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

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 Saree of the
Division of Infrastructure Design and Engineering at 523-4071 if you have any questions.

Very truly yours,

[Signature]
Randall K. Fujiki
Director

Attach.
cc: Engineering Concepts, Inc.
    Planning Solutions, Inc.
FINAL ENVIRONMENTAL ASSESSMENT

KNANANA DEVELOPMENT SPINE ROAD
PEARL CITY, OAHU, HAWAI1

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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State Department of Transportation
Highways Division
869 Punchbowl Street
Honolulu, Hawaii 96813
(808) 587-2220

Mr. Randall K. Fujiki, Director
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.

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<td>Department of Community &amp; Social Resources</td>
<td>Department of Community Services</td>
</tr>
<tr>
<td>Department of Corporation Counsel</td>
<td>No change</td>
</tr>
<tr>
<td>Department of Housing and Community Development</td>
<td>Department dissolved</td>
</tr>
<tr>
<td>Department of Land Utilization</td>
<td>Department of Planning &amp; Permitting</td>
</tr>
<tr>
<td>Department of Parks and Recreation</td>
<td>Department of Parks &amp; Recreation Services</td>
</tr>
<tr>
<td>Department of Personnel</td>
<td>Department of Human Resources</td>
</tr>
<tr>
<td>Planning Department</td>
<td>Department of Planning &amp; Permitting</td>
</tr>
<tr>
<td>Department of Public Works</td>
<td>Department of Facility Maintenance</td>
</tr>
<tr>
<td>Department of Transportation Services</td>
<td>No change</td>
</tr>
<tr>
<td>Department of Wastewater Management</td>
<td>Department of Environmental Services</td>
</tr>
<tr>
<td>Honolulu Police Department</td>
<td>No change</td>
</tr>
<tr>
<td>Honolulu Fire Department</td>
<td>No change</td>
</tr>
</tbody>
</table>
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 Kula Street (Figure ES-2). The planned road transitions smoothly from the Waimano Home Road intersection, running for a short distance along the former cane
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)

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
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 Leq 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/Hoolauloa 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/Noiolani 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

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

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>
<thead>
<tr>
<th></th>
<th>No Action</th>
<th>Preferred Alignment</th>
<th>Alternative Alignment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Land Use</strong></td>
<td>• No change for the foreseeable future</td>
<td>• Removal of 11 existing warehouses and their occupants (8 are currently occupied)</td>
<td>• Removal of 9 existing warehouses and their occupants (7 are currently occupied)</td>
</tr>
<tr>
<td></td>
<td>• Existing warehouses would continue to deteriorate</td>
<td>• Purchase of residential property(s) along cane haul road</td>
<td>• Purchase of residential property(s) along cane haul road</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Facilitation of redevelopment of former Manana Storage Area</td>
<td>• Facilitation of redevelopment of former Manana Storage Area</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Modifications to Post Office property (possibly involving purchase of land)</td>
</tr>
<tr>
<td><strong>Topography</strong></td>
<td>• No impact</td>
<td>• Grubbing and grading, including cut and fill along 3,800 feet of 92-foot right-of-way</td>
<td>• Grubbing and grading, including cut and fill along 4,300 feet of 92-foot right-of-way</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Total of 57,000 cubic yards excavated</td>
<td>• Total of 91,000 cubic yards excavated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Greatest elevation change: 12 feet</td>
<td>• Greatest elevation change: 20 feet</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Steepest slope: 5%</td>
<td>• Steepest slope: 6%</td>
</tr>
<tr>
<td><strong>Economic</strong></td>
<td>• 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.</td>
<td>• Construction cost of roadway and associated features: $9,800,000</td>
<td>• Construction cost of roadway and associated features: $11,200,000</td>
</tr>
<tr>
<td></td>
<td>• Interest on debt would continue to accrue</td>
<td>• Provides temporary and permanent job opportunities</td>
<td>• Provides temporary and permanent job opportunities</td>
</tr>
<tr>
<td>Table ES-2 (continued). Summary of Environmental Impacts</td>
<td></td>
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<tr>
<td>---------------------------------------------------------</td>
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<td></td>
</tr>
<tr>
<td><strong>Noise</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>- Increased noise due to ambient traffic growth.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>No Action</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Preferred Alignment</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Reductions in noise levels along Waimano Home Road and Kamehameha Highway relative to No Action.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Increases in noise levels along Moanalua Road, Cane Haul Road, and in certain portions of residential development near the mauka end of the proposed Spine Road and the Connector Road. Noise barriers needed.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Temporary impacts due to construction activities.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Alternative Alignment</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Reductions in noise levels along Waimano Home Road and Kamehameha Highway relative to No Action.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Increases in noise levels along Moanalua Road, Cane Haul Road, and in certain portions of residential development near the mauka end of the proposed Spine Road and the Connector Road. Noise barriers needed.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>- Temporary impacts due to construction activities.</td>
<td></td>
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</tr>
<tr>
<td><strong>Traffic</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>- 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.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>No Action</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Preferred Alignment</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 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.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Alternative Alignment</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 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</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Flora Resources</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- No impact.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Preferred Alignment</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Permanent destruction of existing vegetation within right-of-way (no endangered species).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Improvements in landscaping of median and sidewalks.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Alternative Alignment</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Permanent destruction of existing vegetation within right-of-way (no endangered species).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Improvements in landscaping of median and sidewalks.</td>
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</tbody>
</table>
Table ES-2 (continued). Summary of Environmental Impacts

<table>
<thead>
<tr>
<th></th>
<th>No Action</th>
<th>Preferred Alignment</th>
<th>Alternative Alignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fauna Resources</td>
<td>• No impact.</td>
<td>• Temporary relocation of fauna (none are endangered)</td>
<td>• Temporary relocation of fauna (none are endangered)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Permanent destruction of limited existing habitat and relocation of some animals (none are endangered or otherwise rare species).</td>
<td>• Permanent destruction of limited existing habitat and relocation of some animals (none are endangered or otherwise rare species).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Creation of new habitat within landscaped areas.</td>
<td>• Creation of new habitat within landscaped areas.</td>
</tr>
<tr>
<td>Archaeological Resources</td>
<td>• No impact.</td>
<td>• No impact expected.</td>
<td>• No impact expected.</td>
</tr>
<tr>
<td>Surface and Groundwater Resources</td>
<td>No impact</td>
<td>• No impact expected.</td>
<td>• No impact expected.</td>
</tr>
<tr>
<td>Floodplains</td>
<td>• No impact</td>
<td>• No impact</td>
<td>• No impact</td>
</tr>
<tr>
<td>Soils</td>
<td>• No impact</td>
<td>• No impact expected because excavated soil may be used productively either on or off-site</td>
<td>• No impact expected because excavated soil may be used productively either on or off-site (34,000 cubic yards more than preferred alternative)</td>
</tr>
<tr>
<td>Natural Disasters</td>
<td>No effect.</td>
<td>• No effect.</td>
<td>• No effect.</td>
</tr>
</tbody>
</table>
Table ES-2 (continued). Summary of Environmental Impacts

<table>
<thead>
<tr>
<th></th>
<th>No Action</th>
<th>Preferred Alignment</th>
<th>Alternative Alignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazardous Materials</td>
<td>• No impact.</td>
<td>• Asbestos and lead-based paint will be removed and disposed of in accordance with pertinent laws and regulations.</td>
<td>• Asbestos and lead-based paint will be removed and disposed of in accordance with pertinent laws and regulations.</td>
</tr>
<tr>
<td>Visual and Aesthetic Resources</td>
<td>• Existing warehouses would continue to deteriorate.</td>
<td>• Establishes a visual corridor through the area with views towards the coastline.</td>
<td>• Establishes a visual corridor through the area with views towards the coastline.</td>
</tr>
<tr>
<td></td>
<td>• No visual corridor through the area would exist.</td>
<td>• Improves aesthetics by establishing appropriate landscaping along the proposed Road.</td>
<td>• Improves aesthetics by establishing appropriate landscaping along the proposed Road.</td>
</tr>
<tr>
<td>Air Quality</td>
<td>• No change.</td>
<td>• Improves air quality at nearby intersections.</td>
<td>• Improves air quality at nearby intersections.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enables potential development of some industrial type facilities with potential to generate air emissions.</td>
<td>• Enables potential development of some industrial type facilities with potential to generate air emissions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Temporary impact due to construction activities.</td>
<td>• Temporary impact due to construction activities.</td>
</tr>
</tbody>
</table>
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). 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.

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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, Waiuna 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.

FEBRUARY 1999
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).

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.

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*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.*
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” road\(^3\). 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.

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\(^3\) 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 Noeani Street at its intersection with Waimano Home Road will be left unchanged.
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 small 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 feet wide on the side closest to the intersection (west) tapering to about 3-feet 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-feet wide on the west side and tapers off completely by the time it reaches the other side of the parcel.
FIGURE 2-4:
Details of Proposed Spine Road - Waimano Home Road Intersection
Manana Development Spine Road
Environmental Assessment
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-outs\(^2\) 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 Road. 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).

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\(^2\) 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.

\(^2\) The Spine Road right-of-way contains portions of existing warehouses that are also within the area that would be developed for the proposed 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).

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*Manana Infrastructure Improvements Spine Road Cost Comparison (revised 9-18-98), Engineering Concept, Inc. 9-21-98
Figure 2-4:
Alternative Alignment - Tie-In to Acacia Road

Manana Development Spine Road Environmental Assessment

Legend:
NOT TO SCALE
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 $1,200,000 (FY 1998). 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.

\[\text{\textsuperscript{3} Ibid}\]
CHAPTER 3

AFFEKTED 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 F EIS 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.
Table 3-1. Existing Warehouse Tenants

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

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.
NOTE:
ROAD AND UTILITY LINE LOCATIONS ARE GENERALIZED FOR GRAPHIC PURPOSES.
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

<table>
<thead>
<tr>
<th>Period</th>
<th>Direction Quadrant</th>
<th>Annual Frequency (%)</th>
<th>Mean Wind Speed (m/sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.M. Peak (7:00 a.m. - 8:00 a.m.)</td>
<td>NE</td>
<td>67.1</td>
<td>4.1</td>
</tr>
<tr>
<td></td>
<td>SE</td>
<td>4.8</td>
<td>3.9</td>
</tr>
<tr>
<td></td>
<td>SW</td>
<td>3.3</td>
<td>2.9</td>
</tr>
<tr>
<td></td>
<td>NW</td>
<td>24.4</td>
<td>1.8</td>
</tr>
<tr>
<td>P.M. Peak (4:00 p.m. - 5:00 p.m.)</td>
<td>NE</td>
<td>78.8</td>
<td>6.0</td>
</tr>
<tr>
<td></td>
<td>SE</td>
<td>7.1</td>
<td>4.2</td>
</tr>
<tr>
<td></td>
<td>SW</td>
<td>10.1</td>
<td>3.3</td>
</tr>
<tr>
<td></td>
<td>NW</td>
<td>3.9</td>
<td>4.8</td>
</tr>
</tbody>
</table>

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%


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>
<thead>
<tr>
<th>POLLUTANT</th>
<th>SAMPLING PERIOD</th>
<th>NAAQS PRIMARY</th>
<th>NAAQS SECONDARY</th>
<th>STATE STANDARDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM\textsubscript{10}</td>
<td>Annual</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>24-hr</td>
<td>150</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>SO\textsubscript{2}</td>
<td>Annual</td>
<td>80</td>
<td>---</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>24-hr</td>
<td>365</td>
<td>---</td>
<td>365</td>
</tr>
<tr>
<td></td>
<td>3-hr</td>
<td>---</td>
<td>1,300</td>
<td>1,300</td>
</tr>
<tr>
<td>NO\textsubscript{x}</td>
<td>Annual</td>
<td>100</td>
<td>---</td>
<td>70</td>
</tr>
<tr>
<td>CO</td>
<td>8-hr</td>
<td>10</td>
<td>---</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>1-hr</td>
<td>40</td>
<td>---</td>
<td>10</td>
</tr>
<tr>
<td>O\textsubscript{3}</td>
<td>1-hr</td>
<td>235</td>
<td>---</td>
<td>100</td>
</tr>
<tr>
<td>H\textsubscript{2}S</td>
<td>1-hr</td>
<td>---</td>
<td>---</td>
<td>35</td>
</tr>
<tr>
<td>Pb</td>
<td>Calendar Quarter</td>
<td>1.5</td>
<td>---</td>
<td>1.5</td>
</tr>
</tbody>
</table>

**KEY:**
- NAAQS - National Ambient Air Quality Standards
- PM\textsubscript{10} - particulate matter ≤ 10 microns
- SO\textsubscript{2} - sulfur dioxide
- NO\textsubscript{x} - nitrogen dioxide
- CO - carbon monoxide
- O\textsubscript{3} - ozone
- H\textsubscript{2}S - hydrogen sulfide
- Pb - lead

**Note:** All concentrations except CO are in micrograms per cubic meter (μg/m\textsuperscript{3}). CO values are in milligrams per cubic meter (mg/m\textsuperscript{3}).

**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 PM_{10} 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 northerly 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

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Concentration (µg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Particulate matter ≤ 10 microns (PM₁₀)</td>
<td></td>
</tr>
<tr>
<td>24-hr (max)</td>
<td>26</td>
</tr>
<tr>
<td>Annual</td>
<td>14</td>
</tr>
<tr>
<td>Sulfur dioxide (SO₂)</td>
<td></td>
</tr>
<tr>
<td>3-hr (max)</td>
<td>73</td>
</tr>
<tr>
<td>24-hr (max)</td>
<td>18</td>
</tr>
<tr>
<td>Annual</td>
<td>3</td>
</tr>
<tr>
<td>Carbon monoxide (CO)</td>
<td></td>
</tr>
<tr>
<td>1-hr (max)</td>
<td>4,589</td>
</tr>
<tr>
<td>8-hr (max)</td>
<td>2,127</td>
</tr>
<tr>
<td>Annual</td>
<td>936</td>
</tr>
<tr>
<td>Ozone (O₃)</td>
<td></td>
</tr>
<tr>
<td>1-hr (max)</td>
<td>92</td>
</tr>
<tr>
<td>Annual</td>
<td>27</td>
</tr>
<tr>
<td>Nitrogen dioxide (NO₂)</td>
<td></td>
</tr>
<tr>
<td>Annual</td>
<td>2</td>
</tr>
<tr>
<td>Lead (Pb)</td>
<td></td>
</tr>
<tr>
<td>Quarterly (max)</td>
<td>0.0</td>
</tr>
<tr>
<td>Annual</td>
<td>0.0</td>
</tr>
</tbody>
</table>

**Notes:**
1. PM₁₀ data are from the Leeward Medical Center site.
2. CO, SO₂, and Pb are from the DOH building in downtown Honolulu
3. O₃ data are from site on Sand Island.
4. NO₂ 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 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 afternoons 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 Waiawa Gulch (subsequently referred to as Waiawa 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 Waiawa 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 Kahuale, 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 Waiawa Stream which is concrete-lined in this area. The channel crosses Kamehameha Highway and eventually empties into the East Loch of Pearl Harbor.
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-Waiau Water Management Area. The Waipahu-Waiau 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 Waiau 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(c) 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 of 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

<table>
<thead>
<tr>
<th>Posted Speed Limit</th>
<th>Time Periods When Applicable</th>
<th>Measurement Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>20 feet</td>
</tr>
<tr>
<td>35 mph or less</td>
<td>6:00 a.m. - 6:00 p.m.</td>
<td>92 dBA</td>
</tr>
<tr>
<td></td>
<td>6:00 p.m. - 10:00 p.m.</td>
<td>92 dBA</td>
</tr>
<tr>
<td></td>
<td>(10:00 p.m. - 6:00 a.m.), Holidays and Sundays</td>
<td>81 dBA</td>
</tr>
<tr>
<td>&gt; 35 mph</td>
<td>All</td>
<td>92 dBA</td>
</tr>
<tr>
<td>Truck Routes</td>
<td>All</td>
<td>96 dBA</td>
</tr>
</tbody>
</table>


3.2.4.3 Federal Highway Administration Design Goals

The Federal Highway Administration (FHWA) has established noise abatement criteria (NAC) for traffic noise exposure. 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.

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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).

<table>
<thead>
<tr>
<th>Activity Category</th>
<th>L_{eq} (b) for Noisiest Traffic Hour</th>
<th>Description of Activity Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>57 (Exterior)</td>
<td>Lands on which serenity and quite 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.</td>
</tr>
<tr>
<td>B</td>
<td>67 (Exterior)</td>
<td>Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools churches, libraries, and hospitals.</td>
</tr>
<tr>
<td>C</td>
<td>72 (Exterior)</td>
<td>Developed lands, properties, or activities not included in Categories A or B.</td>
</tr>
<tr>
<td>D</td>
<td>---</td>
<td>Undeveloped lands.</td>
</tr>
<tr>
<td>E</td>
<td>52 (Interior)</td>
<td>Residences, motels, hotels, public meeting rooms, schools, churches libraries hospitals, and auditoriums.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Measurement Location (See Figure 3-6)</th>
<th>Leq (dBA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>54</td>
</tr>
<tr>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>3</td>
<td>71</td>
</tr>
<tr>
<td>4</td>
<td>51</td>
</tr>
<tr>
<td>5 (5:00 a.m. to 10:00 p.m.)</td>
<td>36 to 44</td>
</tr>
<tr>
<td>5 (10:00 p.m. and 5:00 a.m.)</td>
<td>32 to 38</td>
</tr>
<tr>
<td>6 (5:00 a.m. to 10:00 p.m.)</td>
<td>49 to 57</td>
</tr>
<tr>
<td>6 (10:00 p.m. and 5:00 a.m.)</td>
<td>41 to 48</td>
</tr>
</tbody>
</table>


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 1980 as amended, and as applicable, Chapters 128D and 342J of the Hawai‘i 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 an 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 13. 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‘aloha or ‘haloa (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

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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 Waialua 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, Hoolaula Street, Noeau 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.

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4 The Ewa District is a geographical unit that extends from Red Hill to Kahe, from the shoreline to Millilani. It includes the Pearl City/Manana area.
FIGURE 3-7:
View Angle for Figure 3-8 and Figure 3-9

Manana Development Spine Road
Environmental Assessment
FIGURE 3-9:
Typical View of Manana Storage Area Warehouses
Manana Development Spine Road Environmental Assessment

NOT TO SCALE
Figure 3-11. Lanes, 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 Paana Street and terminates at Kaahumanu Street in Waiau.

3.7.2 TRAFFIC AND INTERSECTION PERFORMANCE
Traffic counts were taken at selected intersections in the study area 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). 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

<table>
<thead>
<tr>
<th>LOS</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UN SIGNALIZED INTERSECTIONS</strong></td>
<td></td>
</tr>
<tr>
<td>LOS A</td>
<td>Little or no delay: less than 5 seconds</td>
</tr>
<tr>
<td>LOS B</td>
<td>Short traffic delays: more than 5 seconds, less than 10 seconds</td>
</tr>
<tr>
<td>LOS C</td>
<td>Average traffic delays: between 10 and 20 seconds</td>
</tr>
<tr>
<td>LOS D</td>
<td>Long traffic delays: more than 20 seconds, less than 30 seconds</td>
</tr>
<tr>
<td>LOS E</td>
<td>Very long traffic delays: between 30 and 45 seconds</td>
</tr>
<tr>
<td>LOS F</td>
<td>Demand volume exceeds capacity, delays longer than 45 seconds</td>
</tr>
<tr>
<td><strong>SIGNALIZED INTERSECTIONS</strong></td>
<td></td>
</tr>
<tr>
<td>LOS A</td>
<td>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.</td>
</tr>
<tr>
<td>LOS B</td>
<td>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.</td>
</tr>
<tr>
<td>LOS C</td>
<td>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.</td>
</tr>
<tr>
<td>LOS D</td>
<td>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.</td>
</tr>
<tr>
<td>LOS E</td>
<td>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.</td>
</tr>
<tr>
<td>LOS F</td>
<td>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.</td>
</tr>
</tbody>
</table>

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.
• **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 Hoomaema 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 of Lehua Avenue. The Waialae 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.
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 Waiaku 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 Waiaku Reservoir (1.0 mg), and the Newton 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 Honolulu 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 Highland 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.
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 Hawai'i'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.

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

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.

#### 4.3.2 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

<table>
<thead>
<tr>
<th>Source &amp; Time</th>
<th>Changes in Traffic Noise Levels (Year 2020 L_{eq} in dBA)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Waimano Home Rd. (Hoamalu St. to Moanalua Rd.)</td>
<td>Kamehameha Hwy. (Acacia Rd. to Waimano Home Rd.)</td>
<td>Moanalua Road (Hoolaula St. to Waimano Home Rd.)</td>
</tr>
<tr>
<td>Morning Peak-Hour:</td>
<td>+0.7</td>
<td>+0.7</td>
<td>+0.7</td>
</tr>
<tr>
<td>Ambient Growth</td>
<td>-1.0</td>
<td>+0.4</td>
<td>+0.5</td>
</tr>
<tr>
<td>Spine Road Effect</td>
<td>-0.3</td>
<td>+0.3</td>
<td>+1.2</td>
</tr>
<tr>
<td>Net Change</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evening Peak Hour:</td>
<td>+0.7</td>
<td>+0.7</td>
<td>+0.7</td>
</tr>
<tr>
<td>Ambient Growth</td>
<td>-1.3</td>
<td>-0.6</td>
<td>+1.5</td>
</tr>
<tr>
<td>Spine Road Effect</td>
<td>-0.6</td>
<td>+0.1</td>
<td>+2.2</td>
</tr>
<tr>
<td>Net Change</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.


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 makua segment of the proposed road as it approaches Moanalua Road, passing just makai of backyards of existing residences on Noe Kau St.

- 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 parcels. 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

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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. 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 S DOT criteria for assessing the existence of a "traffic noise impact" (see Section 3.2.4). 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 S DOT Noise Analysis and Abatement Policy.

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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 Kualapa 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.
Approximate Cost of Wall Providing Mitigation for 31 Lots = $200,000 (FY98)
Note: Development of structures on now-vacant lots would reduce the required size and cost of the wall.

LEGEND:
- 6-Foot High CMU Wall
- 6-Foot High CMU Wall From Interim Phase
- 6- to 15-Foot High CMU Wall
- Lot Benefiting from Wall
- Lot Benefiting from Wall or Future Structure Within Manana Development

SOURCE:
C.G. Gavoni, DPH, April 1998
C.G. Gavoni, DPH, June 8, 1998

FIGURE 4-2:
Permanent Noise Mitigation Measures
Manana Development Spine Road Environmental Assessment
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 CO\(^5\) 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/m\(^3\)). 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)

<table>
<thead>
<tr>
<th></th>
<th>Existing Conditions</th>
<th>2020 No Action</th>
<th>2020 Preferred Alignment</th>
<th>2020 Alternate Alignment</th>
<th>Critical Receptors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning Peak Hour</td>
<td>9.0</td>
<td>8.7</td>
<td>9.6</td>
<td>9.6</td>
<td>R26, R28, R36</td>
</tr>
<tr>
<td>Afternoon Peak Hour</td>
<td>6.0</td>
<td>5.1</td>
<td>5.0</td>
<td>5.0</td>
<td>R14</td>
</tr>
<tr>
<td>8-hour Concentration</td>
<td>4.2</td>
<td>4.1</td>
<td>4.5</td>
<td>4.5</td>
<td>R26, R28, R36</td>
</tr>
</tbody>
</table>

FIGURE 4-3:
Modeled Carbon Monoxide at Moanalua Road - Waimano Home Road Intersection

LEGEND:

SOURCE:
J.W. Morrow, July 1998

NOT TO SCALE
Estimated Maximum Concentration (mg/m³)

<table>
<thead>
<tr>
<th></th>
<th>Existing Conditions</th>
<th>2020 No Action</th>
<th>2020 Preferred Alignment</th>
<th>2020 Alternate Alignment</th>
<th>Critical Receptors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning Peak Hour</td>
<td>9.0</td>
<td>9.6</td>
<td>10.0</td>
<td>10.0</td>
<td>R25, R37, R38</td>
</tr>
<tr>
<td>Afternoon Peak Hour</td>
<td>11.7</td>
<td>8.2</td>
<td>10.0</td>
<td>10.0</td>
<td>R1, R19</td>
</tr>
<tr>
<td>8-hour Concentration</td>
<td>5.5</td>
<td>4.5</td>
<td>4.7</td>
<td>4.7</td>
<td>R37, R38</td>
</tr>
</tbody>
</table>

LEGEND:

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

NOT TO SCALE

SOURCE:
J.W. Monnow, July 1998

FIGURE 4-5:
Manana Development Spine Road Environmental Assessment
Estimated Maximum Concentration (mg/m³)

<table>
<thead>
<tr>
<th></th>
<th>Existing Conditions</th>
<th>2020 No Action</th>
<th>2020 Preferred Alignment</th>
<th>2020 Alternate Alignment</th>
<th>Critical Receptors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning Peak Hour</td>
<td>2.2</td>
<td>2.7</td>
<td>9.5</td>
<td>3.4</td>
<td>R13, R15</td>
</tr>
<tr>
<td>Afternoon Peak Hour</td>
<td>1.3</td>
<td>2.6</td>
<td>6.8</td>
<td>3.2</td>
<td>R13, R14, R15</td>
</tr>
<tr>
<td>8-hour Concentration</td>
<td>1.0</td>
<td>1.3</td>
<td>4.4</td>
<td>1.6</td>
<td>R13</td>
</tr>
</tbody>
</table>

**Legend:**

- NOT TO SCALE

**Source:**

J. W. Morrow, July 1998

**Figure 4-6:**

Modeled Carbon Monoxide at Acacia Road - Kuala Street Intersection

Manana Development Spine Road Environmental Assessment
### Estimated Maximum Concentration (mg/m³)

<table>
<thead>
<tr>
<th>Conditions</th>
<th>2020 No Action</th>
<th>2020 Preferred Alignment</th>
<th>2020 Alternate Alignment</th>
<th>Critical Receptors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning Peak Hour</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>6.3</td>
</tr>
<tr>
<td>Afternoon Peak Hour</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>5.2</td>
</tr>
<tr>
<td>8-hour Concentration</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>2.9</td>
</tr>
</tbody>
</table>

**Legend:**

- **NOT TO SCALE**

**Source:**

J.W. Morrow, July 1999

**Figure 4-7:** Modeled Carbon Monoxide at Realigned Acacia Road - Spine Road Intersection
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 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 alignments 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 EA.

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

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

FEBRUARY 1999
### Table 4-3. Comparison of Existing and Forecast Year 2020 Overall Levels-of-Service for Signalized Intersections: Morning (A.M.) Peak Hour.

<table>
<thead>
<tr>
<th>Location</th>
<th>A.M. Peak Hour (7:00 a.m. to 8:00 a.m.)</th>
<th>Year 2020 No Action/ Without Improvements</th>
<th>Year 2020 No Action/ With Improvements*</th>
<th>Year 2020 Preferred Alt.**</th>
<th>Year 2020 Alt. Align.***</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waimāno Home Road/ Moanalua Road/Spine Road</td>
<td>E</td>
<td>E</td>
<td>E</td>
<td>D/PP†</td>
<td>D/PP†</td>
</tr>
<tr>
<td>Waimāno Home Road/Hoolauloa Street</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Waimāno Home Road/ Kamehameha Hwy.</td>
<td>E</td>
<td>E</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>Waimāno Home Road/ Noiolani Street</td>
<td>B</td>
<td>C</td>
<td>C</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Kamehameha Hwy./Acacia Road (preferred alignment)</td>
<td>D</td>
<td>D</td>
<td>C</td>
<td>C</td>
<td>n.a.</td>
</tr>
<tr>
<td>Kamehameha Hwy./Spine Road (alternative alignment)</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>C</td>
</tr>
<tr>
<td>Spine Road/ Acacia/Kuaia St. (preferred alignment)*</td>
<td>A</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>n.a.</td>
</tr>
<tr>
<td>Spine Road /Acacia Road (alternative alignment)</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>B</td>
</tr>
<tr>
<td>Spine Road/Connector Road</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>B</td>
<td>B</td>
</tr>
</tbody>
</table>

**Notes:**
- (a) Acacia/Kuaia/Spine Road Intersection operates as unsignalized intersection in existing condition.
- (b) Year 2020 LOS for Waimāno Home Road/Noiolani Street intersection is estimated for Alternative 6 with the intersection analyzed independently of Waimāno Home Road/Monaluau 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


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7 Figure 20.
8 Figure 22.
9 Figure 24.
10 Figure 26. Assumes Restricted Movements at Noiolani Street (i.e. Alternative 3).
11 Figure 28. Assumes Restricted Movements at Noiolani Street (i.e. Alternative 3).
12 Table C-4. Assumes No Restrictions at Noiolani Street (i.e. Alternative 6).
13 Table C-4. Assumes No Restrictions at Noiolani 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.

<table>
<thead>
<tr>
<th>Location</th>
<th>P.M. Peak Hour (4:00 p.m. to 5:00 p.m.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Without Improvements</td>
</tr>
<tr>
<td>----------</td>
<td>----------------------</td>
</tr>
<tr>
<td>Waimano Home Road/ Moanalua Road/Spine Road</td>
<td>B</td>
</tr>
<tr>
<td>Waimano Home Road/Hoolaula Street</td>
<td>B</td>
</tr>
<tr>
<td>Waimano Home Road/ Kamehameha Hwy.</td>
<td>F</td>
</tr>
<tr>
<td>Waimano Home Road/ Noelani Street*</td>
<td>B</td>
</tr>
<tr>
<td>Kamehameha Hwy./Acacia Road (preferred alignment)</td>
<td>E</td>
</tr>
<tr>
<td>Kamehameha Hwy./Spine Road (alternative alignment)</td>
<td>n.a.</td>
</tr>
<tr>
<td>Spine Road/Acacia/Kuala St. (preferred alignment)*</td>
<td>n.a.</td>
</tr>
<tr>
<td>Spine Road/Acacia Road (alternative alignment)</td>
<td>n.a.</td>
</tr>
<tr>
<td>Spine Road/Connector Road</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

**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.

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


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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).
19Table C-4. Assumes No Restrictions at Noelani Street (i.e. Alternative 6).
20Table 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.
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 LOS 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 layout 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.
(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 Noeani 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 Noeani 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 Noeani 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 Noeani 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 Noeani 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 Noeani 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.
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

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Weight</th>
<th>Preferred Alignment</th>
<th>Alternative Alignment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Rating Scale</td>
<td>Score</td>
</tr>
<tr>
<td>Compatibility with the master plan in the approved FEIS</td>
<td>4</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Access to Manana Storage Area Development</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Least Problems created by each Alternative</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>LOS at study intersections</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Alternate route to Waimano Home Road</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>1</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

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 Noeani 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.*
ENVIRONMENTAL CONSEQUENCES

- 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 slit 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 μg/m³, 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 roadway 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 Honolulu 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
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 policies. 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.
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. Detrimentally 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 viewplances 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, orEndangered 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 roadway\(^2\) 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

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\(^2\) Analyses assumed that unrelated roadway improvements which have been recommended to relieve existing congestion (at Kamahameha Highway/Waimano Home Road, Kamahameha Highway/Acacia Road, Mountauk Road/Waimano Home Road, Waimano Home Road/Noelani Street, and Acacia/Kuola 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 Honolulu 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 homogeneous, consisting largely of moderately priced single-family homes. Exceptions include the Hale Ola low-density apartments 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 are:

- 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)

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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. Pang, 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 forces 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 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 form 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.
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<th>Federal Agencies</th>
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<td>U.S. Department of Agriculture, Natural Resources Conservation Service</td>
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<td>U.S. Army Corps of Engineers, Pacific Ocean Division</td>
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<td>U.S. Department of the Interior, Fish &amp; Wildlife Service</td>
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<td>U.S. Department of the Interior, National Park Service</td>
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<td>U.S. Department of Commerce, National Marine Fisheries Service</td>
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<td>U.S. Department of Transportation, Federal Aviation Administration</td>
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<td>U.S. Department of the Navy, Facilities Engineering</td>
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<td>U.S. Department of the Navy, Commander, Naval Base Pearl Harbor</td>
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<td>State Agencies</td>
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<td>Department of Hawaiian Home Lands</td>
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<td>Department of Land &amp; Natural Resources</td>
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<td>Department of Land &amp; Natural Resources, Historic Preservation Division</td>
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<td>Department of Health, Environmental Management Division</td>
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<td>Department of Transportation</td>
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<td>Office of Planning</td>
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<td>Office of Hawaiian Affairs</td>
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<td>University of Hawaii, Water Resources Research Center</td>
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<td>University of Hawaii, Environmental Center</td>
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<td>Housing Finance and Development Corporation</td>
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<td>State Energy Office</td>
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<td>Office of Environmental Quality Control</td>
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<td>State Land Use Commission</td>
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☑ = Comment Received  □ = Comment Received Specifically Mentions Spine Road

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

FEBRUARY 1999
### Table 7-1. Parties Consulted During Preparation of the Manana and Pearl City Junction Development Environmental Final Impact Statement (continued)

<table>
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<tr>
<th>City &amp; County of Honolulu Agencies</th>
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<td>Department of Finance</td>
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<tr>
<td>U.S. Congressmember Neil Abercrombie</td>
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<td>State Senator David Ige</td>
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<td>State Senator Cal Kawamoto</td>
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<td>Councilmember Mul H. Hanemann</td>
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<tr>
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<td>Ms. Sherry Aquino</td>
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| ☐ = Comment Received                      | ✔ = Comment Received Specifically Mentions Spine Road |
### Table 7-2. Agencies Contacted In Writing During Preparation of the Draft EA

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<td>Highways Administrator, Hawaii State Department of Transportation</td>
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<tr>
<td>Fish &amp; Wildlife Service, U.S. Department of the Interior</td>
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\(^2\) Provided verbally
\(^3\) Provided verbally
### Table 7-3: Parties to Whom the DEA was Sent

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REFERENCES


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U. S. Environmental Protection Agency (26 June 1996) *Guideline on Air Quality Models (Revised)*, 40 CFR 51, Appendix W.

U. S. Environmental Protection Agency (September 1996) *MOBILE-SB (Mobile Source Emission Factor Model)*.


U.S. Department of the Navy (August 9, 1993) *Memorandum of Understanding between the Department of the Navy and the City and County of Honolulu Concerning the Transfer of Ownership of Lands at Pearl City Junction and Manana*.

U.S. Department of the Navy (December 2, 1994) Letter to Jeremy Harris, Mayor of the City and County of Honolulu, with attached “Finding of Suitability to Transfer Manana Storage Area A”.

U.S. Department of the Navy (June 4, 1996) Letter to Jeremy Harris, Mayor of the City and County of Honolulu, with attached “Finding of Suitability for Transfer Manana Storage Areas B and C”.

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TRAFFIC ASSESSMENT
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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.
EXECUTIVE SUMMARY

Pacific Planning & Engineering, Inc. (PPEI) 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 Kula 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 Kamuela 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 Noeau Street,
- Waimano Home Road with Moanalua Road,
- Waimano Home Road with Hoolauloa Street,
- Kamuela Highway with Waimano Home Road,
- Kamuela Highway with Acacia Road,
- Kamuela Highway with Kula Street and
- Kula 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 Noiolani 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 Kualoa Street (Figure 34).

The following existing intersections do not require any modifications:

- Waimano Home Road with Hoaauauka Street and
- Kamehameha Highway with Kualoa 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 Noiolani Street.
of property along the makai side of Moanalua Road, but does allow limited access to Noeau 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 Noeau 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 Noeau 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 Intersection of Waimano Home Road with Moanalua Road/Spine Road and Acacia Road with Kualoa Street/Spine Road is shown in Appendix D, Figure D3.

2) Determine if the existing traffic signal at the intersection of Noeau 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 Anahim Road with Haua 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, Anahim 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.
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 laneage 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 Waipahu 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, Hoomaluhia Street, Moanalua Road and Noeau 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 interaction with Kamehameha Highway. It also forms an unsignalized T-intersection to the north with Acacia Road. The posted speed limit is 25 mph.

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

Hoomaluhia 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 Noeau Street,
- Waimano Home Road with Moanalua Road,
- Waimano Home Road with Hoomaluhia 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.
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 Plan (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.

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 screenline data near the study area indicates an annual growth rate of approximately 0.0% per year. Accordingly, the existing traffic volumes were increased by 14% (0.0% 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.

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 Report.3

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Morning Enter</th>
<th>Morning Exit</th>
<th>Afternoon Enter</th>
<th>Afternoon Exit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home Improvement Store</td>
<td>130</td>
<td>109</td>
<td>212</td>
<td>407</td>
</tr>
<tr>
<td>Other Use</td>
<td>(45,000 b/d)</td>
<td></td>
<td>(90,000 b/d)</td>
<td></td>
</tr>
</tbody>
</table>

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.

The amount of "Pass-by" trips for the project was based on a previous report for the Home Depot Project 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 Maumau Storage Area development. The peak hour traffic volume forecasts with the project for the "Alternative 1 Spine Road alignment and Alternative 3 mitigation to Noeau 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

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 Noeland 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 Noeland Street with Waimano Home Road, six alternatives were developed. The alternatives were:

1. Remove the traffic signals at the intersection of Noeland Street with Waimano Home Road and restrict Noeland Street to a right-turn in and right-turn out operation. Divert existing Noeland Street motorists to Leomele Street.

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

3. Remove the traffic signals at the intersection of Noeland Street with Waimano Home Road and restrict Noeland Street to a right-turn in and right-turn out operation. Divert existing Noeland Street motorists to a connector road from the Spine Road to an existing Cane Haul Road. The Cane Haul Road would intersect with Kualapa Street just north of Ho'ola 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 Noeland 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 Noeland 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 Noeland 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 Kualapa Street and prohibits left-turns into Noeland Street appears to be the most viable alternative. With the restrictions at Noeland Street, the existing traffic circulation patterns were adjusted. Appendix C describes in detail the developed alternatives.
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 IFE Trip Generation Report as well as other reports where applicable. Table 2 shows the number of generated trips.

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Morning</th>
<th></th>
<th>Afternoon</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Commerical - Total (129,383 a-ft²)</td>
<td>113</td>
<td>73</td>
<td>357</td>
<td>367</td>
</tr>
<tr>
<td>Commerical - Office (44,595 a-ft²)</td>
<td>116</td>
<td>16</td>
<td>26</td>
<td>126</td>
</tr>
<tr>
<td>Medical Office Building (40,000 a-ft²)</td>
<td>78</td>
<td>13</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>Family Center/County Park (23,75 acre)</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Bd. of Water Supply Maint. (2.42 acre)</td>
<td>11</td>
<td>7</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>DPS - Storage &amp; Maintenance (6.06 acre)</td>
<td>7</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>DTS - Vehicle Maintenance (1.34 acre)</td>
<td>7</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Light Industrial (1.14 acre)</td>
<td>70</td>
<td>14</td>
<td>35</td>
<td>123</td>
</tr>
<tr>
<td>Bus Facility (21 acre)</td>
<td>41</td>
<td>64</td>
<td>29</td>
<td>38</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>441</strong></td>
<td><strong>501</strong></td>
<td><strong>462</strong></td>
<td><strong>750</strong></td>
</tr>
</tbody>
</table>

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 Mauna 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 ORIP 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 Moanalua Road/Waimano Home Road/Acacia Road/Kualii 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 divertions due to the modified southern alignment of Alternative 2. These peak hour traffic volume forecasts for "Alternative 2 Spine Road alignment and Alternative 3 mitigation to Noeau 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 Manahum Road with Waimanu Home Road and Noelaun 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 Kualapu Street and prohibits left turns into Noelaun Street appears to be the most viable alternative. With the restrictions at Noelaun 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 Noeauani 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 Kula Street and
- Kula 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 II 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.
Waimano Home Rd with Moanalua Rd and Waimano Home Rd with Noeau St

Due to the close spacing between the signalized intersections of Noeau 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 Noeau 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 Rd with Hookanae Street

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

Waimano Home Rd/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 B) during both peak hours.

Kuala Street with Acacia Rd

- 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 laneage consists of an exclusive left-turn lane, a shared left/through lane and an exclusive right turn lane. The southbound laneage 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 Mauna 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 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 lengths 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 without condition discussed previously, however, modification of the cycle lengths may improve traffic operations.
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 Noeland Street:**

The close distance between the signalized intersections of Noeland 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 Noeland 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 Noeland Street with Waimano Home Road, six alternatives were developed. The locations 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 Koilawa Street, removes the traffic signal at the intersection of Waimano Home Road with Noeland Street, and restricts movements to right-turn in and right-turn of Noeland 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.
• 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/leg left-turn phasing for the northbound and southbound approaches.

Kane'oa Road with Ho'okaulani Street:

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

Kane'oa Highway with Waimano Home Road/Lehua 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.

Kane'oa 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.

Kane'oa Highway with Ka'ula Street:

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

Acacia Road with Ka'ula 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 Kane'oa Highway 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 Kauai Street with Acacia Road and Spine Road with Acacia Road. The intersection configuration and modifications for Alternative 2 are as follows:

**Acacia Road with Kauai 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 LT lane.
- Eastbound approach: exclusive LT lane, exclusive LT 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.
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:


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.

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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.


Alternative 2 appears to provide a somewhat better access to the Manana Storage Area Development for motorists on Kamehameh 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 hook up 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 Kamahameha 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 Kamahameha Highway. This tends to distribute the right-turning traffic on Kamahameha Highway more evenly.

With Alternative 2 and the direct connection to Kamahameha Highway, the route to Kuala Street is more circuitous and therefore, more motorists will tend to use the intersection of Kamahameha 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 Kamahameha Highway. However, Alternative 2 provides a direct connection to Kamahameha 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 Noeau Street (Figure 31).
- Waimano Home Road with Moanalua Road/Spine Road (Figure 32).
- Waimano Home Road with Kamehameha Highway (Figure 32).
- Kamehameha Highway with Alakai Road (Figure 33) and
- Alakai Road with Kualoa Street (Figure 34).

The following existing intersections do not require any modifications:

- Waimano Home Road with Hoalaula Street and
- Kamehameha Highway with Kualoa 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 Kualoa Street just above Hoalaula 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 Noeau 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 Noeland 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 Noeland 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 Noeland Street with Waimano Home Road and restrict Noeland Street to a right-turn in and right-turn out operation. Divert existing Noeland Street motorists to Leomele Street.

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

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

Alternative 1 (Leomele Street) does not seem feasible from both a constructability and a traffic operations perspective. Alternative 2 (Spine Road via Kuuahka Street extension) requires the use of park land and subsequently may not be possible because of Section 408 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 Noeland Street) results in LOS “D” conditions during both the morning and afternoon peak hours. Alternative 5 (Noeland Street restricted to through movement) also results in LOS “D” conditions during both peak hours. However, Alternative 4 (Noeland Street open and Alternative 5 (Noeland 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 Noeau 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 Noeau 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 contralflow of the northbound left-turn lane on Waimano Home Road at Noeau 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 2020.

1) Necessary laneages at the intersections of Waimano Home Road with Moanalua Road/Spine Road and Acacia Road with Kuali Street/Spine Road is shown in Appendix D, Figure D3.

2) Determine if the existing traffic signal at the intersection of Noeau 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.
# APPENDIX A

## TRAFFIC COUNT DATA

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### Project: 86.1 Manana Spine Road TIAA

#### Date: 3/14/98

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### Project: 86.1 Manana Spine Road TIAA

#### Date: 3/14/98

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### Project: 86.1 Manana Spine Road TIAA

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- TH T/B: 0
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**Source:** Parson Brinkerhoff
### Table A-4

**Source:** Parsons Brinckerhoff

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### Table A-5

**Source:** Parsons Brinckerhoff

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### Project: 80.1 Manana Spine Road TAIAR

**Date:** 3/1/08

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### Source: Parson Brinckerhoff
### Project: 88.1 Manana Spur Road TIFAR

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A-9
### Project: 80.1 Mano Road TAIR

**Date:** 3/1/19

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**Source:** Parson Brinkerhoff

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### Project: 80.2 Mano Road TAIR

**Date:** 3/1/19

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**Source:** Parson Brinkerhoff
### Project: 80.1 Manana Spine Road TIA
**Date: 3/15/98**

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### Project: 80.1 Manana Spine Road TIA
**Date: 3/15/98**

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| 5:00 PM    | 0   | 109| 0  | 0  | 209 | 209 | 0.005 |

Source: Parsons Brinckerhoff
APPENDIX B

LEVEL-OF-SERVICE FOR SIGNALIZED INTERSECTIONS AND UNSIGNALIZED 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 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 ratio (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 condition is considered to be unacceptable to most drivers. This condition often occurs with overstatement, 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.

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<td>B</td>
<td>&gt; 0 and 5</td>
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<td>D</td>
<td>&gt; 15 and 25</td>
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<td>E</td>
<td>&gt; 25 and 40</td>
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<tr>
<td>F</td>
<td>&gt; 60</td>
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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 intersections than for a signalized intersection.

<table>
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<tr>
<th>Level of Service</th>
<th>Average Total Delay (sec/veh)</th>
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<td>B</td>
<td>&gt; 5 and 10</td>
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<tr>
<td>C</td>
<td>&gt; 10 and 20</td>
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<td>D</td>
<td>&gt; 20 and 30</td>
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<td>E</td>
<td>&lt;30 and 45</td>
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<tr>
<td>F</td>
<td>&gt;45</td>
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Appendix C - Alternatives to address traffic impacts at the intersections of Waimano Home Road with Moanalua Road/Spine Road and Waimano Home Road with Noeau Street.

The close distance between the signalized intersections of Noeau 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 Noeau 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 Noeau 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 Kualaska 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 D provides detailed definitions of the LOS used in this study.
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 Noeau Street with Waimano Home Road and restrict Noeau Street to a right-turn in and right-turn out operation. Divert existing Noeau Street motorists to Leolehe Street.
2. Remove the traffic signals at the intersection of Noela Street with Waimano Home Road and restrict Noela Street to a right-turn in and right-turn out operation. Divert existing Noela Street motorists to a connector road from the Spine Road to a Kuahaka Street extension.

3. Remove the traffic signals at the intersection of Noela Street with Waimano Home Road and restrict Noela Street to a right-turn in and right-turn out operation. Divert existing Noela 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 Noela 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 Noela 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 Noela Street unchanged.

The alternatives are shown schematically on Figure C8.
Alternative 1: Restrict Access to Noeia Street and Divert Motorists 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 Noeia Street to access Moanalua Road now use Leomele Street.

Leomele Street is currently a two-lane road which is approximately 700 feet north of Noeia Street. Waimano Home Road, at its intersection with Leomele Street consists of four lanes with no left-turn storage lane. The intersection is currently unsigned.

With restrictions at Noeia Street, there will be a significant increase in traffic due to Noeia Street motorists using Leomele Street. With the increased traffic volumes, the intersection meets the minimum requirement 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 100 vehicles to over 400 vehicles in the afternoon peak hour. This is a significant increase of over 300%. During the morning peak hour, there is an increase from 150 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 Makama 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 Makama 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 Motorists to a Spine Road Connection via Kualaha Street Extension

Alternative 2 provides another solution to the traffic impact at the intersection of Waimano Home Road with Manana 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 Kualaha 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 Kal 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 Kualaha 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 Manana 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 Kualaha 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 Manana Road are shown in Table C1.

<table>
<thead>
<tr>
<th>Movement</th>
<th>Level of Service</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Morning Peak Hr.</td>
</tr>
<tr>
<td>NO LT from Waimano Home Rd</td>
<td>D</td>
</tr>
<tr>
<td>NO TH/HT from Waimano Home Rd</td>
<td>D</td>
</tr>
<tr>
<td>NO LT from Manana Road</td>
<td>E</td>
</tr>
<tr>
<td>NO TH/HT from Waimana Road</td>
<td>D</td>
</tr>
<tr>
<td>ED LT/HT from Spine Rd</td>
<td>D</td>
</tr>
<tr>
<td>ED RT from Spine Rd</td>
<td>A</td>
</tr>
<tr>
<td>WD LT from Manana Rd</td>
<td>E</td>
</tr>
<tr>
<td>WD TH/HT from Manana Rd</td>
<td>D</td>
</tr>
<tr>
<td>WD RT from Manana Rd</td>
<td>D</td>
</tr>
</tbody>
</table>

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 motorists during the morning peak hour by adding a second left-turn lane on Waimano Home Road. This is possible due to the restricted southbound left-turn movement into Noela 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 Kualoa Street at a location close to the intersections of Kualoa Street with Hooli Circle and Kawelo Street. The approximate centerline to centerline distance between the cane haul road and Hooli Circle is 150'. The approximate centerline to centerline distance between the cane haul road and Kawelo Street is 170'.

Another impact of removing traffic signals at Noela 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 Moanalua 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 Noeland Street and provide a Spine Road Connection

The fourth alternative would continue to allow access to Noeland 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 Noeland Street and Moanalua Road/Spine Road is shown in Figure C10.

The synchronized phase for the eastbound right-turn from Noeland 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 motorists.

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 Noeland Street comprises less than 30% of the southbound movement. The remaining 70% of the motorists is presumably from Pacific Palisades and Upper Pearl City. Because of the protected green phase for the synchronized movements, Noeland 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

<table>
<thead>
<tr>
<th>Movement</th>
<th>Level of Service</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Morning Peak Hr.</td>
</tr>
<tr>
<td>R28 LT from Waimano Home Rd</td>
<td>D</td>
</tr>
<tr>
<td>R29 TH/TT from Waimano Home Rd</td>
<td>D</td>
</tr>
<tr>
<td>S28 LT from Waimano Home Rd</td>
<td>F</td>
</tr>
<tr>
<td>S29 TH/TT from Waimano Home Rd</td>
<td>E</td>
</tr>
<tr>
<td>S30 LT/TT from Spine Rd</td>
<td>E</td>
</tr>
<tr>
<td>WH LT from Moanalua Rd</td>
<td>A</td>
</tr>
<tr>
<td>WH TH/TT from Moanalua Rd</td>
<td>E</td>
</tr>
<tr>
<td>WH LT from Moanalua Rd</td>
<td>D</td>
</tr>
<tr>
<td>WH TH/TT from Moanalua Rd</td>
<td>D</td>
</tr>
<tr>
<td>Overall</td>
<td>F</td>
</tr>
</tbody>
</table>

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 Noeau 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 Noeau 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 Noeau Street. Northbound left-turns into Noeau 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 Noeau Street, thereby allowing a phase when pedestrians can cross Waimano Home Road.

The synchronized signal phasing between Noeau 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 Noeau 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.
Table C3 Alternative 5 - Waimano Home Road with Moanalua Road/Spine Road

<table>
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<th>Movement</th>
<th>Level of Service Morning Peak Hr.</th>
<th>Level of Service All Hour Peak Hr.</th>
</tr>
</thead>
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<tr>
<td>ND LT from Waimano Home Rd</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>RD Thru/Rt on Waimano Home Rd</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>SB LT from Waimano Home Rd</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>SB Thru/Rt from Waimano Home Rd</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>ED LT from Spine Rd</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>ED Thru/Rt from Spine Rd</td>
<td>D</td>
<td>C</td>
</tr>
<tr>
<td>W11 Thru/Rt from Moanalua Rd</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>W11 Thru/Rt from Moanalua Rd</td>
<td>H</td>
<td>D</td>
</tr>
<tr>
<td>W11 Thru/Rt from Moanalua Rd</td>
<td>H</td>
<td>D</td>
</tr>
<tr>
<td>Overall</td>
<td>D</td>
<td>D</td>
</tr>
</tbody>
</table>

Alternative 6: Allow Access to Noeani 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 Noeani 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 Noeani Street and Moanalua Road/Spine Road is shown in Figure C12. The results of the analysis for Alternative 6 are shown in Table C4.
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, Nokela 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 Nokela Street will not permit the addition of a second left-turn lane for the southbound movement to Manana 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 road-geometry, additional right-of-way will be 
required to provide adequate transition for the eastbound through movement
across 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 (Keomele Street) does not seem feasible from both a 
constructability and a traffic operations perspective. Alternative 2 (Spine Road 
via Kualakai Street extension) requires the use of park land and subsequently 
may not be possible because of Section 408 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 
movement) also results in LOS "D" conditions during both peak hours. 
However, Alternative 4 (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>
<thead>
<tr>
<th>Time Period</th>
<th>Existing</th>
<th>Alternative 3</th>
<th>Alternative 4</th>
<th>Alternative 5</th>
<th>Alternative 6</th>
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</thead>
<tbody>
<tr>
<td>Morning Peak Hour</td>
<td>E</td>
<td>D</td>
<td>F</td>
<td>D</td>
<td>F</td>
</tr>
<tr>
<td>Afternoon Peak Hour</td>
<td>D</td>
<td>D</td>
<td>E</td>
<td>D</td>
<td>E</td>
</tr>
</tbody>
</table>

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 mauka 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.
APPENDIX D

MANANA SPINE ROAD
INTERIM CONDITIONS

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 (Meanana Road to Acacia Road) is built to provide access to the site. The following issues will also be discussed:

1) Necessary lanes at the intersections of Waianae Home Road with Meanana 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 Noela Street with Waianae Home Road can still be coordinated with the traffic signal at the new intersection of Waianae Home Road with Meanana Road/Spine Road.

3) Determine if the addition of an exclusive westbound right-turn lane on Hamehameha 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 (Boad 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.

D - 1
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.

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Morning</th>
<th>Afternoon</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Enter</td>
<td>Exit</td>
</tr>
<tr>
<td>Family Center/County Park (20.75 acre)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Blk. of Water Supply Maint. (7.42 acre)</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td>DTSS - Storage &amp; Maintenance (4.56 acre)</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>DTSS - Vehicle Maintenance (4.34 acre)</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Bus Facility (21 acre)</td>
<td>41</td>
<td>64</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td>68</td>
<td>79</td>
</tr>
</tbody>
</table>

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/William H. Hoolehua Highway. Trips to Moanalua Road/Walnana Home Road/Acacia Road/Kiikahuna Street or Keahamela Highway via the Spine Road.

### Issues

1. Necessary laneage at the intersections of Walnana 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 Walnana 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 exiting traffic signal phasing at the intersections of Waimano Home Road, Koolaulani Street, and Moanalua Road with Moanalua Road/Spine Road.

For build-out conditions, it was recommended that the traffic signals at the intersection of Koolaulani 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 Koolaulani Street without having to construct a connector road.

Lanes and Phasing

The laneage for the interim condition needs to be modified to accommodate the spine. 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 Koolaulani Street is maintained.

A phasing plan was developed which includes the Spine Road while still allowing motorists to make left-turns into Koolaulani 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 Koolaulani 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 lanes 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 Nualapali 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 Meanahua 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 Kanehameha Highway.

The addition of the City facilities and the Spine Road is expected to have a small impact to the intersection of Kanehameha 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 Kanahameha 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, Waipahu Home Road (Bus Facility) and Kanehameha Highway. The resultant impact of these trips becomes negligible.

Second, the poor LOS westbound on Kanehameha 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 Kanehameha 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 D5 shows the interim laneages and improvements.
APPENDIX B
ACOUSTICAL ASSESSMENT
<table>
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<th>Section</th>
<th>Description</th>
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</thead>
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<td>Summary</td>
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<td>3.0</td>
<td>Noise Standards and Guidelines</td>
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<td>5.0</td>
<td>Potential Noise Impact Due to the Project and Noise Mitigation</td>
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<td></td>
<td>References</td>
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<td>Appendix A - Acoustical Terminology</td>
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<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
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<tr>
<td>1</td>
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<td>2</td>
<td>Projected Traffic Noise Level ($L_{eq}$ in dBA) Changes During Peak Traffic Hours</td>
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</table>
1.0 SUMMARY

1.1 The potential noise impacts due 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 Ho'olaule'a Street and Hoonaula Street that abut the new road's right-of-way. These areas currently experience ambient noise levels ranging from 33 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 Kaneohe Bay (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 Kamehameha Highway.

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/lane storage turn, 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 noise metrics and terminology used in these guidelines and standards is presented in Appendix A.

3.1 U.S. Federal Highway Administration

The Federal Highway Administration (FHWA) has developed noise abatement criteria in its regulations which constitute the noise standards mandated by 23 U.S.C. 109(a) (Reference 1). The noise abatement criteria is comprised of four land use categories and corresponding maximum noise equivalent sound levels, LAeq, as listed in Table 1. The FHWA noise standards are applicable to Federal or Federal-aid highway projects. 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 levels. 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 (HDDOT) 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, Ldn, 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 Ldn not exceeding 65 dBA and a future goal to further reduce exterior environmental noise to an Ldn 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, LAeq, and in units of A-weighted decibels (dBA). Appendix A provides a brief description of A-weighted sound levels and
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 L40 were recorded starting from about 5:00 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:

<table>
<thead>
<tr>
<th>Measurement Location</th>
<th>L40 (dB(A))</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>58</td>
</tr>
<tr>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>3</td>
<td>71</td>
</tr>
<tr>
<td>4</td>
<td>54</td>
</tr>
<tr>
<td>5</td>
<td>35 to 44 (between 5:00 a.m. and 10:00 p.m.)</td>
</tr>
<tr>
<td>6</td>
<td>32 to 38 (between 10:00 p.m. and 5:00 a.m.)</td>
</tr>
<tr>
<td></td>
<td>48 to 57 (between 5:00 a.m. and 10:00 p.m.)</td>
</tr>
<tr>
<td></td>
<td>41 to 48 (between 10:00 p.m. and 5:00 a.m.)</td>
</tr>
</tbody>
</table>

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 Mountain 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 Noeau Street and Hooh Circle that are adjacent to the new Spine Road's and Connector Road's ROW. In accordance with FHWA's recommended L40, as presented in Table 1, an exterior hourly L40 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 Montalvo 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 abatement 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 L40 of 33 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 3), 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.

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 Hoolei Circle and Noeauani Street, as discussed above remain unchanged. The residences of the Kauhaha 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 levels 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 HDOF 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 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 vehicle noise requirements (Reference 7).
REFERENCES:


---

TABLE 1

<table>
<thead>
<tr>
<th>Activity Category</th>
<th>( \text{L}_{\text{eq}, \text{h}} \text{ in dBA} )</th>
<th>Description of Activity Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 57 (Exterior)</td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>B 67 (Exterior)</td>
<td>Picnic areas, recreation areas, playgrounds, active sport areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.</td>
<td></td>
</tr>
<tr>
<td>C 72 (Exterior)</td>
<td>Developed lands, properties, or activities not included in Categories A or B above.</td>
<td></td>
</tr>
<tr>
<td>D ---</td>
<td>Undeveloped lands.</td>
<td></td>
</tr>
<tr>
<td>E 52 (Interior)</td>
<td>Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.</td>
<td></td>
</tr>
</tbody>
</table>
### TABLE 2

**PREDICTED FUTURE TRAFFIC NOISE LEVEL (L_{eq} in dBA) CHANGES DURING PEAK TRAFFIC HOURS**

<table>
<thead>
<tr>
<th>Roadway</th>
<th>Waikamoa Rd. (between Hoakalei Rd. and Moanalua Rd.)</th>
<th>Kanehoalani Hwy. (between Atalaya Rd. and Waikamoa Rd.)</th>
<th>Moanalua Rd.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Future Changes (in dBA)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Without Project</td>
<td>AM Peak 0.7</td>
<td>PM Peak 0.7</td>
<td>0.7</td>
</tr>
<tr>
<td>With Project</td>
<td>AM Peak -0.3</td>
<td>PM Peak 0.1</td>
<td>2.2</td>
</tr>
<tr>
<td><strong>Future Changes (in dBA)</strong></td>
<td>AM Peak -1.0</td>
<td>PM Peak -0.6</td>
<td>1.5</td>
</tr>
</tbody>
</table>

**Notes:**

1. Traffic noise levels were measured at an arbitrary 50-foot distance from edge of nearest traffic lane and

---

**Diagram:**

- Compactors (Haulers)
- Front Loaders
- Backhoes
- Tractors
- Scrapers, Graders
- Pavers
- Trucks
- Concrete Mixers
- Concrete Pumps
- Cranes (Novabeck)
- Cranes (Demolishers)
- Pumps
- Generators
- Compressors
- Pneumatic Wrenches
- Jack Hammers and Rock Drills
- Pile Drivers (Spears)
- Vibrators
- Saws

**Noise Level at 484 ft at 30 feet**

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**Page 9**
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:

\[ SPL = 20 \log (P_P/P_{ref}) \text{ dB} \]

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 \( SPL = 0 \) dB, or if \( P \) is 200 micropascals, then \( SPL = 20 \) 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 3-5 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-emphasize 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.

Appendix A
Acoustical Terminology (Continued)

Spectral Sound Levels

The sound levels of long-term noise generating activities, such as traffic movement, aircraft operations, etc., can vary considerably within a single day. 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 Exceedence Level, \( L_x \). The Exceedence Level, \( L_x \), represents the sound level which is exceeded for \( x \)% of the measurement time period. For example, \( L_{50} \) or 60 dBA indicates that for the duration of the measurement period, the sound level exceeded 60 dBA 50% of the time. Commonly used Exceedence Levels include \( L_{20} \), \( L_{50} \), \( L_{80} \) and \( L_{100} \) which are widely used to assess community and environmental noise. Figure A-3 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 sound 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, \( L_{den} \), 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 \( L_{den} \) 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 \( L_{den} \), are shown in Figure A-3.
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<tr>
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<td>Existing Site Conditions: Waimano Home Road at Kamehameha Highway</td>
</tr>
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<td>13</td>
<td>Estimates of Maximum 1-Hour Carbon Monoxide Concentrations: Acacia Road at Proposed Spine Road (Alternative 2), Peak Traffic Hours, 2020</td>
</tr>
</tbody>
</table>
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 new (western) side of the property starting in the northeast at the junction of Manana 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 area and proceed directly to the existing Kanehameha Highway intersection with Acacia Road. In this alternative, Acacia Road would also be realigned to run directly into the new spine road instead of Kanehameha Highway (Figure 1).

The purpose of this report is to assess the impact of the 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 Act 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 (1993) and future (2020) conditions with and without the proposed road.

Finally, construction-related emissions will be generated over due to vehicular movement, grading, and general dust generating as well as effluent due to concrete and asphalt batch. 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 1.13

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, water, vegetation, man-made materials, animals, wildlife, visibility, climate, and economic values. Some of Hawaii’s standards (CO, NOx, 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 effects they had at ambient levels. The hydrocarbons standard was formally eliminated in January 1983.

The U.S. Environmental Protection Agency (EPA) is mandated by Congress to periodically review and reevaluate the federal standards in light of new research findings. The latest review resulted in an...
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-hour) and seasonal 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 Carbon Monoxide Monitoring: In conjunction with this project, air sampling was conducted on the east (downstream) side of the Kahului Road - Waimanalo Road Intersection. A continuous carbon monoxide (CO) instrument was set up and operated during the a.m. and p.m. peak traffic hours. An ascrometer and anemometer were also installed to record on-site 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 hour is clearly seen in Figures 3 and 4.

Weather conditions during the months of May 1998 were characterized by mostly cloudy skies and light northwest winds (about 1 mph) which changed to onshore trade winds shortly before 8:00 a.m. Total traffic along the segment of Waimanalo Road facing the sampling site was

J.W. MORROW
The effects of wind direction were clearly demonstrated in the CO data collected. The northeasterly winds during the peak hour of the monitoring period
typical of the peak hour were not 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 95% of the existing a.m. volume reported in the aforementioned traffic
study. The CO level was higher than the a.m., averaging 2.5 mg/m³ due primarily to the steeper
wind direction, and despite the lower traffic volume. Again, measured concentrations were below
State and federal standards (Table 1). See Figure 4.

3.4 Methylene Chloride 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 indicates 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). An
annual average, the daytime 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 range from the mid-60's in the low 70's. The
historical high at the airport is 95 degrees while the low is 53 F.

Historical data from the National Weather Service at Honolulu International Airport indicates that
annual rainfall on the leeward side of Oahu averages 22.0 inches. As in accordance with Thomre's
scheme for climatic classification, the area would therefore be considered semi-arid with a
precipitation/evaporation (P/E) Index of 50.

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 1. 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).

J.W. MORROW
FIGURE 2
A.M. PEAK HOUR CONDITIONS
MOANALUA ROAD AT WAINANALO HOME ROAD
22 MAY 1998

- Wind Speed (mph)
- Wind Direction
- CO (mg/m³)
- Traffic (5-min counts)

Time of Day

FIGURE 3
P.M. PEAK HOUR CONDITIONS
MOANALUA ROAD AT WAINANALO HOME ROAD
22 MAY 1998

- Wind Speed (mph)
- Wind Direction (deg)
- CO (mg/m³)
- Traffic (5-min counts)

Time of Day
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 this purpose. A summary of the results of this 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. These data indicated that stable conditions, i.e., Panlul-Gifford stability categories E and F, occur about 28% of the time on an annual basis and 30% 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 stability. It is under such conditions that the greatest potential for air pollutant buildup from ground-level 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 vehicles activity may increase airborne particle concentrations as well as on the project site itself. Most of the non-repetitive activities in the area are currently operating at 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 ones, 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 well 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 indicate that about 1.2 tons/km² 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 10. [10]

If the full length of the proposed road was under construction, that rate would equate to approximately 0.4 ton/day based on a 5-day work week, and 15 pounds per hour based on an 8-hour work day.

Onsite soils are predominantly sandy silty clays which suggest silt content of about 53%. 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 become:

\[
\text{EPR} = 0.575 \times 0.925 = 0.54 \text{ lb/acre hour}
\]

Using this adjusted emission rate, the EPA grid-delineation model, ISC [16], 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**

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<th>Wind Speed (m/s)</th>
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**SOURCE:** National Weather Service, 1992
FIGURE 4
JANUARY WIND ROSE
HONOLULU INTERNATIONAL AIRPORT

FIGURE 5
AUGUST WIND ROSE
HONOLULU INTERNATIONAL AIRPORT

SOURCE: National Weather Service
Historical Records, 1948-57
TABLE 4
SUMMARY OF TYPICAL WIND CONDITIONS
DURING PEAK TRAFFIC HOURS
HONOLULU, OAHU

<table>
<thead>
<tr>
<th>Period</th>
<th>Direction Quadrant</th>
<th>Annual Frequency of Occurrence (%)</th>
<th>Mean Wind Speed (mph)</th>
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<tr>
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<td>NW</td>
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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. A.M frequency for winds 1.5 m/s = 0.37%.
5. Wind speeds not reported at 1.5 m/s.

the maximum 24-hour concentration reported at the AirShore Peal City monitoring site (Table 3), 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 particulates matter and other gaseous pollutants. It is too
easy, however, to identify the specific facilities that will be providing these materials and thus the
discussion of air quality impacts is necessarily generic. The batching 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 regulations 1. In order to obtain these
permits, they must demonstrate their ability to continuously comply with both emission 3 and ambient
air quality 3 standards. Under the recently promulgated federal Title V operating permit
requirements 4, now incorporated in Hawaii’s rules 5, air pollution sources must regularly attest to their
compliance with all applicable requirements.

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6. MOBILE SOURCE IMPACTS

6.1 Mobile Source Activity. The traffic study 5 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 Waimanalo Road
- Waimanalo Road at Kaneohe Highway
- Kaneohe Highway at Acacia Road (Alternative 2: Spine Road)
- Acacia Road at Kualoa 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 (MOBILE-3B) 6. To
localize the emission factors as much as possible, the March 1992 age distribution for registered
vehicles in the City & County of Honolulu 7 was used in lieu of state statistics. This year age
distribution was the basis for the distribution of vehicle miles traveled as well.

6.3 Peak Hour Modeling. Due to the present state-of-the-art in air quality modeling, analysis 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) 8, and it comprises the largest fraction
of automotive emissions.

Using the traffic and intersection signalization data provided in the traffic study 9, a peak hour analysis
was performed for the aforementioned intersections for 1998 and 2020 (two alternatives and "no
build") 10. One year of Honolulu meteorological data pre-processed with EPA's PCAMANGET 11
program was used along with a revised version of EPA's guidelines model CAL3QHC 12, 13, 14 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 modeled. Because the area is
suburban, a background CO concentration of 0.3 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 interactions 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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to compliance with the more stringent State standard are mixed. The standard is met at the Mormonka Road and Koa 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 annual 1-hour and 8-hour CO measurements. A local persistence factor was computed from Department of Health data for a recent project 19 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 below or 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 Thornwaite'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% 17. The sooner 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.
FIGURE 11
ESTIMATES OF MAXIMUM 1- AND 8-HOUR CARBON MONOXIDE CONCENTRATIONS
Kamehameha Highway at Acacia Road (Spine Road)
Peak Traffic Hours
1998 - 2020

Estimated Maximum Concentrations
(ng/ml)

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* Spine Road @ Kamehameha Highway
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 impacts was determined from a change to expected increases in CO levels. Due to the proposed Spine Road, CO increases significantly at the Anacita Road - Kualoa Street intersection but remain below State standards. Predicted decreases at other intersections were the result of redistribution of traffic due to the proposed new road, revised signiﬁcation, 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 street, 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, these 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


7. State of Hawaii. Title 11, Administrative Rules, Chapter 60.1, Air Pollution Control, November 1993.


December 4, 1998

MEMORANDUM

To: Esame
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

1481 South King Street, Suite 540, Honolulu, Hawai'i 96814
Telephone: (808) 942-9066 Pager: (808) 576-3532
APPENDIX D
CONSULTATION LETTERS and RESPONSES
DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

September 21, 1998

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 523-1288 or write to him at Planning Solutions, Inc., 1210 Aukai 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 Sarna of the Division of Infrastructure Design and Engineering at 523-4071.

Very truly yours,

[Signature]
Director

Attach.

cc: Mr. Kay Muramura, Engineering Concepts
Mr. Perry White, Planning Solutions, Inc.

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, Maunana Development Spine Road Environmental Assessment

The City Department of Design and Construction (DDC) proposes to construct a collector road through the former Maunana 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.
Operations Branch

Mr. Randall E. Fujiki
Department of Design
and Construction
City and County of Honolulu
660 South King Street, 2nd Floor
Honolulu, Hawaii 96813

Dear Mr. Fujiki:

This is in regard to your letter of September 22, 1989, requesting comments on the proposed Kamehameha High School Road Construction Project at 606 Kamehameha Highway, Waialua, Hawaii. Based on the information provided in the Environmental Assessment, I have determined that the proposed roadway 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 Delaney or my staff at 416-3260, extension 15. Please refer to File No. 8400000315.

Sincerely,

George F. Evenson, P.E.
Chief, Operations Branch
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: 9-7-24-11) 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.

At 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 you 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 393-1288 or write to him at Planning Solutions, Inc., 1210 Awahine 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 Sano of the Division of Infrastructure Design and Engineering at 323-6071.

Very truly yours,

[Signature]

Director

Attach.

cc: Mr. Kay Morinaka, Engineering Concepts
    Mr. Perry White, Planning Solutions, Inc.
Mr. Perry White
Planning Solutions, Inc.
1215Aualii Street, Suite 221
Hilo, Hawaii 96724

Dear Mr. White:

SUBJECT: Chapter 45A Historic Preservation Consent on the Proposed Construction of a Collector Road at the Former Manana Storage Area in Pearl City

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 subsection 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 Manana 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.

Sincerely,

DON NISBARD, Administrator
State Historic Preservation Division

SCje
Mr. Perry White
Planning Solutions
1210 Auahi Street, Suite 221
Honolulu, HI 96814

September 24, 1998

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 as an EPA Sole Source Aquifer in 1987. Under provisions of the Safe Drinking Water Act, Section 1424(a), 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 ensure 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. Melgin
Regional Hydrologist
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 533-1288 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 Sanoe of the Division of Infrastructure Design and Engineering at 523-4071.

Very truly yours,

[Signature]
Randall K. Fukiki  
Director

Attach.

c/attach: Mr. Kay Murasaka, Engineering Concepts  
Mr. Perry White, Planning Solutions, Inc.
August 14, 1998

Mr. Doug Tom, Director
Coastal Zone Management Program Office
Office of State Planning
State of Hawaii
P. O. Box 3540
Hilo, Hawaii 96720

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.

Mr. Doug Tom
Page 2
August 7, 1998

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 993-1288 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 Sara of the Division of
Infrastructure Design and Engineering at 523-4071.

Very truly yours,

[Signature]

Deborah K. Fujii
Director

Attachment

cc: Engineering Concepts, Inc.
Ms. Kathleen Dadey, Planning Solutions, Inc.
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 Daday, 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 Sarac of the Division of Infrastructure Design and Engineering at 523-4071.

Very truly yours,

[Signature]

Director

Attachment

cc: Engineering Concepts, Inc.
Ms. Kathleen Daday, Planning Solutions, Inc.
Mr. David Z. Arikawa, Mayor's Representative
Council Chair Muli Hanneman
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 593-1298 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 your organization has no comments at this time.

Should you have any questions, please call Robert Sareo of the Division of Infrastructure Design and Engineering at 523-4071.

Very truly yours,

[Signature]

Attachment

cc: Engineering Concepts, Inc.
Mrs. Kathleen Dadey, Planning Solutions, Inc.
Council Chair Muil Henneman
August 14, 1998

Mr. Gregory Gonsalves
Recording Secretary
Manana Community Association
P.O. Box 386
Pearl City, Hawaii 96782

Dear Mr. Gonsalves:

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 5-7-244:1) 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 Daday, of Planning Solutions, Inc., will be directing the consultation for DDC. Please call her at 533-1288 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 your organization has no comments at this time.

Should you have any questions, please call Robert Sarre of the Division of Infrastructure Design and Engineering at 523-4071.

Very truly yours,

[Signature]

Director

Attachment

cc: Engineering Concepts, Inc.
Ms. Kathleen Daday, Planning Solutions, Inc.
Council Chair Muhi Hannaman
August 19, 1998

The Honorable Muli 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.

DDC has hired Engineering Concepts, Inc. (ECI) as its 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 to provide our consultants with any comments you have on the proposed project. A brief description of the proposed road is attached.

We will contact your office in a week to confirm if you have any comments at this time.

Very truly yours,

[Signature]

RANDALL K. FUJIM Director

Attachment

cc: Mayor Jeremy Harris
Engineering Concepts, Inc.
Ms. Kathleen Daday, Planning Solutions, Inc.

FORWARDED:

[Signature]

BENJAMIN C. LEE
Acting Managing Director
August 1, 1998

MEMORANDUM

TO:    MS. JAN NADA SULLIVAN, DIRECTOR
        DEPARTMENT OF PLANNING AND PERMITTING

FROM:  Randal K. Fujii, AIA
        DIRECTOR
        DEPARTMENT OF DESIGN AND CONSTRUCTION

SUBJECT: REQUEST FOR CONSULTATION, MANA NA DEVELOPMENT SPINE ROAD ENVIRONMENTAL ASSESSMENT

Ms. Jan Nana 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 Saroe of the Division of Infrastructure Design and Engineering at 523-4071.

Attachment

cc:   Engineering Concepts, Inc.
      UFS, Kathleen Daday, Planning Solutions, Inc.

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) on 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 department provide our consultants with any comments you have on the proposed project. A brief description of the proposed road is attached.

Ms. Kathleen Daday, 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
MEMORANDUM

TO: MR. PATRICK T. ONISHI, CHIEF PLANNING OFFICER
   PLANNING DEPARTMENT

FROM: ROY C. ALAO, JR., 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.

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 to provide our consultants with any comments you have on the proposed project. A brief description of the proposed road is attached.

Ms. Kathleen Dadey, of Planning Solutions, Inc., will be directing the early coordination for DDC. Please call her at 593-1289 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.

Attachment

cc: Engineering Concepts, Inc.
    Ms. Kathleen Dadey, Planning Solutions, Inc.

MR. Patrick Onishi
Page 2
August 7, 1998

Should you have any questions, please call Robert Sarne of the Division of Infrastructure Design and Engineering at 523-4971.
The City and County of Honolulu purchased the 190-acre Kamehameha Valley Park for the Koko Crater Restoration Project. The official report on the Koko Crater Restoration Project was developed by the City and County of Honolulu, Division of Parks and Recreation, in cooperation with the City and County of Honolulu Planning Department.

In addition, the master plan for the Koko Crater Restoration Project was developed by the City and County of Honolulu, Division of Parks and Recreation, in cooperation with the City and County of Honolulu Planning Department. The master plan included provisions for a two-mile loop trail through the park.

The master plan for the Koko Crater Restoration Project was developed by the City and County of Honolulu, Division of Parks and Recreation, in cooperation with the City and County of Honolulu Planning Department. The master plan included provisions for a two-mile loop trail through the park.

The master plan for the Koko Crater Restoration Project was developed by the City and County of Honolulu, Division of Parks and Recreation, in cooperation with the City and County of Honolulu Planning Department. The master plan included provisions for a two-mile loop trail through the park.
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 Manana/Waimana Home Road intersection to Acacia Road at Naiku Street (Figure 2). The total length of the preferred alternative is approximately 3,000 feet. The road would transition smoothly from the Waimana Home Road intersection, running for a short distance along the existing canal haul road at the mauka (north) boundary of the former Manana Storage Area property. The posted speed limit on the Spine Road would be 35 miles per hour.

The preferred 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 Naiku Street - Waimana 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 asphalt 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 6 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 Waimana Home Road would include two westbound and three eastbound lanes. The most northbound eastbound lane would provide for left turns and through movements. The middle (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.
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 months 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. Sub-surface from the utility lines would be provided to each lot within the former Manana Storage Area. The actual connection deposits 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 Road. 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 grading 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 monitoring for dust control, temporary safety barriers, 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 "right-of-way" is a short connection from the main utility line to the boundary of a parcel. The parcel description is responsible for any 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 Pearl City Business Park. The alternative would contain these warehouses; the alternative alignment would not. Depending upon the timing of the two projects, it is possible that these two warehouses could be vacated before work begins on the Spine Road. In addition, because only part of the warehouses are within the road right-of-way, the City may have to demolish only portions of the affected warehouses.

<table>
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<tr>
<th>Table 1. Preliminary Cost Estimates (in 1998 Dollars)</th>
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<tr>
<td>Project Description</td>
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<td>Building Demolition and Removal</td>
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<td>Grading, Grading and Soil Removal</td>
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<td>Roadway, Sidewalk and Median Construction*</td>
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<td>Storm Drain System</td>
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<td>Street Lighting</td>
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<td>Traffic Signal Upgrades</td>
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<td>Retaining Wall</td>
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<td>Grading and Grading of Acacia Road Realignment</td>
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<td>TOTAL</td>
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The model portion of the alternative alignment differs from the preferred alternative in terms of its general location (more through the center of the former Manana Storage Area) and in its southerly terminus (approximately at the existing intersection of Acacia Road and Kamehameha Highway). The alternative alignment would be about 200 feet longer than the preferred alternative (4,300 feet versus 4,200 feet). In addition, a portion of Acacia Road would have to be realigned to connect with the alternative alignment in a T-intersection.

* Includes base covers, pavement, sidewalks, landscaping, and roadway stripping.

Amends 1995
The intersection of the rerouted Acacia Road with the alternative alignment Spine Road would be signalized. Makaha-bound traffic on the Spine Road would be provided with a dedicated left-turn lane and a shared right-turn lane; two makaha-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 north of the existing intersection with Kalakaua Avenue. 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 Manana 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 excavations for the preferred alternative). The road grade would generally be two percent or less, but includes an 80-foot long portion along its makaha 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 $1,855,000.
APPENDIX E
DEA COMMENT LETTERS AND RESPONSES
DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
600 SOUTH KING STREET, 15TH FLOOR
HONOLULU, HI 96813
Phone: (808) 548-8177 Fax: (808) 548-8179

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, 1998, 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.

Please review the Draft EA and address your written comments to:

Department of Design and Construction, IDEB
City and County of Honolulu
600 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
223 South Beretania Street, Suite 702
Honolulu, Hawaii 96813
(phone: 556-4183; FAX: 556-4186)

Interested party
Page 2
October 23, 1998

Planning Solutions, Inc.
1210Auahi Street, Suite 221
Honolulu, Hawaii 96814

Attention: Mr. Perry White (phone: 593-1288; FAX: 593-1568)

A public hearing has been scheduled on Tuesday, November 17, 1998, at 7:30 p.m., in the Pearl City Elementary School’s cafeteria (1000 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,

Randall K. Fujita
Director

October 26, 1998

We have no comments. If you have any questions, please call Leaverne Higa at 527-8246.

Johnnie K. Shimada, PhD
Director and Chief Engineer
Department of Facility Maintenance
MEMORANDUM

TO: DR. JONATHAN K. SHIMADA, DIRECTOR AND CHIEF ENGINEER
   DEPARTMENT OF FACILITY MAINTENANCE

FROM: RANDALL K. FUJII, 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 26, 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 Sann 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.
October 28, 1998

Rendell K. Fuji
Department of Design and Construction
City and County of Honolulu
660 South King Street, 2nd Floor
Honolulu, Hawaii 96813

LOG NO: 22458
DOCNO: 98106239

Dear Mr. Fuji:

SUBJECT: Chapter 6E-8 Historic Preservation Review — Draft Environmental Assessment Manana Development Splits Road Manana, ‘Ewa, O’ahu TMK: 5-7-24A1

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 Jourdane at 587-0014.

Aloha,

Don Hibble, Administrator
Historic Preservation Division

cc: OEOC, 235 South Beretania Street, Suite 702, Hon, HI 96813
1 Perry White, Planning Solutions, 1210 Auali Street, Suite 221, Hon, HI 96814
TELEPHONEMEMORANDUM

Date: October 29, 1994
Subject: Mauna Development Spice Road Draft Environmental Assessment (DEA)
Prepared by: Robert Sako (Received Call)
Outside Party: Chris Swanson, Wildlife Biologist
U.S. Department of the Interior
Fish and Wildlife Service
Pacific Island Eco-region
Ph. No. 341-3441

Summary of Conversation:

Mr. Swanson said that the U.S. Fish and Wildlife Service (Service) has reviewed the DEA for the proposed Mauna Development Spice Road, Oahu, Hawaii. The Service does not anticipate significant adverse impacts to fish and wildlife resources to result from the Mauna Development Spice Road project. The Service will not provide any written comments.

FEBRUARY 1994

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MEMORANDUM

TO:        MR. ATTILIO K. LEONARDI, FIRE CHIEF
            HONOLULU FIRE DEPARTMENT

FROM:      ATTILIO K. LEONARDI, FIRE CHIEF
            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 Seme 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.
November 24, 1998

Mr. Paul Minna, P.E.
Civil Works Branch
U.S. Army Engineer District, Honolulu
Building 220
Fort Shafter, Hawaii 96850-5440

Attention: CEPOH-ED-C

Dear Mr. Minna:

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 Sarse of the Division of Infrastructure Design and Engineering at 523-4071.

Very truly yours,

[Signature]

Director

cc: Office of Environmental Quality Control
Mr. Perry White, Planning Solutions, Inc.
Mr. Kenneth Ishizaki, Engineering Concepts, Inc.
MEMORANDUM

TO: MR. RANDALL K. FUKU, DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

ATTENTION: MR. ROBERT SARAS
INFRASTRUCTURE DESIGN AND ENGINEERING BRANCH
CHEF, K. CWILL CLAYTON

FROM: KENNETH S. SPRAGUE, DIRECTOR
DEPARTMENT OF ENVIRONMENTAL SERVICES

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (DEA)
MANANA DEVELOPMENT SPINE ROAD

November 4, 1998

MEMORANDUM

TO: DR. KENNETH S. SPRAGUE, DIRECTOR
DEPARTMENT OF ENVIRONMENTAL SERVICES

FROM: MR. RANDALL K. FUKU, DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

SUBJECT: MANANA DEVELOPMENT SPINE ROAD: DRAFT ENVIRONMENTAL ASSESSMENT

November 24, 1998

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 contact Robert Saras 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 Ishida, Engineering Concepts, Inc.
November 17, 1998

Mr. Randell K. Fujiki
Director
Department of Design and Construction
City and County of Honolulu
500 S. King Street
Honolulu, Hawaii 96813

Attention: Mr. Robert Sato

Dear Mr. Fujiki:

Subject: Draft Environmental Assessment - Manana Development Splan Road

We have reviewed the proposed Spur 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 Miller of our Coastal Zone Management Program at 387-2843.

Sincerely,

Bradley J. Monsma
Director
Office of Planning

cc: Planning Solutions, Inc. (Attn: Penny White)
Gary Gill, OEQC
Sue F. Naya
November 17, 1998

TO:       RALPH R. PRZYBYLO, DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

FROM:     WILLIAM D. BALFOUR, JR., DIRECTOR

SUBJECT: WAIKIKI DEVELOPMENT SPINE ROAD
REVISED 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 Walanae House Road.

If you have any questions, please contact Mr. John Breland,
Executive Assistant, at 827-4038.

WILLIAM D. BALFOUR, JR.
Director

cc: Office of Environmental Quality Control
November 18, 1998

TO: RANDBALL K. FUJIKI, DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

FROM: PATRICK KANISHI
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 Nuulii 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 subdivisions 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.

If you have any questions, please call Eugene Takahashi of our staff at 527-6002.

PTO: th

cc: OEQC
Planning Solutions, Inc.
Attn: Mr. Perry White
November 18, 1998

Mr. Robert Serae
Department of Design and Construction
City & County of Honolulu
650 South King Street, 2nd Floor
Honolulu, Hawaii 96813

Dear Mr. Serae:

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 B. Pemberacker
Special Assistant to the State Librarian

cc: Office of Environmental Quality Control Planning Solutions, Inc.
November 18, 1998

Perry J. White, President
Planning Solutions
1210 Auahi St. #221
Honolulu, HI 96814

Perry J. White,

The Century Park Plaza Community Association has asked me to convey our concerns about the Spine Road that is about to be built in Manoa Warehouse Area.

Century Park Plaza is two (2) three hundred unit condominiums located at 1060 Kamahana Hwy. We have four driveways that exit and enter our facility. Currently we need to make a left turn from our driveway onto Kualoa, then make a right turn onto Kamahana Highway, to enable us to travel in the Diamond Head direction. When the Spine Road is built, we would still want to make a left turn to get to HI eastbound. Sam’s Club, Old Navy Store and Ross’ are across the street from us. They have two driveways that concern us on Kualoa. Kualoa Road bends toward the ocean right at our driveway and Old Navy store’s driveway. The rest of the driveways previously mentioned are hidden from the view of oncoming traffic in both directions.

Our concern is that we will not be able to make the necessary left turn to get out of our driveway, once the traffic picks up, after the Spine Road is built. Also the cars and trucks coming out of the Sam’s Club and Old Navy Store parking spaces will also get hit trying to make a left turn for them to go in the Ewa direction.

Currently people, from Century Park Plaza, can make a right turn onto Kualoa, which would be safer, go down to Kamahana Hwy and make another right turn heading Ewa bound. About one quarter of a mile down the road they could do a U-turn and come back on Kamahana Hwy heading Diamondhead, but we believe that people are lazy and will not take this option.

Please let us know if you have any plans to address our concern.

Mahalo,

Susan G. Everett
PO Box 30994
Honolulu, HI 96820-0094
(808) 456-2457
February 9, 1999

Ms. Susan Everett
Century Park Plaza Community Association
P. O. Box 30054
Honolulu, Hawaii 96826-3094

Dear Ms. Everett:

Subject: Manoa Development Spine Road - Draft Environmental Assessment

Thank you for your November 18, 1998, e-mail regarding this Department's proposed Manoa 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 Kaaia Street. The traffic impact analysis 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 on your driveways, the traffic signals that the City plans to install at the Spine Road/Kaaia Street/Aloha Road intersection should help mitigate the increase in traffic. The traffic signals should provide adequate gaps in the flow of traffic on Kaaia 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 Kaaia 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

volunteers and roadway performance to determine if further mitigation measures may be needed, including traffic signals.

Should you have any questions, please call Robert Sone of the Division of Infrastructure Design and Engineering at 808-442-1.

Very truly yours,

Randy K. Perry
Director

Re: EOA
cc: Office of Environmental Quality Control
Mr. Puni White, Planning Solutions, Inc.
Mr. Kenneth Inabata, Engineering Concepts, Inc.
Mr. Robert Sare
Department of Design and Construction, IDEB
City and County of Honolulu
650 South King Street, 12th Floor
Honolulu, HI 96813

December 21, 1998

Dear Mr. Sare:

Subject: DRAFT ENVIRONMENTAL ASSESSMENT (DEA) FOR THE MANANA DEVELOPMENT SPINE ROAD, PEARL CITY, OAHU, HAWAII

Thank you for providing us with the subject DEA to review and comments. The Navy has no comment to offer at this time and appreciates the opportunity to participate in your review process.

Should you have any questions, please contact the undersigned at 471-5086.

Sincerely,

C. K. Yokota
Environmental Program Manager
By direction of
Commander, Naval Base, Pearl Harbor

Copy to:
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, HI 96813

Mr. Perry White
Planning Solutions, Inc.
1219 Aushi Street, Suite 211
Honolulu, HI 96814

February 1999
MEMORANDUM

TO: RANDALL K. FUJIKI, DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION

ATTN: ROBERT SABAY

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 2 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.

CHERYL D. SOON

CC: Mr. Gary Gill, Office of Environmental Quality Control
Mr. Perry White, Planning Solutions, Inc.
MEMORANDUM

TO:  RANDALL K. FUJIKI, DIRECTOR
     DEPARTMENT OF DESIGN AND CONSTRUCTION

ATTN:  MR. ROBERT SAKAI

FROM:  JAN HAO SULLIVAN, DIRECTOR
     DEPARTMENT OF PLANNING AND PERMITTING

SUBJECT:  DRAFT ENVIRONMENTAL ASSESSMENT (EA) FOR
          MAUNA DEVELOPMENT SITE, 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 phase of the development. The roadway improvements that will be ultimately constructed are planned for a period prior to the year 2025 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 use, to determine when the various roadway improvements would be required.
MEMORANDUM

TO:  ME. JAN NAOE SULLIVAN, DIRECTOR
     DEPARTMENT OF PLANNING AND PERMITTING

FROM:  Randal D. Purnell, C.E.
        DEPARTMENT OF DESIGN AND CONSTRUCTION

SUBJECT: MANANA DEVELOPMENT SPINE ROAD – DRAFT ENVIRONMENTAL ASSESSMENT

January 13, 1999

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 in the area. In this regard, it is worth noting that construction vehicles traveling to and from the Pearl City Rail Facility and the Board of Water Supply’s parcel will generally use Waianae Homestead Road while much of the vehicular movement 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 2000.

Should you have any questions, please call Robert Sato of the Division of Infrastructure Design and Engineering at extension 4071.

RAS:LC/03
cc: Office of Environmental Quality Control
    Mr. Perry White, Planning Solutions, Inc.
    Mr. Kenneth Ishizaki, Engineering Coopers, Inc.

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November 25, 1998

Manana Development Spine Road
Page 2

Very truly yours,

Chair

cc: Manana Community Association
   Shigeo Uhibo, Vice President
   Susan Everett
   Association of Apartment Owners - Century Park Plaza
   Council Chair Muji 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

Department of Design and Construction
Infrastructure Design and Engineering Division
650 South King Street, 16th Floor
Honolulu, Hawaii 96813

Attention: Mr. Robert Sarac

Gentlemen:

Subject: Manana Development Spine Road
Draft Environmental Assessment (EA)
Manana and Waiawa, Eva, Gahu, Hawaii
Tax Map Key: 9-7-24; par.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 Noanani
   Street, except for the a.m. peak hour when two makai-bound lanes
   are to be created by "contra-flow" zoning 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 Koko 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.
February 9, 1999

Ms. Susan Everett
Century Park Plaza Community Association
P. O. Box 30924
Honolulu, Hawaii 96824-0924

Dear Ms. Everett:

Subject: Manoa Development Spine Road – Draft Environmental Assessment

Thank you for your November 18, 1998, e-mail regarding this Department’s proposed Manoa 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 Kualii 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/Kualii Street/Araloa Road intersection should help mitigate the increase in traffic. The traffic signals should provide adequate gaps in the flow of traffic on Kualii Street for existing Century Park Plaza traffic. Currently, the intersection is unregulated and does not control 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 limits on Kualii 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 volumes and roadway performance to determine if further mitigation measures may be needed, including traffic signals.

Should you have any questions, please call Robert Sane of the Division of Infrastructure Design and Engineering at 523-4031.

Very truly yours,

RANDELL K. FIFITA
Director
TO: MR. RANDALL K. FUKUI, DIRECTOR
DEPARTMENT OF DESIGN AND CONSTRUCTION, IDEB

ATTN: MR. ROBERT SARAB

FROM: CLIFFORD K. MULLE

SUBJECT: YOUR TRANSMITTAL OF THE DRAFT ENVIRONMENTAL ASSESSMENT FOR THE MANANA DEVELOPMENT SPINE ROAD, PEARL CITY, QARI TASK: 1-7-24, FEB. 81

November 23, 1998

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 Urasawa at 527-3235.

cc: Office of Environmental Quality Control
Planning Solutions, Inc.
November 27, 1999

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 (EIA) 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,

Areliña Madrid Shaw
Director

AMSods

cc: Office of Environmental Quality Control
Planning Solutions, Inc.
Attn: Mr. Perry White
Mr. Robert Sarea  
Department of Design and  
Construction, ID 22  
City and County of Honolulu  
450 South King Street, 19th Floor  
Honolulu, Hawaii 96813

Dear Mr. Sarea:

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

cc: OHP  
Planning Solutions
TO: Randal K. Fuji, 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

November 13, 1998

MEMORANDUM

Thank you for your letter of November 13, 1998, commenting on the Draft Environmental Assessment for the 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 Department will need to increase 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 523-0771.

cc: Office of Environmental Quality Control
Mr. Perry White, Planning Solutions, Inc.
Mr. Kenneth Ishizaki, Engineering Concepts, Inc.
Our People...Our Islands...In Harmony

December 2, 1998

Mr. Robert Saree
Department of Design and Construction, IDEB
650 South King Street, 15th Floor
Honolulu, Hawaii 96813

Dear Mr. Saree:

Subject: Draft Environmental Assessment (DEA) - Manana Development Spine Road,
Paa, 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,

KERNETH M. KANEKO
State Conservationist

cc: Mr. Gary Gil, 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

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Beyond the call

Susan K. Eicher
General Manager
Infrastructure Provisioning

November 11, 1998

Mr. Robert Sase
Department of Design and Construction, IDEB
City and County of Honolulu
650 South King Street, 15th Floor
Honolulu, Hawaii 96813

Dear Mr. Sase:

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. Eicher

cc: Office of Environmental Quality Control
Perry White (Planning Solutions, Inc.)
Dennis Silva (GTE Hawaiian Tel)

December 2, 1998

Ms. Susan K. Eicher, General Manager
Infrastructures Provisioning
GTE Hawaiian Telephone Company, Inc.
P.O. Box 2200
Honolulu, Hawaii 96841

Dear Ms. Eicher:

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 Sase of the Division of Infrastructure Design and Engineering at 523-4071.

Very truly yours,

Randall K. Fuji
Director

Attach:
Office of Environmental Quality Control
Mr. Perry White, Planning Solutions, Inc.
Mr. Kenneth Ishizaki, Engineering Concepts, Inc.
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,

[Signature]
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/Waimano Home Road intersection to the Acacia Road/Ruali 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 Kapalina 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
255 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 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 (1999 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 5:30 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 323-4071 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

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

Department of Design and Construction
City & County of Honolulu
FHWA
PREPARED FOR:
Engineering Concepts, Inc.

PREPARED BY:
Planning Solutions, Inc.
PacifiCorp, Inc.

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

LEGEND:

Pearl City Planning Task Force
Preferred Conceptual Master Plan

Manana Development Spine Road
Environmental Assessment
FIGURE 2-3:

Typical Roadway Sections

Manana Development Spine Road
Environmental Assessment

NOT TO SCALE
Summary of Recommended Measures and Improvements

- Construct Connector Road (see existing Cave Head Road).
- Consider for Traffic Signalization.

- Modify existing signal timing to improve level of service (see p. 37 & 56).
- Modify existing signal timing and phasing to accommodate Spike Road.
- Traffic conditions to be re-evaluated with development of private parcels.

- Lane usage to remain as existing for the interim period.
- Traffic conditions to be re-evaluated with development of private parcels.
Table ES-2. Summary of Environmental Impacts.

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Preferred Alignment</th>
<th>Alternative Alignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>No change for the foreseeable future</td>
<td>Removal of 11 existing warehouses and their occupants (8 are currently occupied)</td>
<td>Removal of 9 existing warehouses and their occupants (7 are currently occupied)</td>
</tr>
<tr>
<td>Existing warehouses would continue to deteriorate</td>
<td>Purchase of residential property(s) along cane haul road</td>
<td>Purchase of residential property(s) along cane haul road</td>
</tr>
<tr>
<td></td>
<td>Facilitation of redevelopment of former Manana Storage Area</td>
<td>Facilitation of redevelopment of former Manana Storage Area</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Modifications to Post Office property (possibly involving purchase of land)</td>
</tr>
<tr>
<td>Topography</td>
<td>No impact</td>
<td>Grubbing and grading, including cut and fill along 3,800 feet of 92-foot right-of-way</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total of 57,000 cubic yards excavated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Greatest elevation change: 12 feet</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Steepest slope: 5%</td>
</tr>
<tr>
<td>Economic</td>
<td>Reduced incentive for private development since necessary infrastructure would not be constructed. Therefore reduced possibility for recouping monies expended by the City for the purchase of the area.</td>
<td>Construction cost of roadway and associated features: $9,800,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provides temporary and permanent job opportunities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Construction cost of roadway and associated features: $11,200,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provides temporary and permanent job opportunities</td>
</tr>
<tr>
<td></td>
<td>Interest on debt would continue to accrue.</td>
<td></td>
</tr>
</tbody>
</table>
Table ES-2 (continued). Summary of Environmental Impacts

<table>
<thead>
<tr>
<th>No Action</th>
<th>Preferred Alignment</th>
<th>Alternative Alignment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Noise</strong></td>
<td>• Increased noise due to ambient traffic growth.</td>
<td>• Reductions in noise levels along Waimano Home Road and Kamehameha Highway relative to No Action.</td>
</tr>
<tr>
<td></td>
<td>• Increases in noise levels along Moanalua Road, Cane Haul Road, and in certain portions of residential development near the muku end of the proposed Spine Road and the Connector Road. Noise barriers needed.</td>
<td>• Increases in noise levels along Moanalua Road, Cane Haul Road, and in certain portions of residential development near the muku end of the proposed Spine Road and the Connector Road. Noise barriers needed.</td>
</tr>
<tr>
<td></td>
<td>• Temporary impacts due to construction activities.</td>
<td></td>
</tr>
<tr>
<td><strong>Traffic</strong></td>
<td>• 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.</td>
<td>• Most intersections would experience better or the same LOS as with No Action</td>
</tr>
<tr>
<td><strong>Flora Resources</strong></td>
<td>• No impact.</td>
<td>• Permanent destruction of existing vegetation within right-of-way (no endangered species).</td>
</tr>
<tr>
<td></td>
<td>• Improvements in of landscaping of median and sidewalks.</td>
<td></td>
</tr>
</tbody>
</table>
Table ES-2 (continued). Summary of Environmental Impacts

<table>
<thead>
<tr>
<th></th>
<th>No Action</th>
<th>Preferred Alignment</th>
<th>Alternative Alignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fauna Resources</td>
<td>• No impact.</td>
<td>• Temporary relocation of fauna (none are endangered)</td>
<td>• Temporary relocation of fauna (none are endangered)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Permanent destruction of limited existing habitat and relocation of some animals (none are endangered or otherwise rare species).</td>
<td>• Permanent destruction of limited existing habitat and relocation of some animals (none are endangered or otherwise rare species).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Creation of new habitat within landscaped areas.</td>
<td>• Creation of new habitat within landscaped areas.</td>
</tr>
<tr>
<td>Archaeological Resources</td>
<td>• No impact.</td>
<td>• No impact expected.</td>
<td>• No impact expected.</td>
</tr>
<tr>
<td>Surface and Groundwater Resources</td>
<td>• No impact</td>
<td>• No impact expected.</td>
<td>• No impact expected</td>
</tr>
<tr>
<td>Floodplains</td>
<td>• No impact</td>
<td>• No impact</td>
<td>• No impact</td>
</tr>
<tr>
<td>Soils</td>
<td>• No impact</td>
<td>• No impact expected because excavated soil may be used productively either on or off-site</td>
<td>• No impact expected because excavated soil may be used productively either on or off-site (34,000 cubic yards more than preferred alternative)</td>
</tr>
<tr>
<td>Natural Disasters</td>
<td>No effect.</td>
<td>• No effect.</td>
<td>• No effect.</td>
</tr>
</tbody>
</table>
Table ES-2 (continued). Summary of Environmental Impacts

<table>
<thead>
<tr>
<th></th>
<th>No Action</th>
<th>Preferred Alignment</th>
<th>Alternative Alignment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hazardous Materials</strong></td>
<td>• No impact.</td>
<td>• Asbestos and lead-based paint will be removed and disposed of in accordance with pertinent laws and regulations.</td>
<td>• Asbestos and lead-based paint will be removed and disposed of in accordance with pertinent laws and regulations.</td>
</tr>
</tbody>
</table>
| **Visual and Aesthetic Resources** | • Existing warehouses would continue to deteriorate.  
• No visual corridor through the area would exist. | • Establishes a visual corridor through the area with views towards the coastline.  
• Improves esthetics by establishing appropriate landscaping along the proposed Road. | • Establishes a visual corridor through the area with views towards the coastline.  
• Improves esthetics by establishing appropriate landscaping along the proposed Road. |
| **Air Quality**       | • No change.                                   | • 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. | • 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. |
## SIGN-IN SHEET

Manana Development Spine Road Public Hearing  
November 17, 1998- Pearl City Elementary School

<table>
<thead>
<tr>
<th>First</th>
<th>Last Name</th>
<th>Organization</th>
<th>Address</th>
<th>Phone</th>
<th>Fax</th>
</tr>
</thead>
<tbody>
<tr>
<td>George</td>
<td>Dillay</td>
<td></td>
<td>1553 Nahiku St. P.C.</td>
<td>468-4849</td>
<td></td>
</tr>
<tr>
<td>Nelson</td>
<td>Moriwaki</td>
<td></td>
<td>1471 Kalaipio St. P.C.</td>
<td>455-7970</td>
<td></td>
</tr>
<tr>
<td>Albert</td>
<td>Fukushima</td>
<td>Manana Community Assn</td>
<td>1841 Palamol St. P.C.</td>
<td>985-7151</td>
<td></td>
</tr>
<tr>
<td>Pat Y.</td>
<td>Onoake</td>
<td></td>
<td>1106 Mānāeie P.C.</td>
<td>485-3376</td>
<td></td>
</tr>
<tr>
<td>George</td>
<td>Tamashiro</td>
<td>Dept  B Design &amp; Constr.</td>
<td>95-411 Kaloa St. Military</td>
<td>527-6325</td>
<td></td>
</tr>
<tr>
<td>Scott</td>
<td>Ishikawa</td>
<td>Honolulu Advertiser</td>
<td></td>
<td></td>
<td>525-8090</td>
</tr>
<tr>
<td>Bob</td>
<td>Kudo</td>
<td></td>
<td>914 Leamana St. P.C.</td>
<td>468-4470</td>
<td></td>
</tr>
</tbody>
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</thead>
<tbody>
<tr>
<td>Kenji</td>
<td>UEJo</td>
<td>ROE</td>
<td>1522 Koomana Pl, P.O. 4620, 897</td>
<td>452-3897-</td>
<td></td>
</tr>
<tr>
<td>Robert</td>
<td>Nakahashi</td>
<td>ROE</td>
<td>1478 Hooli Cir.</td>
<td>452-5539</td>
<td></td>
</tr>
<tr>
<td>Douglas</td>
<td>Orimoto</td>
<td>SOVT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lee</td>
<td>Young</td>
<td>SOVT</td>
<td>949 Makakau Pl.</td>
<td>455-3758</td>
<td></td>
</tr>
<tr>
<td>Susan</td>
<td>Everett</td>
<td>Centennial Plaza</td>
<td>PO Box 30094, Honolulu, HI 96820-0094</td>
<td>456-2457</td>
<td></td>
</tr>
<tr>
<td>James</td>
<td>Honke</td>
<td>Dept. of Design &amp; County</td>
<td>650 South King St, Honolulu, HI 96813</td>
<td>517-5000</td>
<td></td>
</tr>
<tr>
<td>Paula</td>
<td>Avenida</td>
<td>Corvalveser, Multifamily</td>
<td>5305, King St. Honolulu, HI 96813</td>
<td>527-2263</td>
<td></td>
</tr>
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<tbody>
<tr>
<td>Alvin</td>
<td>Wong</td>
<td></td>
<td>1163 Hooli Circle</td>
<td>456-2489</td>
<td></td>
</tr>
<tr>
<td>Kenneth</td>
<td>AU</td>
<td>SDOT</td>
<td>2629 Lurong Ave</td>
<td>457-8851</td>
<td></td>
</tr>
<tr>
<td>Stanley</td>
<td>Yamada</td>
<td></td>
<td>1278 Kaweloka Street</td>
<td>457-4549</td>
<td></td>
</tr>
</tbody>
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</thead>
<tbody>
<tr>
<td>Kay</td>
<td>Muranaka</td>
<td>ECI</td>
<td>Auahi Str</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jerry</td>
<td>Iwata</td>
<td>DDC</td>
<td>650 South King St</td>
<td>523-4072</td>
<td>521-6103</td>
</tr>
<tr>
<td>Ann</td>
<td>Kimura</td>
<td>DDC</td>
<td>650 South King St</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roland</td>
<td>Libby</td>
<td>DDC</td>
<td>650 South King St</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ken</td>
<td>Ishizaki</td>
<td>ECI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Joe</td>
<td>Magaldi</td>
<td>DTS</td>
<td>711 Kapiolani Blvd</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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</tr>
</thead>
<tbody>
<tr>
<td>Joe</td>
<td>Nose</td>
<td>Dept. of Budget &amp; Fiscal Services</td>
<td>530 S. King St., Honolulu, HI 96813</td>
<td>523-4698</td>
<td>528-4849</td>
</tr>
<tr>
<td>Esme</td>
<td>Corbell, Suzuki</td>
<td>Planning Solutions Inc</td>
<td>1210 Auahi St, Honolulu</td>
<td>593-1288</td>
<td>595-1956</td>
</tr>
<tr>
<td>Perry</td>
<td>White</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Richard</td>
<td>Suzuki</td>
<td>DDC</td>
<td>650 S. Kamehameha St</td>
<td>527-5099</td>
<td></td>
</tr>
<tr>
<td>Benson</td>
<td>Chow</td>
<td>Pacific Planning &amp; Engineering</td>
<td>1221 Kapiolani Blvd, Honolulu</td>
<td>596-0045</td>
<td>596-2016</td>
</tr>
<tr>
<td>Reed</td>
<td>Matsuo</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Robert</td>
<td>Saraha</td>
<td>DDC</td>
<td>650 S. Kualii St</td>
<td>527-5053</td>
<td></td>
</tr>
</tbody>
</table>
My name is Albert Fukushima. I am presenting testimony on the Manaana Development SPINE Road Environmental Assessment (EA) on behalf of the Manaana Community Association as its President.

After reviewing the document, our Directors voted at its November 9, 1990 Board meeting to endorse the "City Preferred" alignment from Waimare Home Road and Hoaaulu Road to Anaia Road at Kealani Street, with widening improvements to the Anaia Road and making of Anaia Road from Koolau View Highway to Kealani Street, and construction of the Connector Road along portions of the former Camp Pearl Road from Kealakeka Road to the Spine Road to provide Holiday City and lower Manaana residents improved access to the major roadway system in our area of Pearl City.

We also recommend retaining daily media bound left turns from Waimare Home Road (anaa) Noalani Street, except during the weekday morning peak hours when the Manaana Storage Area becomes more fully developed and increases in traffic volume will warrant implementation of "contra-flow/coming" of while to allow two media bound left turns lanes to enter Anaia Road in the Anaia Road direction.

We also favor that the City create 24-hour no parking area and "no parking" signs on the Spine, Connector, Anaia Roads, Kealani Street, and internal project roadways. As mitigating measures to ensure 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 direction, circulation, and on street, as well as off-street parking, controls should be included with the environmental impact when the Manaana Storage Area is removed for sale of commercial/industrial parcels to prospective buyers.
APPENDIX G

CZM CONSISTENCY DETERMINATION
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 Sarai of the Division of Infrastructure Design and Engineering at 523-4071.

Very truly yours,

[Signature]

Director

cc: Mr. Kay Muranaka, Engineering Concepts, Inc.  
Mr. Perry White, Planning Solutions, Inc.