spine Road will use alternate routes.
- (2) The City does not yet have any firm commitments from private developers for use of the parcels that will be created by redevelopment of the former Manana Storage Area parcel. Because of this, we cannot provide the kind of detailed analysis you requested. Nonetheless, we are confident that the roadway and intersection improvements that will be installed during the first phase of construction will be sufficient to accommodate forecast traffic through 2005.

Should you have any questions, please call Robert Sarac of the Division of Infrastructure Design and Engineering at extension 4071.

RMS:IG:jcm ymy
cc: Office of Environmental Quality Control
Mr. Perry White, Planning Solutions, Inc.
Mr. Kenneth Ishizaki, Engineering Concepts, Inc.
Board of Water Supply (w/DPP letter)
bcc: DDC - DEG (w/DPP letter)

15

FEBRUARY 1999

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PEARL CITY NEIGHBORHOOD BOARD NO. 21

99 NEIGHBORHOOD COMMISSION • CITY HALL, ROOM 400 • HONOLULU, HAWAII 96813

November 25, 1998

Department of Design and Construction
Infrastructure Design and Engineering Division
650 South King Street, 15th Floor
Honolulu, Hawaii 96813

Attention: Mr. Robert Sarae

Gentlement:

Subject: Manana Development Spine Road
Draft Environmental Assessment (EA)
Manana and Waiawa, Ewa, Oahu, Hawaii
Tax Map Key: 9-7-24; por.41

This is to inform you that the Pearl City Neighborhood Board No. 21, at its November 19, 1998 regular meeting, voted 12-0-0, to recommend the following actions, after review of the Draft EA and testimony from the community at the November 17, 1998 public hearing to obtain Federal funding:

1. Support efforts of the Manana Community Association to continue the mauka-bound left turn lane from Waimano Home Road into Noelani Street, except for the a.m. peak hour when two makai-bound lanes are to be created by "contra-flow" coning for left turns from Waimano Home Road into Moanalua Road (Waikiki-bound) in the future.
2. Support the efforts of the Century Park Plaza Association of Apartment Owners to request the City Department of Transportation Services conduct an impact analysis to provide traffic signalization on Kula Street to allow residents to make protected left turns from the apartment driveways mauka-bound to the new Acacia/Spine Road intersection, together with an on-street parking feasibility study to allow more parking for the affected residents and Pearl Highlands Center patrons.

Your favorable action to include these comments in the Final EA is appreciated.



City of Honolulu Neighborhood Board System - Established 1973

16

Manana Development Spine Road
Page 2

Very truly yours,

Joshua Kaye
Joshua Kaye
Chair

cc: Manana Community Association
Shigeo Ushiro, Vice President
Susan Everett
Association of Apartment Owners - Century Park Plaza
Council Chair Mufi Hannemann
Pearl City Community Association, Bob Kubo
Perry White, Planning Solutions, Inc.
U.S. DOT, FHWA: Pat Phung
Office of Environmental Quality Control
Pearl City Neighborhood Board members
Neighborhood Commission Office

X

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
150 SOUTH KING STREET, 2ND FLOOR
HONOLULU, HAWAII 96813
PHONE: (808) 523-3384 • FAX: (808) 523-4187



JEREMY HARRIS
MAYOR

FILE COPY

RANDALL K. FUJIKI, AIA
DIRECTOR
ROLAND D. LIBBY, JR., AIA
DEPUTY DIRECTOR

IDEB 99-0015

February 9, 1999

Mr. J. Joshua Kaye, Chairman
Pearl City Neighborhood Board No. 21
c/o Neighborhood Commission
City and County of Honolulu
City Hall, Room 400
Honolulu, Hawaii 96813

Dear Mr. Kaye:

Subject: Manana Development Spine Road -- Draft Environmental Assessment

Thank you for your November 25, 1998, letter concerning the Draft Environmental Assessment for this Department's proposed Manana Development Spine Road project. We appreciate the time you and other members of the Neighborhood Board spent reviewing the document and preparing your comments. Responses to the points contained in your letter are as follows:

1. We understand the Manana Community Association's concerns regarding access to Noelani Street. Alternative #6 was selected as the preferred alternative largely in response to these concerns. Nonetheless, as traffic increases with the redevelopment of the former Manana Storage Area, additional mitigation measures may be needed. These measures could include contraflow of the northbound left-turn lane on Waimano Home Road at Noelani Street. This would provide double left-turn lanes in the southbound (makai-bound) direction onto Moanalua Road. Additional signal timing modifications may also be required.

2. Thank you for informing us of your support of the Century Park Plaza Association request. Our response to the Association's comments is attached.

Should you have any questions, please call Robert Sarae of the Division of Infrastructure Design and Engineering at 523-4071.

Very truly yours,

Randall K. Fujiki
RANDALL K. FUJIKI
Director

RMS:LC:lcm
Attach.

cc: Office of Environmental Quality Control
Mr. Perry White, Planning Solutions, Inc.
Mr. Kenneth Ishizaki, Engineering Concepts, Inc.

bcc: Mr. Dave Arakawa, Mayor's Representative
Ms. Sharon Ishii, Mayor's Representative

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DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
850 SOUTH KING STREET, 2ND FLOOR
HONOLULU, HAWAII 96813
PHONE: (808) 523-4184 • FAX: (808) 523-4187



JEREMY HARRIS
MAYOR

RANDALL K. FLURO, AIA
DIRECTOR
ROLAND D. LIBBY, JR., AIA
DEPUTY DIRECTOR

FILE COPY

IDEB 99-0014

February 9, 1999

Ms. Susan Everett
Century Park Plaza Community Association
P. O. Box 30094
Honolulu, Hawaii 96820-0094

Dear Ms. Everett:

Subject: Maunaloa Development Spine Road - Draft Environmental Assessment

Thank you for your November 18, 1998, e-mail regarding this Department's proposed Maunaloa Development Spine Road project. We appreciate the time you and other members of the Century Park Plaza Community Association spent reviewing the Draft Environmental Assessment, attending the public hearing, and preparing your comments.

We understand the Association's concerns that the proposed Spine Road will make egress from the condominium driveways harder by increasing the through-traffic on Kuala Street. The traffic impact analyses conducted for the project considered the needs of the Century Park Plaza condominium residents. Although construction of the Spine Road is expected to increase through-traffic past your driveways, the traffic signals that the City plans to install at the Spine Road/Kuala Street/Acacia Road intersection should help mitigate the increase in traffic. The traffic signals should provide adequate gaps in the flow of traffic on Kuala Street for existing Century Park Plaza traffic. Currently, the intersection is unsignalized and does not meter the through-traffic. The City will also consider prohibiting parking in the single space between the second Century Park Plaza driveway and the fire hydrant to improve the sight-distance for vehicles exiting the Century Park Plaza. The removal of a single on-street parking space will not significantly change the parking situation for area residents.

Motorists do sometimes drive faster than the posted speed limit on Kuala Street, thus causing some discomfort to vehicles exiting the Century Park Plaza. After the Spine Road is built, the City will review the situation periodically to determine if traffic-calming measures are warranted to slow drivers to a more reasonable speed. The City will also continue monitoring the traffic

Ms. Susan Everett
February 9, 1999
Page 2

volumes and roadway performance to determine if further mitigation measures may be needed, including traffic signals.

Should you have any questions, please call Robert Same of the Division of Infrastructure Design and Engineering at 523-4071.

Very truly yours,


RANDALL K. FLURO
Director

RMS:LC:lem
RL

cc: Office of Environmental Quality Control
Mr. Perry White, Planning Solutions, Inc.
Mr. Kenneth Ishizaki, Engineering Concepts, Inc.

16

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96813
PHONE (808) 527-6180
FAX (808) 533-2714



November 25, 1998

COPY

SEBASTIANE DAVIS
EDGE FLORES, JR., Chairman
FORREST C. MURPHY, Vice Chairman
KAZUHIKASHIWA
JAN M.L.Y. AUI
JOHANNAN K. SHIMADA, P.E.
BARBARA JOHNSON
CHARLES A. STEED
CLIFFORD S. JAMILE
Manager and Chief Engineer

FINAL ENVIRONMENTAL ASSESSMENT - MANANA DEVELOPMENT SPINE ROAD

APPENDIX E

TO: MR. RANDALL K. FUJIKI, DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION, IDEB

ATTN: MR. ROBERT SARAE
FROM: *Clifford S. Jamile*
CLIFFORD S. JAMILE

SUBJECT: YOUR TRANSMITTAL OF THE DRAFT ENVIRONMENTAL
ASSESSMENT FOR THE MANANA DEVELOPMENT SPINE
ROAD, PEARL CITY, OAHU, TMK: 9-7-24: POR. 41

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Thank you for the opportunity to review and comment on the document for the proposed roadway.

We have no objections to the proposed project. The preferred alignment conforms to the approved Manana Water Master Plan. The construction plans for Phases III A to III C, for the infrastructure improvements, are currently under our review.

If you have any questions, please contact Barry Usagawa at 527-5235.

cc: Office of Environmental Quality Control
Planning Solutions, Inc.

FEBRUARY 1999

DEPARTMENT OF COMMUNITY SERVICES
CITY AND COUNTY OF HONOLULU

715 SOUTH KING STREET, SUITE 311 • HONOLULU, HAWAII 96813 • AREA CODE 808 • PHONE: 527-4311 • FAX: 527-4498

JEREMY HARRIS
MAYOR



ABELINA MADRID SHAW
DIRECTOR
GEORGINA M. YUEN
DEPUTY DIRECTOR

November 27, 1998

Mr. Randall K. Fujiki, AIA
Director
Department of Design and Construction
650 South King Street, 2nd Floor
Honolulu, Hawaii 96813

Dear Mr. Fujiki:

Subject: Manana Development Spine Road
Review of Draft Environmental Assessment

Thank you for your letter of October 23rd requesting our review and comments on the draft Environmental Assessment (EA) for the proposed Manana Development Spine Road project.

The Department of Community Services has reviewed the draft EA and concurs with the assessment that the proposed Spine Road is necessary to provide access to programs and facilities proposed for the subject property by the Pearl City Task Force. We therefore have no concerns pertaining to the proposed Spine Road project as outlined in the draft EA.

Thank you for the opportunity to comment on this matter.

Sincerely,

ABELINA MADRID SHAW
Director

AMS:ds

/ c: Office of Environmental Quality Control
Planning Solutions, Inc.
Attn: Mr. Perry White

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KEOLANI J. CAITANO
DIRECTOR OF HEALTH



STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. BOX 3178
HONOLULU, HAWAII 96811

November 27, 1998

98-234/epc

LAWRENCE KING
DIRECTOR OF MANA

in reply, please refer to

FINAL ENVIRONMENTAL ASSESSMENT — MANANA DEVELOPMENT SPINE ROAD

APPENDIX E

Mr. Robert Sarae
Department of Design and
Construction, IDEB
City and County of Honolulu
650 South King Street, 15th Floor
Honolulu, Hawaii 96813

Dear Mr. Sarae:

Subject: Draft Environmental Assessment
Manana Development Spine Road
Pearl City, Oahu

Thank you for allowing us to review and comment on the subject
project. We do not have any comments to offer at this time.

Sincerely,

BRUCE S. ANDERSON, Ph.D.
Deputy Director for
Environmental Health

c: OEQC
Planning Solutions

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FEBRUARY 1999

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU
801 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96813 - AREA CODE (808) 525-3111



JEREMY HARRIS
MAYOR

LEE D. DONOHUE,
CHIEF
WILLIAM B. CLARK
MICHAEL CARVALHO
DEPUTY CHIEFS

US REFERENCE CS-TL

November 13, 1998

TO: RANDALL K. FUJIKI, DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

ATTENTION: ROBERT SARAE, INFRASTRUCTURE DESIGN AND ENGINEERING

FROM: LEE D. DONOHUE, CHIEF OF POLICE
HONOLULU POLICE DEPARTMENT

SUBJECT: MANANA DEVELOPMENT SPINE ROAD
REVIEW OF DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for the opportunity to review the subject document. We have the following comments relative to the proposed project's impact on the services provided by the Honolulu Police Department.

In spite of mitigation measures, calls for service during the construction phase of the project will be inevitable for fugitive dust, noise and traffic-related complaints.

When completed, officers assigned to the district will be required to patrol the spine road and other streets in the development area for vehicular and pedestrian safety.

We have noted the comments on pages 4-38 and 6-8 which relate that the Honolulu Police Department will need to increase facilities and staffing to cover not only the proposed redevelopment of the former Manana storage area, but elsewhere on the island. We would like to clarify that there will be a need to increase facilities and staffing to accommodate the redevelopment of the former Manana Storage area as well as for other completed projects and future projects immediately surrounding it. We will monitor the situation closely since the creation of another beat may be required.

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
800 SOUTH KING STREET, 2ND FLOOR
HONOLULU, HAWAII 96813
PHONE: (808) 522-5444 • FAX: (808) 522-4947



JEREMY HARRIS
MAYOR

RANDALL K. FUJIKI, AIA
DIRECTOR
ROLAND D. LIBERT, JR., AIA
DEPUTY DIRECTOR

IDEB 98-0306

November 27, 1998

MEMORANDUM

TO: LEE D. DONOHUE, CHIEF OF POLICE
HONOLULU POLICE DEPARTMENT

FROM: *R. P. Sarae*
RANDALL K. FUJIKI, DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

SUBJECT: MANANA DEVELOPMENT SPINE ROAD: DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your November 13, 1998, comment letter on the October 1998 *Draft Environmental Assessment* for this department's proposed Manana Development Spine Road project. We appreciate the time you and your staff spent reviewing the document.

We appreciate the clarification you offered regarding your staffing and facilities needs. In order to correctly reflect your concerns, we propose to modify the statement you referenced in your letter to read:

"The Honolulu Police and Fire Departments would need to increase their facilities and staffing to service the redevelopment of the former Manana Storage Area as well as other recently completed projects and planned projects in the immediate vicinity. The Honolulu Police Department will monitor the situation closely to determine if and when a new beat should be created."

The revised statement will be included in the Final Environmental Assessment. We hope this accurately reflects your clarification.

Should you have any questions, please call Robert Sarae of the Division of Infrastructure Design and Engineering at 523-4071.

cc: Office of Environmental Quality Control
Mr. Perry White, Planning Solutions, Inc.
Mr. Kenneth Ishizaki, Engineering Concepts, Inc.



United States
Department of
Agriculture

Natural
Resources
Conservation
Service

P.O. Box 50004
Honolulu, HI
96850

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

December 2, 1988

Mr. Robert Sarate
Department of Design
and Construction, IDEB
650 South King Street, 15th Floor
Honolulu, Hawaii 96813

Dear Mr. Sarate:

Subject: Draft Environmental Assessment (DEA) - Manana Development Spine Road,
Pearl City, Oahu, Hawaii

We have reviewed the above mentioned document and have no comments to offer at
this time.

Thank you for the opportunity to review this document.

Sincerely,

KENNETH M. KANESHIRO
State Conservationist

cc: Mr. Gary Gill, Director, Office of Environmental Quality Control, 235 South Beretania
Street, Suite 702, Honolulu, Hawaii 96813
Mr. Perry White, Planning Solutions, Inc., 120 Auahi Street, Suite 221,
Honolulu, Hawaii 96814

The Natural Resources Conservation Service works hand-in-hand with
the American people to conserve natural resources on private lands.

AN EQUAL OPPORTUNITY EMPLOYER

21

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GTE Hawaiian Tel

GTE Hawaiian Telephone Company Incorporated
P.O. Box 2000 • Honolulu, HI 96841 • 808/546-2065

Beyond the call

Susan K. Eichor
General Manager
Infrastructure Provisioning

November 11, 1998

Mr. Robert Sarae
Department of Design and Construction, IDEB
City and County of Honolulu
650 South King Street, 15th Floor
Honolulu, Hawaii 96813

Dear Mr. Sarae:

Subject: MANANA DEVELOPMENT SPINE ROAD
REVIEW OF DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for the opportunity to review and comment on the Draft Environmental Assessment for the proposed Manana Development Spine Road.

Based on our review, GTE Hawaiian Telephone Company has no conflicts with the proposed project and will be able to provide telecommunication services to your proposed project. In order to ensure a timely installation of your total communication requirements, at your earliest convenience, please forward a copy of your construction schedule. GTE Hawaiian Tel also requests the opportunity to review and comment on the detailed electrical construction drawings.

The location and type of GTE Hawaiian Tel facilities are accurately stated in the Draft Environmental Assessment. Should these facilities need to be relocated as a result of the project, the cost to relocate the facilities will be borne by the project.

If you have any questions or require assistance in the future on this project, please call Dennis Silva at 840-5856.

Sincerely,

Susan K. Eichor

c: Office of Environmental Quality Control
Perry White (Planning Solutions, Inc.)
Dennis Silva (GTE Hawaiian Tel)

A PART OF GTE CORPORATION

DEPARTMENT OF DESIGN AND CONSTRUCTION

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 2ND FLOOR
HONOLULU, HAWAII 96813
PHONE: (808) 522-3344 • FAX: (808) 522-5587



JERRY HARPER
MAYOR

RANDALL K. FUJIKI, AA
DIRECTOR
ROJANO D. LIBERT, JR., AA
DEPUTY DIRECTOR

IDEB 98-0508

December 2, 1998

Ms. Susan K. Eichor, General Manager
Infrastructure Provisioning
GTE Hawaiian Telephone Company, Inc.
P.O. Box 2200
Honolulu, Hawaii 96841

Dear Ms. Eichor:

Subject: Manana Development Spine Road: Draft Environmental Assessment

Thank you for your November 11, 1998, response to the October 1998 *Draft Environmental Assessment* for this department's proposed Manana Development Spine Road project. We appreciate the time you and your staff spent reviewing the document.

Construction schedules for the Spine Road and other public facilities within the Manana Development will be forwarded for your information, when available (see attached request letters). We will also route the electrical plans to your office for your review and comment once they are available.

We understand from your letter that should any existing GTE facilities in the Manana Development area need to be relocated as a result of the Spine Road project, the City and County of Honolulu will need to bear the cost of the relocation of these facilities.

Should you have any questions, please call Robert Sarae of the Division of Infrastructure Design and Engineering at 523-4071.

Very truly yours,

Randall K. Fujiki
RANDALL K. FUJIKI
Director

Attach.
cc: Office of Environmental Quality Control
Mr. Perry White, Planning Solutions, Inc.
Mr. Kenneth Ishizaki, Engineering Concepts, Inc.

11-11-98 (11:11 AM) 11-11-98 (11:11 AM) 11-11-98 (11:11 AM) 11-11-98 (11:11 AM) 11-11-98 (11:11 AM)

APPENDIX F
PUBLIC HEARING

FEBRUARY 1999

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 2ND FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 523-4554 • Fax: (808) 523-4557



JEREMY HARRIS
MAYOR

RANDALL K. FUJIKI, AIA
DIRECTOR

ROLAND D. LIBBY, JR., AIA
DEPUTY DIRECTOR

IDEB 98-0420

October 23, 1998

Dear Interested Party:

Subject: Manana Development Spine Road
Availability of Draft Environmental Assessment

The City and County of Honolulu, Department of Design and Construction, in cooperation with the State Department of Transportation and the Federal Highway Administration, announces the availability of the Draft Environmental Assessment (EA) for the Manana Development Spine Road project. An announcement of availability of the Draft EA appeared in the October 23, 1988, issue of *The Environmental Notice*, published by the State Office of Environmental Quality Control and in the Legal Advertisement section of the October 16, 1998, Honolulu Advertiser. A copy of the legal ad is attached for your information.

If you would like to comment on the Draft EA, please address your written comments to:

Department of Design and Construction, IDEB
City and County of Honolulu
650 South King Street, 15th Floor
Honolulu, Hawaii 96813

Attention: Mr. Robert Sarae (phone: 523-4071; FAX: 527-6103)

Copies of your comments should also be furnished to the following parties:

Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

(phone: 586-4185; FAX: 586-4186)

Interested party
Page 2
October 23, 1998

Planning Solutions, Inc.
1210 Auahi Street, Suite 221
Honolulu, Hawaii 96814

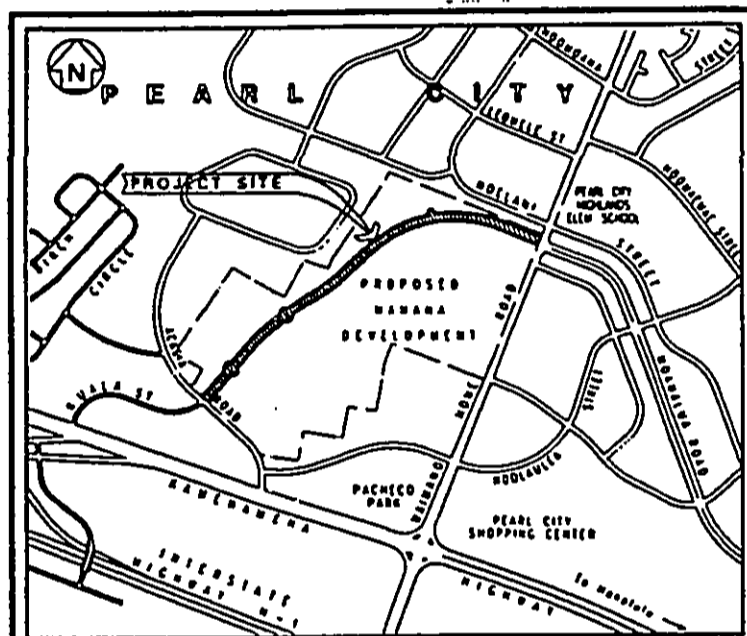
Attention: Mr. Perry White (phone: 593-1288; FAX: 593-1956)

The comment period ends on November 23, 1998. Written comments must be received by 4:30 p.m. or postmarked by that date.

Very truly yours,


RANDALL K. FUJIKI
Director

Attachment: Honolulu Advertiser legal ad, October 16, 1998



NOTICE

The City and County of Honolulu, Department of Design and Construction, in cooperation with the State Department of Transportation and the Federal Highway Administration, announces the availability of the Draft Environmental Assessment for the construction of the Manana Development Spine Road. The Spine Road would be a major collector road through the former Manana Storage Area in Pearl City, Hawaii to serve the City and County of Honolulu's proposed Manana Development. The Spine Road would be constructed within a 92-foot right-of-way, connecting the Moanalua Road/Walmano Home Road intersection to the Acacia Road/Kuala Street intersection. Copies of the Draft Environmental Assessment will be available for public review and inspection after October 23, 1998 at the following locations:

Federal Highway Administration
Room 3-306
300 Ala Moana Boulevard
Honolulu, Hawaii

State Department of Transportation
Highways Division, Planning Branch
600 Kapiolani Boulevard, Room 301
Honolulu, Hawaii

City and County of Honolulu
Department of Design & Construction
Division of Infrastructure Design & Engineering
650 South King Street, 15th Floor
Honolulu, Hawaii

Hawaii State Library (Main Branch)
Reference Desk
478 South King Street
Honolulu, Hawaii

State of Hawaii
Office of Environmental Quality Control
235 South Beretania Street, Room 702
Honolulu, Hawaii

Municipal Reference & Records Center
558 South King Street (City Hall Annex)
Honolulu, Hawaii

Pearl City Public Library
1138 Waimano Home Road
Pearl City, Hawaii

Notice is also hereby given that the City and County of Honolulu, Department of Design and Construction will hold a public hearing on November 17, 1998 at 7:30 p.m. at Pearl City Elementary School Cafeteria (1090 Waimano Home Road, Pearl City, Hawaii) for the purpose of receiving evidence and testimony relating to the Manana Development Spine Road project. Interested persons will be heard particularly with reference to the social, economic, and environmental impacts of the proposed project. An "open-house" will precede the hearing from 6:30 p.m. to 7:15 p.m. to provide information on the proposed Spine Road. Persons wishing to speak at the public hearing should sign up at the public hearing site during the open-house, prior to the start of the public hearing. Speakers will be limited to a three-minute presentation and are requested to submit two (2) copies of their statement. Any disabled person requiring special assistance should contact the Department of Design and Construction, Division of Infrastructure Design and Engineering at 523-4071 for details no later than seven (7) calendar days prior to the public hearing date. Persons unable or desiring not to appear at the public hearing may file signed statements presenting their views on the project. Such statements should be submitted up to and including November 23, 1998 and should be addressed to Director, Department of Design and Construction, 650 South King Street, Honolulu, Hawaii 96813.

Maps, drawings, and other pertinent information including written views as a result of coordination with other government agencies are available for public inspection and copying at the following location:

City and County of Honolulu
Department of Design and Construction
Division of Infrastructure Design & Engineering
650 South King Street, 15th Floor
Honolulu, Hawaii

RANDALL K. FUJIKI
Director

(Hon. Adv.: Oct. 16; Nov. 10, 1998)

(A-50044)

Open House & Public Hearing
MANANA SPINE ROAD DRAFT ENVIRONMENTAL ASSESSMENT

Tuesday, November 17, 1998
Open House — 6:30 p.m.
Public Hearing — 7:30 p.m.
Pearl City Elementary School

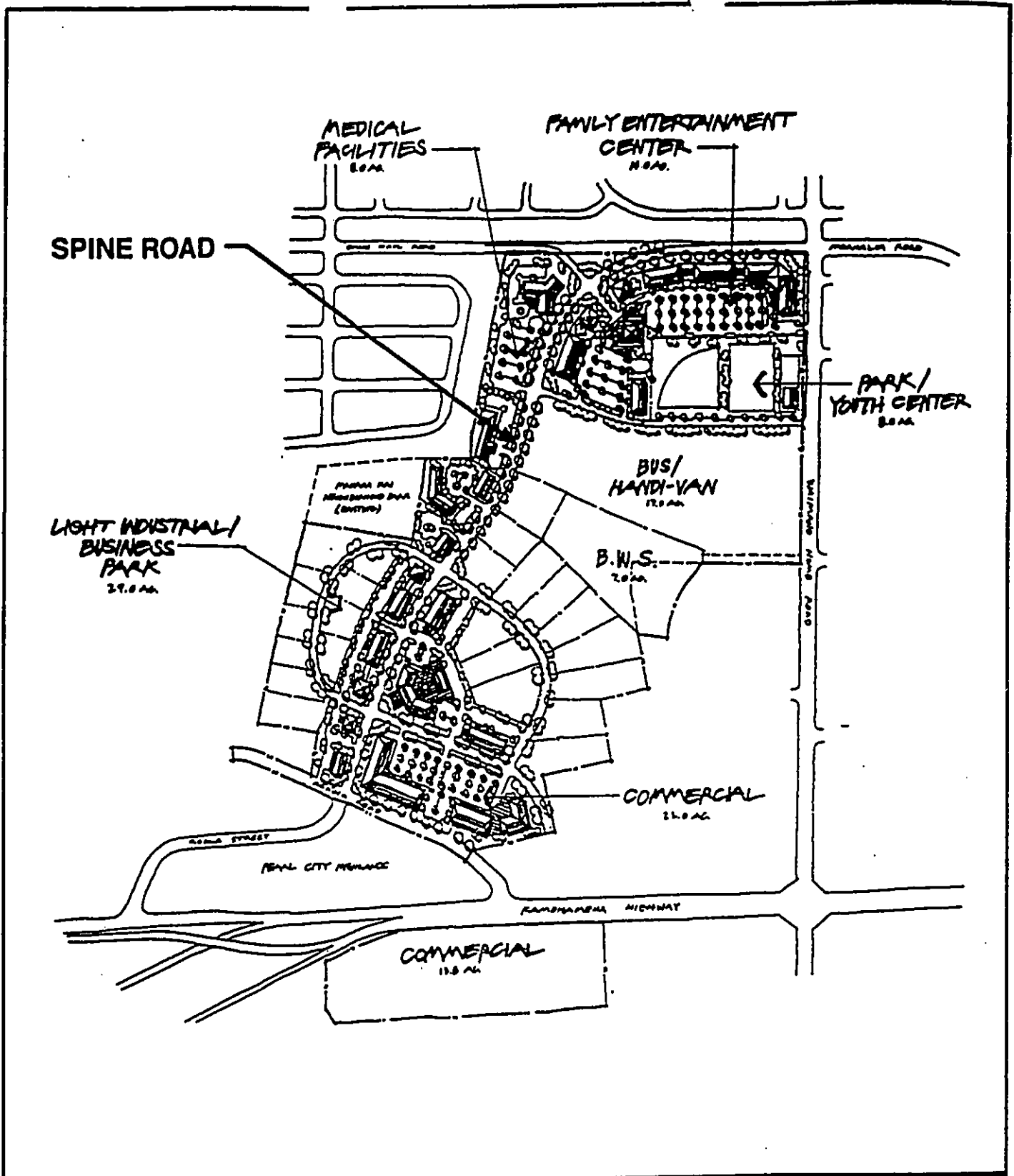
AGENDA

PART ONE: OPEN HOUSE

Overall Manana Redevelopment
Alternative Alignments
Traffic/Intersection Modifications
Environmental Process & Considerations

PART TWO: PUBLIC HEARING

Introduction of Elected Officials & Project Staff
Official Opening of Public Hearing
Hearing Agenda and Ground Rules
Background of Project
Description the Proposed Roadway
Mitigation of Traffic Impacts
Summary of Environmental Process and Issues
Public Testimony



PREPARED FOR:
Engineering Concepts, Inc.

PREPARED BY:
Planning Solutions, Inc.
Pacific Data Digitizing

SOURCE:
City and County of Honolulu
Dept. of Housing and Community
Development, 1998.
Manana and Pearl City Junction
Development EIS

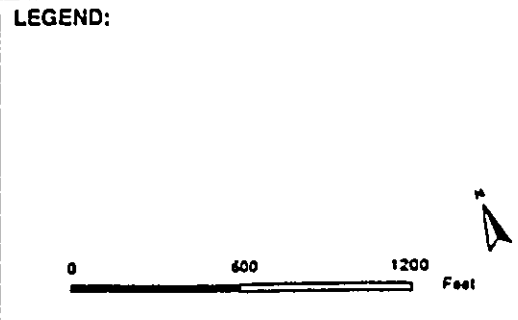
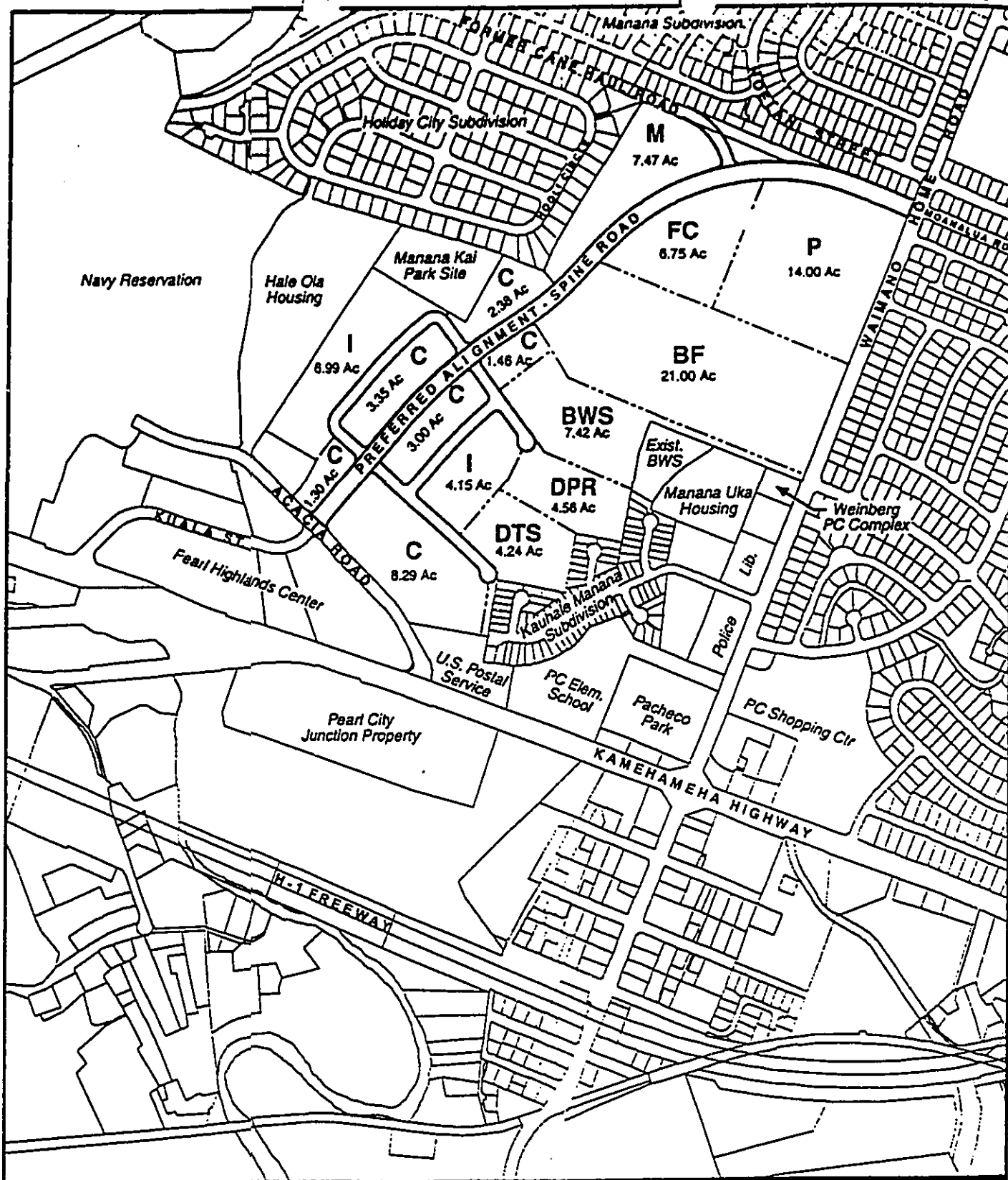


FIGURE 1-2:

Pearl City Planning Task Force
Preferred Conceptual Master Plan

Manana Development Spine Road
Environmental Assessment

City and County of Honolulu, Department of Planning, 1998



PREPARED FOR:
Engineering Concepts, Inc.

PREPARED BY:
Planning Solutions, Inc.
Pacific Data Digitizing

SOURCE:
C & C of Honolulu, DPW, April 1998
C & C of Honolulu, OLU, June 5, 1998
Engineering Concepts, Inc.,
July 10, 1998

LEGEND:

- | | | | |
|-----|----------------------------------|----|---------------|
| BF | Bus Facility | FC | Family Center |
| BWS | Board of Water Supply | I | Industrial |
| C | Commercial | M | Medical |
| DPR | Dept. of Parks & Recreation | P | Park |
| DTS | Dept. of Transportation Services | | |

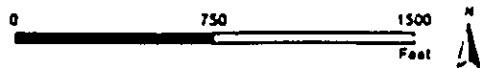


FIGURE 2-1:

Preferred Alignment

Manana Development Spine Road
Environmental Assessment

As of June 1998, Fig. 2-1 Preferred Alignment

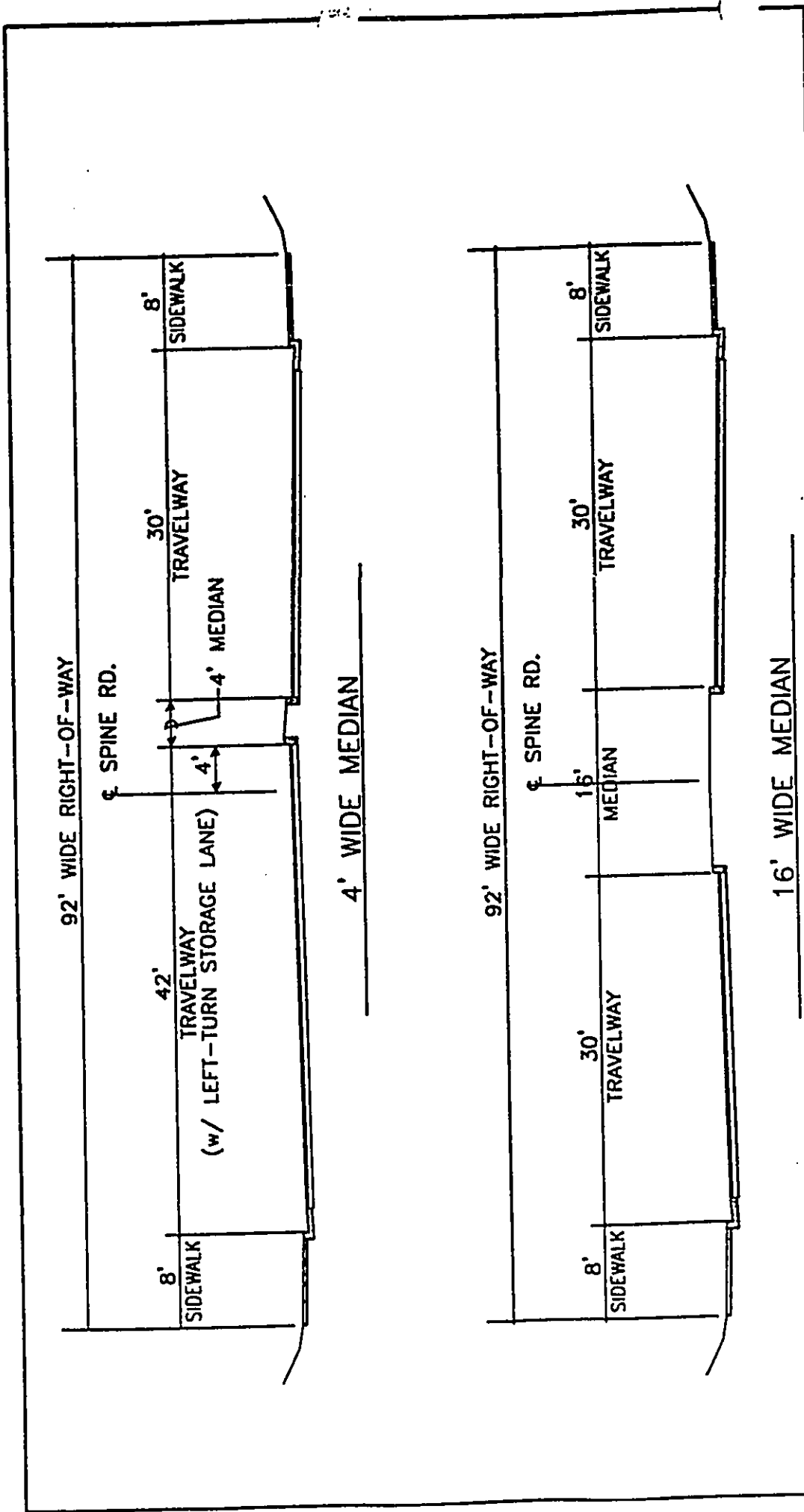


FIGURE 2-3:

Typical Roadway Sections

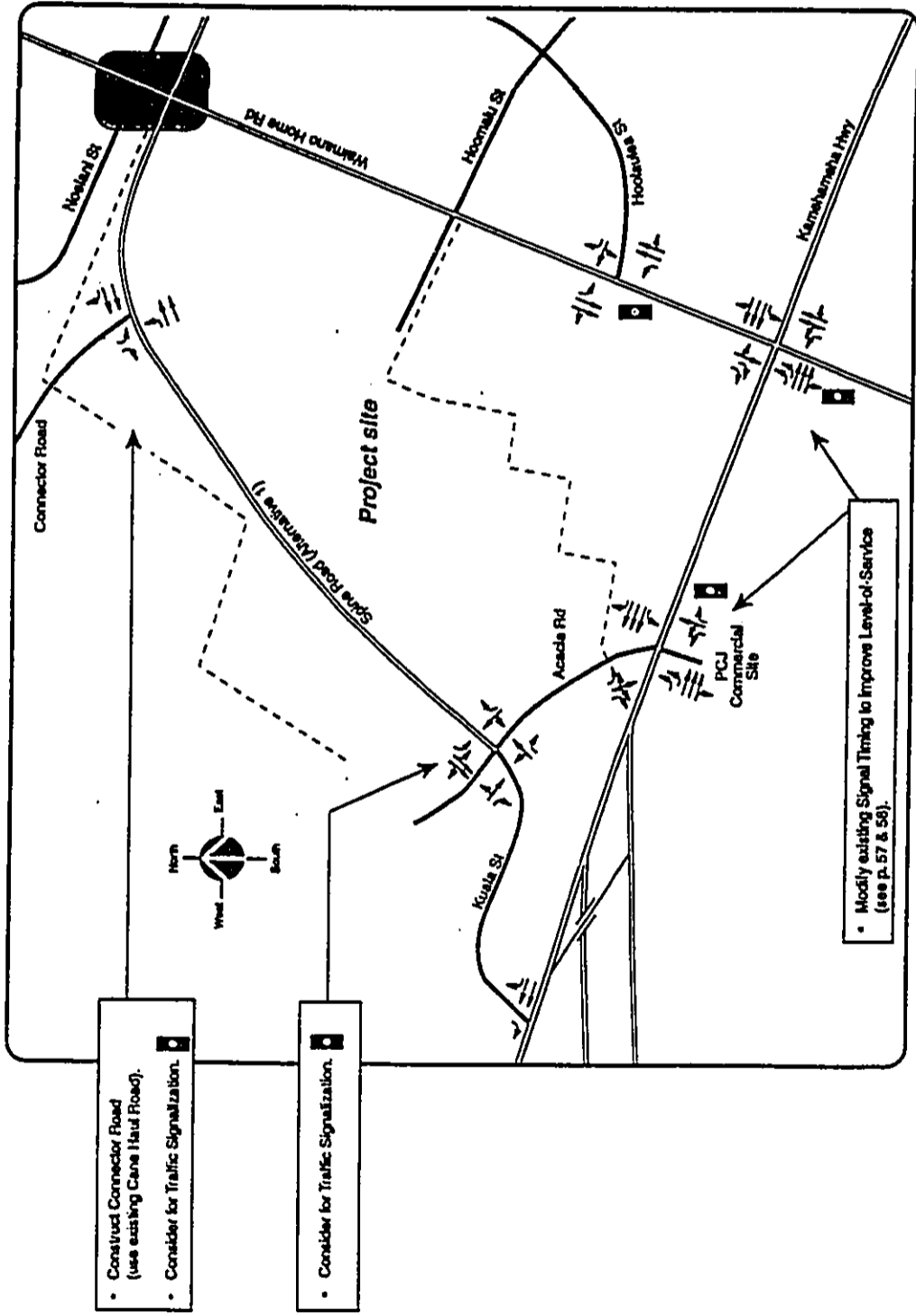
Manana Development Spine Road
Environmental Assessment

PREPARED FOR:
Engineering Concepts, Inc.

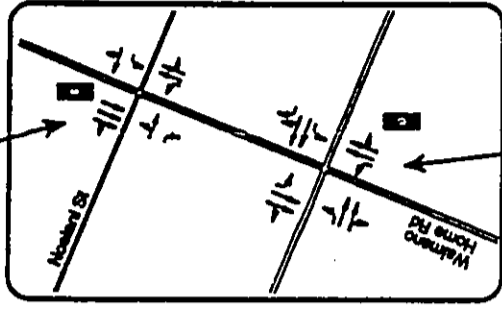
PREPARED BY:
Piercing Schoenau, Inc
Public Data Digitizing

SOURCE:
Engineering Concepts, Inc. July 10, 1998

NOT TO SCALE



- Laneage to remain as existing for the interim period.
- Traffic conditions to be re-evaluated with development of private parcels.



- Modify existing Signal Timing and Phasing to accommodate Spine Road.
- Traffic conditions to be re-evaluated with development of private parcels.

Summary of Recommended Laneages and Improvements

Table ES-2. Summary of Environmental Impacts.

| | No Action | Preferred Alignment | Alternative Alignment |
|------------|---|---|---|
| Land Use | <ul style="list-style-type: none"> No change for the foreseeable future Existing warehouses would continue to deteriorate | <ul style="list-style-type: none"> Removal of 11 existing warehouses and their occupants (8 are currently occupied) Purchase of residential property(s) along cane haul road Facilitation of redevelopment of former Manana Storage Area | <ul style="list-style-type: none"> Removal of 9 existing warehouses and their occupants (7 are currently occupied) Purchase of residential property(s) along cane haul road Facilitation of redevelopment of former Manana Storage Area Modifications to Post Office property (possibly involving purchase of land) |
| Topography | <ul style="list-style-type: none"> No impact | <ul style="list-style-type: none"> Grubbing and grading, including cut and fill along 3,800 feet of 92-foot right-of-way Total of 57,000 cubic yards excavated Greatest elevation change: 12 feet Steepest slope: 5% | <ul style="list-style-type: none"> Grubbing and grading, including cut and fill along 4,300 feet of 92-foot right-of-way Total of 91,000 cubic yards excavated Greatest elevation change: 20 feet Steepest slope: 6% |
| Economic | <ul style="list-style-type: none"> Reduced incentive for private development since necessary infrastructure would not be constructed. Therefore reduced possibility of recouping monies expended by the City for the purchase of the area. Interest on debt would continue to accrue. | <ul style="list-style-type: none"> Construction cost of roadway and associated features: \$9,800,000 Provides temporary and permanent job opportunities | <ul style="list-style-type: none"> Construction cost of roadway and associated features: \$11,200,000 Provides temporary and permanent job opportunities |

Table ES-2 (continued). Summary of Environmental Impacts

| | No Action | Preferred Alignment | Alternative Alignment |
|-----------------|---|--|--|
| Noise | <ul style="list-style-type: none"> Increased noise due to ambient traffic growth. | <ul style="list-style-type: none"> Reductions in noise levels along Waimano Home Road and Kamehameha Highway relative to No Action. Increases in noise levels along Moanalua Road, Cane Haul Road, and in certain portions of residential development near the <i>mauka</i> end of the proposed Spine Road and the Connector Road. Noise barriers needed. Temporary impacts due to construction activities. | <ul style="list-style-type: none"> Reductions in noise levels along Waimano Home Road and Kamehameha Highway relative to No Action. Increases in noise levels along Moanalua Road, Cane Haul Road, and in certain portions of residential development near the <i>mauka</i> end of the proposed Spine Road and the Connector Road. Noise barriers needed. Temporary impacts due to construction activities. |
| Traffic | <ul style="list-style-type: none"> If suggested traffic improvements are implemented, LOS of nearby intersections will remain similar as existing steady, despite growth in ambient traffic. If they aren't these LOSs will deteriorate. | <ul style="list-style-type: none"> Most intersections would experience better or the same LOS as with No Action | <ul style="list-style-type: none"> Identical to preferred alignment with exception of Spine Road (Acacia Road) with Kamehameha Hwy which would have a lower LOS in the p.m. peak hour under this scenario |
| Flora Resources | <ul style="list-style-type: none"> No impact. | <ul style="list-style-type: none"> Permanent destruction of existing vegetation within right-of-way (no endangered species). Improvements in landscaping of median and sidewalks. | <ul style="list-style-type: none"> Permanent destruction of existing vegetation within right-of-way (no endangered species). Improvements in landscaping of median and sidewalks. |

Table ES-2 (continued). Summary of Environmental Impacts

| | No Action | Preferred Alignment | Alternative Alignment |
|-----------------------------------|--|--|---|
| Fauna Resources | <ul style="list-style-type: none"> No impact. | <ul style="list-style-type: none"> Temporary relocation of fauna (none are endangered) Permanent destruction of limited existing habitat and relocation of some animals (none are endangered or otherwise rare species). Creation of new habitat within landscaped areas. | <ul style="list-style-type: none"> Temporary relocation of fauna (none are endangered) Permanent destruction of limited existing habitat and relocation of some animals (none are endangered or otherwise rare species). Creation of new habitat within landscaped areas. No impact expected. |
| Archaeological Resources | <ul style="list-style-type: none"> No impact. | <ul style="list-style-type: none"> No impact expected. | <ul style="list-style-type: none"> No impact expected. |
| Surface and Groundwater Resources | <ul style="list-style-type: none"> No impact | <ul style="list-style-type: none"> No impact expected. | <ul style="list-style-type: none"> No impact expected |
| Floodplains | <ul style="list-style-type: none"> No impact | <ul style="list-style-type: none"> No impact | <ul style="list-style-type: none"> No impact |
| Soils | <ul style="list-style-type: none"> No impact | <ul style="list-style-type: none"> No impact expected because excavated soil may be used productively either on or off-site | <ul style="list-style-type: none"> No impact expected because excavated soil may be used productively either on or off-site (34,000 cubic yards more than preferred alternative) |
| Natural Disasters | <ul style="list-style-type: none"> No effect. | <ul style="list-style-type: none"> No effect. | <ul style="list-style-type: none"> No effect. |

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

Table ES-2 (continued). Summary of Environmental Impacts

| | No Action | Preferred Alignment | Alternative Alignment |
|--------------------------------|--|---|---|
| Hazardous Materials | <ul style="list-style-type: none"> No impact. | <ul style="list-style-type: none"> Asbestos and lead-based paint will be removed and disposed of in accordance with pertinent laws and regulations. | <ul style="list-style-type: none"> Asbestos and lead-based paint will be removed and disposed of in accordance with pertinent laws and regulations. |
| Visual and Aesthetic Resources | <ul style="list-style-type: none"> Existing warehouses would continue to deteriorate. No visual corridor through the area would exist. | <ul style="list-style-type: none"> Establishes a visual corridor through the area with views towards the coastline. Improves esthetics by establishing appropriate landscaping along the proposed Road. | <ul style="list-style-type: none"> Establishes a visual corridor through the area with views towards the coastline. Improves esthetics by establishing appropriate landscaping along the proposed Road. |
| Air Quality | <ul style="list-style-type: none"> No change. | <ul style="list-style-type: none"> Improves air quality at nearby intersections by providing improved performance of nearby intersections. Enables potential development of some industrial type facilities with potential to generate air emissions. Temporary impact due to construction activities. | <ul style="list-style-type: none"> Improves air quality at nearby intersections by providing improved performance of nearby intersections. Enables potential development of some industrial type facilities with potential to generate air emissions. Temporary impact due to construction activities. |

①

SIGN-IN SHEET

**Manana Development Spine Road Public Hearing
November 17, 1998- Pearl City Elementary School**

| First | Last Name | Organization | Address | Phone | Fax |
|--------|-----------|-----------------------------|--------------------------------|----------|-----|
| George | DUNLAP | | 1553 MAHAKEA, Pt. P.C. | 455-4642 | |
| NELSON | MORIWAKI | | 1471 KALAUPO ST. P.C. | 455-2170 | |
| ALBERT | FUKUSHIMA | MANANA
COMMUNITY ASSN | 1841 PARAMOI ST P.C. | 455-7753 | |
| Pat/y. | Onaka | | 1106 MAHAOIE PC | 455-3376 | |
| George | Tamashima | Dept of Design
& Constr. | 45-411 Ikalooa St.
MILILANI | 527-6355 | |
| Scott | Ishikawa | Honolulu
Advertiser | | 525-8090 | |
| Bob | Kudo | Manana
Task Force | 914 Leomoku Sp. P.C. | 455-1520 | |

1)

PEARL CITY ELEMENTARY SCHOOL

SIGN-IN SHEET

**Manana Development Spine Road Public Hearing
November 17, 1998- Pearl City Elementary School**

| First | Last Name | Organization | Address | Phone | Fax |
|---------|-----------|---------------------------------------|---|----------|-----|
| KENJI | UEJO | Reed | 1522 Grooms Lane Pl. P.O. | 455-3899 | — |
| Robert | Nakanishi | . | 1478 Hooli Cir. | 455-5339 | |
| Douglas | Orimoto | SOUT | | | |
| Lee | YOUNG | | 949 MUKAMUA PL. | 455-3958 | |
| SUSAN | Everett | Century Park Plaza
Community Assoc | PO Box 30094
Hon HI 96820-0094 | 456-2457 | |
| James | Honke | Dept. of
Design + County | 650 South King St.
Honolulu HI 96813 | 527-5098 | |
| Paula | Arcena | Councilmember
Multi-Honolulu's | 5305. King St.
Hon. 96813 | 527-8653 | |

SIGN-IN SHEET

**Manana Development Spine Road Public Hearing
November 17, 1998- Pearl City Elementary School**

| First | Last Name | Organization | Address | Phone | Fax |
|--------|-----------|--------------|--------------------|----------|----------|
| Kay | Muranaka | ECI | Auahi Str | | |
| Gerry | Iwata | DPC | 650 South King Str | | |
| Ann | KIMURA | DPC | 650 South King St. | 523-4072 | 527-6103 |
| Roland | Libby | DPC | 650 South King St. | | |
| Ken | ISHIZAKI | ECI | | | |
| Joe | Magaldi | DTS | 711 Kapiolani Bvd. | | |
| | | | | | |

NOVEMBER 17, 1978.

My name is Albert Fukushima. I am presenting testimony on the Manana Development Spine Road Environmental Assessment (EA) on behalf of the Manana Community Association as its President.

After review of the document, our Directors voted at its November 9, 1978 Board meeting to endorse the "City preferred" alignment from Waimano Home Road and Moanalua Road to Heacia Road at Kuala Street, with widening improvements ^{to be made} to the koko head and make sides of Heacia Road from Kanehama Highway to Kuala Street and construction of the Connector Road along portions of the former Kanehama Road from Kuala Street to the Spine Road ^{in order} to provide Holiday City and lower Manana residents improved access to the major roadway system in our area of Pearl City.

We also recommend retaining daily make bound left turns from Waimano Home Road ^(with) ^{into} Noelani Street, except during the weekday morning peak hours when the Manana Storage Area becomes more fully developed and increases in traffic volume will ^{warrant} recommended proposals of "contra flow/coming" of WHR to allow two make bound left turn lanes to enter Moanalua Road in the koko head direction.

We also favor that the City create 24-hour no parking ^{areas} and tow away zones on the Spine, Connector and Heacia Roads, Kuala Street, and internal project roadways as mitigative measures to insure traffic flow and circulation along these roadways is maintained and that congestion does not become a problem.

Assurances for the community in the implementation of future traffic directional, circulation and on-street, as well as off-street parking controls should be included with the conditional agreement when the Manana Storage Area is rezoned for sale of commercial/industrial parcels to prospective buyers.

Albert Fukushima
H.I. Frank Tachimaru

Also disclosure of major proposed improvements to the Waimana Home Road and Aracia Road intersection ^{at Kamehameha Hall} as well as ^{as well as} mitigation measures to allow construction of the Spine Road ~~and~~ mitigation measures for potential air and noise impacts to properties on the north side of Muanua Road proposed to be acquired for all-land right-of-way based on acceptance. Alternatives 5 and 6 should be addressed in the Final EA.

Finally, the Association would like to defer any specific and detailed comments pertaining to the Draft EA until the submittal of these concerns are made prior to the November 23rd deadline.

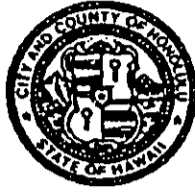
Thank you for allowing us to submit our ~~written~~ ^{written} comments for the EA at this public hearing. We are hopeful that our ~~concerns~~ ^{concerns} and recommendations will meet with your favorable consideration and implementation for the best interest of the Manana community.

APPENDIX G
CZM CONSISTENCY DETERMINATION

FEBRUARY 1999

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 2ND FLOOR
HONOLULU, HAWAII 96813
PHONE: (808) 523-4564 • FAX: (808) 523-4567



JEREMY HARRIS
MAYOR

RANDALL K. FUJIKI, AIA
DIRECTOR

ROLAND D. LIBBY, JR., AIA
DEPUTY DIRECTOR

IDEB 99-0067

February 23, 1999

Mr. David Blane
Office of Planning
Department of Business, Economic
Development and Tourism
State of Hawaii
235 South Beretania Street, 6th Floor
Honolulu, Hawaii 96813

Attention: Mr. John Nakagawa, Coastal Zone Management Program

Dear Mr. Blane:

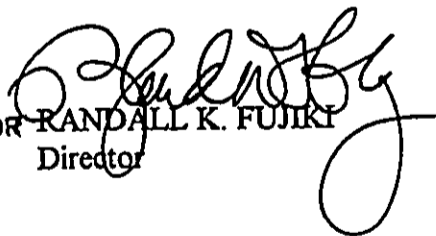
Subject: Manana Storage Area Spine Road CZM Consistency Determination for Manana
Development Spine Road

As discussed in Section 5.10.2 of the *Draft Environmental Assessment for the Manana Development Spine Road*, the City has evaluated the proposed action for consistency with the Hawaii Coastal Zone Management Program. A copy of the *Draft Environmental Assessment* was submitted to the Coastal Zone Management Office in October 1998.

Based on the analysis described in the *Draft Environmental Assessment*, the Department of Design and Construction hereby certifies that the project complies with the approved Coastal Zone Management Program and will be conducted in a manner consistent with that program.

Should you have any questions or require additional information, please call Robert Sarae of the Division of Infrastructure Design and Engineering at 523-4071.

Very truly yours,


FOR RANDALL K. FUJIKI
Director

cc: Mr. Kay Muranaka, Engineering Concepts, Inc.
Mr. Perry White, Planning Solutions, Inc.