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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO:

HWY-DS
2.7433

February 23, 2000

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

RECEIVED
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OFC. OF ENVIRONMENTAL
QUALITY CONTROL

Dear Ms. Salmonson:

Subject: Finding of No Significant Impact for Interstate Route H-1, Punahou Street Off-Ramp Improvements Project.

The State Department of Transportation (DOT) has reviewed the comments received during the 30-day public comment period which began Feburary 23, 1998. Concerns regarding noise, dust, traffic, drainage, landscaping, and visual impacts that were raised during the review period are addressed in the Final Environmental Assessment (EA).

Best Management Practices and mitigation measures described in the Final EA will ensure that no significant negative impacts will result from the proposed project. The State DOT has therefore determined that this project will not have significant environmental effects and hereby issues a finding of no significant impact. Please publish this notice in the March 8, 2000 Environmental Notice.

We have enclosed a completed Office of Environmental Quality Control (OEQC) Environmental Notice Publication Form and four copies of the Final EA. Please contact Mr. Kevin Ito, Project Manager Technical Design Section, at 692-7548, if you have any questions.

Very truly yours,

PERICLES MANTHOS
Administrator
Highways Division

Enclosures

29

2000-03-08-OA-FEA-

Interstate Route H-1 (Punahou Street Off-Ramp Improvements)

Final Environmental Assessment

February 2000

Prepared For:

State of Hawaii
Department of Transportation
Highways Division

Interstate Route H-1
Punahou Street Off-Ramp
Improvements

Final Environmental Assessment

February 2000

Prepared for:

State of Hawaii
Department of Transportation
Highways Division

Prepared by:

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

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PROJECT SUMMARY

Project:	Interstate Route H-1 Punahou Street Off-Ramp Improvements
Applicant:	State of Hawaii, Department of Transportation, Highways Division
Accepting Authorities:	State of Hawaii Department of Transportation U.S. Department of Transportation Federal Highways Administration
TMKs:	2-4-07:1 (portion) 2-4-09:6 (portion)
Owners:	Shriners' Hospital for Children Jodo Mission of Hawaii
Location:	Interstate Route H-1, Eastbound at Punahou Off-Ramp, Oahu, Hawaii
Project Area:	13,500 square feet acquired land (approximate)
Agent:	R.M. Towill Corporation 420 Waiakamilo Road, Suite 411 Honolulu, Hawaii 96817 Phone (808) 842-1133 Facsimile: (808) 842-1937
Existing Land Uses:	Public Facilities, Existing Right of Way
Proposed Action:	The proposed project involves expanding the Punahou Off-Ramp for eastbound traffic exiting H-1. The proposed off-ramp widening will realign the exit lane and create an additional 11-foot wide, dedicated right turn lane onto Punahou Street. The improvement will include deceleration and turning area and a paved shoulder. Additionally, the existing lanes will be resurfaced with concrete. The new alignment and right turn lane will be taken on the makai side of the existing exit lane starting from Makiki Street to Punahou Street. The proposed expansion will require the acquisition of portions of land currently owned by the Shriners' Hospital for Children and by the Jodo Mission of Hawaii.

CHAPTER 1

PURPOSE AND NEED FOR ENVIRONMENTAL ASSESSMENT

1.1 PROJECT OVERVIEW

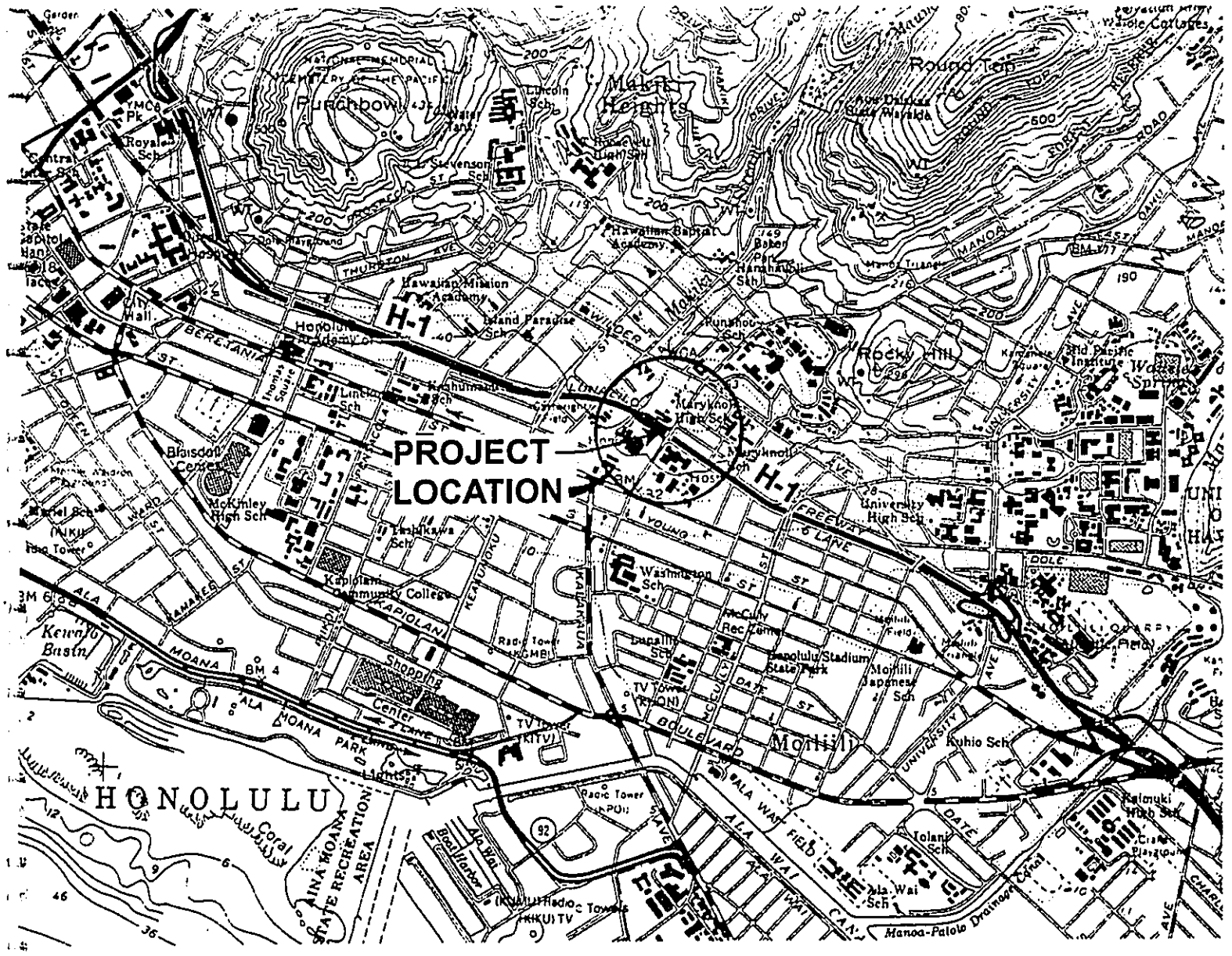
The State Department of Transportation Highways Division (SDOT-H) proposes to expand the east-bound H-1 Punahou Off-Ramp by 1 lane, from the existing 3 lanes to 4 lanes. This improvement is recommended to increase the storage capacity for the right turn movement onto Punahou Street, to improve access to Waikiki and the newly constructed Hawaii Convention Center, and to meet the overall projected operating conditions of the off-ramp and the freeway (Julian Ng, Inc., 1997). **Figure 1-1, Project Vicinity**, shows the location of and area surrounding the proposed project site.

Completion of the project will involve evaluation of existing land uses and environmental conditions to determine the overall impact of construction activities and the impacts of the expansion on area traffic patterns. Additionally, community input has been sought early on in the development process to identify non-design issues in order to resolve them during the planning and design stage. All project activities will be assessed for compliance with State and County policies and land use plans.

The total project cost, including land acquisition, is currently estimated at $7.5 million dollars. Approximately ninety percent of the project cost will be funded by the Federal Highways Administration and ten percent by the State through the Department of Transportation. No county funds will be used in this project. Construction is anticipated to begin in August 2000. The project will take approximately eleven months to complete. The estimated end date for the project is June 2001.

1.2 PROJECT DESCRIPTION

The proposed project involves expanding the Punahou Off-Ramp for eastbound traffic exiting H-1. The proposed off-ramp widening will realign the exit lane and create an additional 11-foot



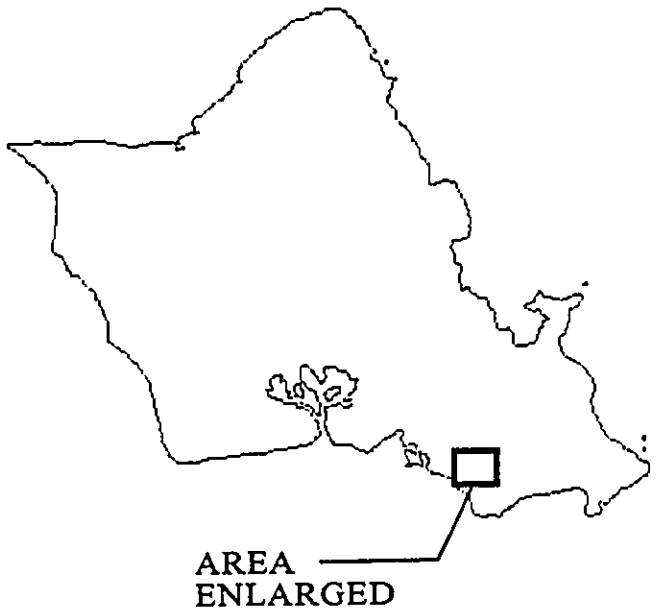


Figure 1-1
PROJECT VICINITY

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State of Hawaii
Department of Transportation

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February 2000

wide, dedicated right turn lane onto Punahou Street. The improvement will include deceleration and turning area and a paved shoulder. Additionally, the existing off-ramp lanes will be resurfaced with concrete. The new alignment and right turn lane will be taken on the makai side of the existing exit lane starting from Makiki Street to Punahou Street as shown in **Figure 1-2, Project Site and Tax Map Key Locations**. (Darby & Assoc., 1998).

In addition to the exit lane realignment and new right turn lane, the right lane of the three eastbound H-1 through lanes will offer the option to traffic of continuing on the freeway, continuing straight on Bingham Street, or turning left on Punahou Street as shown in **Figure 1-3, Proposed Improvements**. (Darby & Assoc., 1998).

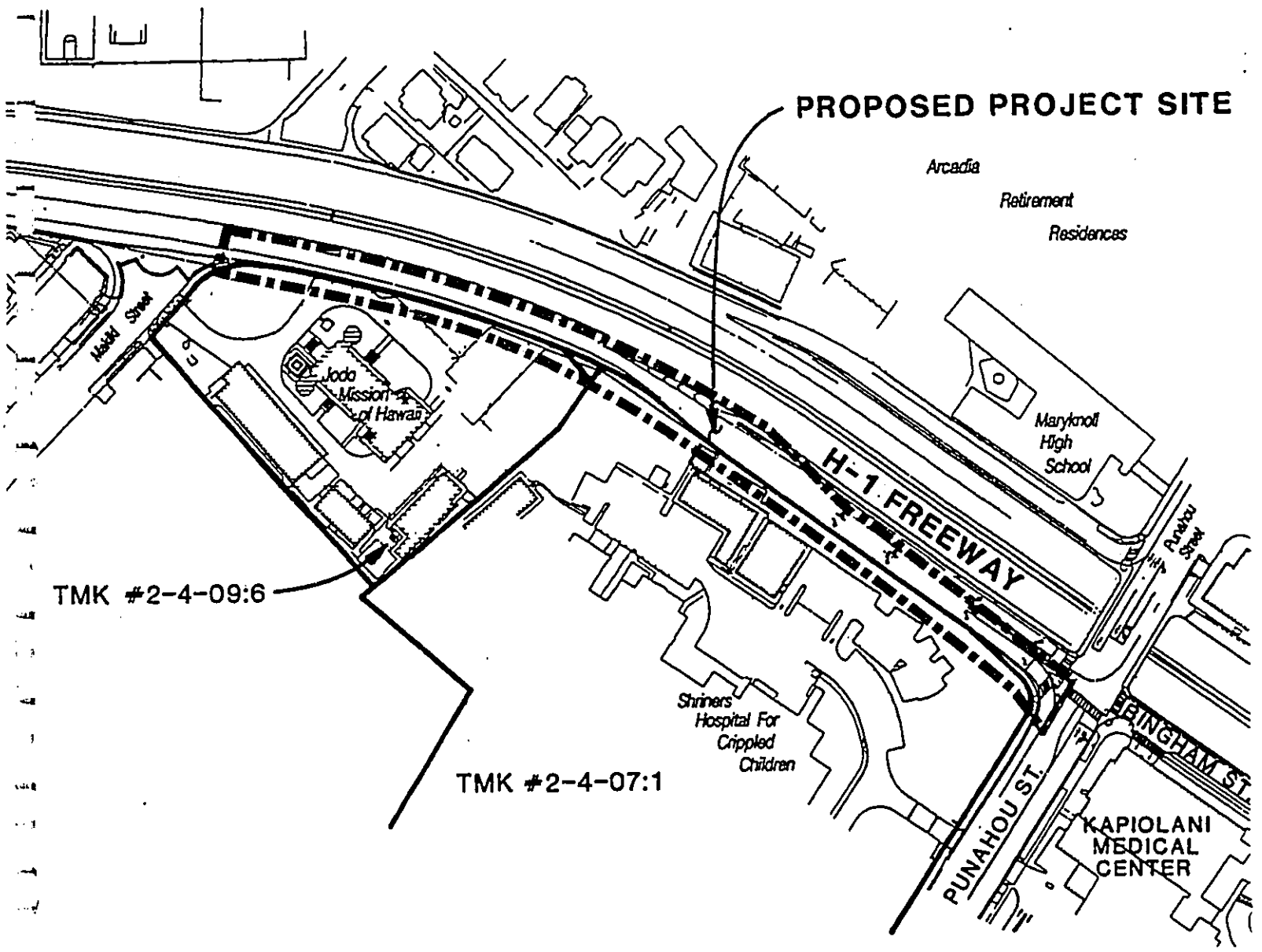
1.3 PURPOSE AND NEED FOR PROJECT

Traffic volumes at the Punahou Off-Ramp will increase by a projected 22% by the year 2020 as the result of population growth, increased activity surrounding the Hawaii Convention Center, and other developments that attract traffic. Traffic projections for the year 2020 show traffic volumes at level of service F during the morning peak hours from 6:45 am to 8:00 am and the afternoon peak hours of 3:15 pm to 7:00 pm. Level of Service F is defined as total gridlock condition.

The proposed Punahou Off-Ramp expansion will reduce projected traffic congestion on the off-ramp and provide adequate new capacity for Waikiki-bound traffic through the year 2020. The improvements would increase the level of service to D during peak hours and increase the amount of lane storage thereby reducing the amount of queuing on the freeway.

1.4 ENVIRONMENTAL CONSIDERATIONS

Environmental considerations arising from the proposed expansion include air quality, noise levels, and land acquisition.



PROJECT OUTLINE

Figure 1-2
PROJECT SITE AND
TAX MAP KEY LOCATIONS

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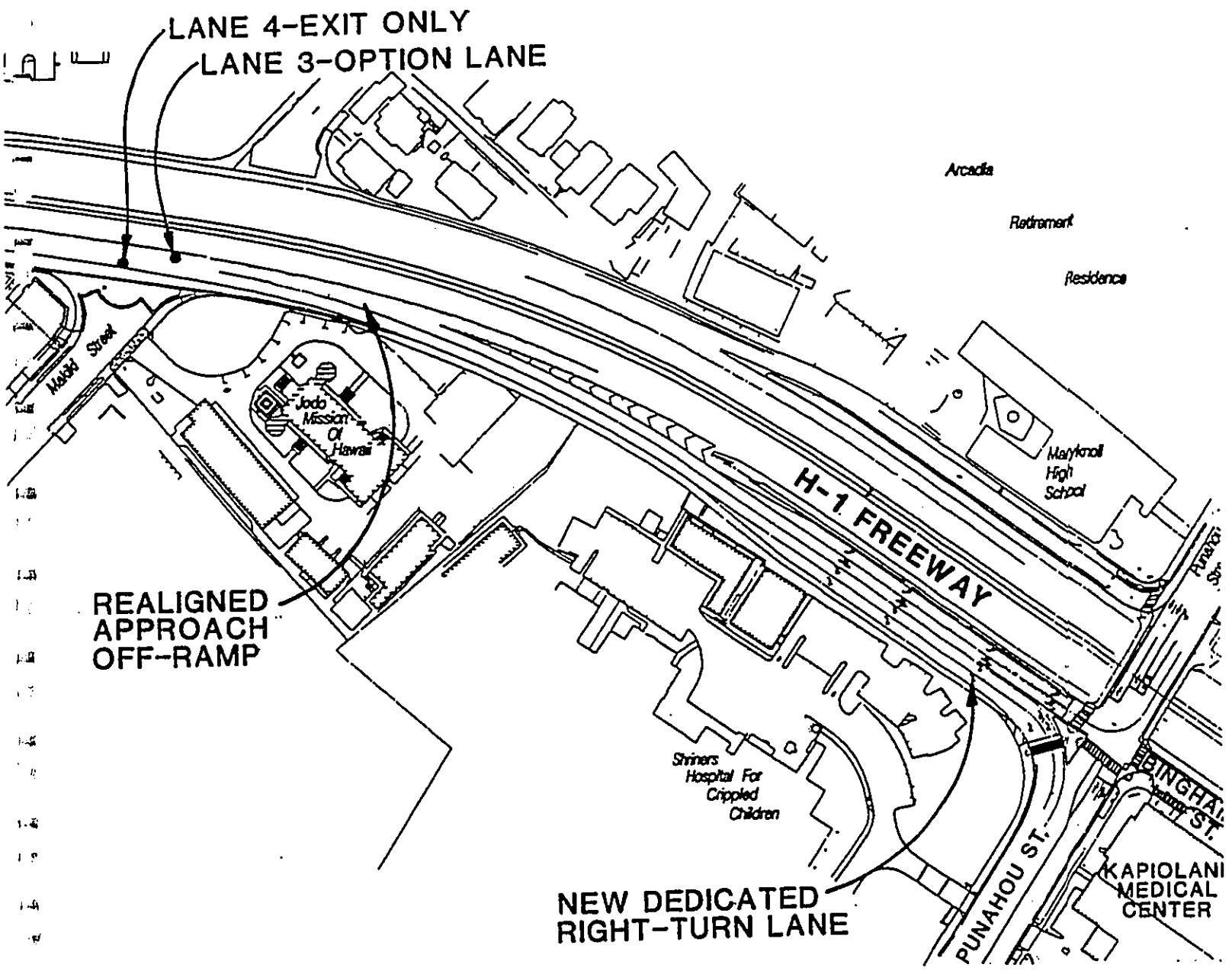

Figure 1-3
PROPOSED IMPROVEMENTS

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An air quality study prepared by B.D. Neal & Associates (1997) for the project evaluated ambient air quality as well as potential short- and long-term air quality impacts that could occur as a result of construction and use of the proposed off-ramp. The study determined that short-term impacts related to construction activities would be of little concern due to the fact that they would be temporary in nature and easily mitigated. An evaluation of long-term impacts projected a slight increase in carbon monoxide (CO) levels due to increased vehicle traffic and to the additional right turn lane, which would concentrate more vehicles into the intersection area. As with current conditions, future scenarios, both with and without the proposed expansion, produced estimated CO concentrations within the national standards but in excess of the State standards (See Table 1-1). (B.D. Neal & Assoc., 1997).

Table 1-1
Estimated Worst-Case 1-Hour Carbon Monoxide Concentrations
At Intersection of H-1 Off-Ramp with Punahou and Bingham Streets
(milligrams per cubic meter)

Scenario	Maximum Concentration		
	AM	PM Early	PM Late
1997 Existing	17.7	17.8	16.4
2020 Without Project	15.9	17.3	15.6
2020 With Project	17.1	18.1	16.9

Hawaii State Air Quality Standard: 10
National Air Quality Standard: 40

Potential short-term and long-term noise impacts of the proposed expansion were assessed by Darby & Associates (1998). Their study concluded that short-term construction noise may impact noise sensitive locations around the project site, such as the Shriners' Hospital for Children and Kapiolani Medical Center, however, mitigative measures by project contractors can be employed to minimize this temporary noise source (See section 4.1.2).

With regards to long-term impacts, the study determined that traffic noise levels in the project area would increase slightly, less than 1 decibel (dB) relative to existing levels, over a 20+ year period to the year 2020 with or without the off-ramp expansion. An increase of this magnitude is well below the threshold change in noise level of 3 dB that is perceptible to most people with normal hearing and is not considered significant. However, in accordance with the Hawaii Department of Transportation (HDOT) Noise Analysis and Abatement Policy, traffic noise impacts that "approach or exceed" the Federal Highway Administration's noise abatement criteria were forecast to occur at six of the eleven test locations. Therefore, noise mitigation measures, including acoustical barrier walls and air conditioning for impacted buildings, have been considered. (Darby & Assoc., 1998).

Land for the project will be acquired from property makai of the existing off-ramp. The proposed expansion will require the acquisition of approximately 9,720 square feet of land currently owned by the Shriners' Hospital for Children (TMK#2-4-07:1), and approximately 3,600 square feet of property owned by the Jodo Mission of Hawaii (TMK# 2-4-09:6).

No functional land-use loss will result from the acquisition of these parcels, however some alterations are necessary. On the portion to be acquired from the Shriners' Hospital, one utility structure housing an incinerator will be demolished and removed. Another utility structure supporting dual cooling towers for the hospital will require relocation to the existing parking lot on the east side of the main hospital building. On the Jodo Mission parcel, the area to be used for the expansion is currently occupied by a parking lot that will be restriped to maintain existing capacity.

1.5 PROJECT TRAFFIC CONDITIONS

The H-1 Punahou Off-Ramp is one of the busiest single-lane ramps on the freeway system in Hawaii. In 1996, an average weekday flow of 29,100 vehicles was counted (SDOT-H, 1996). Flow rates greater than 1,400 vehicles per hour were counted continuously from 6:00 AM to 5:30 PM, and from 6:00 PM to 7:15 PM. Counts taken in September 1997 at the intersection of the

off-ramp and Punahou Street show similar results for the off-ramp, with an average volume of 28,355 vehicles per day and flow rates exceeding 1,400 vehicles per hour from 5:45 AM to 5:15 PM and 6:30 PM to 8:00 PM. (Julian Ng. Inc., 1997). (The methodology used for taking traffic counts is described in Appendix A, Traffic Analyses for Improvements to H-1 Punahou Off-Ramp).

The Punahou Off-Ramp is at the end of a weaving section of H-1 created by a single-lane on-ramp from Piikoi Street. The weave section, which totals four lanes wide with the inclusion of three through lanes of the H-1 Freeway, is estimated to carry 102,000 vehicles per day. The off-ramp widens to three lanes on its approach to Punahou Street, where a traffic signal controls movements. The off-ramp terminates at a traffic signal, thus the free-flow speed of the ramp is less than 50 miles per hour. The eastbound approach from the off-ramp consists of a left turn only lane, an option lane for left turns and through traffic to Bingham Street, and a right turn only lane. The ramp was widened by one lane in 1984. (Julian Ng, Inc., 1997).

Bingham Street is a one lane street departing the intersection to the east. It serves the Kapiolani Medical Center and the residential area south of the H-1 Freeway. Punahou Street is a major north-south collector street, connecting to Manoa Road as one of two entrances into Manoa Valley. Between the H-1 Freeway and Manoa Road, Punahou Street serves the lower Makiki area, consisting of single family homes, low rise apartments, high rise condominium buildings, and numerous private schools, including Punahou and Maryknoll Schools. (Julian Ng, Inc., 1997).

CHAPTER 2

PROJECT ALTERNATIVES

2.1 INTRODUCTION

As part of the analysis for this project, several alternatives were considered to address the projected increases in traffic on the Punahou Off-Ramp. The alternatives evaluated include the no action alternative as well as several different configurations of off-ramp expansion.

2.2 ALTERNATIVES

2.2.1. "No-Action" Alternative

State and Federal legislation require that a "no-action" alternative be considered to serve as a baseline against which potential actions can be measured. In this case, the no action alternative does not provide a solution to meet the projected increase in traffic on the Punahou Off-Ramp: it was therefore not considered to be a viable alternative.

2.2.2 Off-Ramp Expansion Alternatives

Two off-ramp expansion alternatives were considered. As set forth in the *Highway Capacity Manual - Third Edition*, a single lane ramp would not have the capacity to service the assigned peak hour volumes; therefore, a two-lane off-ramp is considered in both of the design alternatives. Both alternatives also conceive a realignment of the existing off-ramp and restriping of freeway laneage, from 3 to 4 lanes, prior to the Piikoi On-Ramp and Punahou exit. (Julian Ng, Inc., 1997).

Alternative A:

In Alternative A, the off-ramp consists of two lanes: the fourth eastbound lane (counting from the median) is an exit-only lane which becomes the right lane on the exit while the third lane is an option lane from which vehicles can either continue on H-1 or exit onto the left lane of the off-ramp. The right lane would lead into the two lanes from which right turns to Punahou Street would be made, while the left lane would be for left turns to Punahou Street and through traffic to Bingham Street. (Julian Ng, Inc., 1997).

Alternative B:

In Alternative B, a fifth lane is introduced as a parallel type off-ramp prior to the dropping of the fourth lane into the ramp. In this configuration, the third lane (from the median) would be a freeway through-lane only, and would not provide the option of exiting at the Punahou Off-Ramp without a lane change to lane four. Traffic projects under Alternative B show that traffic densities would be higher, and conditions between 6:30 AM and 7:15 PM would be at Level of Service E, except for five 15-minute periods at Level of Service D. (Julian Ng, Inc., 1997).

Analysis shows Alternative A to be better than Alternative B. However, in Alternative A, vehicles queued by the traffic signal at Punahou Street could back up onto a through lane of the freeway. While there is approximately 600 feet between the intersection stop bar and the ramp nose, the near capacity of this intersection and the effects of peak hour congestion at the nearby signalized intersections to the north cause concerns about long queues from the left turn and left/through options. In Alternative B, a lane change to the right, from the third lane to the fourth lane in a short distance before the nose of the off-ramp, would be required. This lane change would be possible only if a gap is created by a vehicle changing from the fourth to fifth lane. (Julian Ng, Inc., 1997)

In both cases, the analyses showed that desirable Level of Service D conditions are exceeded through most of the day. Other operational problems affect both alternatives. Traffic densities in Alternative A would be less and it is therefore the preferred configuration of the off-ramp. While the analyses have assumed a fourth eastbound freeway lane, restriping would result in undesirable lane and shoulder widths; the addition of the fourth lane should be deferred until alternatives are evaluated. (Julian Ng, Inc., 1997)

2.2.3 Recommended Alternative

The recommended improvement requires no freeway lane restriping. In this configuration, the Piikoi On-Ramp creates an additional, exit-only fourth lane to the freeway, which then becomes the expanded right lane of the off-ramp. The third lane of the freeway becomes an option lane

from which vehicles can either continue on H-1 or exit onto the left lane of the off-ramp. The right lane of the off-ramp would lead into two dedicated right-turn only lanes onto southbound Punahou Street. The left off-ramp lane would also lead into two lanes, one of which would be a dedicated left turn lane onto northbound Punahou Street, the other of which would provide the option of a left turn or through traffic to Bingham Street.

Figure 2-1, Freeway & Off-Ramp Configuration Alternatives, displays the alternatives as well as the recommended improvement.

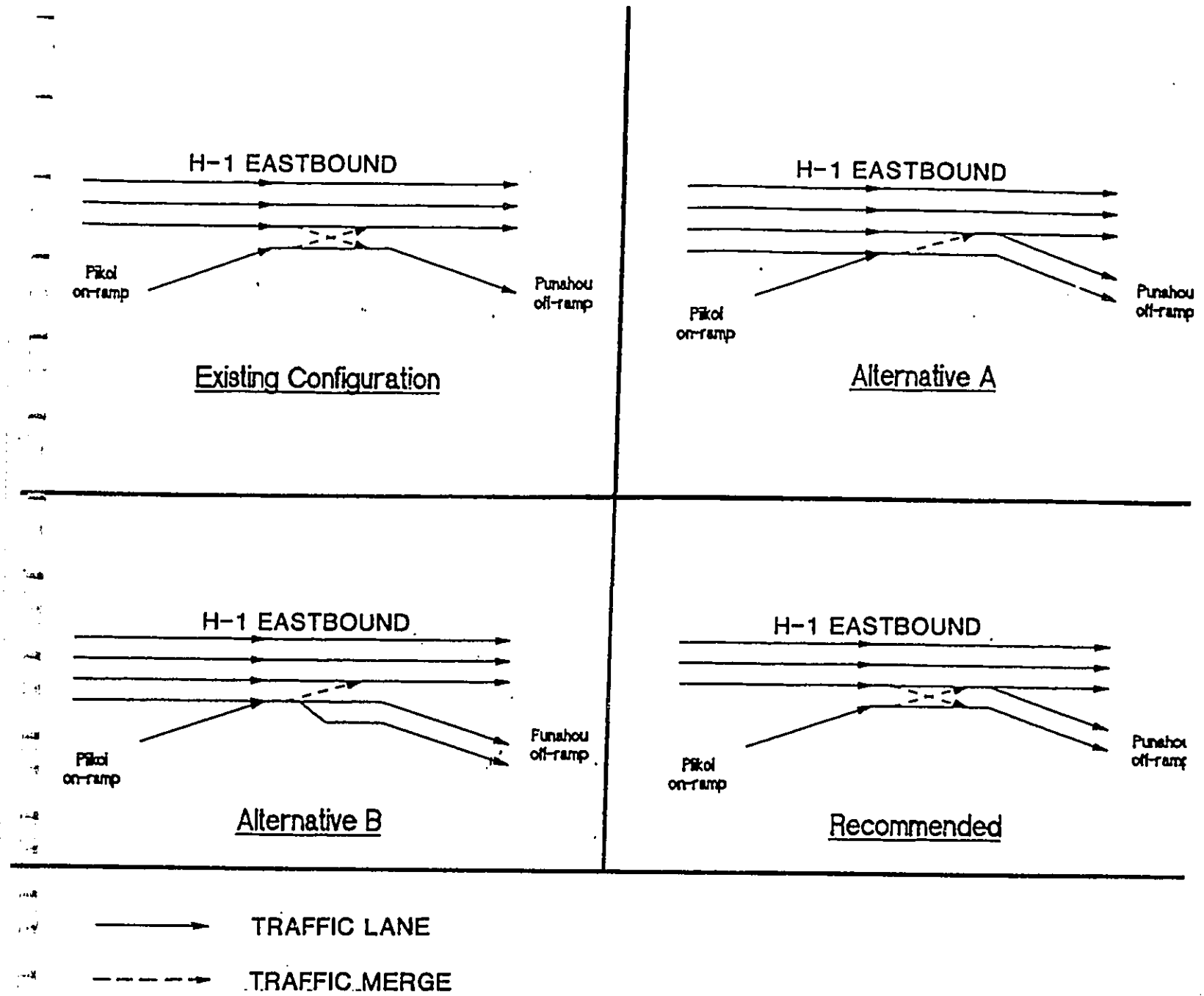

Figure 2-1
OFF-RAMP CONFIGURATION ALTERNATIVES

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State of Hawaii
Department of Transportation

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February 2000

CHAPTER 3
DESCRIPTION OF THE EXISTING ENVIRONMENT

3.1 NATURAL ENVIRONMENT

3.1.1 Geology and Hydrology

Oahu's south central coast, geographically referred to as the Honolulu Plain, is underlain by a broad elevated coral reef that has been partly covered by alluvium carried down from the mountains. Core samples show lava flows of the Honolulu Volcanic Series are interbedded with these reef deposits that were formed when sea level was higher than it is now.

The same interbedding of coral and alluvial deposits that play an important role in Oahu's geology also influenced the hydrological character of Oahu's leeward coastline. The interface between upper sedimentary layers and the underlying basalt constitutes a zone of low permeability known as caprock. This caprock extends along the coastline about 800 to 900 feet below sea level, forming an impervious zone that prevents the seaward movement of potable water from the basaltic aquifers. The width and thickness of the caprock suggests that the basal potable water supply will be relatively unaffected by modifications near the coastline.

The project site is located on the southeastern flank of Punchbowl Hill (Puowaina). Punchbowl Hill is a tuff cone near the center of Honolulu built against the end of a spur of the Koolau Range. The only source of surface water in the area is the highly modified Makiki Stream, which passes under the H-1 Freeway and through the project site via an underground cement box culvert.

3.1.2 Soils

A soils study conducted for the proposed Punahou Off-Ramp expansion encountered surficial and near-surface soils consisting of stiff to very stiff clayey silts and silty clays to depths varying from about 5 to 14 feet below the existing ground surface. The surficial clayey soils were generally underlain by cinder deposits consisting of medium dense to dense silty sands extending to the maximum depth explored of approximately 21.5 feet below the existing ground surface.

A general soil classification of the project area, according to the U.S. Department of Agriculture, Soil Conservation Service (1972), identifies the soil as Makiki Clay Loam, 0 to 2 percent slope. This type of soil occurs in the city of Honolulu, and is characterized by well-drained soils on alluvial fans and terraces formed of alluvium mixed with volcanic ash, cinders, and rock fragments. Permeability is considered to be moderately rapid, runoff slow, and the erosion hazard no more than slight. (U.S. Department of Agriculture, 1972).

Figure 3-1, Soils Map, displays the soil classifications for the project site.

3.1.3 Climate

The climate of the Honolulu area is typical of the leeward coastal lowlands of Oahu. The area is characterized by abundant sunshine, persistent tradewinds, relatively constant temperatures, moderate humidities, and the infrequency of severe storms.

The prevailing wind throughout the year is the northeasterly tradewind, although its frequency varies from more than 90 percent during the summer months to 50 percent in January. The average annual velocity of the wind is approximately 10 miles per hour.

The mean temperature in Honolulu ranges from 73 degrees Fahrenheit in the winter to 82 degrees in the summer. The mean annual rainfall is 23 inches with most of the rainfall occurring between November and April. Relative humidity ranges between 56 and 72 percent.

3.1.4 Earthquake

Implementing a recommendation by the Seismic Zonation Committee of the Structural Engineers Association of Hawaii, the Honolulu Building Code was recently revised to upgrade the seismic zone for Oahu from Zone 1 to Zone 2A. Zone 2A acknowledges a greater seismic threat to buildings and other structures than Zone 1. However, the proposed Punahou Off-Ramp expansion involves no structural supports that would be subject to seismic regulations of the Honolulu Building Code.

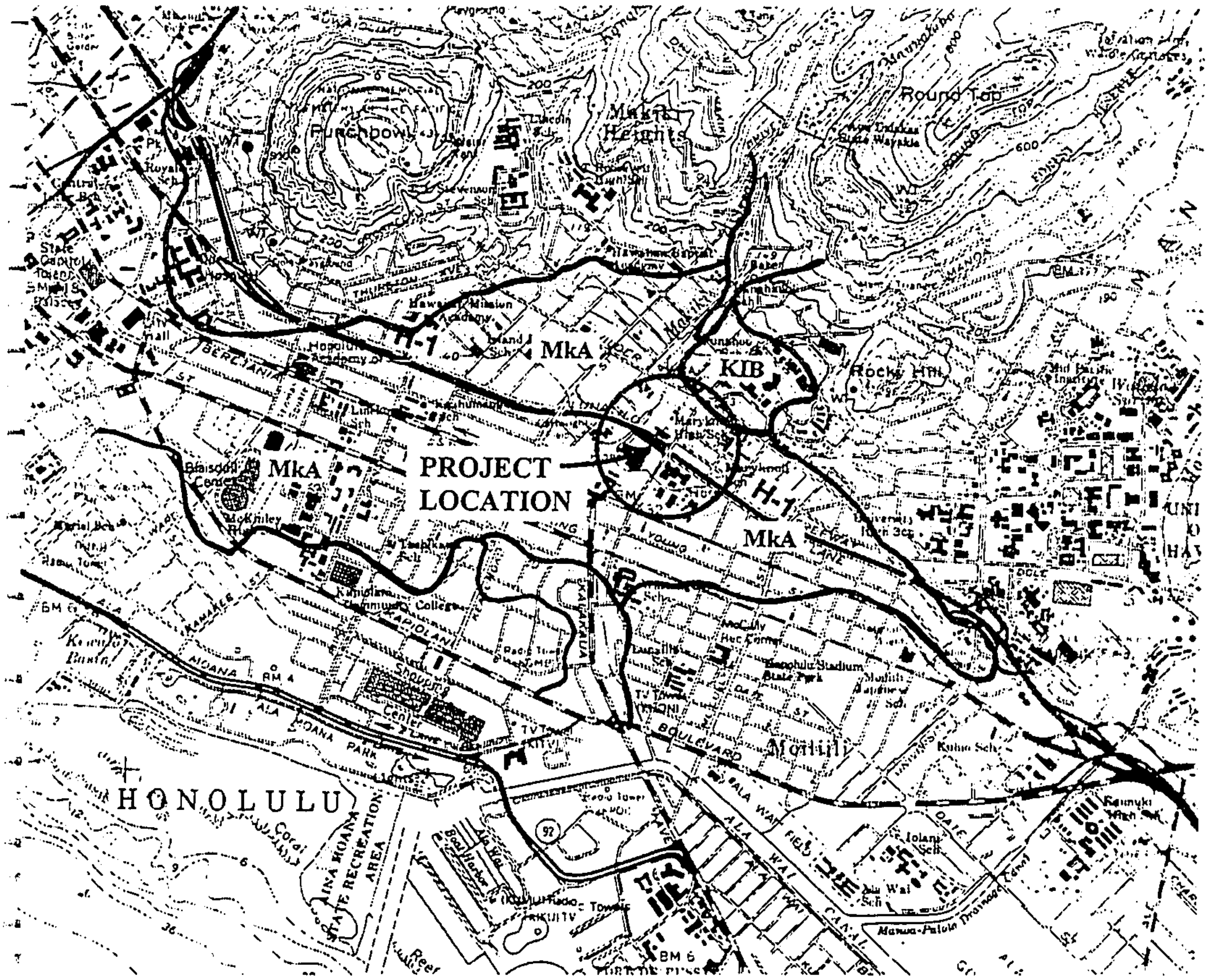

Figure 3-1
SOILS MAP

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State of Hawaii
Department of Transportation

R. M. TOWILL CORPORATION
February 2000

<u>LEGEND</u>

MkA Makiki Clay Loam, 0 to 2 % slopes
KIB Kawaihapai Clay Loam, 2 to 6 % slopes

3.1.5 Topography

The proposed project site is located inland from Waikiki at the base of Makiki Heights and Tantalus/Round Top at approximately 50 feet above mean sea level (msl). The topography is characterized by very slight slopes of 0 to 2 percent. The land surrounding the site has been extensively modified by grading and no significant geological features exist in the immediate area. The most significant topographical feature near the project site results from the H-1 Freeway underpass at Punahou, which dips approximately twenty-five feet below the surrounding developed plain.

3.1.6 Flora and Fauna

Urban development around the proposed project site has almost entirely replaced native flora and fauna with introduced species. Fauna in the area consist primarily of exotic bird species, the most abundant of which include the Spotted Dove (*Streptopelia chinensis*), Zebra Dove (*Geopelia striata*), Mynah (*Acridotheres tristis*), Java Sparrow (*Padda oryzivora*), and House Finch (*Carpodacus mexicanus*).

The original flora at the project site and surrounding area has been almost entirely replaced by introduced weed species and grass. Natural vegetation on the makai shoulder and on property within the realignment zone includes pitted beardgrass (*Bothriochloa pertusa*), Bermuda Grass (*Cynodon dactylon*), and Guinea grass (*Panicum maximum*), as well as several types of weedy plants. A variety of introduced trees and shrubs are used for landscaping in the affected area. These include plumeria (*Plumeria acuminata*), shower tree (*Cassia* spp.), lemon tree (*Citrus limon*), mock orange hedge (*Murraya paniculata*), coconut (*Cocos nucifera*), and Norfolk pine (*Araucaria heterophylla*).

3.2 SOCIAL ENVIRONMENT

3.2.1 Population Characteristics

The Punahou Off-Ramp is located in the Makiki/Tantalus Neighborhood Statistics Program Area and is part of the Census Bureau's Honolulu Division statistic (See **Figure 3-2**). According to

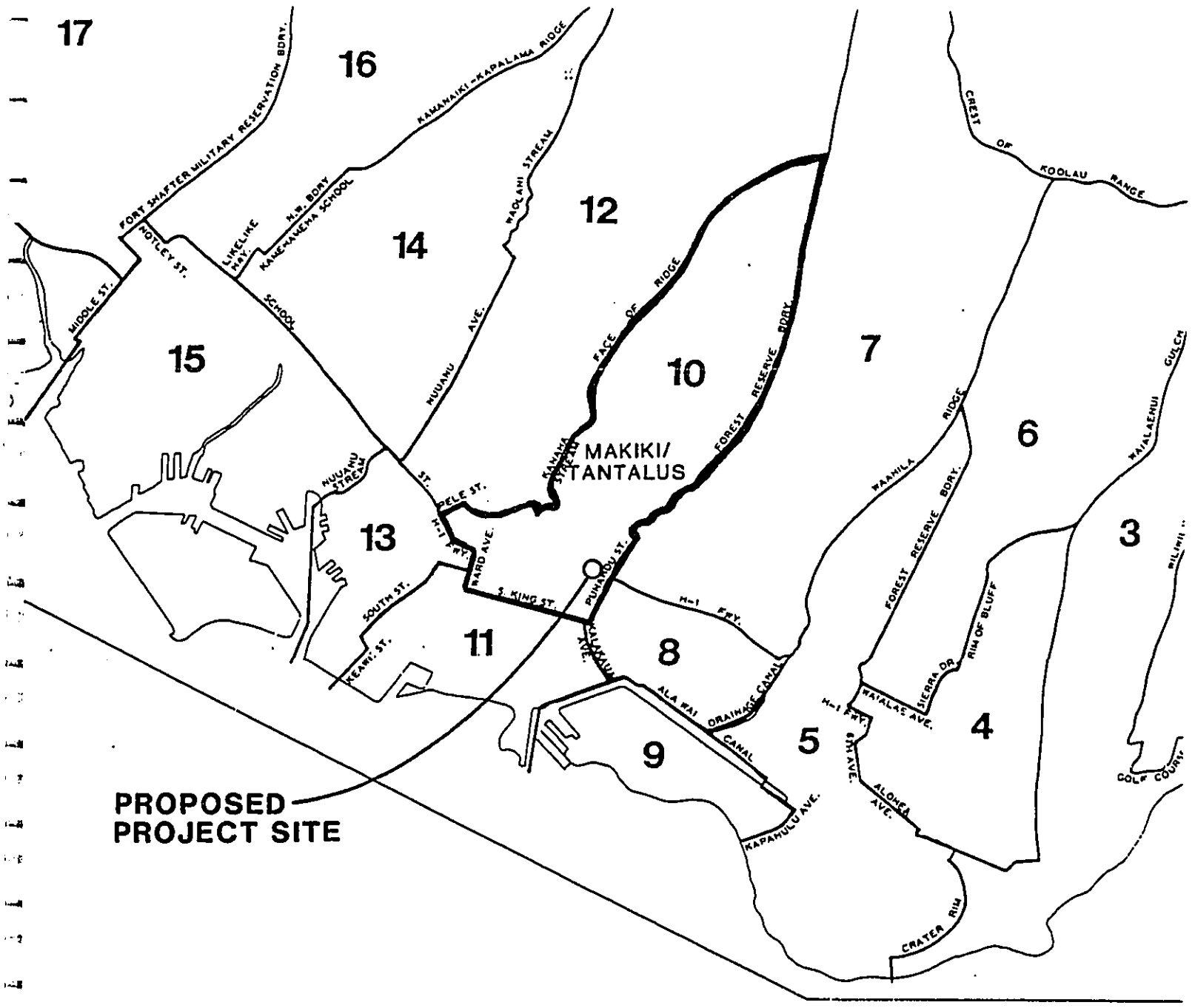

Figure 3-2
NEIGHBORHOOD AREA NUMBER 10
MAKIKI/TANTALUS

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the U.S. Census, the Honolulu Division population decreased by 0.5% between 1990 and 1994, from 377,059 to 375,300 residents. This represents a change in the population trend for the area, which, between 1980 and 1990, had grown by 3.3%, from 365,048 to 377,059. The decrease in the Honolulu Division population is most likely due to increased residential developments in Central Oahu and at Kapolei in Ewa. This is supported by census figures that show robust population growth in Wahiawa and Ewa.

At the census tract level, statistical data reveal subtle ethnic variation among area neighborhoods (Census Tracts 26, 35, 27.02, and 34.04 through 34.07), marked most notably by the divide created by the H-1. In general approximation, the area population can be broken down as follows: Caucasians 31%, Japanese 29%, Chinese 15%, Korean 8%, and Filipino 4%, with the remaining 13% composed primarily of other Asian and Pacific Island ethnicities. Other races combined comprise less than 4% of the area population.

This distribution varies slightly across the H-1 corridor. The area mauka of H-1 has a higher percentage of Caucasian residents, approximately 34%, and slightly lower percentage of Japanese residents, approximately 27%. Overall, approximately 55% of the residents mauka of the H-1 are of Asian ancestry. Makai of the H-1 the variation is slightly more pronounced, with a breakdown of 21% Caucasian, 36% Japanese, 17% Chinese, and 10% Korean. Approximately 72% of the residents makai of the H-1 are of Asian ancestry.

3.2.2 Land Use

The Punahou Off-Ramp is located in a State Land Use Urban District. Land immediately surrounding the project site is under County zoning for medium- and high-density apartments, while land in the project vicinity is zoned for single family residences, public use areas, and mixed-use/low-density apartments. On the County's Development Plan Land Use Map, land around the project site is shown to be in use as Public Facilities.

Immediately makai of the off-ramp, and forming its southern boundary, is the Jodo Mission of Hawaii and the Shriners' Hospital for Children. The Banyan Tree Plaza, a high-density apartment building, is neighbor to the Shriners' Hospital, both of which front Punahou Street and are accessed from the off-ramp's right turn lane. Kapiolani Medical Center occupies the south-east corner of the off-ramp intersection, sharing the block with the Central Union Church of Honolulu and some medium-density apartment complexes. Southbound Punahou Street crosses Beretania and King Street, both of which are mixed-use commercial/residential corridors.

Mauka of the H-1 Freeway, the Punahou Off-Ramp serves Maryknoll School, Punahou School, and the Arcadia Retirement Residence, as well as numerous condominium buildings in the Makiki/Tantalus community. Single-family residences are interspersed throughout.

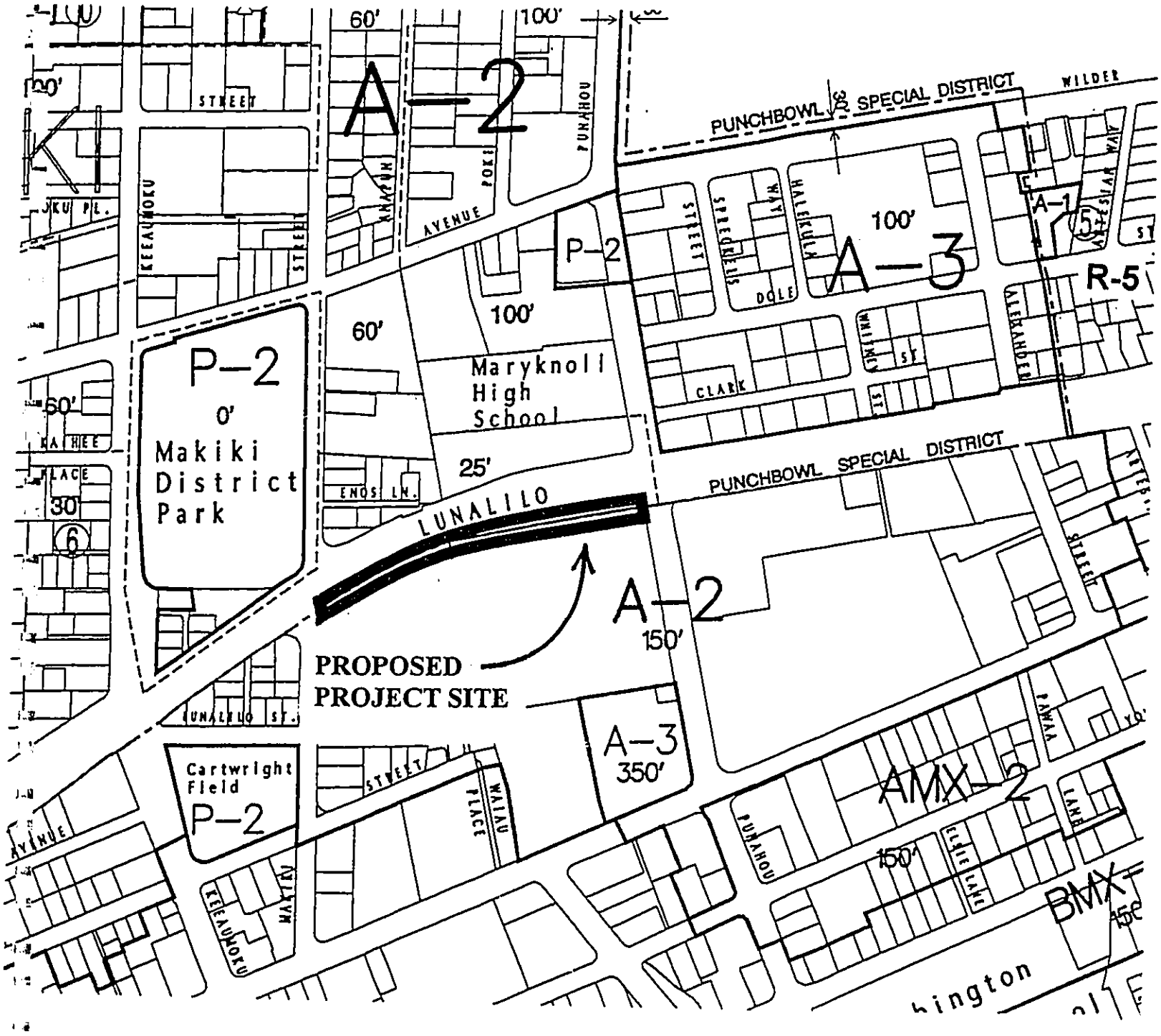
Figure 3-3, Land Use Map, displays zoning and land uses at the project site and vicinity.

3.2.3 Housing

According to the 1990 Census, the Makiki/Tantalus Neighborhood Statistics Program Area contained 14,681 households with an average household size of 2.03 persons and a median household income of $33,263. Census tract information reveals the share of owner-occupants to be approximately 32% of total households in the area. This is somewhat lower than the island average of approximately 52% owner-occupied housing. The difference can be largely explained by the high percentage of condominium units in the project vicinity, which account for nearly 54% of area housing stock.

3.2.4 Transportation Facilities

The H-1 Punahou Off-Ramp is one of the busiest single-lane ramps on the freeway system in Hawaii. The off-ramp is at the end of a weaving section of H-1 created by a single-lane on-ramp from Piikoi Street. The weave section, which totals four lanes wide with the inclusion of three through lanes of the H-1 Freeway, is estimated to carry 102,000 vehicles per day. The off-ramp widens to three lanes on its approach to Punahou Street, where a traffic signal controls



LEGEND

APARTMENT
- A-2 Low-Density
- A-3 High-Density
- AMX-2 Mixed Use Low-Density

PRESERVATION
- P-2 General

RESIDENTIAL
- R-5 Single-Family Dwelling - 5,000 Sq ft.

Figure 3-3
ZONING AND LAND USE

NOT TO SCALE

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movements. The off-ramp terminates at a traffic signal, thus the free-flow speed of the ramp is less than 50 miles per hour. The eastbound approach from the off-ramp consists of a left turn only lane, an option lane for left turns and through traffic to Bingham Street, and a right turn only lane. The ramp was widened by one lane in 1984. (Julian Ng, Inc., 1997).

Bingham Street is a one lane street departing the intersection to the east. It serves the Kapiolani Medical Center and the residential area south of the H-1 Freeway. Punahou Street is a major north-south collector street, connecting to Manoa Road as one of two entrances into Manoa Valley. Between the H-1 Freeway and Manoa Road, Punahou Street serves the lower Makiki area, consisting of single family homes, low rise apartments, high rise condominium buildings, and numerous private schools, including Punahou School and Maryknoll Schools. (Julian Ng, Inc., 1997).

The next nearest exit serving the general area is the H-1 eastbound Bingham Off-Ramp which exits onto Bingham Street approximately ½ mile east of the Punahou Off-Ramp (see **Figure 3-4, Transportation Facilities Map**).

3.2.5 Recreation

The Punahou Off-Ramp provides access to two small community parks, 'O Makiki District Park and Cartwright Field, a municipal sports field, as well as numerous school grounds that provide additional recreational opportunities to area residents. Punahou Street is a primary corridor to the beaches of Waikiki, providing a convenient route for residents of Makiki and Manoa, as well as eastbound travelers on H-1. In the mauka direction, Punahou Street provides access to Makiki Heights/Tantalus and Round-Top, a forested, mountainous area which boasts numerous hiking trails maintained by the State's Na Ala Hele program, as well as a State recreational park at the peak of Round Top.

CORRECTION

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

movements. The off-ramp terminates at a traffic signal, thus the free-flow speed of the ramp is less than 50 miles per hour. The eastbound approach from the off-ramp consists of a left turn only lane, an option lane for left turns and through traffic to Bingham Street, and a right turn only lane. The ramp was widened by one lane in 1984. (Julian Ng, Inc., 1997).

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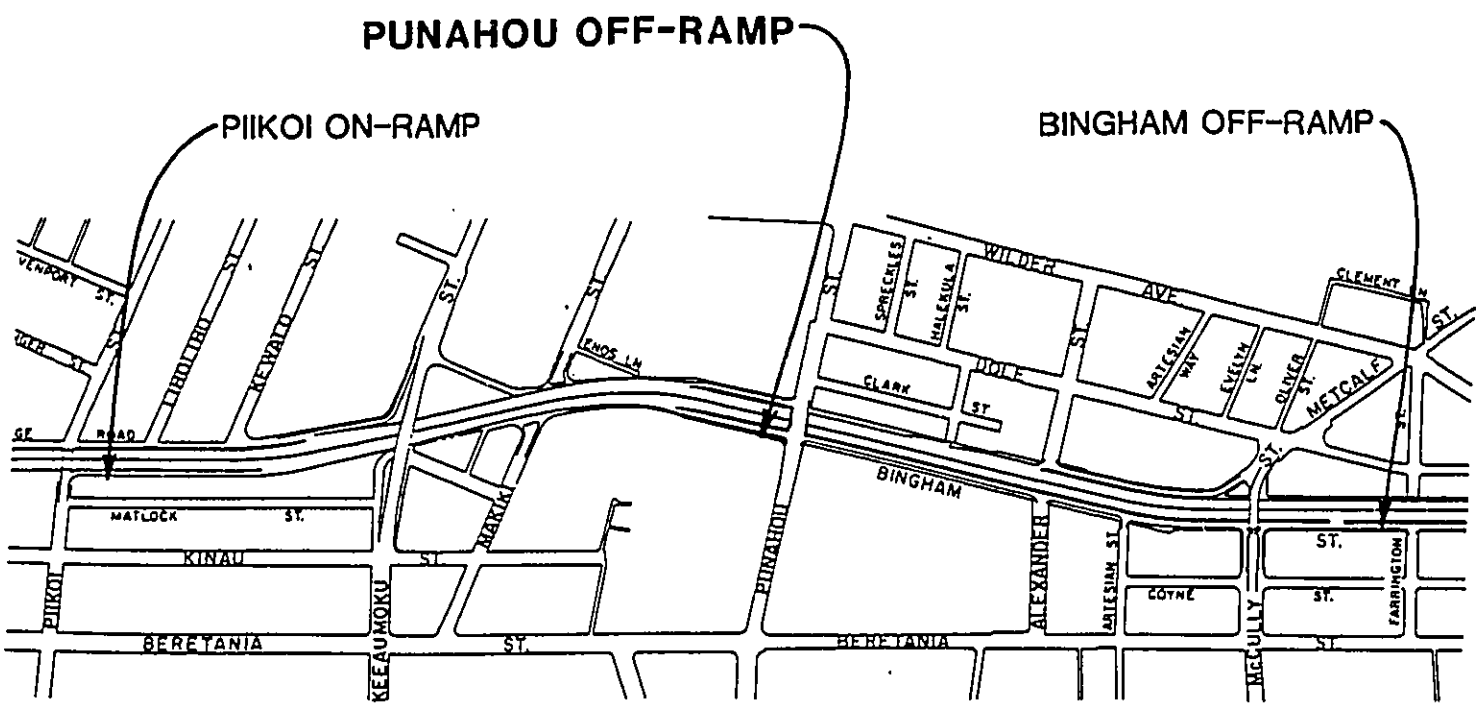

Figure 3-4
TRANSPORTATION FACILITIES

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3.3 ECONOMY

Hawaii's economy is currently undergoing a structural change in which the once dominant sectors of agriculture and the military have given way to growth in service sectors. Today, sugar and pineapple, the historic mainstays of Hawaii's agricultural economy, comprise just 1% of the GSP, while defense accounts for just under 11%. This transformation is further reflected in the growth of the visitor economy, which peaked in 1990 at approximately 26% of the GSP and has since tapered off to 24% of the GSP. The movement towards a service- and trade-based economy is also apparent in the distribution of Hawaii's jobs across sectors. The share of the economy's jobs accounted for by manufacturing and agriculture have declined steadily and currently make up approximately 8% of total jobs in the economy. By comparison, the shares of jobs in wholesale and retail trade and in services have risen to a current position of approximately 23% and 28% respectively.

Accompanying this change, state government has expanded, as indicated by the rise in the ratio of state expenditures to GSP and the number of state jobs as a percentage of total jobs (from approximately 9.7% in 1989 to over 11% in 1994). This growth in the public sector has been a source of some concern, and has caused a refocusing of attention on the need to stimulate greater productive capacity and more diverse business opportunities in the economy. (DBEDT, 1996).

CHAPTER 4

ENVIRONMENTAL CONSEQUENCES OF PROPOSED ACTION

This chapter assesses the environmental consequences of the proposed action described in Chapter 1. Potential impacts are described and evaluated. Compliance or noncompliance with existing governmental standards is indicated. Mitigation measures that would eliminate and/or reduce potential adverse impacts are identified.

4.1 PHYSICAL IMPACTS

4.1.1 Air Quality

Both federal and state standards have been established to maintain ambient air quality at healthy levels. At the present time, seven parameters are regulated including: particulate matter, sulfur dioxide, hydrogen sulfide, nitrogen dioxide, carbon monoxide, ozone, and lead. In most cases, the State of Hawaii's air quality standards are more stringent than the comparable national limits.

Presently, air quality in the vicinity of the project is mostly affected by air pollutants emitted by motor vehicles using the H-1 Freeway, a major arterial roadway that often carries heavy volumes of traffic, and Punahou Street. To a lesser and occasional extent, air quality is impacted by emissions originating from distant industrial, natural and/or agricultural sources. Natural sources of air pollution that may affect the air quality of the site include the ocean, plants, wind-blown dust and distant volcanoes. (B.D. Neal & Assoc., 1997).

Except possibly for areas near traffic-congested intersections, air quality at the project site is relatively good. Air quality data from the nearest monitoring stations operated by the Department of Health suggest that all national air quality standards are currently being met in the Honolulu area, although occasional exceedances to the more stringent state standards for ozone and carbon monoxide may occur. (B.D. Neal & Assoc., 1997).

If the proposed project is given the necessary approvals to proceed, it is inevitable that some short- and long-term impacts on air quality will occur either directly or indirectly as a

consequence of project construction and use. Short-term impacts from fugitive dust will likely occur during the project construction phase. To a lesser extent, exhaust emissions from stationary and mobile construction equipment, from the disruption of traffic, and from workers' vehicles may also affect air quality during the period of construction. (B.D. Neal & Assoc., 1997).

State air pollution control regulations require that there be no visible fugitive dust emissions at the project boundary. Therefore, an effective dust control plan will be implemented by the project contractor to ensure compliance with state regulations. Fugitive dust emissions can be controlled to a large extent by watering of active work areas, using wind screens, keeping adjacent paved roads clean, and by covering open-bodied trucks. Exhaust emissions will be mitigated by moving construction equipment and workers to and from the project site during off-peak traffic hours. Additionally, project contractors will properly maintain their internal combustion engines and comply with DOH Rules Title 11, Chapter 59 and 60, regarding Air Pollution Control. (B.D. Neal & Assoc., 1997).

To assess the potential impact of exhaust emissions from increased vehicular traffic flow following the off-ramp expansion, an air quality monitoring study was undertaken to estimate current ambient concentrations of carbon monoxide at the intersection of the H-1 Freeway off-ramp and Punahou and Bingham Streets and to predict future levels both with and without the proposed project at this intersection.

During worst-case conditions, model results indicated that presently the national 1-hour and 8-hour ambient air quality standards for carbon monoxide are being met but the more stringent state standards could potentially be exceeded. The year 2020 scenario, without the project, produced a slight drop in predicted concentrations compared to current conditions. This can be attributed to cleaner running vehicles in use in 2020.

Predicted worst-case concentrations in the year 2020, with the project, increased slightly over the "no-project" scenario, indicating the very minimal effect the off-ramp improvement would have

on air quality in the vicinity of the Punahou Street intersection. As with the existing case, both future scenarios produced estimated concentrations within the national standards but in excess of the state standards. Due to the predicted minimal impact of the project, it appears that mitigation of any long-term impacts is unwarranted. (B.D. Neal & Assoc., 1997).

4.1.2 Noise Impacts

A noise impact study was prepared for the proposed Punahou Off-Ramp expansion. Noise measurements conducted in the vicinity of the project site indicated that the ambient noise levels are currently dominated by traffic on H-1 Freeway and Punahou Street. The traffic, together with an occasional overflight by aircraft, contributed to measured ambient noise levels ranging from about 60 to 74 dBA for the measurements conducted adjacent to the Jodo Mission of Hawaii and Shriners' Hospital for Children (See Table 4-1). These levels are typical for urban areas near major thoroughfares. (Darby & Assoc., 1998).

Noise levels were projected for the year 2020 under varying scenarios. Without the proposed project, the traffic noise levels are expected to increase slightly by 2020, less than 1dB relative to existing levels, at the Jodo Mission and Shriners' Hospital. Similar findings were projected in the expanded off-ramp scenario. Such small increases are not perceptible to most people and are not considered significant.

In accordance with the Federal Highway Administration's (FHWA) noise level standards for residences, schools, churches and hospitals, applicable to the Jodo Mission and Shriners' Hospital for Children, the recommended maximum exterior noise level is 67 dBA. At four of six exterior measuring stations located on Shriners' Hospital property, existing traffic noise levels during peak hour traffic were found to be less than 67 dBA and should remain so for the future year 2020 with or without the project. Two measuring stations located closest to the freeway near the Hospital's planned orthotics facility recorded peak hour traffic noise levels of approximately 73 dBA. At the Jodo Mission, the recommended maximum is exceeded by approximately 4 to 6 dBA.

Table 4-1
Existing (1997) and Future (2020) Traffic Noise Level, L_{eq} (dBA),
Projections During Morning and Afternoon Peak Travel Periods

Locations	Existing		2020			
			No Build		Build	
	AM	PM	AM	PM	AM	PM
1 Jodo Mission	72.6	71.7	73.2	72.4	73.4	72.8
1A Jodo Mission*	70.5	69.6	71.2	70.3	71.3	70.7
2 Shriners' Hospital	73.3	72.4	74.0	73.1	74.2	73.5
2A Shriners' Hospital	73.1	72.1	73.8	72.8	73.8	73.1
2B Shriners' Hospital	65.0	64.0	65.7	64.7	65.8	64.9
3 Shriners' Hospital	63.4	62.3	64.1	62.9	64.1	63.2
4 Shriners' Hospital	64.1	62.9	64.7	63.5	64.8	63.8
5 Shriners' Hospital	63.9	62.8	64.5	63.3	64.6	63.6
6 Maryknoll School	71.7	70.5	72.3	71.1	72.4	71.3
7 Arcadia Residence	65.7	64.7	66.4	65.4	66.5	65.6
8 Arcadia Residence	66.1	65.1	66.8	65.7	66.8	65.9

Source: Darby & Associates, October, 1998.

* Measurement taken from second-story level. All other measurements taken from ground level.

Similar conditions exist at locations mauka of the proposed project site, including Maryknoll High School. Measured noise levels at Arcadia Retirement Residence remain below the recommended maximum of 67 dBA and are projected to remain so to the year 2020 with or without the proposed improvements. (Darby & Assoc., 1998).

According to Hawaii Department of Transportation (HDOT) Noise Analysis and Abatement Policy, traffic noise impacts that "approach or exceed" the Federal Highway Administration's noise abatement criteria suggest a need for mitigative action. HDOT defines "approach" as being

at least 1 dB less than the federal standard of 67 dB. As shown in Table 4-1, six of the eleven test sites currently "approach or exceed" FHWA noise abatement criteria and seven sites are forecast to do so for both the future "build" and "no build" conditions. That is, even without the project, traffic noise levels will trigger HDOT noise abatement criteria through the year 2020.

The exterior-interior noise level reductions characteristic of naturally ventilated buildings generally range from 9 to 12 dB. Based on a reduction of 12 dB, the existing interior noise levels at the Jodo Mission and Maryknoll High School exceed 52 dBA which is the interior noise level for schools and churches cited in the Noise Abatement Criteria. By the year 2020, the projected interior noise level increases attributable to the project range from 0.1 to 0.3 dB and will not be perceptible.

Based on the findings of the environmental noise assessment, mitigation measures have been considered to reduce the long-term noise impacts occurring in the project vicinity. Among the alternatives, roadside acoustical barrier walls were considered - with a design objective of reducing noise levels by at least 5+ dB at the impacted locations. However, the minimum height and length of a noise barrier that would meet this objective would result in a wall that is both aesthetically unpleasing and impractical to construct. Therefore, acoustical barrier walls are no longer being considered for this project.

As an alternative method for mitigating traffic noise, the report recommends the installation of air conditioning in impacted buildings. Compared to naturally ventilated buildings, air conditioning is estimated to provide a traffic noise level reduction of 15 dB in building interiors.

The State considers the Jodo Mission Temple to be a highly noise sensitive structure. Based on the results of the acoustical study, the State will provide air conditioning for noise abatement within the temple building. The Jodo Mission will be responsible for all costs to maintain and operate the air conditioning system.

Regarding noise impacts to building interiors at Shriners' Hospital, specifically to the proposed orthotics facility, the State has completed a study of noise impacts to the planned facility. (See Appendix D, Environmental Noise Assessment, Punahou Off-Ramp Improvements, Honolulu, Hawaii.) Based on construction plans provided by Shriners' Hospital, the Study determined that traffic noise levels inside the future orthotics facility will be less than the State's recommended interior noise levels of 52 dBA. Abatement measures will therefore not be needed.

With regards to Maryknoll High School and Arcadia Residence, existing noise levels at those locations currently exceed abatement criteria. The proposed ramp widening will cause an increase in noise levels of only 1 dB. Because noise levels are already exceeded under existing conditions, and only a minor increase will result from the proposed improvements to the makai off-ramp, noise abatement will not be undertaken for Maryknoll High School and Arcadia Residence during this project. Noise abatement will be considered when improvements are made to the Punahou on-ramp on the mauka side of H-1, or during freeway widening.

The study also identified short-term noise impacts associated with the project. Construction of the proposed off-ramp expansion will involve excavating, grading, and paving. The various construction phases will likely generate significant noise which could impact nearby noise sensitive areas. The actual noise levels produced are dependent on the construction methods employed during each phase of the construction process. Earth moving equipment, such as diesel engine powered bulldozers, trucks, backhoes, front-end loaders, graders, etc., will probably be the noisiest equipment used during construction. However, as the noise will be temporary, no lasting impact due to the construction of the proposed project is expected. (Darby & Assoc., 1998).

Excessive noise levels generated by project activities will require that a general noise permit for daytime construction be filed with DOH, Noise and Radiation Branch. The provisions of the noise permit will require that contractors muffle all construction vehicles and machinery and maintain all noise attenuation equipment in good operating condition. Faulty equipment will be repaired or replaced.

4.1.3 Energy Impacts

Implementation of the Punahou Off-Ramp expansion would require the use of construction equipment, including bulldozers, trucks, graders, and other heavy equipment used to prepare or manufacture construction materials. This would result in higher short-term energy use compared to the no-action alternative. However, over the long run, construction of the Punahou Off-Ramp expansion would reduce total energy use.

If the off-ramp expansion is not built, the result would be increased traffic congestion on the off-ramp and on the approach lanes of the H-1 Freeway. Increased congestion, in turn, causes a reduction in average operating speeds and significantly lower fuel efficiency for vehicles caught in traffic. It is difficult to precisely estimate the amount of decrease in fuel efficiency, however, a general approximation can be derived by comparing the U.S. Environmental Protection Agency's "highway average" and its "miles per gallon" figure. The latter figure is more representative of in-town driving, characterized by stop and go traffic and periods of engine idling. Based on this standard, vehicle fuel consumption without the benefit of the project would be approximately one-third higher than if the project were built.

4.1.4 Floodplain Impacts

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate map (FIRM) of September 4, 1987, identifies the project site as lying within "Zone X", an area determined to be outside of the 500-year flood plain. This designation indicates the site is not likely to be subject to floods that would impact the project, nor will the project exacerbate conditions that would contribute to flooding. See **Figure 4-1, FEMA/FIRM Map.**

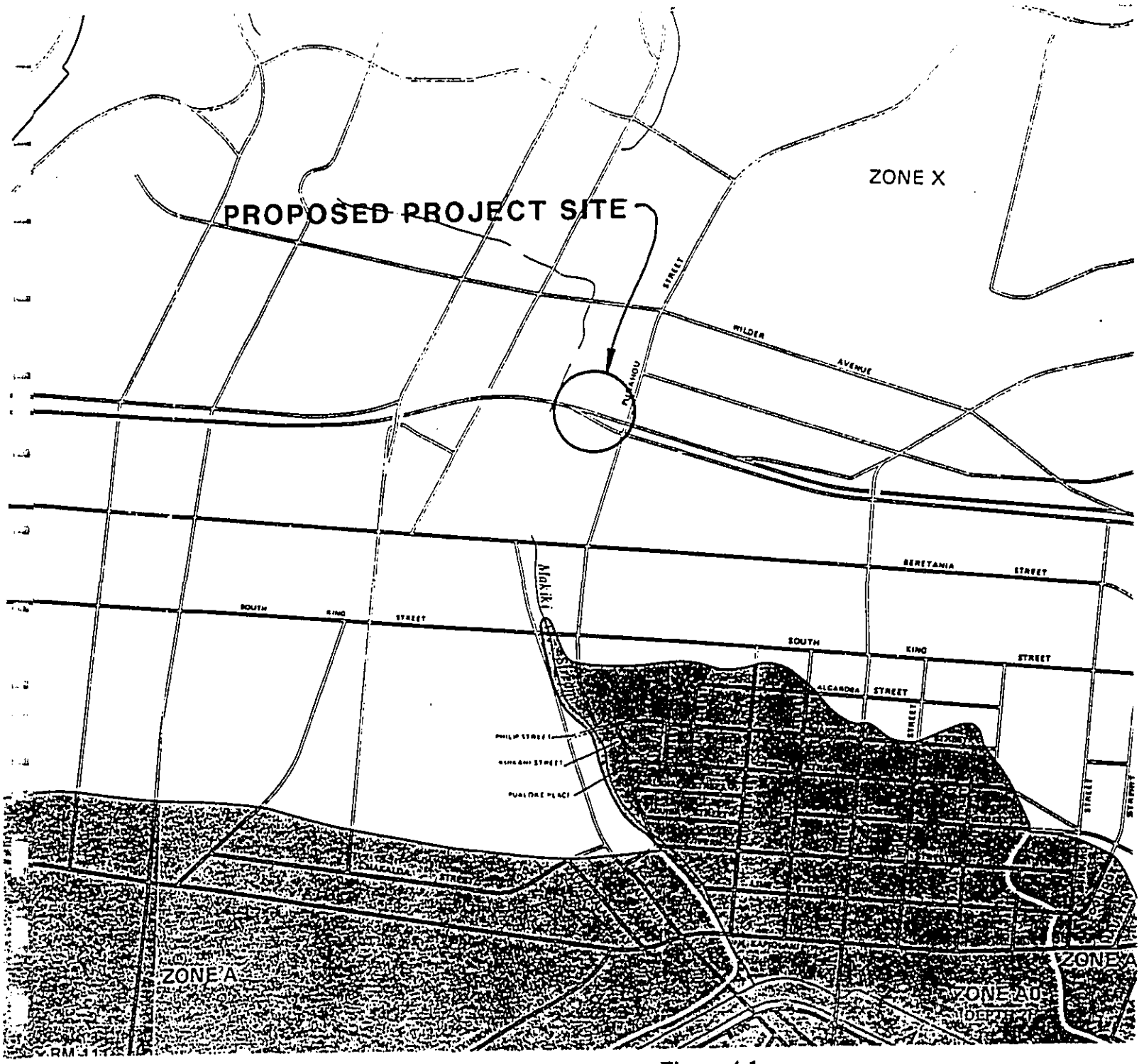

Figure 4-1
FEMA/FIRM MAP

ZONE X — AREA DETERMINED TO BE OUTSIDE OF 500-YEAR FLOOD PLAIN

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4.1.5 Wetlands

No wetland areas occur in the vicinity of the project site. Three wetland areas are identified in Honolulu District: Ka'au Crater, Paiko Lagoon, and seasonally within Diamond Head Crater. No adverse impacts to these wetlands are expected from project activities or increased traffic flow on the expanded Punahou Off-Ramp due to the great distance separating the project site from the wetlands.

4.1.6 Water Quality Impacts

No adverse impacts to water quality are expected from project activities or increased traffic flow on the expanded Punahou Off-Ramp. During the soils study prepared in conjunction with this Environmental Assessment, core samples taken at the project site to a depth of approximately 21.5 feet encountered no underground water sources (Geolabs, 1997). The underlying geological and hydrological features will be unaffected by surface grading and other construction work and no impacts to ground water flows are anticipated.

The only source of surface water in the area is the highly modified Makiki Stream, which passes under the H-1 Freeway and through the project site via an underground, cement box culvert. The current design of the off-ramp approach lane accommodates the box culvert without disruption or alteration. Project contractors will employ best management practices to control storm water runoff and prevent water pollution resulting from construction activities. Erosion control measures may include the use of berms, dikes, fiber mats, silt fence, netting, gravel, mulches, grass, and slope drains. Specific measures will be tailored to conform with site conditions and construction activities.

4.1.7 Threatened or Endangered Species

None of the flora or fauna known from the project site and vicinity are listed, proposed, or threatened and endangered species. (See Appendix E, Correspondence, U.S. Fish and Wildlife Service, November 25, 1997.) All species noted in section 3.1.6 are common and occur widely throughout Honolulu.

Given the above findings, the proposed project will not have a significant negative impact on botanical or faunal resources. Project activities might alter the local distribution of birds presently visiting the site, but will not impact the overall abundance of these species of Oahu. There are no reasons to impose restrictions, conditions, or impediments to the proposed project based on conditions or natural biological resources at the site. No mitigation measures are required or recommended for botanical and faunal resources.

4.1.8 Landscaping

On the Shriners' Hospital property, four trees (one plumeria, one mango and two pine) will be removed and six trees (one coconut, two shower and three poinciana) will be relocated to make room for the expansion. The six trees to be relocated will be integrated into the front landscape of the Shriners' Hospital. Additionally, a mock orange hedge growing along the existing off-ramp will be removed. A new hedge of salmon hibiscus will be planted along the border of the expanded off-ramp. No other trees or landscaping will be affected on the Shriners' property.

On the Jodo Mission property, six trees (five plumeria and one lemon tree) will be removed to accommodate the expansion. Additionally, a mock orange hedge running along the existing property boundary will be removed. In the preliminary landscape plan, twelve new allspice trees will be planted around the parking lot and adjacent to the mission building, and three additional trees of undetermined species will be added to the front landscape.

Over the course of the project, the preliminary landscape design may undergo some alteration with additional input from Shriners' Hospital, Jodo Mission, and from the landscape architect assisting with the design.

4.2 URBAN AND COMMUNITY IMPACTS

4.2.1 Social and Economic Impacts

The proposed Punahou Off-Ramp expansion is an integral component in the managed development of Honolulu's Primary Urban Center. The purpose and primary impact of the project will be to facilitate more efficient traffic flow of vehicles exiting onto Punahou Street.

Improved traffic flow will not, in its own right, put additional burden on the surrounding streets, but will accommodate projected increases in vehicle use associated with the growth of the urban population. Additionally, the expansion will help maintain a level of service that supports the local economic base as well as nearby economic development initiatives including the Hawaii Convention Center and redevelopment in surrounding communities. Short-term economic impacts from the proposed project will result primarily from construction jobs, services, and procurements in the form of construction supplies and equipment.

The project will not significantly change the character of the surrounding area: no zoning changes are required or presaged by the expansion. Aside from its function in meeting the demands of increased traffic, the potential social and economic effects of the expanded off-ramp are anticipated to be minimal.

In order to address any concerns associated with potential impacts to the local community, a series of meetings was held between September 1997 and January 1998 with community leaders, area residents, neighborhood boards, and reprcsentatives from other neighborhood organizations, including:

- Arcadia Retirement Residence
- Kapiolani Medical Center
- Jodo Mission
- Shriners' Hospital for Children
- Central Union Church
- Banyan Tree Plaza
- Maryknoll
- Surrounding Condominium Boards

The community participation process was conducted to help disclose any non-cost and non-technical issues early on in the development process so that they could be addressed during the planning stage and, if necessary, incorporated in the project design. Few concerns and no opposition to the proposed expansion was expressed at these meetings. No letters were received from area residents expressing concern.

4.2.2 Relocation Impacts

The proposed project site will require the acquisition of portions of property owned by the Shriners' Hospital and the Jodo Mission of Hawaii. Along the northwestern portion of the Shriners' Hospital parcel, the project site occupies a grassy area bordered with a hedge, chain link fence and retaining wall that abuts the existing Punahou Off-Ramp. Two maintenance/ utility structures are located within 5 feet of the existing retaining wall. One houses an incinerator that will be demolished and removed. The other supports dual cooling towers for the hospital. The cooling towers will be relocated to the existing parking lot on the east side of the main hospital building in order to allow construction of the proposed project. The relocation will require a shallow foundation system consisting of spread and/or continuous footings bearing on recompacted soils to support the utility structure at the relocated site.

On the Jodo Mission parcel, the area to be used for the expansion is currently occupied by a parking lot and a strip of landscaped space alongside the H-1 Freeway. Reconfiguration and restriping of the remaining parking space will prevent any functional loss due to the reduction in land area. No significant structures will be displaced due to the proposed expansion.

4.2.3 Land Use Impacts

The proposed Punahou Off-Ramp expansion is being developed as part of a long-range strategy consistent with existing State and County land use plans for the region. The project will require no land use zoning changes and is not expected to be a stimulus to unexpected growth. The off-ramp improvements would meet the needs of anticipated urban growth and help make it possible to realize the objectives of existing public and private plans. In contrast, the "no-action" alternative would not support existing land use policies in that it would fail to maintain the necessary level of urban infrastructure service in line with traffic increases.

The proposed project does require the acquisition of portions of land makai of the existing off-ramp. Approximately 9,720 square feet will be acquired from property owned by the Shriners' Hospital for Children (TMK# 2-4-07:01), and 3,600 square feet will be taken from the Jodo Mission of Hawaii (TMK# 2-4-09:06).

4.2.4 Surface Street Impacts

Traffic volumes on the Punahou Off-Ramp and in the vicinity of the project site are projected to increase as the result of population growth, increased activity surrounding the Hawaii Convention Center, and other developments in the area. The Punahou Off-Ramp expansion is proposed as one step towards accommodating these increases by facilitating more efficient traffic flow exiting east-bound H-1 onto south-bound Punahou Street.

Potentially problematic burdens on the surrounding surface streets, and particularly at intersections along Punahou Street, can be expected from the projected traffic increases. The intersection at Punahou and Beretania may experience increased conflicts between makai-bound right-turn movement and mauka-bound left-turn movement onto Beretania. Similarly, left-turn stacking of makai-bound traffic at Punahou and King Street may increase. HDOT will coordinate traffic light synchronization with the City and County Department of Transportation Services (DTS) to mitigate potential surface street intersection problems. Further, levels of service on the surrounding surface streets, and particularly at intersections along Punahou Street, will be closely monitored by HDOT in conjunction with input from the community. This information will provide the basis for future proposed roadway improvements.

The widening of the eastbound off-ramp will also affect vehicular access to the Shriners' Hospital. The project will physically locate the right lane of the off-ramp closer to the driveways. The project will also increase the radius of the right turn movement from the off-ramp onto makai-bound Punahou Street, alleviating some of the existing delay caused by vehicles slowing to execute a tight right turn. These factors combine to reduce the time that a vehicle making the right-turn from the off-ramp will be visible to a driver exiting the Shriners' site.

However, conditions for users of the driveway would be better with the proposed project than without the project. If the project is not constructed, the existing signal phasing would have to be modified to accommodate the projected increase in traffic volumes. These modifications would include extending the duration of the free right turn from the ramp provided by the right arrow

and lengthening the signal cycle. While these measures would increase vehicular capacity, they would also increase delays to drivers exiting Shriners' Hospital.

With the proposed project, the signal would be operated in such a way that right turns from the ramp are not permitted when the makai-bound Punahou Street traffic has a green light. This phasing would permit shorter traffic signal cycle lengths and would create more gaps in traffic for cars exiting Shriners' driveways. It would also allow makai-bound traffic on Punahou Street to get into the curb lane fronting the hospital, facilitating entry into the Shriners' site. For these reasons, no mitigation measures are considered necessary. (See Appendix B, Interstate Route H-1, Punahou Off-Ramp Improvements, Effect on Driveways to Shriners' Hospital).

4.2.5 Considerations Relating to Pedestrians and Bicyclists

The flat terrain and mild climate of Honolulu make it well suited for walking and bicycling. In the vicinity of the project site, sidewalks are generally broad, and the open space provided by the front lawns of the Shriners' Hospital for Children and the Central Union Church create a pleasant setting for pedestrians. Mauka of the freeway, sidewalks along Punahou Street are narrower and are disrupted by uneven paving and numerous driveways. Nevertheless, the area is generally well-used by pedestrians, primarily area residents and school children. Bicyclists, though discouraged by heavy motor-vehicle traffic and lack of shoulder striping along area streets, do make use of Punahou Street, Wilder Avenue, and Beretania as primary transportation corridors.

The proposed off-ramp expansion would improve the flow of vehicle traffic onto both mauka- and makai-bound Punahou Street. Traffic exiting from H-1 is, however, regulated by the signalized intersection at Punahou and Bingham Streets. The intersection would be reconfigured to accommodate the expansion. Pedestrians and bicyclists on Punahou Street would experience little change from existing conditions.

4.2.6 Visual Impacts

Visual impacts associated with the construction and use of the proposed off-ramp expansion are discussed in terms of short-term and long-term effects.

4.2.6.1 Short-Term Impacts

Short-term impacts associated with the project primarily relate to construction activities. Temporary signage, nighttime lighting, the presence of heavy construction equipment and ongoing modifications to the existing landscape will all create short-term impacts on the visual setting surrounding the project site. Construction activities will be apparent from the H-1 corridor and from various city streets in the area, including segments of Punahou, Makiki, and Keeaumoku Streets. The project site will also be visible from buildings and homes in the vicinity, including the Jodo Mission, the Shriners' Hospital, Kapiolani Medical Center, Maryknoll School, and several homes adjacent to the H-1 Freeway. Visual impacts related to construction activities are temporary in nature, however, and not considered significant.

4.2.6.2 Long-Term Impacts

The expanded off-ramp will result in long-term visual impacts in the form of a permanent additional lane and expanded paved area over what is now landscaped terrain. Most of the off-ramp expansion will be visible only from areas immediately adjacent to the roadway. Landscaping of the project area following the expansion will help soften the visual effects. In general, the appearance of the new exit lane would be similar to the visual impact created by the existing off-ramp and would not detract significantly from existing views.

4.3 HISTORIC AND ARCHAEOLOGICAL PRESERVATION IMPACTS

4.3.1 Overview

The Historic Preservation Division of the Department of Land and Natural Resources (DLNR), State of Hawaii, was contacted for information regarding any significant historic or archaeological features within the project area. DLNR specialists in architecture and archaeology reviewed project plans and a map of the project site to assess the potential for project-related impacts to any cultural resources at or near the site.

4.3.2 Findings

No known archaeological sites exist in the project area, however, several buildings in the vicinity are of historic importance. According to DLNR, Central Union Church, Jodo Mission, and the First Church of Christ, Scientist, are all eligible for listing on the State and National Registers of Historic Places. (See Appendix E, Correspondence, DLNR, December 12, 1997.) None of these buildings, however, have yet undergone a complete review for listing. At present, Punahou School is the only area facility officially recognized by the State and Federal government for its historic content. The entire Punahou School campus is listed on the National Register of Historic Places.

4.3.3 Impact of Proposed Action

Of the significant buildings in the vicinity, only the Jodo Mission would be directly affected by the proposed expansion, as the project requires the acquisition of a portion of Mission property. The Jodo Mission has historical and cultural importance as a local site of the annual Bon Dance Festival, which is held on the front lawn of the Mission grounds. Bon Dance originated in Japan as a traditional community festival to honor the dead and mark the beginning of harvest season. In Hawaii, it is a significant celebration of Japanese heritage and identity, a reminder of the contributions Japanese residents have made to Hawaii, and an occasion of community gathering shared by all of Hawaii's ethnic groups.

During the preliminary design phase of project development, several alternative off-ramp alignments were assessed in order to minimize property takings and avoid encroachment on the lawn area used for the Bon Dance. The proposed project design claims approximately 3,600 square feet of Jodo Mission property and includes a portion of the driveway and a strip of landscaped space alongside the H-1 Freeway. The entire lawn area and site of the Bon Dance is avoided in the design.

Under consultation with DLNR, Historic Preservation Division, it has been determined that the proposed project design will have "no effect" on any historic or cultural resources at the Jodo

Mission or other buildings in the area (See Appendix E, Correspondence, DLNR, State Historic Preservation Division, December 12, 1997.) Additionally, based on DLNR's review of the project plans, and on the extensively modified condition of the project area, it has been determined that the proposed off-ramp improvements will not adversely impact any archaeological resources. DLNR's determination of "no effect" satisfies Section 106 consultation requirements.

There is always the possibility that previously unknown or unexpected subsurface cultural features, deposits, or burials may be encountered. To ensure that no subsurface cultural features will be destroyed during project construction, all work within the project area will be monitored. In the unlikely event that archaeologically significant remains are encountered, work will cease in the immediate area and the DLNR, State Historic Preservation Division would be notified at (808) 692-8029 to determine significance and treatment of any findings.

CHAPTER 5
RELATIONSHIP TO LAND USE POLICIES AND CONTROLS OF THE AFFECTED AREA

5.1 RELATIONSHIP TO OTHER POLICIES AND LAND USE PLANS

Several State and County policy plans and land use plans and controls are relevant to the proposed project. These are discussed below in two general categories: policy plans and land use plans.

5.1.1 Policy Plans

5.1.1.1 Hawaii State Plan

The Hawaii State Plan, adopted in 1978, consists of three parts:

(1) an overall theme together with broad goals, objectives, and policies;
(2) a system designed to coordinate public planning to implement the goals, objectives, and policies of the State Plan;
(3) priority guidelines which are statement of Statewide interrelated problems deserving immediate attention.

Three broad goals in the areas of the economy, the physical environment and the physical, social and economic well-being of the people express the ideal end-states of the State Plan. The Punahou off ramp project is consistent with the objectives and policies for a state system of transportation.

The improvement to the H-1 Freeway Punahou Off-Ramp was first proposed three years ago to meet East Honolulu's future transportation needs. The widening of the off ramp is needed to insure that growth in Honolulu occurs in an orderly pattern, consistent with State planning objectives, and to insure that through traffic moves efficiently off the H-1 Freeway and into destinations including Waikiki and the Hawaii Convention Center.

The proposed highway improvements will be financed under the Federal Aid Highway Program with 75 percent of the funds contributed by the Federal Department of Transportation and 25 percent contributed by the State of Hawaii. Community needs, environmental concerns and cultural resources are considered in the Environmental Assessment and design process. The Punahou off ramp project supports the State Plan's general objectives and policies for transportation.

5.1.1.2 State Functional Plans

The State functional plans are intended to provide more detail to the State Plan. They serve to guide State and County actions under specific functional topics of governance. The functional plans relevant to the Punahou off ramp project are the Transportation Plan and Tourism Plan. Applicable objectives and policies from these plans are discussed below.

Transportation

Objective I.A: Expansion of the transportation system.

Policy I.A.1: Increase transportation capacity and modernize transportation infrastructure in accordance with existing master plans and laws requiring accessibility for people with disabilities.

Policy I.A.2: Improve regional mobility in areas of the State experiencing rapid urban growth and road congestion.

The Punahou Off-Ramp expansion is proposed to alleviate congestion on the H-1 Freeway and Punahou exit, and to accommodate projected increases in vehicular traffic to the year 2020. The project is being conducted in compliance with existing state and county master plans.

Objective II.A: Development of a transportation infrastructure that supports economic development initiatives.

Policy II.A.1: Support State economic development initiatives.

Policy II.A.2: Support tourism and economic development.

In addition to providing an improved level of service to area residents, the expansion of Punahou Off-Ramp will result in a more efficient flow of traffic from eastbound H-1 to tourist destinations in Waikiki, the new Hawaii Convention Center, and Ala Moana Shopping Center. Improved access will make these destinations more attractive to visitors and residents alike, and, in this fashion, will serve to support their general economic vitality.

Tourism

Objective I.A: Development, implementation and maintenance of policies and actions which support the steady and balanced growth of the visitor industry.

Policy I.A.1: Identify and ensure a rate of industry growth that is consistent with the social, physical and economic needs of the residents and the preservation of Hawaii's natural environment.

Objective II.A: Development and maintenance of well-designed visitor facilities and related developments which are sensitive to the environment, sensitive to neighboring communities and activities, and adequately serviced by infrastructure and support services.

Policy II.A.1: Maintain high standards of overall quality of existing visitor destination and attraction areas.

Developments supporting the visitor industry, such as the new Hawaii Convention Center and proposed redeveloped retail areas in Waikiki, require infrastructure support that is both convenient and efficient. The Punahou Off-Ramp expansion is consistent with this objective in facilitating the flow of traffic from eastbound H-1 Freeway to Honolulu's premier tourist destinations of Waikiki, Ala Moana, and the new Hawaii Convention Center.

5.1.1.3 State Land Use Commission

The proposed project site is located within the State Urban District, thus it is subject to zoning regulations under the City and County of Honolulu Land Use Ordinance.

5.1.1.4 City and County of Honolulu General Plan

The General Plan for the City and County of Honolulu provides a statement of the long-range social, economic, environmental, and design objectives for the general welfare and prosperity of the people of Oahu. Using a 20-year time horizon, broad policies are also specified to facilitate attainment of the objectives of the Plan. The Punahou Off-Ramp expansion will be consistent with the following objectives and policies of the General Plan:

Population

Objective B: To plan for future population growth.

Policy 1: Allocate efficiently the money and resources of the City and County in order to meet the needs of Oahu's anticipated future population.

Objective C: To establish a pattern of population distribution that will allow the people of Oahu to live and work in harmony.

Policy 1: Facilitate the full development of the Primary Urban Center.

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.

Policy 5: Improve roads in existing communities to reduce congestion and eliminate unsafe conditions.

Objective D: To maintain transportation and utility systems which will help Oahu continue to be a desirable place to live and visit.

Policy 1: Give primary emphasis in capital-improvement program to the maintenance and improvement of existing roads and utilities.

Policy 4: Evaluate the social, economic, and environmental impact of additions to the transportation and utility systems before they are constructed.

Physical Development and Urban Design

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

Objective B: To develop Honolulu (Waialae-Kahala to Halawa), Aiea, and Pearl City as the Island's primary urban center.

5.1.2 Land Use Plans

5.1.2.1 City and County of Honolulu Development Plans

The Development Plans help to implement the objectives and policies of the General Plan by providing relatively detailed development schemes for geographical regions of the island. The Development Plan Land Use Maps depict land use patterns which are consistent with the objectives and policies of the General Plan.

The Punahou Off-Ramp Expansion project site is located within the Primary Urban Center (PUC) Development Plan. The PUC is the most populated region in the State of Hawaii and is Oahu's largest employment center. The PUC Land Use Map designates the land proposed for the expansion as Public Facilities. Roadway improvements are acceptable under such designation when required to meet a public need.

The Development Plan Public Facilities Map identifies public and private proposals for improvements and additions to the streets and highway system. The Development Plan Public Facilities Map for the PUC designates the prosed project site as "Improvements within existing right of way". This designation is compatible with the objectives of the proposed expansion.

5.1.2.2 City and County of Honolulu Land Use Ordinance

The City and County of Honolulu Land Use Ordinance (LUO) regulates land use in accordance with adopted land use policies, including the Oahu General Plan and the City and County of Honolulu Development Plans.

The proposed Punahou Off-Ramp expansion will require the acquisition of portions of land makai of the existing off-ramp that are currently owned by the Shriners' Hospital for Children (TMK # 2-4-07:1) and the Jodo Mission of Hawaii (TMK# 2-4-09:6). Both of these parcels are currently zoned A-2: Apartment, Medium-Density. Following acquisition, the parcel will not require rezoning.

5.1.2.3 City and County of Honolulu Special District Design Guidelines

The City and County of Honolulu, Department of Land Utilization (DLU) was contacted for guidance regarding Special District permit requirements. After reviewing project plans, it was determined that although the proposed project site is partially located within the Punchbowl Special District, grading, construction, and landscaping for the expansion will be undertaken on land currently outside of the Punchbowl Special District boundary. Therefore, a Special District Permit is not required (personal communication, Tony Ching, DL, December 17, 1997). Following completion of the off-ramp expansion, DL will redraw the Punchbowl District boundary to reflect the new property lines.

CHAPTER 6

NECESSARY PERMITS AND APPROVALS

6.1 STATE OF HAWAII

6.1.1 Department of Health

Excessive noise levels generated by project activities will require that a general noise permit for daytime construction be filed with DOH, Noise and Radiation Branch. The provisions of the noise permit will require that contractors muffle all construction vehicles and machinery and maintain all noise attenuation equipment in good operating condition. Faulty equipment will be repaired or replaced.

6.1.2 Department of Transportation - Highways Division

Permission from the Department of Transportation, Highways Division for conducting work in State Highways is required before work within the H-1 corridor can commence.

6.2 CITY AND COUNTY OF HONOLULU

6.2.1 Department of Land Utilization

The City and County of Honolulu, Department of Land Utilization (DLU) was contacted for guidance regarding Special District permit requirements. After reviewing project plans, it was determined that although the proposed project site is partially located within the Punchbowl Special District, grading, construction, and landscaping for the expansion will be undertaken on land currently outside of the Punchbowl Special District boundary. Therefore, a Special District Permit is not required (See Appendix E, Correspondence, City and County of Honolulu, Department of Land Utilization, December 17, 1997).

CHAPTER 7

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

Development of the proposed project will commit the necessary construction materials, human effort, and fiscal resource. Use of these resources will benefit residents and visitors to the City and County of Honolulu by improving transportation flow on eastbound H-1 and improving access to Waikiki and the newly constructed Hawaii Convention Center.

Long-term gains resulting from the proposed project include maintaining a satisfactory level of service on the H-1 Freeway and Punahou Off-Ramp to meet projected increases in traffic to the year 2020. Additionally, Hawaii's visitor economy will benefit from improved access to neighboring communities and the Hawaii Convention Center.

CHAPTER 8
IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Development of the proposed project will involve the irretrievable loss of certain environmental and fiscal resources. However, the costs associated with the use of these resources should be evaluated in light of recurring benefits to the residents of Honolulu.

It is anticipated that the construction of the proposed project will commit the necessary construction materials and human resources (in the form of planning, engineering, construction and labor). Reuse for much of these resources is not practicable. Although labor is compensated during the various stages of development, labor expended for project development is non-retrievable.

CHAPTER 9
ORGANIZATIONS AND AGENCIES CONSULTED DURING DEA PREPARATION AND 30-DAY COMMENT PERIOD

9.1 FEDERAL AGENCIES

U.S. Department of Agriculture - Soil Conservation Service

U.S. Department of the Interior - Fish and Wildlife Service

U.S. Department of Transportation - Federal Highways Administration

9.2 STATE AGENCIES

Department of Accounting and General Services

Department of Business, Economic Development, & Tourism

Department of Health

- Noise and Radiation Branch

Department of Land and Natural Resources

- State Historic Preservation Division

Department of Transportation - Highways Division

Land Use Commission

Office of the Governor

University of Hawaii - Environmental Center

9.3 CITY AND COUNTY OF HONOLULU

Department of Land Utilization

Department of Public Works

Department of Transportation Services

Planning Department

9.4 OTHER PRIVATE ORGANIZATIONS AND ELECTED OFFICIALS

9.4.1 Private Organizations

Arcadia Retirement Residence

Kapiolani Medical Center

Jodo Mission of Hawaii

Shriners' Hospital for Children

Central Union Church of Honolulu

Banyan Tree Plaza (Certified Management, Inc.)

Maryknoll School

Punahou-Wilder Condominium

Punahou Regency Condominium

Palo Alto Condominium

The Jason Apartments

Alexander Arms

Punahala Condominium

1511 Punahou Street Condominium

The Limtiaco Group

9.4.2 Elected Officials

State Senator Carol Fukunaga - 12th District, Makiki-Tantalus

State Representative Sam Aiona - 24th District, Makiki-Tantalus

CHAPTER 10
DETERMINATION

10.1 OVERVIEW

In accordance with the provisions set forth in Chapter 343, Hawaii Revised Statutes, and in Section 11-200-12 of Title 11, Chapter 200, Hawaii Administrative Rules (HAR), the proposed Punahou Off-Ramp expansion has been assessed for short- and long-term and cumulative effects on the environment.

10.2 SIGNIFICANCE CRITERIA

Significance criteria set forth in Section 11-200-12 of Title 11, Chapter 200 HAR were used to evaluate the potential impacts of the proposed project on the environment. The thirteen criteria are listed below along with a brief discussion.

Criteria 1. Involves an irrevocable commitment to loss or destruction of any natural or cultural resource;

An assessment of flora and fauna, and historic and archaeological sites at and near the project area found no presence of natural or cultural resource that would be jeopardized by the proposed off-ramp expansion. According to DLNR, several buildings in the vicinity of the project are eligible for listing on the State and National Registers of Historic Places, however, under consultation with DLNR, Historic Preservation Division, it has been determined that the proposed project design will have "no effect" on any historic or cultural resources (See Appendix E, Correspondence, DLNR, State Historic Preservation Division, December 12, 1997.) DLNR's determination of "no effect" satisfies Section 106 consultation requirements.

Criteria 2. Curtails the range of beneficial uses of the environment;

The proposed expansion is located primarily within the existing traffic corridor. Minor encroachment on adjoining land will not detract from the function or use of the remaining area of those parcels.

Criteria 3. Conflicts with the State's long-term environmental policies or goals and guidelines as expressed in chapter 344, HRS;

The project proposal has been prepared according to State and County guidelines, plans, and policies and has been found to be in compliance with all relevant provisions.

Criteria 4. Substantially effects the economic or social welfare of the community or State;

The proposed expansion is expected to have little effect on the social and economic environment. In general, the expansion will serve to meet the level of service needs for transportation infrastructure required by area residents and businesses.

Criteria 5. Substantially affects the public health;

Factors affecting public health, including air quality, water quality, and noise levels, were assessed according to various project scenarios and determined to be only minimally affected or unaffected by the construction and use of the expanded off-ramp.

Criteria 6. Involves substantial secondary impacts, such as population changes or effects on public facilities;

The proposed project will not, in its own right, stimulate unexpected change in the population, but will accommodate projected increases in vehicle use associated with expected growth of the urban population.

Criteria 7. Involves a substantial degradation of environmental quality;

Analysis of air and water quality, noise levels, and land use associated with the construction and use of the off-ramp expansion has determined that the proposed project will not substantially degrade environmental quality.

Criteria 8. Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions;

In response to existing and projected demand, the proposed project is being developed to improve regional mobility in an area experiencing growth and road congestion. The proposed expansion is a component of the State and County commitment to maintain a safe and efficient transportation infrastructure, but will not, of itself, involve a commitment for larger actions.

Criteria 9. Substantially affects a rare, threatened, or endangered species, or its habitat;

An investigation of flora and fauna in the project vicinity discovered no species that are listed as rare, threatened, or endangered by the State or Federal government. Urban development and intensive modifications in the project area have long since replaced all remnants of native habitat.

Criteria 10. Detrimentally affects air or water quality or ambient noise levels;

Analysis of air and water quality, and ambient noise levels associated with the construction and use of the expanded off-ramp have determined that effects to these environmental measures will be minimal or temporary.

Criteria 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;

The project site is located inland from any coastal waters within an area determined by the Federal Emergency Management Agency to be outside of the 500-year flood zone. Soils in the area are classified as well-draining with no more than slight erosion hazard, thus, the project is not likely to affect of suffer damage from natural forces.

Criteria 12. Substantially affects scenic vistas and view planes identified in County or State plans or studies; or,

Though the project site is located within the Punchbowl Special Design District, it does not intrude upon view planes identified within the guidelines for this area. The appearance of the

new exit lane would be similar to the visual impact created by the existing off-ramp and would not detract significantly from existing views. Visual impacts associated with construction activities will be temporary.

Criteria 13. Requires substantial energy consumption.

Construction activities associated with the off-ramp expansion would require high, short-term energy use, however, reduced traffic congestion resulting from the project would translate into better fuel efficiency for vehicles and greater energy savings over the long run.

10.3 FINDINGS

In accordance with the provisions set forth in Chapter 343, Hawaii Revised Statutes, and the significance criteria in Section 11-200-12 of Title 11, Chapter 200, this assessment has determined that the project will have no significant adverse impact to water quality, air quality, existing utilities, noise levels, social welfare, archaeological sites, or wildlife habitat. All anticipated impacts will be temporary and will not adversely impact the environmental quality of the area.

Based on analysis and review of the above factors, it has been determined that an Environmental Impact Statement (EIS) will not be required, and that a Finding of No Significant Impact (FONSI) is being considered for this project.

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APPENDICES

APPENDIX A

Traffic Analyses for Improvements to H-1 Punahou Off-Ramp

Traffic Analyses for
Improvements to H-1 Punahou Off-ramp
Honolulu, Hawaii

Draft September 24, 1997

The State of Hawaii Department of Transportation - Highways Division has proposed to construct improvements to the eastbound off-ramp from Interstate Route H-1 to Punahou Street (Figure 1). This improvement is needed to improve operating conditions at the off-ramp. This traffic analyses report reviews existing traffic conditions at the ramp, assesses future conditions for the year 2020, and provides recommendations for improvements at the off-ramp. Other improvements beyond the scope of this project that are indicated by the analyses will also be identified.

Introduction

The Punahou Off-ramp is one of the busiest single-lane ramps on the freeway system in Hawaii. In 1996, an average weekday flow of 29,100 vehicles was counted[1]. Flow rates greater than 1,400 vehicles per hour were counted continuously from 6:00 AM to 5:30 PM, and from 6:00 PM to 7:15 PM. Counts taken in September 1997 at the intersection of the off-ramp and Punahou Street show similar results for the off-ramp, with an average volume of 28,355 vehicles per day and flow rates exceeding 1,400 vehicles per hour from 5:45 AM to 5:15 PM and 6:30 PM to 8:00 PM (count summary appended).

The Punahou off-ramp is at the end of a weaving section created by a single-lane on-ramp from Piikoi Street. The weave section, which totals four lanes wide with the inclusion of three through lanes of the H-1 Freeway, is estimated to carry 102,000 vehicles per day. The off-ramp widens to three lanes on its approach to Punahou Street, where a traffic signal controls movements. The eastbound approach from the off-ramp consists of a left turn only lane, an option lane for left turns and through traffic to Bingham Street, and a right turn only lane. The ramp was widened by one lane in 1984.

Bingham Street is a one lane street departing the intersection to the east. It serves the Kapiolani Medical Center and the residential area south of the H-1 Freeway. Punahou Street is a major north-south collector street, connecting to Manoa Road as one of two entrances into the Manoa Valley. Between the H-1 Freeway and Manoa Road, Punahou Street serves the lower Makiki area, consisting of single family homes, low rise apartments, high rise condominium buildings, and numerous private schools, including Punahou School and Maryknoll Schools.

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1 State of Hawaii, Department of Transportation, Highways Division. *Traffic Survey Data, Island of Oahu - 1996* (Station H1-23B, October 30-31, 1996).

Improvements on the ramp to increase the storage capacity for the right turn movement onto Punahou Street have been recommended to improve access to Waikiki[2]. The traffic analyses that were done quantifies the requirements for these improvements. As part of these analyses, traffic count data were evaluated, counts were taken in the field, other field observations were made, other planning documents related to traffic were reviewed, and future traffic assignments were developed. Several alternatives were developed and freeway capacity analyses, weaving and ramp analyses, and intersection analyses were used to evaluate the alternatives. The freeway, weaving, and ramp analyses used procedures described in the *Highway Capacity Manual-Third Edition*[3]; intersection analyses to determine the adequacy of the number of approach lanes provided were based on the Planning Application described in the 1985 *Highway Capacity Manual*[4]. Finally, recommendations for the project were developed and other improvements beyond the scope of this project were identified.

Existing Conditions

The H-1 Freeway is the primary roadway carrying traffic in the east-west direction through Honolulu. The freeway has a basic section of six lanes, three in each direction; supplemental lanes added at various locations at on-ramps which drop off at the next off-ramp create weave sections. The Piikoi on-ramp and Punahou off-ramp create such a weave section on the eastbound lanes of the freeway.

Record plans show the weave section to be 1,260 feet long, measured from the point where the left edge of the on-ramp and the right edge of the through lanes are two feet apart to the nose of the crash barrier separating the through lanes and the off-ramp lane. The weave section consists of four lanes, varying in width from 11 feet to 12 feet. The left shoulder is four feet wide and the right shoulder varies in width from two feet to 18 feet. For the analyses, the weave section was described as four 11-foot lanes with 4-foot shoulders on both sides.

Traffic volumes for existing conditions (1997) were developed using machine counts taken over 48-hour periods in the fall of 1996 at three locations[5]. The averages of counts taken on two days at each location for each 15-minute period were increased by 1% to represent typical volumes. Four peak hours were identified for consideration: two during the morning (AM) peak period and two during the afternoon (PM) peak period. In each case, one peak hour occurs with the highest total volume in the weave section (hours

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2 Kaku Associates. *Waikiki Regional Traffic Impact Plan, Summary Report*, December, 1995. p.43.

3 Transportation Research Board Special Report 209. *Highway Capacity Manual - Third Edition.* October, 1994.

4 Transportation Research Board Special Report 209. *Highway Capacity Manual.* 1985.

5 State of Hawaii, Department of Transportation, Highways Division. *Traffic Survey Data, Island of Oahu - 1996* (Stations H1-23A & H1-23B, October 30-31, 1996; Station H-624-A: movement 5, December 4-5, 1996).

ending 8:00 AM and 6:00 PM); the second peak hour has the highest potential weaving volumes (combination of on-ramp and off-ramp volumes, hours ending 8:15 AM and 5:15 PM). Figure 2 shows the traffic assignments for the peak hours.

The traffic count data do not include the number of weaving movements. However, field observations show that the number of vehicles entering from the Piikoi on-ramp and leaving on the Punahou off-ramp is small. Two weaving assignments, identified as "Case 1" and "Case 2", were made for each peak hour. Case 1 assumed that all of the traffic which came on from Piikoi Street changed lanes to the through lanes and continued on H-1 past Punahou Street. Case 2 was developed assuming that the proportion off-ramp users from Piikoi Street was equal to the proportion of traffic in the weave section from that ramp. The actual existing weaves should be between these cases.

Weaving analyses were conducted for each case, assuming that the weave section operated without influence from the traffic signal at the intersection of the off-ramp and Punahou Street. The weaving analyses use equations to calculate the running speeds for non-weaving and weaving traffic and the number of lanes needed to serve the weaving; these equations are valid within specified ranges of the length of the weaving area, the total flow rate, the volume of weaving traffic, and ratios of traffic volumes.

Levels of service are determined from these calculated speeds; the operation of the weave section is classified as "unconstrained" or "constrained" depending on the width needed and the type of weave section. The existing ramp lane configuration is considered a "Type A" weave section, in which the maximum lanes available for weaving is 1.40. In each case evaluated, the number of lanes needed for weaving exceeded 1.40, and the operation is constrained. The weaving analyses. however, may not be applicable because the equations are valid for a maximum weaving volume of 1,800 passenger cars per hour; this volume was exceeded in all cases. Further, queues from the intersection often back onto the through lanes of the freeway and resulting in forced flow. Nevertheless, the analyses results do provide a means of evaluating the weave section. Table 1 summarizes the speeds and levels of service for each peak hour.

Table 1
EXISTING CONDITIONS - WEAVE SECTION

	Highest Total Volume			Highest Weave Volume		
Speed (mph), LOS	Case 1	Case 2	Averaged	Case 1	Case 2	Averaged
AM Peak Hour						
non-weaving	45 D	47 D	46 D	45 D	46 D	45 D
weaving	34 F	35 E	34 F	34 F	35 E	34 F
PM Peak Hour						
non-weaving	44 D	46 D	45 D	46 D	47 D	46 D
weaving	33 F	35 E	34 F	34 F	35 E	34 F

As shown in Table 1, existing peak hour conditions are poor, with constrained conditions and poor levels of service for weaving traffic.

On eastbound H-1 before the Piikoi on-ramp, three 12-foot lanes are provided on a viaduct structure, with 4-foot shoulders on the left and 6-foot shoulders on the right. For the level conditions, trucks and other vehicles in the traffic stream have little impact to traffic flow; however, they do take more space and need to be considered. Using 2% trucks in the AM Peak Hour and 1% trucks in the PM Peak Hour[6], the maximum volumes for desirable Level of Service D conditions are 5,360 vehicles per hour in the AM peak period and 5,390 vehicles per hour in the PM Peak Period. As shown in Figure 1, these service volumes are exceeded and Level of Service E describes existing peak hour conditions on the viaduct.

A review of the traffic estimates for the typical day in 1996 (average of two days' counts) show Level of Service E conditions on the eastbound lanes on the viaduct for the periods 6:45 AM to 8:15 AM, 8:45 AM to 9:15 AM, and 2:15 PM to 7:15 PM.

Traffic volumes at the intersection of the off-ramp and Punahou Street are shown in Figure 3. Three peak hours were identified: the AM Peak Hour when commuting traffic and school traffic occur simultaneously, an early afternoon peak hour at the completion of the school day, and a later afternoon peak hour which consists of commuting traffic.

The analyses indicate that the existing approach laneage and signal phasing at the intersection serves existing volumes at desirable "under" capacity conditions in the AM Peak Hour and marginal "near" capacity conditions in both PM Peak Hours. Table 2 summarizes the results of the analyses (if the sum of critical movements is 1,200 or less, conditions are described as "under" capacity; between 1,201 and 1,400, "near" capacity; and greater than 1,400, "over" capacity).

Table 2
EXISTING INTERSECTION CONDITIONS

	AM Peak Hour	PM Peak Hour (early)	PM Peak Hour (later)
Sum of critical movements	1,108	1,207	1,228
condition (... capacity)	under	near	near
Right turn lane (assumed g/c=0.83)	1,059	1,359	1,081
condition (... capacity)	under	near	under

6 State of Hawaii, Department of Transportation, Highway Planning Branch. *Traffic Summary, Island of Oahu - 1995.*

The results shown in Table 2 indicate that acceptable conditions occur during the morning peak hour; however, field observations indicate that the intersection does not operate efficiently due to queues from signalized intersections to the north (Punahou Street and Dole Street, and Punahou Street and Wilder Avenue). Existing conditions are marginal (low range of "near" capacity) during the PM peak hours.

A similar evaluation was conducted for each of the 15-minute periods of the day, using the average (of two days) traffic counted for each lane group. As indicated in the appendix, the main part of the intersection operates at "near" or "under" capacity conditions, with "near" capacity conditions occurring primarily during the afternoon. Volumes on the right turn lane, however, are at the "near" capacity level between 5:45 AM and 6:45 AM and between 8:00 AM and 3:45 PM.

Future Conditions

Traffic volumes at the Punahou off-ramp are expected to increase as the result of growth in population and other developments which attract traffic which must use the ramp. Housing projects near Young Street and the convention center that is currently under construction near Waikiki are specific examples of development projects which may affect traffic on the ramp. Other growth is expected to result in increases in traffic on other parts of the freeway system.

Rather than trying to piece together future traffic estimates to reflect the contribution of many little projects and overall growth, the rate of growth in traffic in the area east of downtown Honolulu was considered. Future traffic assignments were developed for the year 2020 using the Oahu Regional Transportation Plan[7] screenline projections for traffic across Ward Avenue. The screenline volumes indicate a 22.3% increase from 1990 to 2020; assuming compounding, the average rate of growth is 0.67% per year. Freeway volumes were increased at this rate. However, since traffic volumes on Punahou Street to and from the north and on Bingham Street to the east are not expected to increase since these areas are fully developed, increases in ramp traffic have been assumed to turn right onto Punahou Street. The future traffic assignments for year 2020 are shown in Figures 4 and 5.

Congested, over-capacity conditions would occur throughout the day with the expected increase in right turns from the Punahou off-ramp to Punahou Street. Peak hour critical movement sums would increase to as much as 1,900 vehicles per hour. Near capacity (greater than 1,200 vph) and over capacity (greater than 1,400 vph) conditions would occur between 5:30 AM and 5:30 PM, and between 6:30 PM and 8:00 PM, assuming that the existing distribution of traffic over the day continues.

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7 Kaku Associates. *Oahu Regional Transportation Plan, Final Report.* Table 2-6

In the analysis of freeway conditions, the limitations of the weaving analyses are exceeded, as was the case for 1996 volumes. Table 3 shows the results of the application of the weaving analyses. At the intersection of the off-ramp and Punahou Street, the main intersection would have critical movement sums similar to existing, since the volumes there do not change. However, the increases in right turn traffic would worsen the already poor conditions if the existing laneage is retained.

Table 3
FUTURE (2020) CONDITIONS - EXISTING WEAVE SECTION

	Highest Total Volume			Highest Weave Volume		
Speed (mph), LOS	Case 1	Case 2	Averaged	Case 1	Case 2	Averaged
AM Peak Hour						
non-weaving	44 D	45 D	44 D	43 D	45 D	44 D
weaving	32 F	33 F	33 F	32 F	33 F	33 F
PM Peak Hour						
non-weaving	42 D	44 D	43 D	44 D	46 D	45 D
weaving	32 F	33 F	32 F	32 F	33 F	33 F

If no improvements are made to the eastbound H-1 in the vicinity of the Punahou off-ramp, the volumes on the viaduct would exceed the service volume for Level of Service E in all of the peak hours considered (6,760 vehicles per hour for the AM peak hours and 6,800 vehicles per hour for the PM peak hours). Level of Service F conditions would occur for the volumes projected from 6:45 AM to 8:00 AM and from 3:15 PM to 7:00 PM. Volumes exceeding the service volume for Level of Service D are projected for the all daylight hours (6:15 AM to 7:15 PM).

Possible Improvements

The proposed widening of the off-ramp from three to four lanes would permit restriping to provide two right turn lanes at Punahou Street. The second lane would increase the capacity for right turns, as well as increase the storage to reduce queueing onto the freeway. The right turn would be accommodated at under capacity conditions throughout the day. Table 4 summarizes the findings of the analysis of the intersection.

Table 4
INTERSECTION CONDITIONS (RIGHT TURNS)

	Existing	2020	2020
Right Turns: Number of lanes	1	1	2
Number of 15-minute periods			
Near Capacity Conditions	26	10	0
Over Capacity Conditions	9	46	0

Increased traffic on the freeway will require additional lanes on the freeway approaching the Punahou off-ramp. The existing 46 feet of width could be restriped for four 10-foot lanes with a minimal (1-foot) shoulder on the left side and a 5-foot wide shoulder on the right side. A second alternative would be restriping for four 11-foot lanes with minimal (1-foot) shoulders on both sides (in either case, field measurements need to be taken to verify the width of the viaduct and to ensure that no obstructions exist that would limit the restriping).

With the restriping to four lanes, the worst conditions for the future year 2020 would be Level of Service E instead of Level of Service F. However, long periods during which volumes would exceed the service volume for Level of Service D would still exist. Table 5 summarizes the service volumes for the existing laneage and the alternatives, and lists the number of 15-minute periods in which conditions would be worse than Level of Service D.

Table 5
FUTURE (2020) VIADUCT CONDITIONS

	Existing	Alternative	Alternative
Number of lanes	3	4	4
Lane width	12'	11'	10'
AM Peak Hour service volumes			
LOS D (pcph)	5,360	6,210	6,280
LOS E (pcph)	6,760	7,920	7,830
v/SV_D, peak hour	1.39	1.20	1.18
PM Peak Hour service volumes			
LOS D (pcph)	5,390	6,240	6,320
LOS E (pcph)	6,800	7,870	7,960
v/SV_D, peak hour	1.33	1.15	1.14
Number of 15-minute periods			
at LOS E	31	30	28
at LOS F	21	0	0

Poor conditions would also occur past the Punahou off-ramp. The projected peak hour volumes indicate Level of Service E conditions for each peak hour for the existing three 12-foot lanes under the Punahou Street bridge. The restriping to provide a fourth lane by narrowing the shoulders would improve levels of service on the freeway east of Punahou Street; however, Level of Service E would still occur.

The future laneage on the eastbound lanes of the freeway would be four lanes before (west of) the Piikoi on-ramp and three lanes after, or east of, the Punahou off-ramp. The four lanes to the west would be necessary for volumes projected for the segment between the Vineyard and Ward on-ramps (6,860 vehicles per hour in the AM Peak Hour). Since

the columns supporting the Keeaumoku Street bridge limit the width of the eastbound freeway lanes to four lanes, the ramp from Piikoi Street will merge with the fourth lane on the freeway.

The configuration of each alternative and the traffic volumes preclude the use of the weaving analyses described in the *Highway Capacity Manual*, since the limitations of the analyses are exceeded. The analyses procedures for merging and diverging traffic were used to evaluate the section between the Piikoi Street and the Punahou Street ramps.

The merge analysis procedure presented in the *Highway Capacity Manual* is based on estimates of the traffic volumes in the two lanes adjacent to the right shoulder. Equations based on field observations are provided; these equations are used to estimate the traffic volumes from freeway and ramp volumes and characteristics. The traffic volumes are used in other equations to determine the traffic density in the merging area, from which levels of service are determined.

For an assumed 700-foot long acceleration lane merging onto a four-lane freeway, the procedure shows Level of Service D or better conditions throughout the day. However, the ramp volumes exceed the range for which the procedure was developed during the morning peak period and between 9:45 AM and 7:15 PM; because the ramp volumes are so high, the level of service findings may not be valid. A review of the ramp and freeway volumes indicates that the merging traffic may have limited opportunities to enter the freeway.

The Punahou off-ramp terminates at a traffic signal; therefore, the free-flow speed of the ramp is less than 50 miles per hour. As indicated by Table 5-6 of the *Highway Capacity Manual - Third Edition*, a single lane ramp would not have the capacity to service the assigned peak hour volumes; therefore, a two-lane off-ramp will be needed. Figure 6 illustrates two possible alternatives which would satisfy these requirements.

In Alternative A, the off-ramp consists of two lanes: the fourth eastbound lane (counting from the median) is an exit-only lane which becomes the right lane on the exit while the third lane is an option lane from which vehicles can either continue on H-1 or exit onto the left lane of the off-ramp. The right lane would serve lead into the two lanes from which right turns to Punahou Street would be made, while the left lane would be for left turns to Punahou Street and through traffic to Bingham Street.

The analysis of diverging traffic also uses equations to estimate traffic volumes and densities on the two lanes adjacent to the right shoulder. The analysis procedure, however, was developed for cases in which the number of lanes on the freeway remains the same. The analysis procedure was applied assuming three eastbound lanes, with an added off-ramp lane beginning at the end of the on-ramp from Piikoi Street (the total capacity in the right lanes calculated for three, rather than two, lanes).

The analysis indicates Level of Service D conditions between 6:30 AM and 7:15 PM, except for Level of Service E conditions between 7:15 AM and 8:00 AM and nine 15-minute periods in the time span between 2:30 PM and 6:45 PM for Alternative A.

In Alternative B, a fifth lane is introduced as a parallel type off-ramp prior to the dropping of the fourth lane into the ramp. In this configuration, the traffic densities are higher, and Level of Service E describes conditions between 6:30 AM and 7:15 PM, except for five 15-minute periods at Level of Service D.

The analyses showed Alternative A to be better than Alternative B. However, in Alternative A, vehicles queued by the traffic signal at Punahou Street could back up onto a through lane of the freeway. While there is approximately 600 feet between the stop bar and the ramp nose, the near capacity conditions at this intersection and the effects of peak hour congestion at the nearby signalized intersections to the north cause concerns about long queues from the left turn and left/through option lanes. In Alternative B, a lane change to the right, from the third lane to the fourth lane in a short distance before the nose of the off-ramp, would be required. This lane change would be possible only if a gap is created by a vehicle changing from the fourth to fifth lane.

In both cases, the analyses showed that desirable Level of Service D conditions are exceeded through most of the day. Other operational problems affect both alternatives. Traffic densities in Alternative A would be less and it is therefore the preferred configuration of the off-ramp. While the analyses have assumed a fourth eastbound freeway lane, restriping would result in undesirable lane and shoulder widths; the addition of the fourth lane should be deferred until alternatives are evaluated. The recommended improvement is shown in Figure 6.

Conclusions and Recommendations

The proposed improvements to add a fourth lane on the approach to Punahou Street from the eastbound off-ramp from the H-1 freeway will alleviate capacity conditions due to the high volume of right turns from the ramp onto Punahou Street, southbound. These volumes are expected to increase and the second lane should be adequate for the projected future volumes.

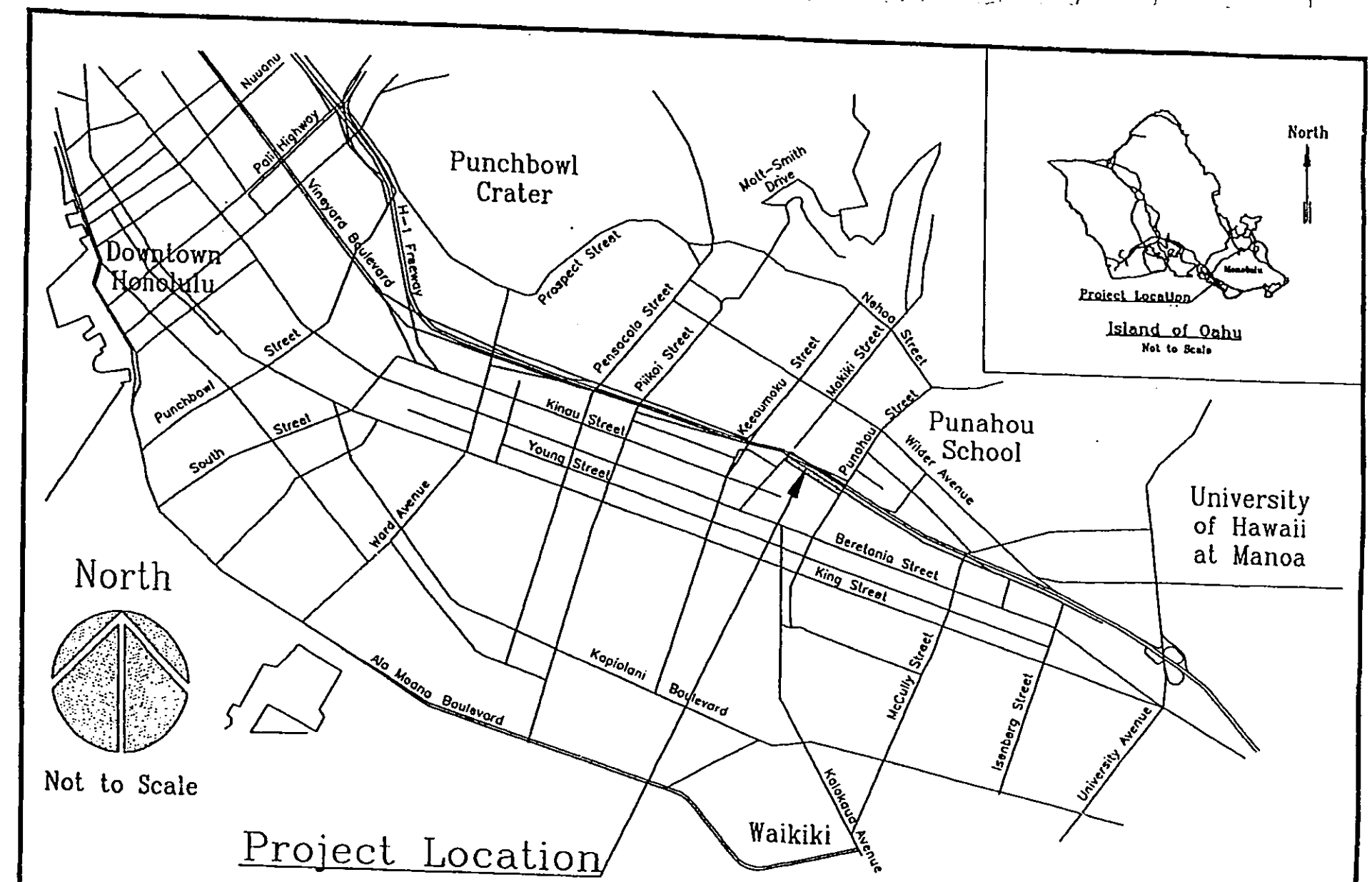
While no improvements are proposed to increase capacity for through movements to Bingham Street eastbound or for left turns onto Punahou Street northbound, traffic volumes for these movements are not expected to increase. Capacity constraints at signalized intersection north of the ramp, which contribute to the congestion along Punahou Street, are beyond the scope of this project.

The improvements at the intersection are expected to reduce the queueing back onto the freeway. However, as traffic volumes increase, poor conditions on the freeway will continue, since physical constraints limit the number of lanes on the freeway.

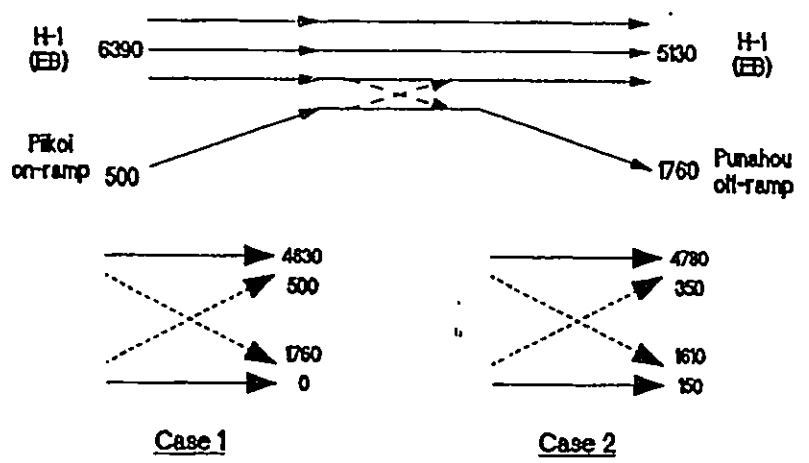
The analyses for future (year 2020) have assumed that a fourth lane eastbound lane is added on the freeway between the on-ramp from Vineyard Boulevard and the off-ramp to Punahou Street. Restriping of the segment on the viaduct (vicinity of Pensacola Street to vicinity of Keeaumoku Street) would virtually eliminate shoulders or reduce lane widths. Alternatives including relocation of the median should be considered before any changes are made to the laneage on the freeway.

Other changes to the freeway system should also be considered. The analyses showed possible problems for traffic merging from the Piikoi Street on-ramp with a fourth eastbound lane on the freeway; ramp metering or other means to regulate entry onto the freeway should be considered. Poor levels of service were also found for the freeway east of Punahou Street; studies to consider alternatives for the addition of a fourth lane should be conducted.

* * *



Traffic Analyses for Improvements to Punahou Off-Ramp Honolulu, Hawaii	Project Location and Vicinity prepared by: Julian Ng, Inc. September, 1997	Figure 1



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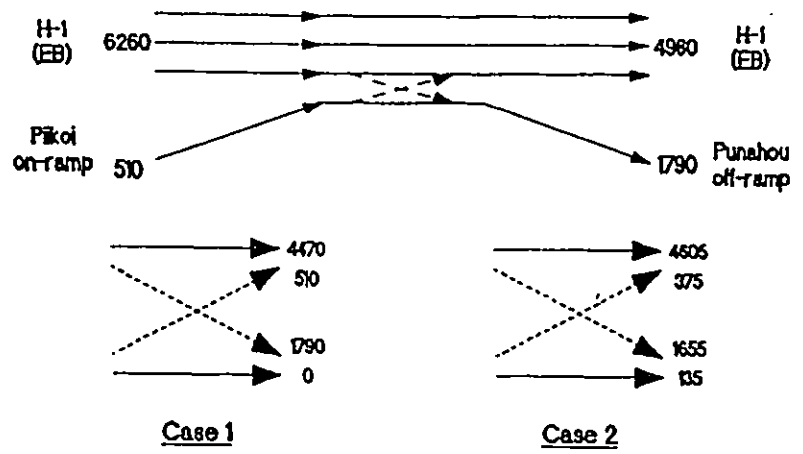

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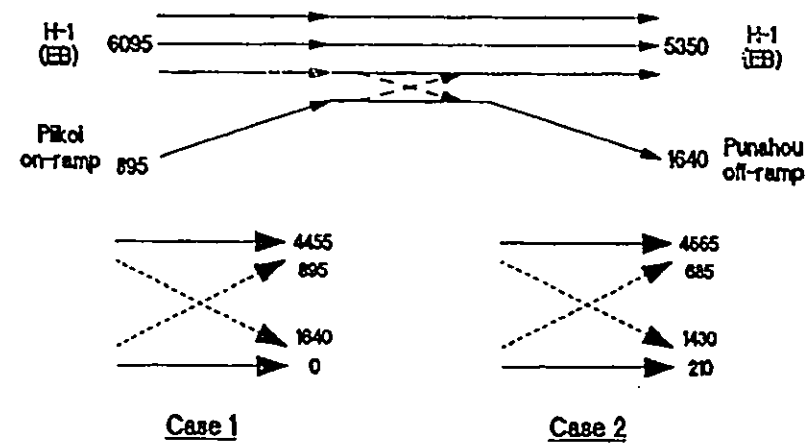

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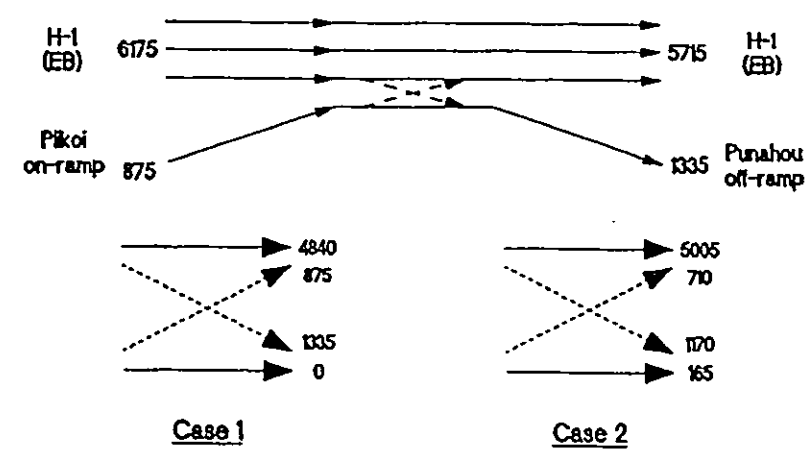
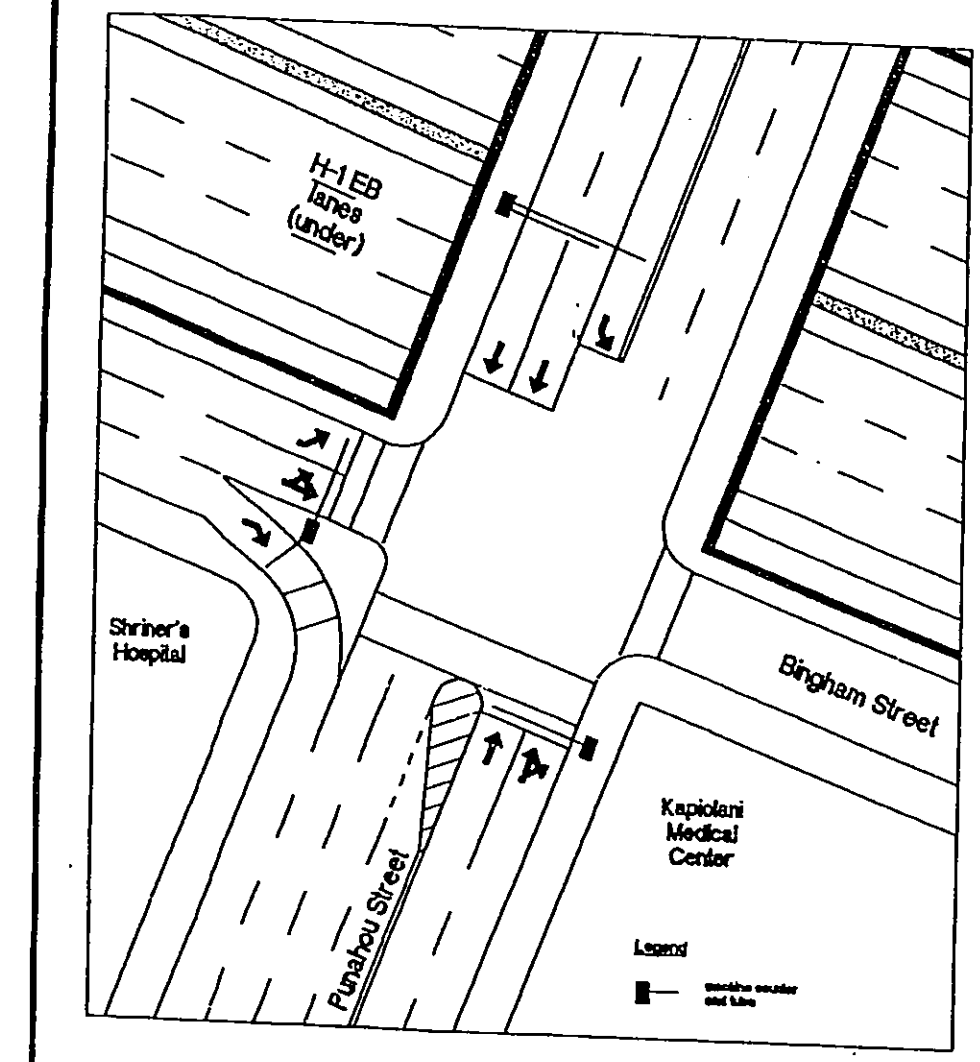


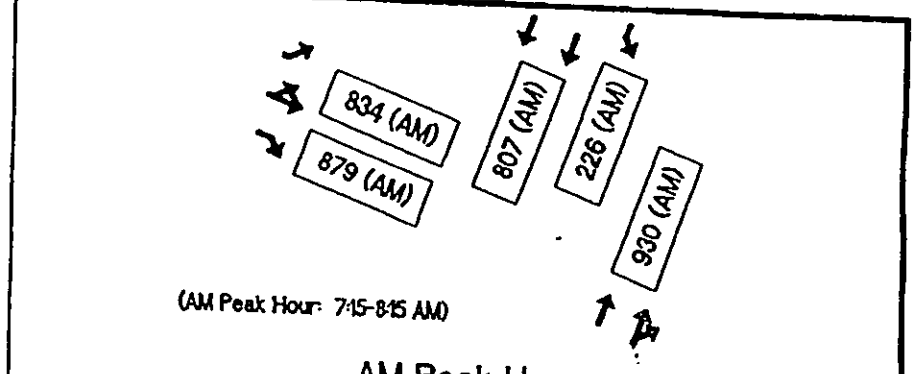
1997 PM Peak Hour (2)

Traffic Analyses for Improvements to Punahou Off-Ramp Honolulu, Hawaii	Existing (1997) Traffic Assignments prepared by: Julian Ng, Inc. September, 1997	Figure 2

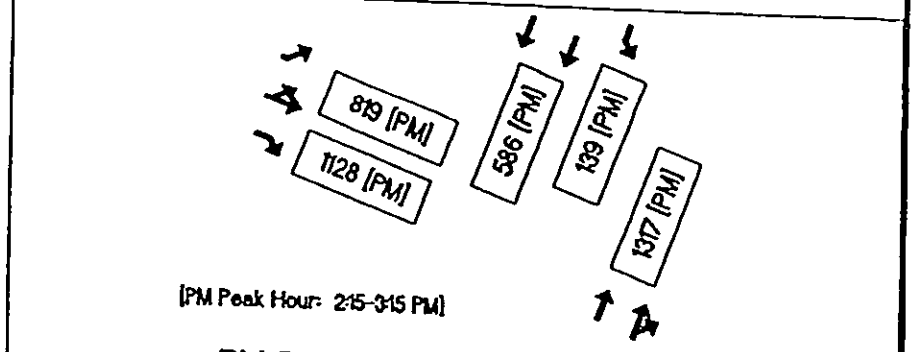


Traffic Counter Locations

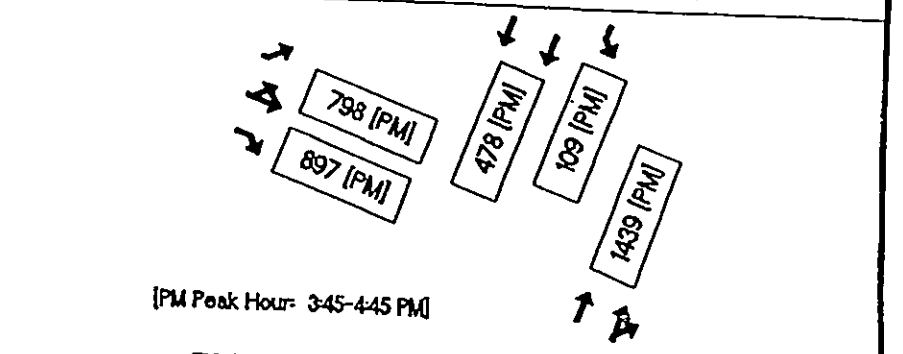
Counts taken 1:00 PM, Monday, September 15, 1997 to 1:00 PM, Wednesday, September 17, 1997



AM Peak Hour



PM Peak Hour (Highest Volume)



PM Peak Hour (Largest Conflict)

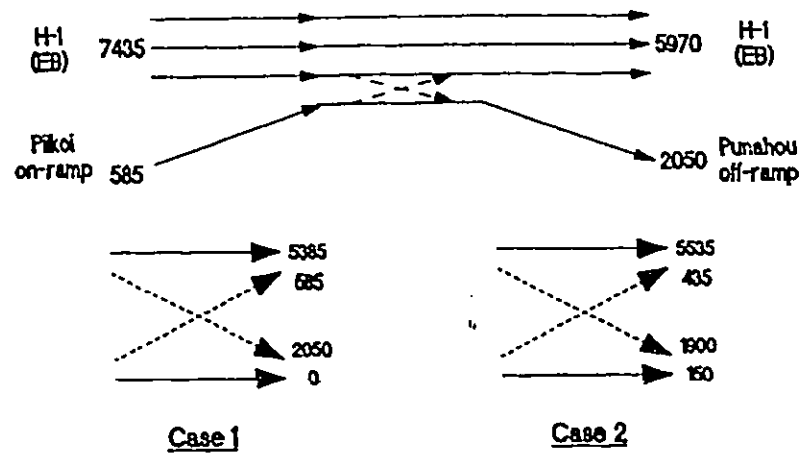
Traffic Analyses for
Improvements to Punahou Off-Ramp
Honolulu, Hawaii

1997 Field Traffic Counts

prepared by: Julian Ng, Inc.

September, 1997

Figure
3



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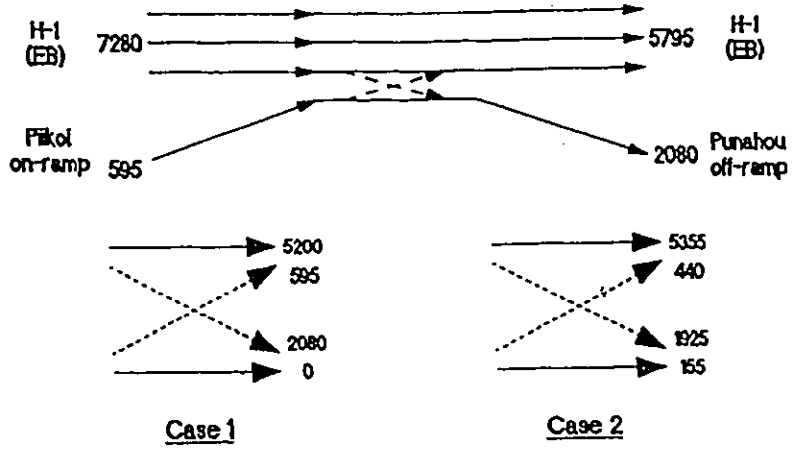

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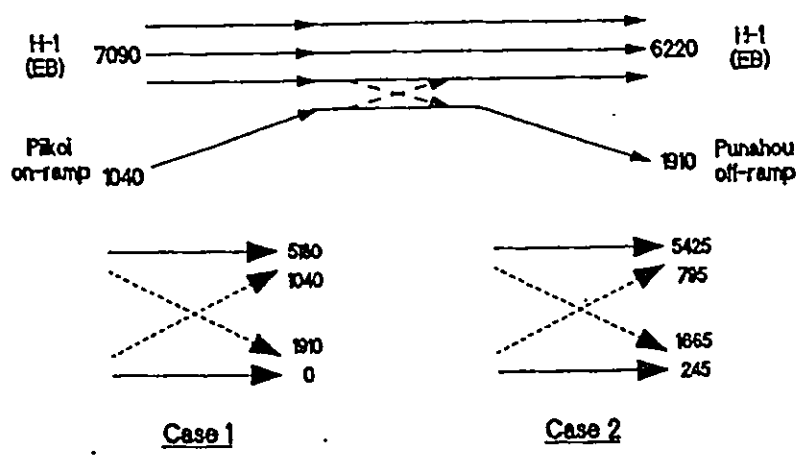
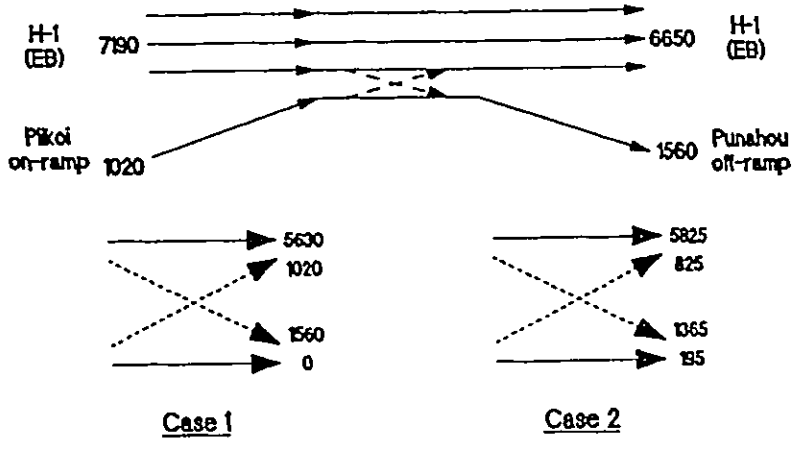


2020 PM Peak Hour (1)



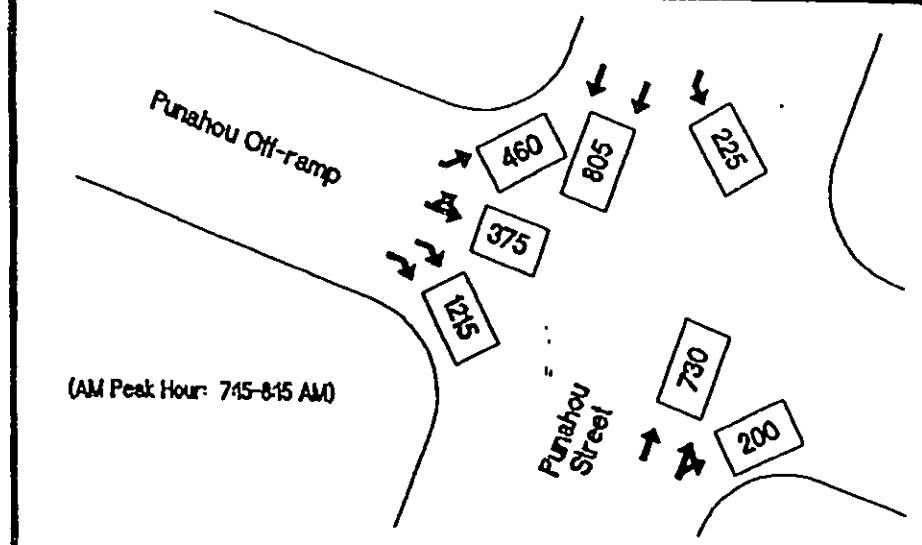
2020 PM Peak Hour (2)

Traffic Analyses for
Improvements to Punahou Off-Ramp
Honolulu, Hawaii

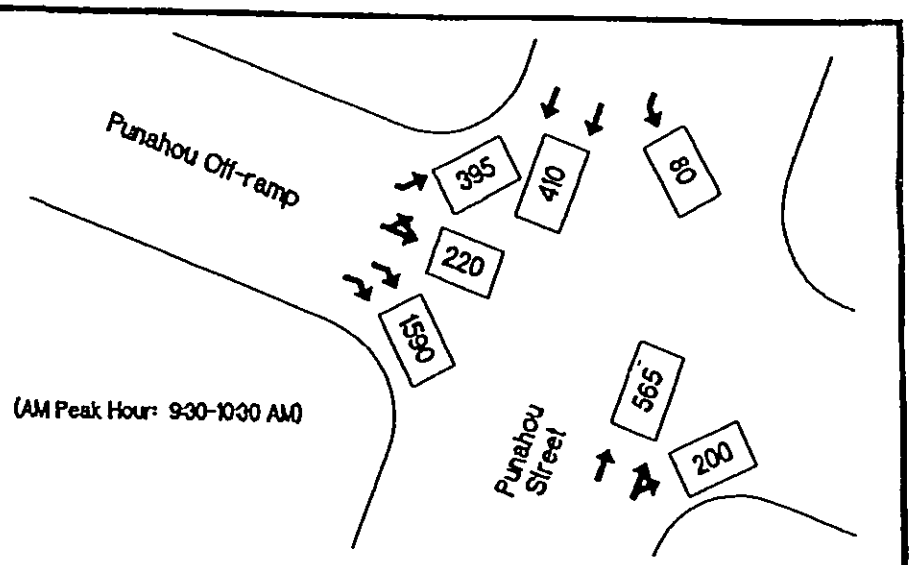
Future (2020) Traffic Assignments

prepared by: Julian Ng, Inc. September, 1997

Figure
4



AM Peak Hour (1)



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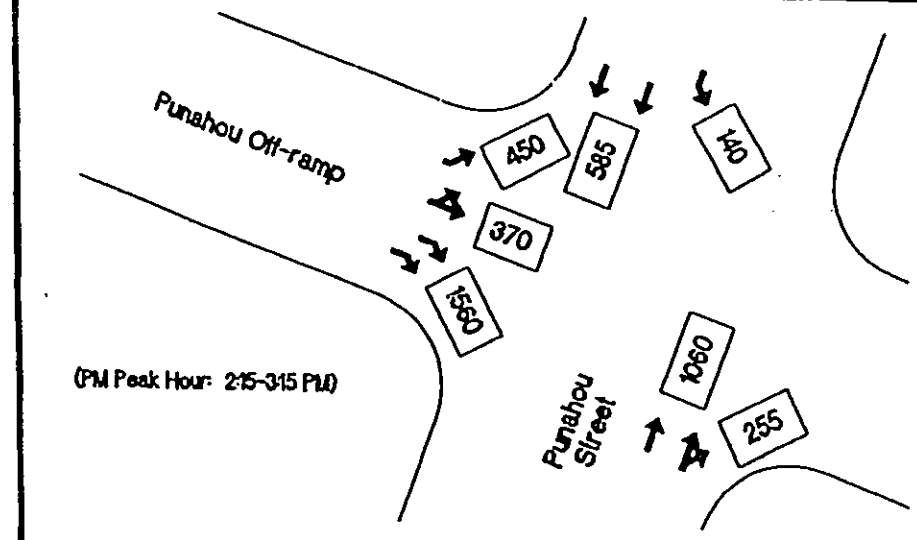
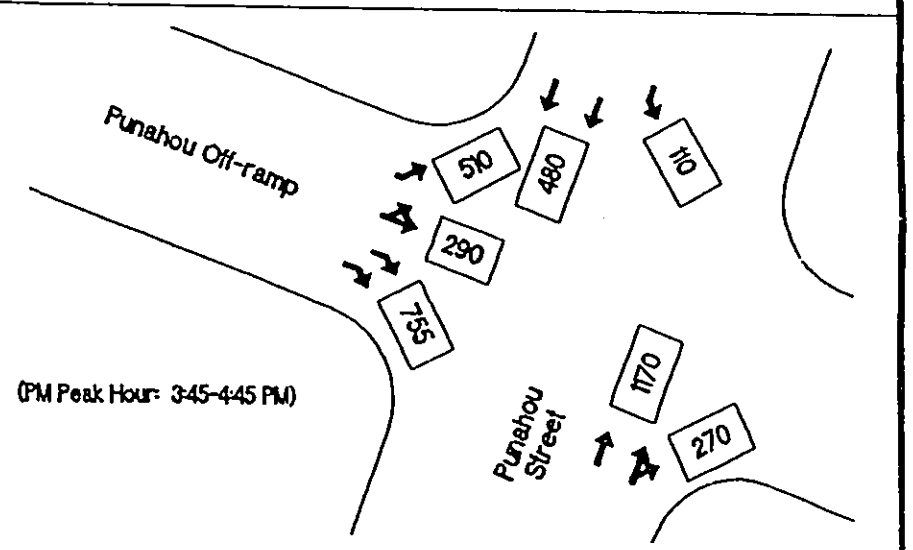
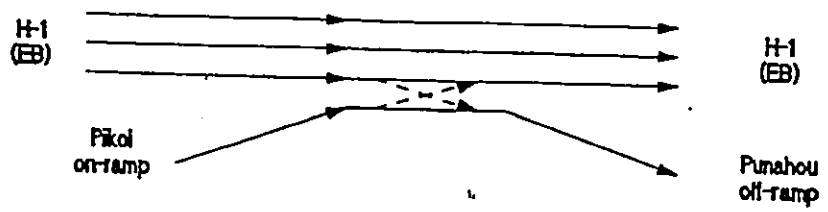


PM Peak Hour (1)

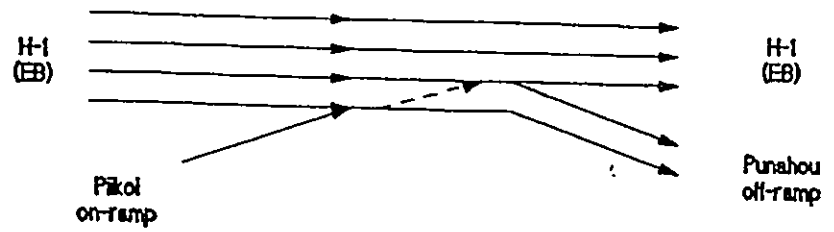


PM Peak Hour (2)

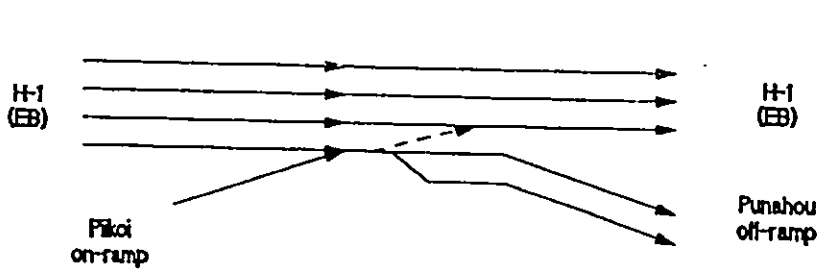
Traffic Analyses for Improvements to Punahou Off-Ramp Honolulu, Hawaii	Future (2020) Intersection Assignments prepared by: Julian Ng, Inc. September, 1997	Figure 5



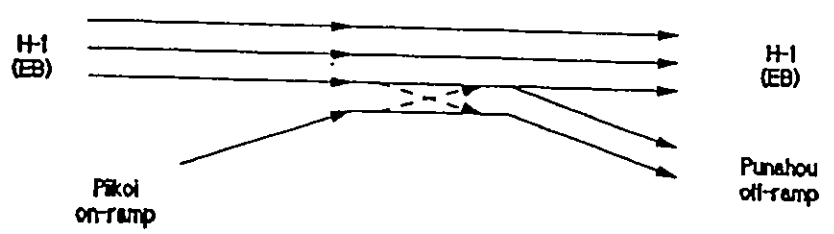
Existing Configuration



Alternative A



Alternative B



Recommended

Traffic Analyses for
Improvements to Punahou Off-Ramp
Honolulu, Hawaii

Freeway / Ramp Configurations

prepared by: Julian Ng, Inc.

September, 1997

Figure
6

Appendix: Traffic Counts, H-1 Punahou Off-ramp at Punahou Street

	average of counts taken 1:00 PM Monday, 9/15 to 1:00 PM Wednesday, 9/17/1997							Intersection condition (... capacity)		
		H1 EB Punahou off ramp		SB Punahou Street		NB Pun. St.	Total	Previous hour	Sum (CM)	EB RT
		LT & TH	RT	TH	LT	TH & RT	Intersection	Sum (CM)	(vphpl)	@ 83% g/o
Highest 15-min.:	11:00 PM – 05:00 AM	58	121	27	7	80	291	376	296	583
	05:00 AM – 05:15 AM	42	124	17	3	19	205	115	134	598
	05:15 AM – 05:30 AM	63	191	19	7	29	309	149	212	920
	05:30 AM – 05:45 AM	90	220	26	9	34	379	192	284	1,060
	05:45 AM – 06:00 AM	115	263	35	12	55	480	255	388	1,267 **
	06:00 AM – 06:15 AM	117	256	50	10	67	500	323	408	1,234 **
	06:15 AM – 06:30 AM	158	282	67	16	82	607	408	552	1,359 **
	06:30 AM – 06:45 AM	187	276	96	16	86	660	489	606	1,330 **
	06:45 AM – 07:00 AM	239	210	125	26	166	766	620	914	1,012
	07:00 AM – 07:15 AM	243	198	166	29	163	799	750	928	954
	07:15 AM – 07:30 AM *	232	188	200	39	212	871	873	1,044	906
	07:30 AM – 07:45 AM *	242	187	219	63	228	939	1,020	1,192	901
	07:45 AM – 08:00 AM *	189	236	219	72	277	993	1,096	1,220 **	1,137
	08:00 AM – 08:15 AM *	171	268	169	52	213	873	1,108	976	1,292 **
	08:15 AM – 08:30 AM	158	303	143	50	185	839	1,069	886	1,480 ****
	08:30 AM – 08:45 AM	158	279	123	46	216	822	1,005	936	1,345 **
	08:45 AM – 09:00 AM	172	294	128	52	173	819	924	898	1,417 ****
	09:00 AM – 09:15 AM	162	274	110	39	175	760	888	830	1,320 **
	09:15 AM – 09:30 AM	171	262	105	32	175	745	871	820	1,263 **
	09:30 AM – 09:45 AM	153	296	99	24	205	777	840	812	1,427 ****
	09:45 AM – 10:00 AM	166	296	122	23	183	790	813	790	1,427 ****
	10:00 AM – 10:15 AM	158	294	100	16	170	736	785	716	1,417 ****
	10:15 AM – 10:30 AM	142	299	88	18	208	755	773	772	1,441 ****
	10:30 AM – 10:45 AM	157	275	92	18	229	771	781	844	1,325 **
	10:45 AM – 11:00 AM	139	288	95	19	202	743	773	758	1,388 **
	11:00 AM – 11:15 AM	154	300	101	18	199	772	788	778	1,446 ****
	11:15 AM – 11:30 AM	145	269	106	11	241	772	799	816	1,296 **
	11:30 AM – 11:45 AM	164	290	104	19	265	842	822	934	1,398 **
	11:45 AM – 12:00 PM	164	288	93	21	254	820	862	920	1,388 **
	12:00 PM – 12:15 PM	175	281	110	17	238	801	891	894	1,258 **
	12:15 PM – 12:30 PM	145	258	105	17	255	780	904	868	1,243 **
	12:30 PM – 12:45 PM	158	255	106	25	264	808	907	944	1,229 **
	12:45 PM – 01:00 PM	173	244	106	20	199	742	883	824	1,176
	01:00 PM – 01:15 PM	134	268	103	27	208	740	857	792	1,292 **
	01:15 PM – 01:30 PM	157	288	105	26	229	805	859	876	1,388 **
	01:30 PM – 01:45 PM	165	283	100	25	201	774	831	832	1,364 **
	01:45 PM – 02:00 PM	199	294	106	22	252	873	873	990	1,417 ****
	02:00 PM – 02:15 PM	207	287	90	38	287	915	960	1,140	1,383 **
	02:15 PM – 02:30 PM *	201	301	122	40	347	1,011	1,055	1,256 **	1,451 ****
	02:30 PM – 02:45 PM *	203	284	147	35	352	1,021	1,159	1,250 **	1,369 **
	02:45 PM – 03:00 PM *	208	255	163	35	310	971	1,206 **	1,176	1,229 **
	03:00 PM – 03:15 PM *	207	288	154	29	308	986	1,207 **	1,146	1,388 **
	03:15 PM – 03:30 PM	211	265	119	27	340	962	1,196	1,210 **	1,277 **
	03:30 PM – 03:45 PM	189	283	153	21	368	1,014	1,183	1,198	1,364 **
	03:45 PM – 04:00 PM	218	243	113	36	338	948	1,203 **	1,256 **	1,171
	04:00 PM – 04:15 PM	204	226	111	22	352	915	1,216 **	1,200	1,089
	04:15 PM – 04:30 PM	182	235	117	28	366	926	1,214 **	1,200	1,133
	04:30 PM – 04:45 PM	194	193	137	25	383	932	1,228 **	1,254 **	930
	04:45 PM – 05:00 PM	175	189	141	30	355	890	1,209 **	1,180	911
	05:00 PM – 05:15 PM	190	179	141	27	338	875	1,200	1,164	863
	05:15 PM – 05:30 PM	143	196	138	23	411	911	1,200	1,200	945
	05:30 PM – 05:45 PM	157	163	128	29	346	823	1,167	1,122	786
	05:45 PM – 06:00 PM	196	174	131	19	388	908	1,183	1,244 **	839
	06:00 PM – 06:15 PM	162	162	126	26	335	811	1,166	1,098	781
	06:15 PM – 06:30 PM	192	146	128	29	313	808	1,148	1,126	704
	06:30 PM – 06:45 PM	179	220	105	29	308	841	1,140	1,090	1,060
	06:45 PM – 07:00 PM	201	256	102	17	258	834	1,075	986	1,234 **
	07:00 PM – 07:15 PM	159	245	65	20	235	754	1,018	868	1,161
	07:15 PM – 07:30 PM	137	225	35	12	207	666	920	738	1,084
	07:30 PM – 07:45 PM	154	189	76	15	209	643	844	786	911
	07:45 PM – 08:00 PM	159	207	76	10	186	638	780	730	998
	08:00 PM – 08:15 PM	122	171	84	16	178	571	729	664	824
	08:15 PM – 08:30 PM	116	170	69	11	160	526	694	596	819
	08:30 PM – 08:45 PM	104	180	66	8	163	521	639	566	867
	08:45 PM – 09:00 PM	117	159	73	10	160	519	605	594	766
	09:00 PM – 09:15 PM	109	159	82	14	148	512	582	570	766
	09:15 PM – 09:30 PM	111	167	54	12	173	517	587	616	805
	09:30 PM – 09:45 PM	99	168	49	9	120	443	564	474	800
	09:45 PM – 10:00 PM	94	156	47	8	120	427	530	460	761
	10:00 PM – 10:15 PM	89	134	54	7	104	388	491	414	646
	10:15 PM – 10:30 PM	93	178	38	6	132	447	456	474	858
	10:30 PM – 10:45 PM	87	223	37	11	85	443	434	388	1,075
	10:45 PM – 11:00 PM	79	142	31	7	79	338	405	344	664
	24-hour Totals	11,459	16,896	7,473	1,588	15,899	53,415	Note: ** near capacity		**** over capacity
Peak Hours:	07:15 AM – 08:15 AM	834	879	607	226	930	3,676	1,108		1,059
	02:15 PM – 03:15 PM	819	1,128	586	139	1,317	3,989	1,207 **		1,359 **
	03:45 PM – 04:45 PM	798	897	478	109	1,439	3,721	1,228 **		1,081

APPENDIX B

Interstate Route H-1, Punahou Off-Ramp Improvements

Effect on Driveways to Shriners' Hospital

Interstate Route H-1
Punahou Off-Ramp Improvements
Effect on Driveways to Shriners' Hospital

The widening of the eastbound off-ramp from the Interstate Route H-1 to Punahou Street will affect vehicular access to the Shriners' Hospital. The project will physically locate the right lane of the off-ramp closer to the driveways. The project will also increase the radius of the right turn movement, alleviating some of the existing delay caused by vehicles slowing to execute a tight right turn. These factors combine to reduce the time that a vehicle making the right turn from the off-ramp will be visible to a driver exiting the Shriners' site.

An evaluation of the situation indicates that visibility of vehicles now making the right turn are blocked by the existing wall. These vehicles currently travel about 190 feet after emerging from behind the wall until they are in front of the driveway; these vehicles would be visible from the mauka driveway for 8 seconds (at 15 miles per hour). With the project, and assuming vehicular speeds increase to 20 miles per hour around the turn, the 175 feet from the ramp to the mauka driveway would mean that an approaching vehicle will be visible for only 6 seconds.

However, conditions for users of the driveway would be better with the proposed project than without the project. If the project were not constructed, the existing signal phasing would have to be modified to accommodate the projected increase in traffic volumes. These modifications would include extending the duration of the free right turn from the ramp provided by the right arrow and lengthening the signal cycle. While these measures would increase vehicular capacity, they would also increase delays to pedestrians wishing to cross the right turn lane and to all vehicles using the intersection of Punahou Street and the off-ramp.

With the proposed project, the signal would be operated in such a way that right turns from the ramp are not permitted when the makaibound Punahou Street traffic has a green light. This phasing would provide greater time for pedestrians to cross the ramp right turn lanes and would permit shorter cycle lengths, thereby reducing overall vehicular and pedestrian delays at the intersection.

Operation of the signal at the intersection will affect conditions in front of the Shriners' Hospital driveways. Assuming that the design traffic volumes for the four peak hours that were considered can somehow be accommodated at the intersection of Punahou Street and the off-ramp, the following comparisons of gaps in makaibound traffic on Punahou Street can be made.

With the proposed improvement and no right turns on red from the off-ramp as described above, the signal phasing for makaibound Punahou Street and the ramp right turn could operate at under capacity conditions (critical volume of 1,200 vehicles per hour per lane or less, as described in the 1985 *Highway Capacity Manual*). The average headway (time interval between vehicles) during the peak hours in the makaibound curb lane would be between 3.9 seconds and 7.2 seconds.

Without the proposed project, the critical volumes for the makaibound Punahou Street traffic and the right turn from the ramp in the two AM peak hours and the earlier PM Peak Hour would be over capacity (critical volume sum greater than 1,400 vehicles per hour per lane) and the right turn would effectively be used 100% of the time. Average headway would range from 2.3 seconds to 4.1 seconds if the volumes shown in the traffic assignments are used.

A reduction of the projected peak hour volumes would be the effect of not constructing the project. Over capacity conditions during the two AM Peak Hours and the earlier PM Peak Hour would remain even if the off-ramp volume were reduced by 10% (to account for capacity constraints). A reduction of off-ramp traffic by 30% would result in "near" capacity conditions, which are typical of an intersection which has heavy traffic but operates with some congestion. Even with this reduction in traffic, the headway in the curb lane would range from 2.9 seconds to 5.5 seconds.

Summarizing, the evaluation shows the following average headways in the makaibound Punahou Street curb lane (nearest the driveways to Shriners' Hospital):

Average headway (seconds)	with project	without project 100% volume	without project 70% volume
AM Peak Hour (1)	4.5	3.0	3.4
AM Peak Hour (2)	4.0	2.3	3.0
PM Peak Hour (1)	3.9	2.3	2.9
PM Peak Hour (2)	7.2	4.1	5.5

The headways represent the spacing between vehicles in the traffic stream on Punahou Street and greater headways mean more opportunities to enter traffic. As indicated in the table, a higher density of traffic is expected in the curb lane without the proposed project.

Traffic leaving the Shriners' Hospital site, therefore, should find it easier with the proposed project than without the project. Left turns onto Punahou Street maukabound, however, would be difficult, especially during peak hours.

With the proposed project, makaibound traffic on Punahou Street will be able to get into the curb lane fronting the hospital, since right turns from the ramp would not be allowed during the green phase for makaibound traffic, facilitating entry into the Shriners' site. Without the ramp widening, concurrent right turns into the dedicated curb lane would be necessary and makaibound traffic wishing to enter the site would need to change lanes (similar to existing conditions, but with increased traffic). Left turns into the site from maukabound Punahou Street would be virtually impossible without the project; with the project, gaps may occur between signal phases at the off-ramp but left turns should still be discouraged or prohibited since any vehicle waiting to turn left would block other maukabound traffic.

***

APPENDIX C

Air Quality Study for the Proposed Improvements to the

H-1 Freeway Punchbowl Off-Ramp

DRAFT

AIR QUALITY STUDY

FOR THE PROPOSED IMPROVEMENTS TO

THE H-1 FREEWAY PUNAHOU OFF-RAMP

HONOLULU, HAWAII

Prepared for:

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5 Estimated Worst-Case 1-Hour Carbon Monoxide Concentrations at Intersection Of H-1 Off-Ramp With Punahou and Bingham Streets

6 Estimated Worst-Case 8-Hour Carbon Monoxide Concentrations at Intersection Of H-1 Off-Ramp With Punahou and Bingham Streets

1.0 SUMMARY

The State of Hawaii Department of Transportation-Highways Division is proposing to construct improvements in the form of an additional right-turn lane to the eastbound off-ramp from Interstate Route H-1 to Punahou Street. The proposed construction is needed to improve operating conditions both on the freeway and at the intersection of the off-ramp and Punahou Street. This study examines the potential short- and long-term air quality impacts that could occur as a result of construction and use of the improved off-ramp. Mitigative measures to reduce any potential air quality impacts from the project are suggested where possible and appropriate.

Both federal and state standards have been established to maintain ambient air quality. At the present time, seven parameters are regulated including: particulate matter, sulfur dioxide, hydrogen sulfide, nitrogen dioxide, carbon monoxide, ozone and lead. In most cases, the Hawaii air quality standards are more stringent than the comparable national limits.

Regional and local climate together with the amount and type of human activity generally dictate the air quality of a given location. The climate of the project area is very much affected by its leeward and near coastal situation. Winds are predominantly trade winds from the east-northeast except for occasional periods when winter storms may generate strong winds from the south or when the trade winds are weak and landbreeze-seabreeze circulations may develop. Wind speeds typically vary between about 5 and 18 miles per hour providing relatively good ventilation much of the time. Temperatures in the area are generally very moderate with average daily temperatures ranging

from about 70°F to 84°F. The extreme minimum temperature recorded at Honolulu International Airport is 53°F, while the extreme maximum temperature is 95°F. Rainfall in the Honolulu area is often highly variable both in location and over time. Based on data collected at the airport, annual rainfall at the project site is probably more than about 22 inches. Monthly rainfall may vary from as little as a trace to more than 20 inches.

Presently, air quality in the vicinity of the project is mostly affected by air pollutants emitted by motor vehicles using the H-1 Freeway, a major arterial roadway that often carries heavy volumes of traffic, and Punahou Street. To a lesser and occasional extent, air quality is impacted by emissions originating from distant industrial, natural and/or agricultural sources. Natural sources of air pollution that may affect the air quality of the site include the ocean, plants, wind-blown dust and distant volcanoes.

Except possibly for areas near traffic-congested intersections, the present air quality of the project area is relatively good. Air quality data from the nearest monitoring stations operated by the state Department of Health suggest that all national air quality standards are currently being met in the Honolulu area, although occasional exceedances of the more stringent state standards for ozone and carbon monoxide may occur.

If the proposed project is given the necessary approvals to proceed, it is inevitable that some short- and long-term impacts on air quality will occur either directly or indirectly as a consequence of project construction and use. Short-term impacts from fugitive dust will likely occur during the project construc-

tion phase. To a lesser extent, exhaust emissions from stationary and mobile construction equipment, from the disruption of traffic, and from workers' vehicles may also affect air quality during the period of construction. State air pollution control regulations require that there be no visible fugitive dust emissions at the project boundary. Hence, an effective dust control plan must be implemented to ensure compliance with state regulations. Fugitive dust emissions can be controlled to a large extent by watering of active work areas, using wind screens, keeping adjacent paved roads clean, and by covering of open-bodied trucks. Exhaust emissions can be mitigated by moving construction equipment and workers to and from the project site during off-peak traffic hours.

After construction, long-term air quality impacts from the project could possibly occur as a result of higher emissions emanating from the increased flow of vehicular traffic along the upgraded off-ramp and through its intersection with Punahou Street. To assess the impact of emissions from these vehicles, an air quality modeling study was undertaken to estimate current ambient concentrations of carbon monoxide at the intersection of the H-1 Freeway off-ramp and Punahou and Bingham Streets and to predict future levels both with and without the proposed project at this intersection. During worst-case conditions, model results indicated that presently the national 1-hour and 8-hour ambient air quality standards for carbon monoxide are being met but the more stringent state standards could potentially be exceeded. The year 2020 without project scenario produced a slight drop in predicted concentrations with respect to the present case. This can be attributed to cleaner running vehicles in use in 2020. Predicted worst-case concentrations in the year 2020 with the project increased slightly over the without project levels indicating the very minimal effect the off-ramp improvement would

have on air quality in the vicinity of the Punahou Street intersection. As with the existing case, both future scenarios produced estimated concentrations within the national standards but in excess of the state standards. It should be noted here that, because the state standards are set at such stringent levels, it is likely that they are currently exceeded at many locations in the state that have even moderate traffic volumes. Due to the predicted minimal impact of the project, it appears that mitigation of any long-term impacts is unwarranted.

2.0 INTRODUCTION AND PROJECT DESCRIPTION

The State of Hawaii Department of Transportation-Highways Division is proposing to construct improvements in the form of an additional right-turn lane to the eastbound off-ramp from Interstate Route H-1 to Punahou Street (see location map provided as Figure 1). This construction is needed to improve operating conditions at the off-ramp, which is one of the busiest single-lane ramps on the freeway system in Hawaii. Presently, nearly 30,000 vehicles use this ramp on an average weekday, and queues from the intersection of Punahou Street and the off-ramp often back onto the through lanes of the freeway. The purpose of this study is to describe existing air quality in the project area and to assess the potential short-term and long-term direct and indirect air quality impacts that could result from construction and use of the improved off-ramp as planned. Measures to mitigate these impacts are suggested where possible and appropriate.

3.0 AMBIENT AIR QUALITY STANDARDS

Ambient concentrations of air pollution are regulated by both national and state ambient air quality standards (AAQS).

National AAQS are specified in Section 40, Part 50 of the Code of Federal Regulations (CFR), while State of Hawaii AAQS are defined in Chapter 11-59 of the Hawaii Administrative Rules. Table 1 summarizes both the national and the state AAQS that are specified in the cited documents. As indicated in the table, national and state AAQS have been established for particulate matter, sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone and lead. The state has also set a standard for hydrogen sulfide. National AAQS are stated in terms of both primary and secondary standards for most of the regulated air pollutants. National primary standards are designed to protect the public health with an "adequate margin of safety". National secondary standards, on the other hand, define levels of air quality necessary to protect the public welfare from "any known or anticipated adverse effects of a pollutant". Secondary public welfare impacts may include such effects as decreased visibility, diminished comfort levels, or other potential injury to the natural or man-made environment, e.g., soiling of materials, damage to vegetation or other economic damage. In contrast to the national AAQS, Hawaii State AAQS are given in terms of a single standard that is designed "to protect public health and welfare and to prevent the significant deterioration of air quality".

Each of the regulated air pollutants has the potential to create or exacerbate some form of adverse health effect or to produce environmental degradation when present in sufficiently high concentration for prolonged periods of time. The AAQS specify a maximum allowable concentration for a given air pollutant for one or more averaging times to prevent harmful effects. Averaging times vary from one hour to one year depending on the pollutant and type of exposure necessary to cause adverse effects. In the case of the short-term (i.e., 1- to 24-hour)

AAQS, both national and state standards allow a specified number of exceedances each year.

The Hawaii AAQS are in some cases considerably more stringent than the comparable national AAQS. In particular, the State of Hawaii 1-hour AAQS for carbon monoxide is four times more stringent than the comparable national limit, and the state 1-hour limit for ozone is more than two times as stringent as the current national 1-hour standard. The national 1-hour ozone standard will be phased out during the next three years in favor of the new (and more stringent) 8-hour standard.

Hawaii AAQS for sulfur dioxide were relaxed in 1986 to make the state standards essentially the same as the national limits. In 1993, the state also revised its particulate standards to follow those set by the federal government. During 1997, the federal government again revised its standards for particulate. To date, the Hawaii Department of Health has not updated the state particulate standards.

4.0 REGIONAL AND LOCAL CLIMATOLOGY

Regional and local climatology significantly affects the air quality of a given location. Wind, temperature, atmospheric turbulence, mixing height and rainfall all influence air quality. Although the climate of Hawaii is relatively moderate throughout most of the state, significant differences in these parameters may occur from one location to another. The most significant differences in regional and local climates that occur within the state are caused by the mountainous topography.

Hawaii lies well within the belt of northeasterly trade winds generated by the semi-permanent Pacific high-pressure cell located northeast of the islands. On the island of Oahu, the Koolau and Waianae Mountain Ranges are oriented almost perpendicular to the trade winds, which accounts for much of the variation in the local climatology of the island. The site of the proposed project is located in a near-coastal area leeward of the Koolau Mountains.

Long-term wind data have been collected at the Honolulu International Airport and are at least somewhat representative of the project area. Wind frequency data given in Table 2 for Honolulu International Airport show that the annual prevailing wind direction for this area of Oahu is east-northeast. On an annual basis, 34.7 percent of the time the wind is from this direction, and nearly 75 percent of the time the wind is in the northeast quadrant. Winds from the south are infrequent occurring only a few days during the year and mostly in association with winter storms. Wind speeds average about 11 mph (10 knots) and mostly vary between about 4 and 18 mph (5 and 15 knots).

Air pollution emissions from motor vehicles, the formation of photochemical smog and smoke plume rise all depend in part on air temperature. Colder temperatures tend to result in higher emissions of contaminants from automobiles but lower concentrations of photochemical smog and ground-level concentrations of air pollution from elevated plumes. In Hawaii, the annual and daily variations of temperature depend to a large degree on elevation above sea level, distance inland and exposure to the trade winds. Average temperatures at locations near sea level generally are warmer than those at higher elevations. Areas

exposed to the trade winds tend to have the least temperature variation, while inland and leeward areas often have the greatest. The project's near coastal, leeward location results in a relatively moderate temperature profile compared to some other locations around Oahu and the state. Based on more than 25 years of data collected at Honolulu International Airport, average annual daily minimum and maximum temperatures in the project area are 70°F and 84°F, respectively [1]. The extreme minimum temperature on record is 53°F, and the extreme maximum is 95°F.

Small scale, random motions in the atmosphere (turbulence) cause air pollutants to be dispersed as a function of distance or time from the point of emission. Turbulence is caused by both mechanical and thermal forces in the atmosphere. It is often measured and described in terms of Pasquill-Gifford stability class. Stability class 1 is the most turbulent and class 6 is the least. Thus, air pollution dissipates best during stability class 1 conditions and the worst when stability class 6 prevails. Within urban Honolulu, stability class 4 is generally the highest stability class that occurs, developing during the nighttime or early morning hours or during cloudy daytime hours. Stability classes 1 through 3 occur during the daytime, depending mainly on the amount of cloud cover and incoming solar radiation and the onset and extent of the sea breeze.

Mixing height is defined as the height above the surface through which relatively vigorous vertical mixing occurs. Low mixing heights can result in high ground-level air pollution concentrations because contaminants emitted from or near the surface can become trapped within the mixing layer. In Hawaii, minimum mixing heights tend to be high because of mechanical mixing caused by the trade winds and because of the temperature moderating effect of

the surrounding ocean. Low mixing heights may sometimes occur, however, at inland locations and even at times along coastal areas early in the morning following a clear, cool, windless night. Coastal areas also may experience low mixing levels during sea breeze conditions when cooler ocean air rushes in over warmer land. Mixing heights in Hawaii typically are above 1000 meters.

Rainfall can have a beneficial effect on the air quality of an area in that it helps to suppress fugitive dust emissions, and it also may "washout" gaseous contaminants that are water-soluble. Rainfall in Hawaii is highly variable depending on elevation and on location with respect to the trade wind. The central Honolulu area is one of the drier areas on Oahu due to its leeward and near sea level location. Average annual rainfall at the airport amounts to about 22 inches [1], but it may be somewhat greater at the project location. Most of the rainfall usually occurs during the winter months. Monthly rainfall can be expected to vary from as little as a trace to more than 20 inches.

5.0 PRESENT AIR QUALITY

Present air quality in the project area is mostly affected by air pollutants from vehicular, industrial, natural and/or agricultural sources. Table 3 presents an air pollutant emission summary for the island of Oahu for calendar year 1993. The emission rates shown in the table pertain to manmade emissions only, i.e., emissions from natural sources are not included. As suggested in the table, much of the particulate emissions on Oahu originate from area sources, such as the mineral products industry and agriculture. Sulfur oxides are emitted almost exclusively by point sources, such as power plants and refineries. Nitrogen oxides emissions emanate predominantly from industrial point

sources, although area sources (mostly motor vehicle traffic) also contribute a significant share. The majority of carbon monoxide emissions occur from area sources (motor vehicle traffic), while hydrocarbons are emitted mainly from point sources. Based on previous emission inventories that have been reported for Oahu, it appears that emissions of particulate and nitrogen oxides have increased during the past ten years, while emissions of sulfur oxides, carbon monoxide and hydrocarbons have declined.

Natural sources of air pollution emissions that also could affect the project area but cannot be quantified very accurately include the ocean (sea spray), plants (aeroallergens), wind-blown dust, and perhaps distant volcanoes on the island of Hawaii.

The State Department of Health operates a network of air quality monitoring stations at various locations on Oahu. Each station, however, typically does not monitor the full complement of air quality parameters. Table 4 shows an annual summary of air quality measurements that were made nearest to the project site for each of the regulated air pollutants for the period 1989 through 1993. These are the most recent data that are currently available.

During the years 1989 to 1993, sulfur dioxide was monitored by the State Department of Health at an air quality station located in downtown Honolulu about 1.5 miles to the west of the project site. There were no exceedances of the state/national 24-hour AAQS for sulfur dioxide during the 5-year period. Concentrations monitored were consistently low with 24-hour averages ranging from near 0 to 9 $\mu g/m^3$.

The nearest monitoring station for particulate matter less than 10 microns in diameter (PM-10) was located at Liliha in Honolulu about 2 miles to the northwest. Twenty-four hour average PM-10 concentrations monitored at this location ranged from 8 to 52 $\mu g/m^3$ from 1989 through 1993. Average daily concentrations were approximately 17 $\mu g/m^3$. No exceedances of the state and national AAQS were reported.

The nearest carbon monoxide measurements were also made at downtown Honolulu. During the 1989 through 1993 period, 1-hour concentrations averaged less than 2 mg/m^3 and ranged from 0.1 to 13.3 mg/m^3. One exceedance of the state 1-hour AAQS was recorded in each of the years 1991 and 1993. Data pertaining to 8-hour average carbon monoxide concentrations have not been reported to date.

The nearest available ozone measurements were obtained at Sand Island about 5 miles west of the project site. The maximum 1-hour concentration for each year from 1989 to 1993 ranged from 94 to 126 $\mu g/m^3$, and several exceedances of the state AAQS were recorded. The number of annual exceedances of the state AAQS has exhibited an upward trend with seven recorded during 1993.

The nearest and most recent measurements of ambient lead concentrations that have been reported were made at the downtown Honolulu monitoring station between 1991 and 1993. Monitoring for this parameter was discontinued during 1988 and resumed in 1991. Lead concentrations in Honolulu have had a downward trend for several years, most probably reflecting the increased use of

unleaded gasoline. Average quarterly concentrations were near or below the detection limit, and no exceedances of the state AAQS were recorded.

Nitrogen dioxide was not monitored by the Department of Health anywhere in the state during the first four years of the 1989-93 reporting period. In 1993 measurements were taken at Kapolei, a distance of 26 miles from the project site, and the average daily value reported was 12 $\mu g/m^3$, safely inside the state and national AAQS.

Based on the data and discussion presented above, it appears likely that the Hawaii AAQS for sulfur dioxide, nitrogen dioxide, lead and particulate matter less than 10 microns in diameter are currently being met at the project site. It is likely, however, that the state AAQS for ozone may be exceeded on occasion based on the Sand Island measurements for this parameter. Carbon monoxide readings from downtown Honolulu suggest that concentrations near traffic-congested intersections may also exceed the state AAQS at times. However, the project area as well as the entire State of Hawaii is presently considered to be an attainment area for all national AAQS.

6.0 SHORT-TERM IMPACTS OF PROJECT

Short-term direct and indirect impacts on air quality could potentially occur due to project construction. For a project of this nature, there are two potential types of air pollution emissions that could directly result in short-term air quality impacts during project construction: (1) fugitive dust from vehicle movement, soil excavation and other construction

activities; and (2) exhaust emissions from on-site construction equipment. Indirectly, there also could be short-term impacts related to slow-moving construction equipment traveling to and from the project site and from a temporary increase in local traffic caused by commuting construction workers.

Fugitive dust emissions may arise from the grading and dirt-moving activities associated with site clearing and preparation work, if any is required for this project. The emission rate for fugitive dust emissions from construction activities is difficult to estimate accurately. This is because of the elusive nature of dust emissions and because the potential for dust generation varies greatly depending upon the type of soil at the construction site, the amount and type of dirt-disturbing activity taking place, the moisture content of exposed soil in work areas, and the wind speed. The EPA [2] has provided a rough estimate for uncontrolled fugitive dust emissions from construction activity of 1.2 tons per acre per month under conditions of "medium" activity, moderate soil silt content (30%), and precipitation/evaporation (P/E) index of 50. Uncontrolled fugitive dust emissions in the project area would likely be somewhere near that level. In any case, State of Hawaii Air Pollution Control Regulations [3] prohibit visible emissions of fugitive dust from construction activities at the project boundary. Thus, an effective dust control plan for the project construction phase is essential.

Adequate fugitive dust control can usually be accomplished by the establishment of a frequent watering program to keep bare-dirt surfaces in construction areas from becoming significant sources of dust. In dust-prone or dust-sensitive areas, other control measures such as limiting the area that can be disturbed at any given time, applying chemical soil stabilizers, mulching and/or

using wind screens may be necessary. Control regulations further stipulate that open-bodied trucks be covered at all times when in motion if they are transporting materials that could be blown away. Haul trucks tracking dirt onto paved streets from unpaved areas is often a significant source of dust in construction areas. Some means to alleviate this problem, such as road cleaning or tire washing, may be appropriate.

On-site mobile and stationary construction equipment also will emit air pollutants from engine exhausts. The largest of this equipment is usually diesel-powered. Nitrogen oxides emissions from diesel engines can be relatively high compared to gasoline-powered equipment, but the standard for nitrogen dioxide is set on an annual basis and is not likely to be violated by short-term construction equipment emissions. Carbon monoxide emissions from diesel engines, on the other hand, are low and should be relatively insignificant compared to vehicular emissions on nearby roadways.

Slow-moving construction vehicles traveling on roadways leading to and from the project site could obstruct the normal flow of traffic to such an extent that overall vehicular emissions are increased, but this impact can be mitigated by moving heavy construction equipment during periods of low traffic volume. Likewise, the schedules of commuting construction workers can be adjusted to avoid peak hours in the project vicinity. Thus, most potential short-term air quality impacts from project construction can be mitigated.

7.0 LONG-TERM IMPACTS OF PROJECT

After construction is completed, use of the improved off-ramp will result in a more efficient flow of traffic on the H-1 Freeway and an increase in the flow of vehicles along the off-ramp and through the Punahou Street intersection. Adding the proposed right-turn lane will also concentrate more traffic near the off-ramp intersection with Punahou Street, potentially causing a long-term impact on ambient air quality in this vicinity. Motor vehicles with gasoline-powered engines are significant sources of carbon monoxide. They also emit nitrogen oxides and other contaminates.

Federal air pollution control regulations require that new motor vehicles be equipped with emission control devices that reduce emissions significantly compared to a few years ago. In 1990, the President signed into law the Clean Air Act Amendments. This legislation requires further emission reductions which have been phased in since 1994. The restrictions on emissions from new motor vehicles will lower average emissions each year as more and more older vehicles leave the state's roadways. Carbon monoxide emissions, for example, will go down by an average of about 10 percent per vehicle during the next 10 years due to the replacement of older vehicles with newer models.

To evaluate the potential long-term ambient air quality impact of the roadway traffic associated with a project such as this, computerized emission and atmospheric dispersion models can be used to estimate ambient carbon monoxide concentrations along roadways in the project vicinity. Carbon monoxide is selected for modeling because it is both the most stable and the most abundant of the pollutants generated by motor vehicles. Furthermore, carbon monoxide air pollution is generally considered to be a

microscale problem that can be addressed locally to some extent, whereas nitrogen oxides air pollution most often is a regional issue that cannot be addressed by a single new project.

For this project, three scenarios were selected for the carbon monoxide modeling study: (1) year 1997 with present conditions; (2) year 2020 (the project horizon year) without the project; and (3) year 2020 with the project. To begin the modeling study, critical receptor areas in the vicinity of the project were identified for analysis. Generally speaking, roadway intersections are the primary concern because of traffic congestion and because of the increase in vehicular emissions associated with traffic queuing. For this study, the intersection of the H-1 Freeway east-bound off-ramp with Punahou and Bingham Streets was selected for air quality analysis. The traffic study for the project [4] describes the present and future traffic conditions and laneage configurations of this intersection in detail. It should be noted that other intersections near the Punahou Street off-ramp may be affected by the project, but analysis of these intersections was beyond the scope of the present study.

The main objective of the air quality modeling study was to estimate maximum 1-hour average carbon monoxide concentrations for each of the three scenarios studied. To evaluate the significance of the estimated concentrations, a comparison of the predicted values for each scenario can be made. Comparison of the estimated values to the national and state AAQS will provide another measure of significance. The traffic study identifies one morning peak hour and two afternoon peak hours, one when traffic departs several schools in the vicinity and a later one consisting mainly of commuter vehicles. The traffic report indicates that traffic

volumes generally are or will be higher during the afternoon peak hours than during the morning peak period. However, both morning and afternoon peak-traffic hours were examined to ensure that worst-case concentrations were identified.

The EPA computer model MOBILE5A was used to calculate vehicular carbon monoxide emissions for each year studied. One of the key inputs to MOBILE5A is vehicle mix. Based on recent vehicle registration figures, the present and projected vehicle mix in the project area is estimated to be 91.9% light-duty gasoline-powered vehicles, 5% light-duty gasoline-powered trucks and vans, 0.5% heavy-duty gasoline-powered vehicles, 0.6% light-duty diesel-powered vehicles, 1% heavy-duty diesel-powered trucks and buses, and 1% motorcycles.

Other key inputs to the MOBILE5A emission model are the cold/hot start fractions. Motor vehicles operating in a cold- or hot-start mode emit excess air pollution. Typically, motor vehicles reach stabilized operating temperatures after about 4 miles of driving. For traffic operating within the project area, it was assumed that during both the morning and the afternoon peak-traffic hours about 25 percent of all vehicles would be operating in the cold-start mode and that about 5 percent would be operating in the hot-start mode. These operational mode values were estimated based on a report from the California Department of Transportation [5] and taking into consideration the likely origin of traffic in the project area.

Ambient temperatures of 59 and 68 degrees F were used for morning and afternoon peak-hour emission computations, respectively. These are conservative assumptions since morning/afternoon ambient

temperatures will generally be warmer than this, and emission estimates given by MOBILE5A are inversely proportional to the ambient temperature.

After computing vehicular carbon monoxide emissions through the use of MOBILE5A, these data were then input to an atmospheric dispersion model. EPA air quality modeling guidelines [6] currently recommend that the computer model CAL3QHC [7] be used to assess carbon monoxide concentrations at roadway intersections, or in areas where its use has previously been established, CALINE4 [8]. CALINE4 has been used extensively in Hawaii to assess air quality impacts at roadway intersections. Each of these two computer models offers advantages and disadvantages. CAL3QHC has the capability to make vehicle queuing estimates, but it does not simulate modal emissions. CALINE4 has the capability to simulate modal emissions, but it does not have the capacity to make queuing estimates.

Since the use of CALINE4 has previously been established in Hawaii, CALINE4 was used to perform the analyses for the subject project. However, all vehicle queuing estimates were made based on the queuing algorithms included in the CAL3QHC model. This approach takes advantage of the best features of both models.

CALINE4 was developed by the California Transportation Department to simulate vehicular movement and atmospheric dispersion of vehicular emissions. This model is designed to predict 1-hour average pollutant concentrations along roadways based on input traffic and emission data, roadway/receptor geometry and meteorological conditions.

Input peak-hour traffic data were obtained from the traffic study cited previously. Vehicles using the off-ramp, Punahou Street and Bingham Street were assumed to accelerate to 25 mph. Deceleration and acceleration times were assumed to be equivalent, and a deceleration/acceleration time of 11 seconds was assumed.

Model roadways were set up to reflect roadway geometry, physical dimensions and operating characteristics. Concentrations predicted by air quality models generally are not considered valid within the roadway mixing zone. The roadway mixing zone is usually taken to include 3 meters on either side of the traveled portion of the roadway and the turbulent area within 10 meters of a cross street. Model receptor sites were thus located at the edges of the mixing zones near the intersection that was studied, which is approximately where sidewalks are located. All receptor heights were placed at 1.8 meters above ground to simulate levels within the normal human breathing zone.

Input meteorological conditions for this study were defined to provide "worst-case" results. One of the key meteorological inputs is atmospheric stability category. For these analyses, atmospheric stability category 4 was assumed for both morning and afternoon cases. These is the most conservative stability category that is generally used for estimating worst-case pollutant dispersion within urban areas. A surface roughness length of 100 cm and a mixing height of 300 meters was used in all cases. Worst-case wind conditions were defined as a wind speed of 1 meter per second with a wind direction resulting in the highest predicted concentration.

Existing background concentrations of carbon monoxide in the project vicinity are believed to be at moderate levels. Thus, background contributions of carbon monoxide from sources or roadways, particularly the adjacent H-1 Freeway, not directly considered in the analysis were accounted for by adding a background concentration of 2 ppm to all predicted concentrations for 1997. With the exception of right-turning off-ramp traffic, the project traffic study indicates that overall traffic volumes are not expected to increase substantially during the next several years in the immediate project vicinity. Hence, a background value of 2 ppm was assumed to persist for the future (2020) scenarios studied.

Predicted Worst-Case 1-Hour Concentrations

Table 5 summarizes the final results of the modeling study in the form of the estimated worst-case 1-hour morning and afternoon ambient carbon monoxide concentrations. These results can be compared directly to the state and the national AAQS. Estimated worst-case carbon monoxide concentrations for the morning and two afternoon peak hours are presented in the table for three scenarios: year 1997 with existing traffic, year 2020 without the project and year 2020 with the project. The locations of these estimated worst-case 1-hour concentrations all occurred at or very near the subject intersection.

As indicated in the table, the estimated present highest worst-case 1-hour carbon monoxide concentration, 17.8 mg/m^3, occurred during the early afternoon peak hour. Estimated concentrations at the other two peak hours were close to that level with the morning at 17.7 mg/m^3 and the late afternoon at 16.4 mg/m^3.

In the year 2020 without the proposed project, the highest worst-case 1-hour concentration in the project vicinity was predicted to decrease to 17.3 mg/m^3. This too was predicted to occur during the early afternoon peak-traffic hour. The late afternoon worst-case concentration was estimated to reach 15.6 mg/m^3 and the morning yielded 15.9 mg/m^3. The decrease in predicted concentrations in comparison to the 1997 scenario can be attributed to the proliferation of cleaner running vehicles in the year 2020 and also to the only slightly higher traffic volumes for that year compared to 1997.

With the project, the highest predicted 1-hour worst-case concentration for 2020 increased to 18.1 mg/m^3. Once again this was predicted to occur during the early afternoon peak traffic hour. The estimated worst-case morning and late afternoon concentrations were predicted to be 17.1 mg/m^3 and 16.9 mg/m^3, respectively. The small increase in the estimated concentrations compared to the without project scenario was due to the second right-turn lane on the improved off-ramp which concentrates more vehicles into the intersection area.

All estimated worst-case 1-hour carbon monoxide levels for all scenarios were within the national AAQS of 40 mg/m^3. However, all estimated concentrations were predicted to exceed the more stringent state 1-hour standard of 10 mg/m^3. It should be noted that because the state standards are set at such stringent levels, it is likely that they are currently exceeded at many locations in the state that have even moderate traffic volumes.

Predicted Worst-Case 8-Hour Concentrations

Worst-case 8-hour carbon monoxide concentrations were estimated by multiplying the worst-case 1-hour values by a persistence factor of 0.5. This accounts for two factors: (1) traffic volumes averaged over eight hours are lower than peak 1-hour values, and (2) meteorological dispersion conditions are more variable (and hence more favorable) over an 8-hour period than they are for a single hour. Based on monitoring data, 1-hour to 8-hour persistence factors for most locations generally vary from 0.4 to 0.8 with 0.6 being the most typical. One recent study based on modeling [9] concluded that 1-hour to 8-hour persistence factors could typically be expected to range from 0.4 to 0.5. EPA guidelines [10] recommend using a value of 0.6 to 0.7 unless a locally derived persistence factor is available. Monitoring data for Honolulu reported by the Department of Health suggest that this factor may range between about 0.35 and 0.55 depending on location and traffic variability. Considering the location of the project and the traffic pattern for the area, a 1-hour to 8-hour persistence factor of 0.5 will likely yield reasonable estimates of worst-case 8-hour concentrations.

The resulting estimated worst-case 8-hour concentrations are indicated in Table 6. For the 1997 scenario, the estimated worst-case 8-hour carbon monoxide concentration at the H-1 Freeway off-ramp/Punahou and Bingham Streets intersection was 8.9 mg/m^3. Without the project, the predicted maximum value for the year 2020 was 8.7 mg/m^3. With the project in the year 2020, the highest worst-case concentration was estimated at 9.1 mg/m^3.

Upon comparing the predicted values to the AAQS, it appears that the 10 mg/m^3 national 8-hour standard would be met in the project

vicinity for all scenarios. However, as it was with the 1-hour standard, the state 8-hour limit of 5 mg/m^3 could potentially be exceeded in all three of the scenarios that were studied. Again, because the state standards are set at such stringent levels, it is likely that they are currently exceeded at many locations in the state that have even moderate traffic volumes.

Conservativeness of Estimates

The results of this study reflect several assumptions that were made concerning both traffic movement and worst-case meteorological conditions. One such assumption concerning worst-case meteorological conditions is that a wind speed of 1 meter per second with a steady direction for 1 hour will occur. A steady wind of 1 meter per second blowing from a single direction for an hour is extremely unlikely and may occur only once a year or less. With wind speeds of 2 meters per second, for example, computed carbon monoxide concentrations would be only about half the values given above. The 8-hour estimates are also conservative in that it is unlikely that anyone would occupy the assumed receptor sites (within 3 m of the roadways) for a period of 8 hours.

8.0 CONCLUSIONS AND RECOMMENDATIONS

The major potential short-term air quality impact of the project will occur from the emission of fugitive dust during construction. Uncontrolled fugitive dust emissions from construction activities are estimated to amount to about 1.2 tons per acre per month, depending on rainfall. To control dust, active work areas should be watered at least twice daily on days without rainfall. Dirt-hauling trucks should be covered when traveling on roadways to

prevent windage. A routine road cleaning and/or tire washing program will also help to reduce fugitive dust emissions that may occur as a result of trucks tracking dirt onto paved roadways in the project area.

During construction phases, emissions from engine exhausts (primarily consisting of carbon monoxide and nitrogen oxides) will also occur both from on-site construction equipment and from vehicles used by construction workers and from trucks traveling to and from the project. Increased vehicular emissions due to disruption of traffic by construction equipment and/or commuting construction workers can be alleviated by moving equipment and personnel to the site during off-peak traffic hours.

After project construction is completed, long-term impacts from pollutants emitted by motor vehicle traffic on the improved off-ramp and in the off-ramp/Punahou and Bingham Streets intersection will not cause any significant increases in air pollution levels in the project area. This conclusion was reached based on the comparison of predicted worst-case carbon monoxide concentrations for the existing case to those for future scenarios with and without the project. Because of the minimal long-term impacts the project is expected to cause, long-term mitigation appears to be unwarranted.

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9. "Persistence Factors for Mobile Source (Roadway) Carbon Monoxide Modeling", C. David Cooper, Journal of the Air & Waste Management Association, Volume 39, Number 5, May 1989.

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FIGURE 1 - LOCATION MAP

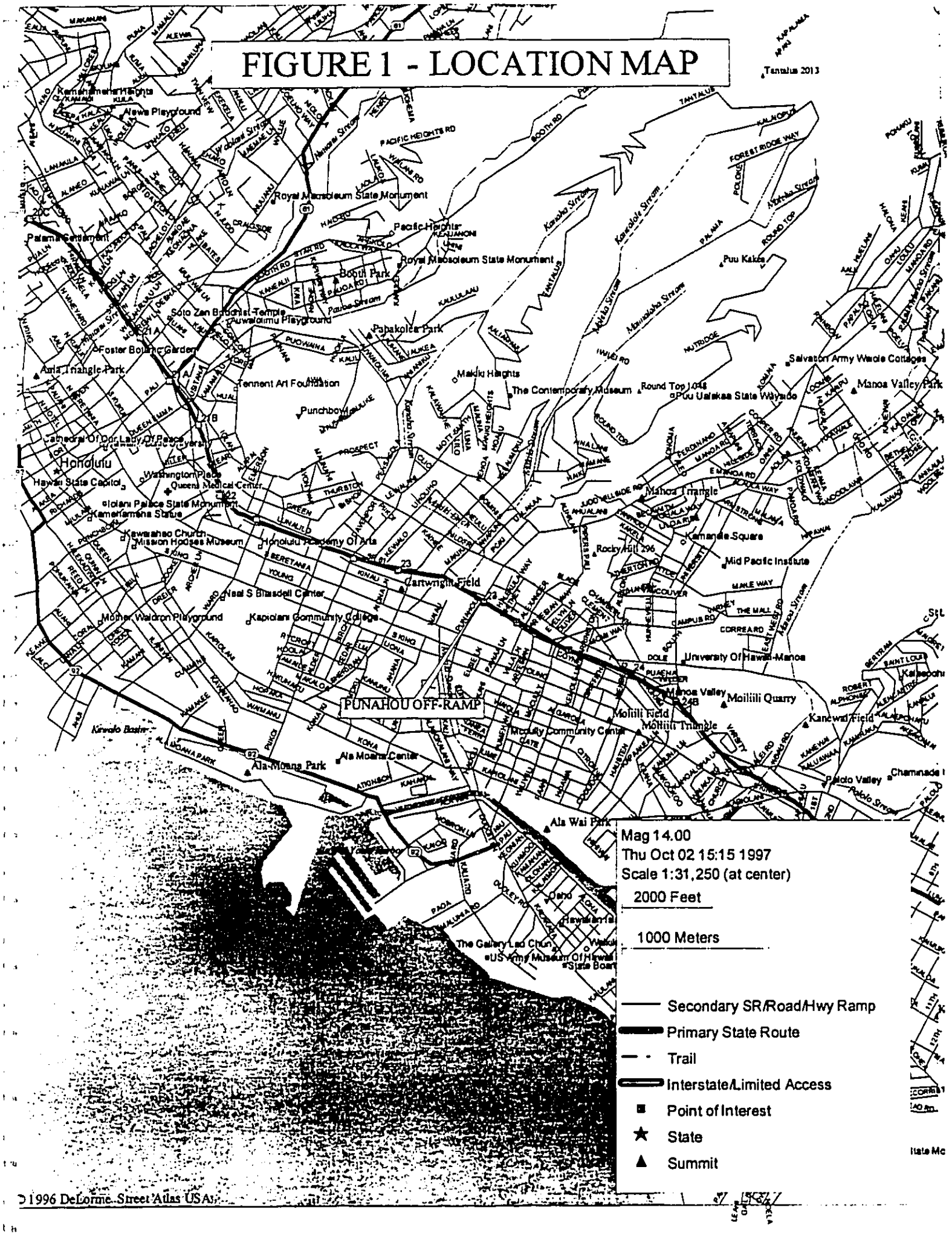

Table 1

SUMMARY OF STATE OF HAWAII AND NATIONAL
AMBIENT AIR QUALITY STANDARDS

Pollutant	Units	Averaging Time	Maximum Allowable Concentration		
			National Primary	National Secondary	State of Hawaii
Particulate Matter (<10 microns)	$\mu g/m^3$	Annual 24 Hours	50[a] 150[b]	50[a] 150[b]	50 150[c]
Particulate Matter (<2.5 microns)	$\mu g/m^3$	Annual 24 Hours	15[a] 65[d]	15[a] 65[d]	- -
Sulfur Dioxide	$\mu g/m^3$	Annual 24 Hours 3 Hours	80 365[c] -	- - 1300[c]	80 365[c] 1300[c]
Nitrogen Dioxide	$\mu g/m^3$	Annual	100	100	70
Carbon Monoxide	mg/m^3	8 Hours 1 Hour	10[c] 40[c]	- -	5[c] 10[c]
Ozone	$\mu g/m^3$	8 Hours 1 Hour	157[e] 235[f]	157[e] 235[f]	- 100[c]
Lead	$\mu g/m^3$	Calendar Quarter	1.5	1.5	1.5
Hydrogen Sulfide	$\mu g/m^3$	1 Hour	-	-	35[c]

[a] Three-year average of annual arithmetic mean.

[b] 99th percentile value averaged over three years.

[c] Not to be exceeded more than once per year.

[d] 98th percentile value averaged over three years.

[e] Three-year average of fourth-highest daily 8-hour maximum.

[f] Standard is attained when the expected number of exceedances is less than or equal to 1.

Table 2

ANNUAL WIND FREQUENCY FOR HONOLULU INTERNATIONAL AIRPORT (%)

Wind Direction	Wind Speed (knots) 0-3	4-6	7-10	11-16	17-21	22-27	28-33	34-40	>40	Total
N	0.5	2.5	1.3	0.5	0.0	0.0	0.0	0.0	0.0	4.8
NNE	0.3	1.2	1.6	1.5	0.2	0.0	0.0	0.0	0.0	4.7
NE	0.3	2.1	6.1	11.0	3.2	0.3	0.0	0.0	0.0	23.0
ENE	0.2	2.5	10.9	16.6	4.1	0.3	0.0	0.0	0.0	34.7
E	0.1	1.0	2.5	2.8	0.5	0.0	0.0	0.0	0.0	7.0
ESE	0.0	0.3	0.4	0.3	0.0	0.0	0.0	0.0	0.0	1.1
SE	0.0	0.3	0.8	1.0	0.1	0.0	0.0	0.0	0.0	2.2
SSE	0.1	0.4	1.2	0.7	0.1	0.0	0.0	0.0	0.0	2.4
S	0.1	0.5	1.4	0.6	0.1	0.0	0.0	0.0	0.0	2.7
SSW	0.0	0.3	0.8	0.3	0.0	0.0	0.0	0.0	0.0	1.5
SW	0.0	0.2	0.8	0.4	0.0	0.0	0.0	0.0	0.0	1.5
WSW	0.0	0.3	0.5	0.4	0.0	0.0	0.0	0.0	0.0	1.2
W	0.1	0.5	0.2	0.2	0.0	0.0	0.0	0.0	0.0	1.1
WNW	0.2	1.4	0.3	0.1	0.0	0.0	0.0	0.0	0.0	2.0
NW	0.4	2.3	0.8	0.1	0.0	0.0	0.0	0.0	0.0	3.8
NNW	0.5	2.3	0.8	0.2	0.0	0.0	0.0	0.0	0.0	3.8
CALM	2.5									2.5
TOTAL	5.4	18.3	30.6	36.5	8.5	0.7				100.0

Source: Climatography of the United States No. 90 (1965-1974), Airport Climatological Summary, Honolulu International Airport, Honolulu, Hawaii, U.S. Department of Commerce, National Climatic Center, Asheville, NC, August 1978.

Table 3

AIR POLLUTION EMISSIONS INVENTORY FOR ISLAND OF OAHU, 1993

Air Pollutant	Point Sources (tons/year)	Area Sources (tons/year)	Total (tons/year)
Particulate	25,891	49,374	75,265
Sulfur Oxides	39,230	nil	39,230
Nitrogen Oxides	92,436	31,141	123,577
Carbon Monoxide	28,757	121,802	150,559
Hydrocarbons	4,160	421	4,581

Source: Final Report, "Review, Revise and Update of the Hawaii Emissions Inventory Systems for the State of Hawaii", prepared for Hawaii Department of Health by J.L. Shoemaker & Associates, Inc., 1996

Table 4

ANNUAL SUMMARIES OF AIR QUALITY MEASUREMENTS
FOR MONITORING STATIONS NEAREST
PUNAHOU OFF-RAMP PROJECT

Parameter / Location	1989	1990	1991	1992	1993
Sulfur Dioxide / Downtown Honolulu					
No. of 24-Hr Samples	52	60	53	34	317
Range of 24-Hr Values (µg/m3)	<5-8	<5-<5	<5-<5	0-3	0-9
Average Daily Value (µg/m3)	<5	<5	<5	1	2
No. of State AAQS Exceedances	0	0	0	0	0
PM-10 / Liliha					
No. of 24-Hr Samples	55	54	55	46	30
Range of 24-Hr Values (µg/m3)	10-33	8-36	8-33	9-25	9-52
Average Daily Value (µg/m3)	16	15	18	16	18
No. of State AAQS Exceedances	-	-	-	-	-
Carbon Monoxide / Downtown Honolulu					
No. of Days of 1-Hr Samples	323	362	348	294	320
Range of 1-Hr Values (mg/m3)	0.3-9.7	0.1-7.1	0.3-10.1	0.4-9.6	0.3-13.3
Arithmetic Average of 1-Hr Values (mg/m3)	1.9	1.5	1.7	1.6	1.8
No. of State 1-Hr AAQS Exceedances	0	0	1	0	1
Ozone / Sand Island					
No. of Days of 1-Hr Samples	342	340	312	298	290
Range of 1-Hr Values (µg/m3)	0-94	4-116	9-120	9-126	31-111
Arithmetic Average of 1-hr Values (µg/m3)	15	36	50	54	68
No. of State AAQS Exceedances	0	2	3	6	7
Lead / Downtown Honolulu					
No. of 24-Hr Samples	-	-	50	44	51
Range of 24-Hr Values (µg/m3)	-	-	0-0.1	0-0.1	0-0.1
Average Quarterly Value (µg/m3)	-	-	0.0	0.0	0.0
No. of State AAQS Exceedances	-	-	0	0	0
Nitrogen Dioxide / Kapolei					
No. of 24-Hr Samples	-	-	-	-	131
Range of 24-Hr Values (µg/m3)	-	-	-	-	4-29
Average Daily Value (µg/m3)	-	-	-	-	12
No. of State AAQS Exceedances	-	-	-	-	0

Source: Hawaii Air Quality Data for the Period of January 1988 to December 1993, Hawaii Department of Health.

Table 5

ESTIMATED WORST-CASE 1-HOUR CARBON MONOXIDE CONCENTRATIONS AT INTERSECTION OF H-1 OFF-RAMP WITH PUNAHOU AND BINGHAM STREETS (milligrams per cubic meter)

Scenario	Maximum Concentration		
	AM	PM Early	PM Late
1997 Existing	17.7	17.8	16.4
2020 Without Project	15.9	17.3	15.6
2020 With Project	17.1	18.1	16.9

Hawaii State AAQS: 10
National AAQS: 40

Table 6

ESTIMATED WORST CASE 8-HOUR CARBON MONOXIDE CONCENTRATIONS AT INTERSECTION OF H-1 OFF-RAMP WITH PUNAHOU AND BINGHAM STREETS (milligrams per cubic meter)

Scenario	*Maximum Concentration*
1997 Existing	8.9
2020 Without Project	8.7
2020 With Project	9.1

Hawaii State AAQS: 5
National AAQS: 10

APPENDIX D

Environmental Noise Assessment,

Punahou Off-Ramp Improvements, Honolulu, Hawaii

D. L. ADAMS ASSOCIATES, LTD.
dba
DARBY & ASSOCIATES
ACOUSTICAL CONSULTANTS

Project No. 98-55

ENVIRONMENTAL NOISE ASSESSMENT
PUNAHOU OFF-RAMP IMPROVEMENTS
HONOLULU, HAWAII

October, 1998

Prepared for
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5	Proposed Six-Foot High CMU Wall
6	Minimum Length of Noise Barrier Wall for the Jodo Mission of Hawaii Facility
7	Construction Equipment Noise Levels

1.0 SUMMARY

1.1 Noise level measurements conducted the vicinity of the project site indicate the ambient noise levels are currently dominated by traffic on H-1 Freeway and Punahou Street. The traffic, together with an occasional overflight by aircraft, contributed to measured ambient noise levels ranging from about 60 to 73 dBA for the measurements conducted adjacent to the Jodo Mission of Hawaii and Shriners Hospital for Crippled Children. These levels are typical for urban areas near major thoroughfares.

1.2 Without the proposed project, the traffic noise levels should slightly increase, less than 1 dB, relative to existing levels at the Jodo Mission and Shriners Hospital for the year 2020. With the proposed project, the traffic noise levels should also increase less than 1 dB at these locations for the year 2020.

1.3 Results of the traffic noise analyses indicate similar increases in traffic noise levels can be expected at locations mauka of the proposed project site including, Maryknoll High School and Arcadia Retirement Residence.

1.4 A traffic noise level increase of less than 1 dB should not be perceptible to residents/occupants of properties adjacent to the off-ramp and is, therefore, not considered to be significant. However, in accordance with the Hawaii Department of Transportation (HDOT) Noise Analysis and Abatement Policy, exterior noise impacts would occur at Locations 1 through 2B and 6 through 8, as shown in Figure 4, since the predicted future traffic noise levels "approach or exceed FHWA's noise abatement criteria." Thus, noise mitigation, e.g., noise barrier walls, should be considered.

1.5 The minimum height of the noise barrier wall required to provide a substantial traffic noise level reduction of at least 5 dB at the impacted locations were determined. Results indicate a 15-foot high wall would be required for the second floor space of the Jodo Mission of Hawaii, which may be considered aesthetically unpleasing and impractical to construct. An alternative method for abating traffic noise, such as providing air-conditioning, should be considered.

1.6 Traffic noise levels inside the future Orthotics Facility at Shriners Hospital for Crippled Children were predicted to be less than HDOT's recommended interior noise levels of 52 dBA based on the provided construction plans.

1.7 Noise due to the construction of the proposed project may impact the noise sensitive locations; however, as the noise will be transient no long term adverse effects are expected.

2.0 PROJECT DESCRIPTION

The proposed widening of the Punahou Off-Ramp will realign the exit lane and create an additional right turn lane onto Punahou Street for eastbound traffic exiting H-1. The new alignment and left turn lane will be taken on the makai side of the existing exit lane

starting from Makiki Street to Punahou Street as shown in Figure 1. In addition to the exit lane realignment and new right turn lane, the right lane of the three through lanes eastbound will offer the option to traffic of continuing on the freeway, or exiting the freeway and continuing straight on Bingham Street or turning left on Punahou Street as shown in Figure 2.

3.0 NOISE STANDARDS AND GUIDELINES

Standards and guidelines promulgated by the various local, state and federal agencies use different noise descriptors to express noise levels. To better understand the various noise descriptors used, a brief description of some common acoustical terminology is presented in Appendix A.

3.1 U.S. Federal Highway Administration

The Federal Highway Administration (FHWA) has developed noise abatement criteria as part of its regulation which constitute the noise standards mandated by 23 U.S.C. 109(i) [Reference 1]. The noise abatement criteria is comprised of four land use categories and corresponding maximum hourly equivalent sound levels, $L_{eq(h)}$, which are listed in Table 1. The FHWA noise standards are applicable to Federal or Federal-aid highway projects and,. . . "All highway projects which are developed in conformance with this regulation shall be deemed to be in conformance with the Federal Highway Administration (FHWA) noise standards."

3.2 U.S. Environmental Protection Agency

The U.S. Environmental Protection Agency (EPA) has identified a range of yearly day-night average sound levels, L_{dn}, sufficient to protect public health and welfare from the effects of environmental noise [Reference 2]. The EPA has established a goal to reduce exterior environmental noise to an L_{dn} not exceeding 65 dBA and a future goal to reduce exterior environmental noise to an L_{dn} not exceeding 55 dBA. Additionally, the EPA states that to protect against hearing damage, one's 24-hour equivalent sound level exposure, $L_{eq(24)}$, at the ear should not exceed 70 dBA. The EPA emphasizes that these goals are not intended as regulations as they have no authority to regulate noise levels, but rather these goals 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.

3.3 State of Hawaii Department of Transportation

The Hawaii Department of Transportation (HDOT) Noise Analysis and Abatement Policy [Reference 3] is substantially based on the noise standards adopted by the Federal Highway Administration [Reference 1] including the Noise Abatement Criteria listed in Table 1.

4.0 EXISTING ACOUSTICAL ENVIRONMENT

On Tuesday and Wednesday, September 30 and October 1, 1997, the ambient noise levels were measured at Locations A, B, C and D in the vicinity of the Punahou Off-Ramp, as shown in Figure 3. These measurement positions are located on two developed properties adjacent to the off-ramp, i.e., the Shriners Hospital for Crippled Children and the Jodo Mission of Hawaii. The information gathered from these measurements was used as the basis from which any impacts to nearby noise sensitive receptors could be predicted. At each of these locations, 15-minute samples were taken of the continuous equivalent sound level, L_{eq}, using a Larson-Davis Model 700 sound level meter during the morning or afternoon peak travel periods.

Weather conditions during the measurements were partly sunny skies with temperatures in the low to mid-80's with tradewinds blowing from 0 to 5 mph. The results from the measurements are presented in Table 2, along with comments relative to identifiable noise sources that contributed to the results.

The measured ambient noise levels, expressed in terms of equivalent continuous noise levels, ranged from about 60 to 73 dBA which is typical for urban areas near major thoroughfares. The highest noise level was measured at Location D which is adjacent to the Jodo Mission of Hawaii and about 50 feet from the edge of the H-1 Freeway eastbound exit lane.

Additional noise measurements at Jodo Mission of Hawaii and at the future Orthotics Facility of the Shriners Hosipital for Crippled Children were taken on the morning of March 26, 1998 and October 20, 1998, respectively. Ten to 15-minute samples were obtained inside the facilities and near the building facades. The results are reported in Table 2 and the locations are shown in Figure 3.

5.0 POTENTIAL IMPACTS DUE TO THE PROJECT AND NOISE MITIGATION

5.1 Traffic Noise

Traffic noise levels corresponding to the morning and afternoon peak hour travel periods for the existing and future year, 2020, were calculated at eight locations. These locations are mauka and makai of the H-1 Freeway from Makiki Street to Punahou Street and are illustrated in Figure 4. The traffic noise levels were calculated using the Federal Highway Administration traffic noise prediction computer model, Stamina 2.0 [Reference 4] in conjunction with existing and predicted peak hour traffic volumes [Reference 5]. The predicted existing and future peak hour traffic noise levels at each of the eight locations shown in Figure 4 are summarized in Table 3. To more easily understand the effect the proposed project will have at these locations, Table 4 summarizes the difference in future traffic noise levels relative to the existing traffic noise levels, and the difference between the future build and no build scenarios.

As can be seen in Table 4, the predicted traffic noise level increases attributable to the project at the assessed locations were less than or equal to 0.4 dB. An increase of this magnitude is well below the threshold change in noise of 3 dB that is perceptible to most people with normal hearing and is not considered significant.

The HDOT Noise Analysis and Abatement Policy [Reference 3] considers a noise impact to occur,". . . when the predicted traffic noise levels approach or exceed the FHWA's noise abatement criteria (NAC), or when the predicted traffic noise levels substantially exceed the existing noise levels." Furthermore, HDOT defines "approach" as being at least 1 dB less than the NAC and a substantial increase as being at least 15 dB.

In accordance with FHWA's NAC, presented in Table 1, the exterior equivalent hourly sound level ($L_{eq(h)}$) of 67 dBA is applicable to the Jodo Mission of Hawaii, Shriners Hospital for Crippled Children, Maryknoll High School and Arcadia Retirement Residence. As shown in Table 3, the predicted future (2020) traffic noise levels "approach or exceed" 67 dBA at Locations 1 through 2B and 6 through 8 on these properties. Thus, in accordance with HDOT Noise Analysis and Abatement Policy, traffic noise impacts would occur at these locations and noise abatement measures should be considered. Possible measures include constructing roadside noise barriers, i.e., walls, earthen berms or a combination of both, and/or providing air-conditioning for the impacted dwellings.

The HDOT Noise Analysis and Abatement Policy also states that noise abatement measures must be "reasonable and feasible." One of the "reasonable and feasible" criteria is achieving a noise reduction of at least 5 dB. The effectiveness of a 6-foot high concrete or concrete masonry unit (CMU) wall makai of H-1 Freeway between Stations 0+00 and 10+50 of the project as shown in Figure 5 [Reference 6] was thus, evaluated using the same computer model. Results indicate less than 4 dB of noise reduction at Locations 1 through 2B and no noise reduction at Locations 6 through 8. Various wall height options were then evaluated and the results are presented in Table 5.

Jodo Mission of Hawaii

As can be seen, increasing the wall height to 8 feet yields about 5 dB of noise level reduction at the ground floor of the Jodo Mission (Location 1). For the second floor space of the facility (Location 1A), non of the options listed in Table 5 provides adequate traffic noise attenuation in accordance with HDOT's abatement criteria. In order to achieve a 5 dB noise reduction at Location 1A, the noise barrier wall must be at least 15 feet above the finished pavement elevation and, as a minimum, extend for the distance as shown in Figure 6 (i.e., between Stations 0+00 and 4+00). This wall extension should be also be the minimum length of the 8-foot high wall for the first floor space of the facility.

An alternative to the noise barrier walls is to provide air-conditioning allowing doors and windows to be closed. Typically, normal construction in Hawaii can be expected to provide an outdoor to indoor noise level reduction of 9 to 12 dB. Based on the measurement results presented in Table 2, air-conditioning would provide approximately

15 dB of traffic noise level reduction in the second floor space of the Jodo Mission of Hawaii Facility.

Shriners Hospital for Crippled Children

For Location 2 at the Shriners Hospital's open area near the off-ramp right-of-way, as shown in Figure 4, noise barrier options 4 and 7 would provide about 5 dB of exterior traffic noise reduction. However, for Locations 2A and 2B, the height of the noise barrier wall would need to be 12 feet and 15 feet above the finished pavement elevation, respectively, in order to achieve 5 dB of noise attenuation, which may be considered impractical since noise sensitive, outdoor activities are not expected in the vicinity of these locations. Interior traffic noise levels in the buildings near these locations, however, are of concern. Traffic noise levels inside the future Orthotics Facility near Location 2A were, thus, evaluated. Based on the traffic noise projection results and the construction plans for the facility [References 7 and 8], which include utilizing eight-inch thick, grout-filled concrete masonry units (CMU) with 1" thick, double-glazed windows for the exterior walls and providing air-conditioning for the spaces within the facility, the proposed Orthotics Facility should not experience interior traffic levels greater than HDOT's limit of 51 dBA.

Maryknoll High School and Arcadia Retirement Residence

In order to achieve any traffic noise reduction at these properties (Locations 6 through 8), a noise barrier wall located mauka of H-1 Freeway would be required. For a 9-foot high wall that extends from the school's basketball court to Punahou Street, about 6 dB of noise attenuation was calculated for Location 6 and minimal noise reduction (i.e., less than 1 dB) for Locations 7 and 8. The reason is traffic noise level projections at Locations 7 and 8 were calculated for receivers located on the sixth floor. Since it would be impractical to construct a wall high enough to provide substantial noise reduction at these two locations, alternative abatement measures (e.g., providing air-conditioning) should be considered.

5.2 Construction Noise

The construction of the proposed project will involve excavating, grading and paving. The various construction phases could generate significant noise, which could impact the nearby noise sensitive areas. The actual noise levels produced are dependent on the construction methods employed during each phase of the construction process. Typical noise level ranges produced by various types of construction equipment are shown on Figure 7. Earth moving equipment, e.g., diesel engine powered bulldozers, trucks, backhoes, front-end loaders, graders, etc., will probably be the noisiest equipment used during construction. However, as the noise will be temporary, no lasting impact due to the construction of the proposed project is expected.

REFERENCES:

1. *Department of Transportation, Federal Highway Administration Procedures for Abatement of Highway Traffic Noise*, Title 23, CFR, Chapter 1, Subchapter J, Part 772, 38 FR 15953, June 19, 1973, Revised at 47 FR 29654, July 8, 1982.

2. *Toward a National Strategy for Noise Control*, U.S. Environmental Protection Agency, April, 1977.

3. *Noise Analysis and Abatement Policy*, State of Hawaii Department of Transportation, Highways Division, Materials Testing and Research Branch, Approved June 26, 1997.

4. *Stamina 2.0*, FHWA Highway Traffic Noise Prediction Computer Model, FHWA/DF - 82/001a; U.S. Department of Transportation, April 1982.

5. *Traffic Analyses for Improvements to H-1 Punahou Off-Ramp*, Julian Ng, Inc., Draft, September 24, 1997, Received from R. M. Towill Corporation, September 26, 1997.

6. Plan and Profile of the Punahou Off-Ramp Improvements Received from Craig Luke of R.M. Towill Corporation on January 13, 1998.

7. Partial Construction Drawings, Renovations for Orthotics Department, Shriners Hospital for Crippled Children, June 22, 1998.

8. Facsimile Transmittals of Windows Specifications for the Future Shriners Orthotics Facility Received from Charles Kaneshiro of The CJS Group Architects, Ltd. on October 23 and 26, 1998.

TABLE 1

FEDERAL HIGHWAY ADMINISTRATION RECOMMENDED
EQUIVALENT HOURLY SOUND LEVEL BASED ON LAND USE

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

CORRECTION

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IMMEDIATELY FOLLOWING

TABLE 1

FEDERAL HIGHWAY ADMINISTRATION RECOMMENDED
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C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	---	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

TABLE 2

AMBIENT NOISE MEASUREMENT RESULTS

A. Exterior Noise Levels

Location*	L_{eq} (dBA)	Noise Source(s)
A	66.7	Traffic on H-1
B	64.2	Traffic on H-1 and Punahou Street
C	59.9	Traffic on Punahou Street and H-1
D	72.5	Traffic on H-1
E	67.6	Traffic on H-1
F	72.1	Traffic on H-1
G	71.5	Traffic on H-1
H	71.6	Traffic on H-1

* See Figure 3. Except for Location E, all were obtained with the microphone of the sound level meter at approximately 5 feet above the finished pavement elevation. At Location E, the microphone was at the elevation of the second floor windows.

B. Interior Noise Levels

Location	L_{eq} (dBA)	Room Condition
E1- In the Second Floor Space of the Jodo Mission	66.8	All windows open
	51.9	All windows closed
G1- Inside the Future Orthotics Facility	47.3	Under renovation. Windows closed.

TABLE 3

EXISTING (1997) AND FUTURE (2020) TRAFFIC NOISE LEVEL (L_{eq} in dBA) PROJECTIONS DURING MORNING AND AFTERNOON PEAK TRAVEL PERIODS

Locations*	Existing		2020			
			No Build		Build	
	AM	PM	AM	PM	AM	PM
1	72.6	71.7	73.2	72.4	73.4	72.8
1A	70.5	69.6	71.2	70.3	71.3	70.7
2	73.3	72.4	74.0	73.1	74.2	73.5
2A	73.1	72.1	73.8	72.8	73.8	73.1
2B	65.0	64.0	65.7	64.7	65.8	64.9
3	63.4	62.3	64.1	62.9	64.1	63.2
4	64.1	62.9	64.7	63.5	64.8	63.8
5	63.9	62.8	64.5	63.3	64.6	63.6
6	71.7	70.5	72.3	71.1	72.4	71.3
7	65.7	64.7	66.4	65.4	66.5	65.6
8	66.1	65.1	66.8	65.7	66.8	65.9

* See Figure 4. Except for Locations 1A, 7 and 8, all projections were calculated for receivers located on ground floor. Projections at Location 1A were made for receivers located on second floor. For Locations 7 and 8, receivers were assumed at the sixth floor level.

TABLE 4

INCREASE FROM EXISTING TRAFFIC NOISE LEVELS
DURING FUTURE MORNING AND AFTERNOON
PEAK TRAVEL PERIODS

Location*	2020				Increase due to Project	
	No Build		Build			
	AM	PM	AM	PM	AM	PM
1	0.6	0.7	0.8	1.1	0.2	0.4
1A	0.7	0.7	0.8	1.1	0.1	0.4
2	0.7	0.7	0.9	1.1	0.2	0.4
2A	0.7	0.7	0.7	1.0	0	0.3
2B	0.7	0.7	0.8	0.9	0.1	0.2
3	0.7	0.6	0.7	0.9	0	0.3
4	0.6	0.6	0.7	0.9	0.1	0.3
5	0.6	0.5	0.7	0.8	0.1	0.3
6	0.6	0.6	0.7	0.8	0.1	0.2
7	0.7	0.7	0.8	0.9	0.1	0.2
8	0.7	0.6	0.7	0.8	0	0.2

* See Figure 4.

Option	Height of Noise Barrier Wall Above Finished Pavement Elevation	[illegible]										
		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	No Noise Barrier Wall	73.4	71.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	6 Feet	69.6	70.2	73.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	8 Feet	68.1	69.3	71.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	10 Feet	66.6	68.3	69.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	8 Feet (bet. Sta. 0+00 & 5+50) 6 Feet (bet. Sta. 5+50 & 10+50)	68.1	69.3	71.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6	9 Feet (bet. Sta. 0+00 & 5+50) 6 Feet (bet. Sta. 5+50 & 10+50)	67.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	10 Feet (bet. Sta. 0+00 & 5+50) 6 Feet (bet. Sta. 5+50 & 10+50)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

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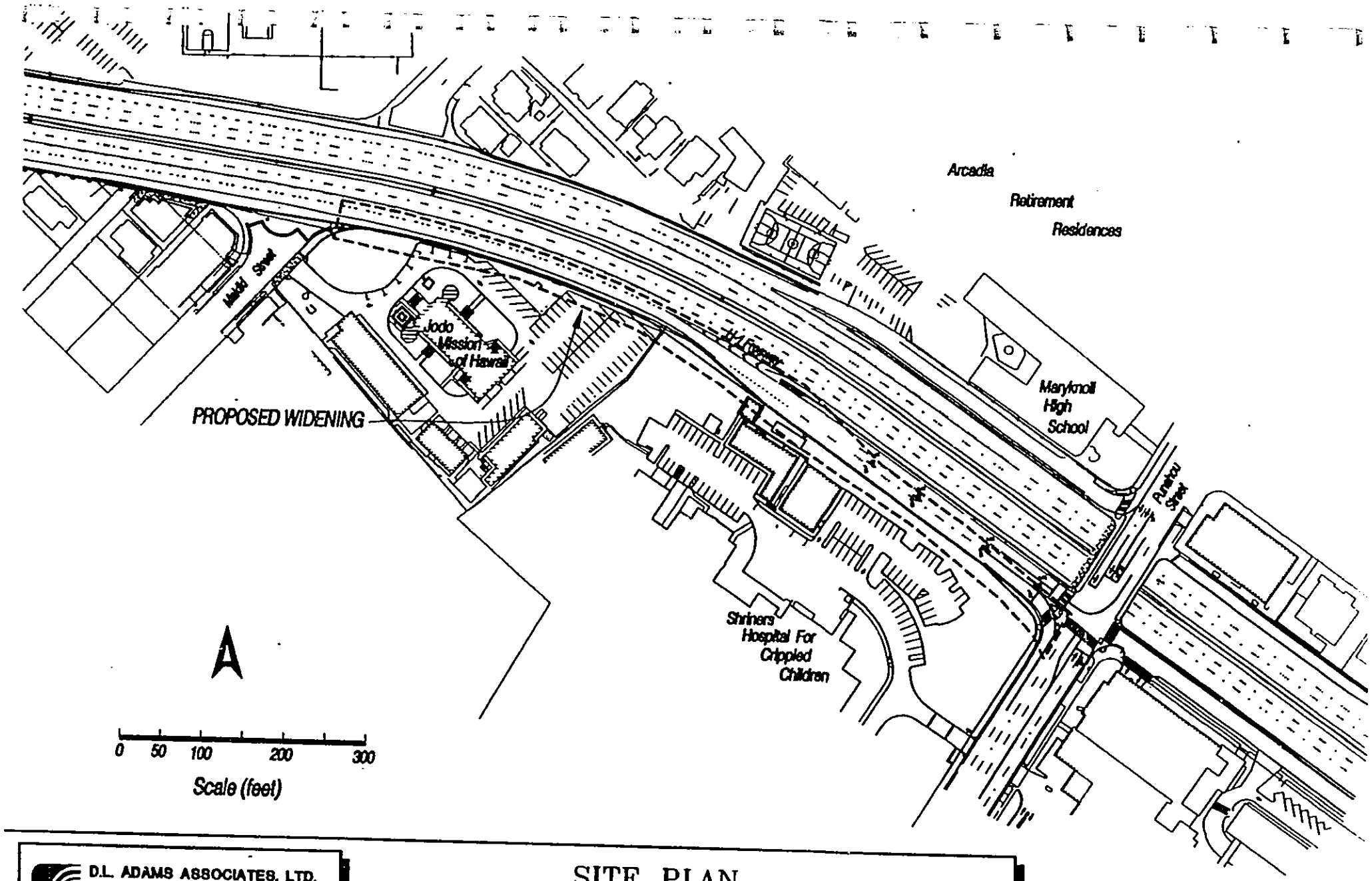
TABLE 5

RESULTS OF NOISE BARRIER ANALYSES

Option	Height of Noise Barrier Wall Above Finished Pavement Elevation	Future (2020) Traffic Noise Level (L_{eq} in dBA) at the Assessed Location Shown in Figure 4 During Morning Peak Travel Period										
		1	1A	2	2A	2B	3	4	5	6	7	8
1	No Noise Barrier Wall	73.4	71.3	74.2	73.8	65.8	64.1	64.8	64.6	72.4	66.5	66.8
2	6 Feet	69.6	70.2	73.4	73.4	64.4	62.9	63.3	62.9	72.4	66.5	66.8
3	8 Feet	68.1	69.3	71.0	72.8	63.6	62.2	62.4	62.2	72.4	66.5	66.8
4	10 Feet	66.6	68.3	69.3	70.5	62.8	61.5	61.7	61.5	72.4	66.5	66.8
5	8 Feet (bet. Sta. 0+00 & 5+50) 6 Feet (bet. Sta. 5+50 & 10+50)	68.1	69.3	71.1	73.2	63.7	62.6	63.1	62.8	72.4	66.5	66.8
6	9 Feet (bet. Sta. 0+00 & 5+50) 6 Feet (bet. Sta. 5+50 & 10+50)	67.4	68.8	70.4	72.7	63.4	62.4	63.0	62.7	72.4	66.5	66.8
7	10 Feet (bet. Sta 0+00 & 5+50) 6 Feet (bet. Sta. 5+50 & 10+50)	66.6	68.3	69.4	72.5	63.1	62.2	62.9	62.7	72.4	66.5	66.8



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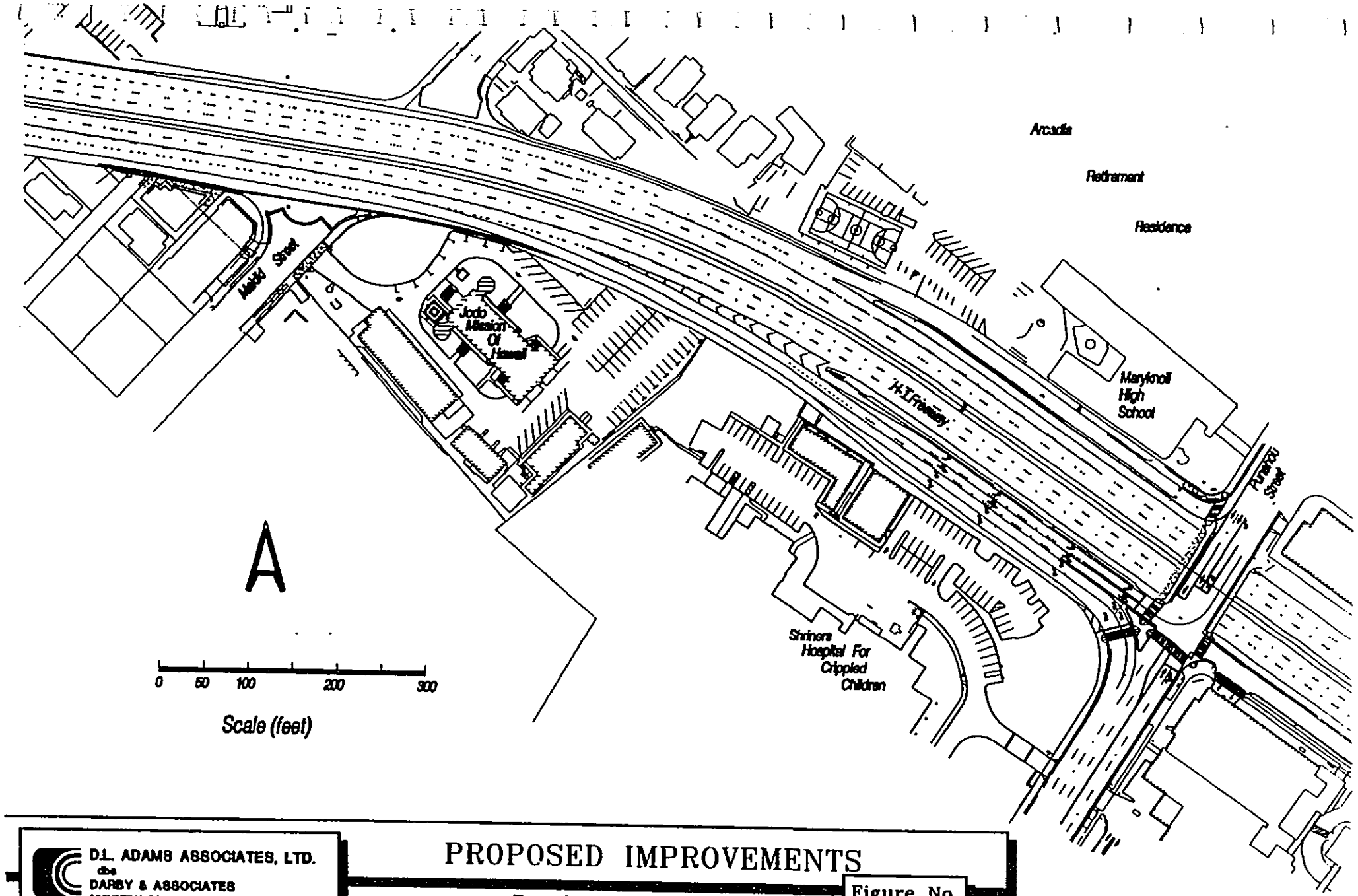
SITE PLAN

Punahou Off-Ramp

Figure No. 1

Date	Project No.	Drawn By
October, 1998	98-55	PTN



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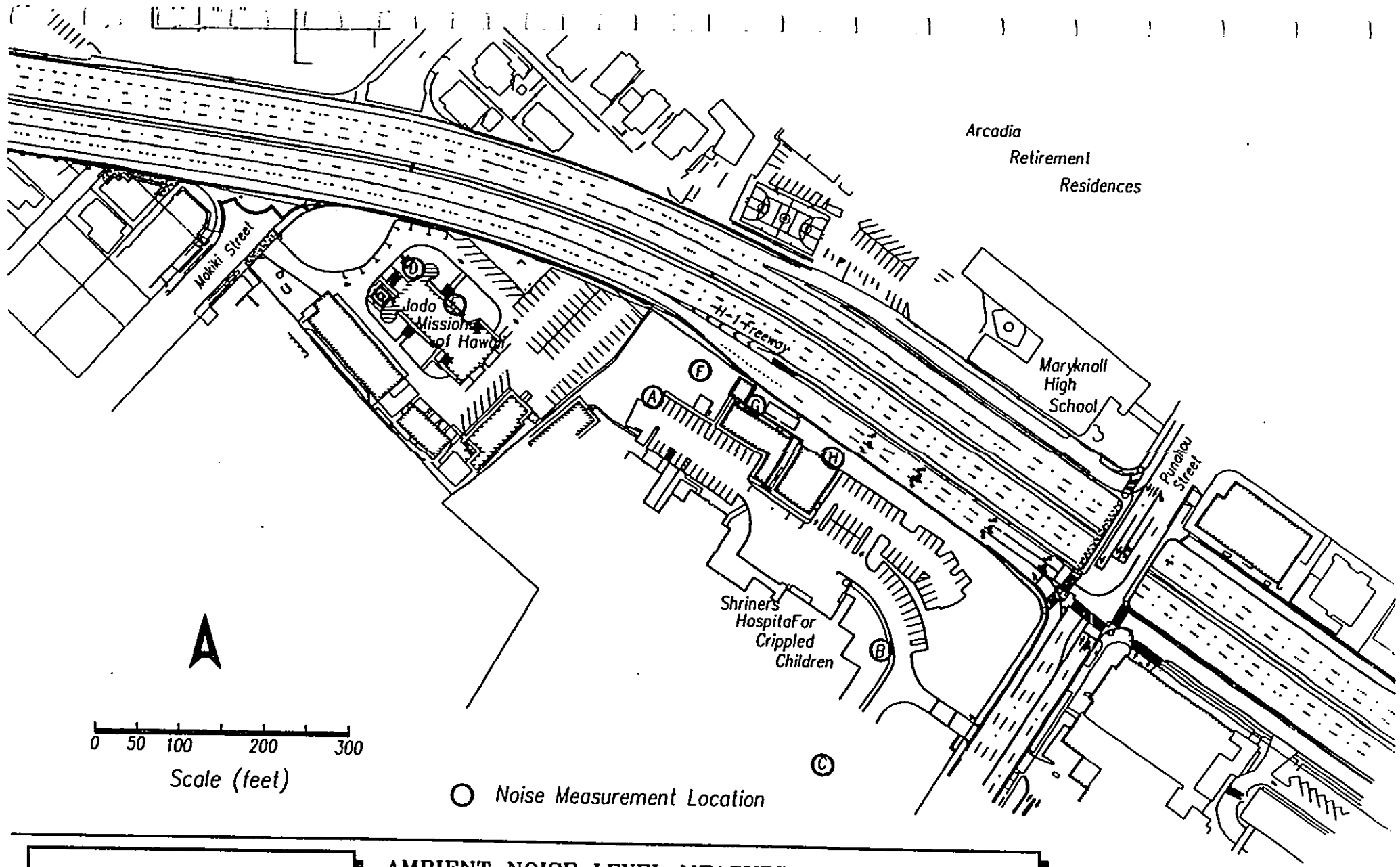
PROPOSED IMPROVEMENTS

Punahou Off-Ramp

Figure No. 2

Date	Project No.	Drawn By
October, 1998	98-55	PTN



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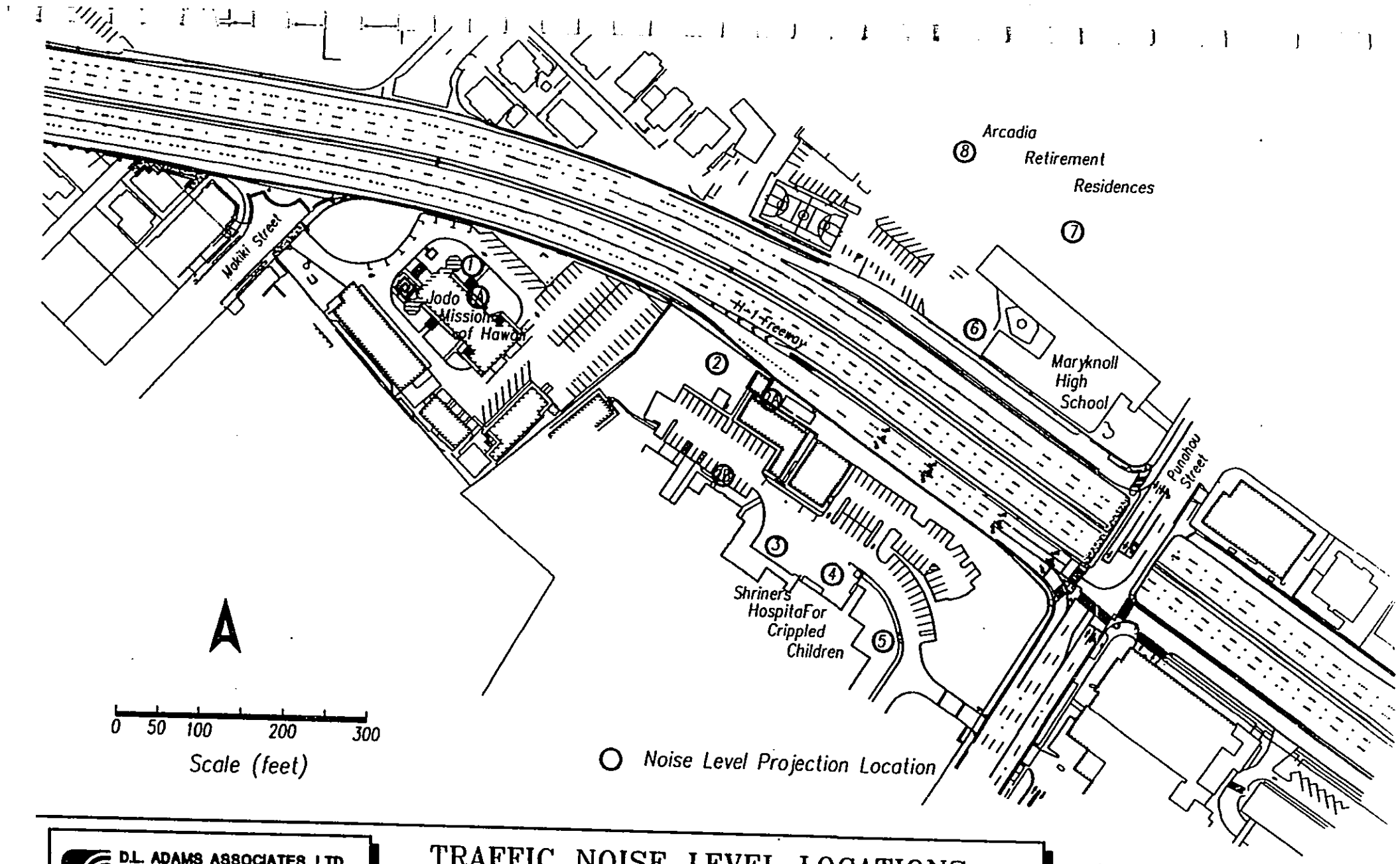
AMBIENT NOISE LEVEL MEASUREMENT LOCATIONS

Punahou Off-Ramp

Figure No. 3

Date	Project No.	Drawn By
October, 1998	98-55	PTN



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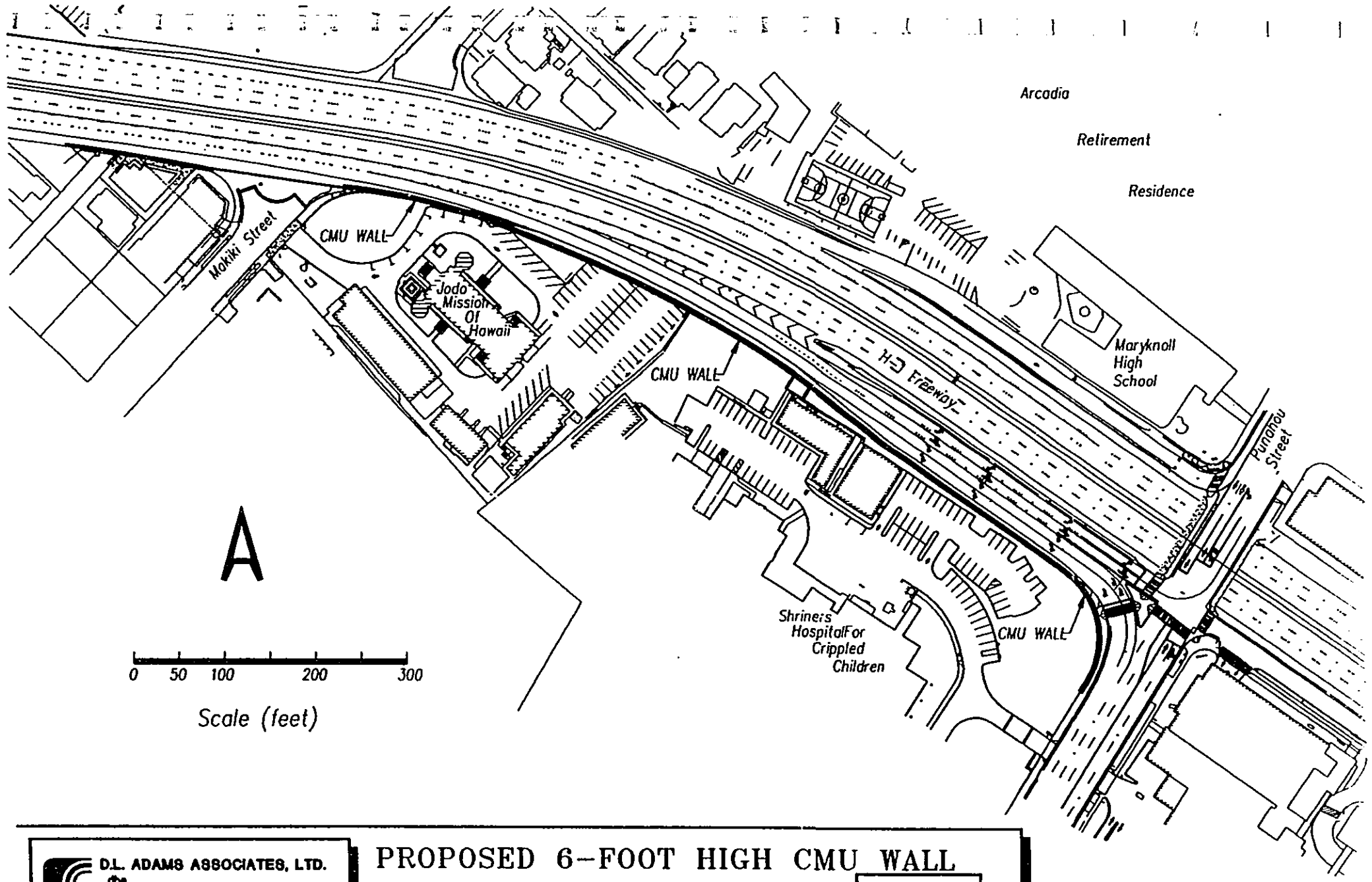
TRAFFIC NOISE LEVEL LOCATIONS

Punahou Off-Ramp

Figure No. 4

Date	Project No.	Drawn By
October, 1998	98-55	PTN



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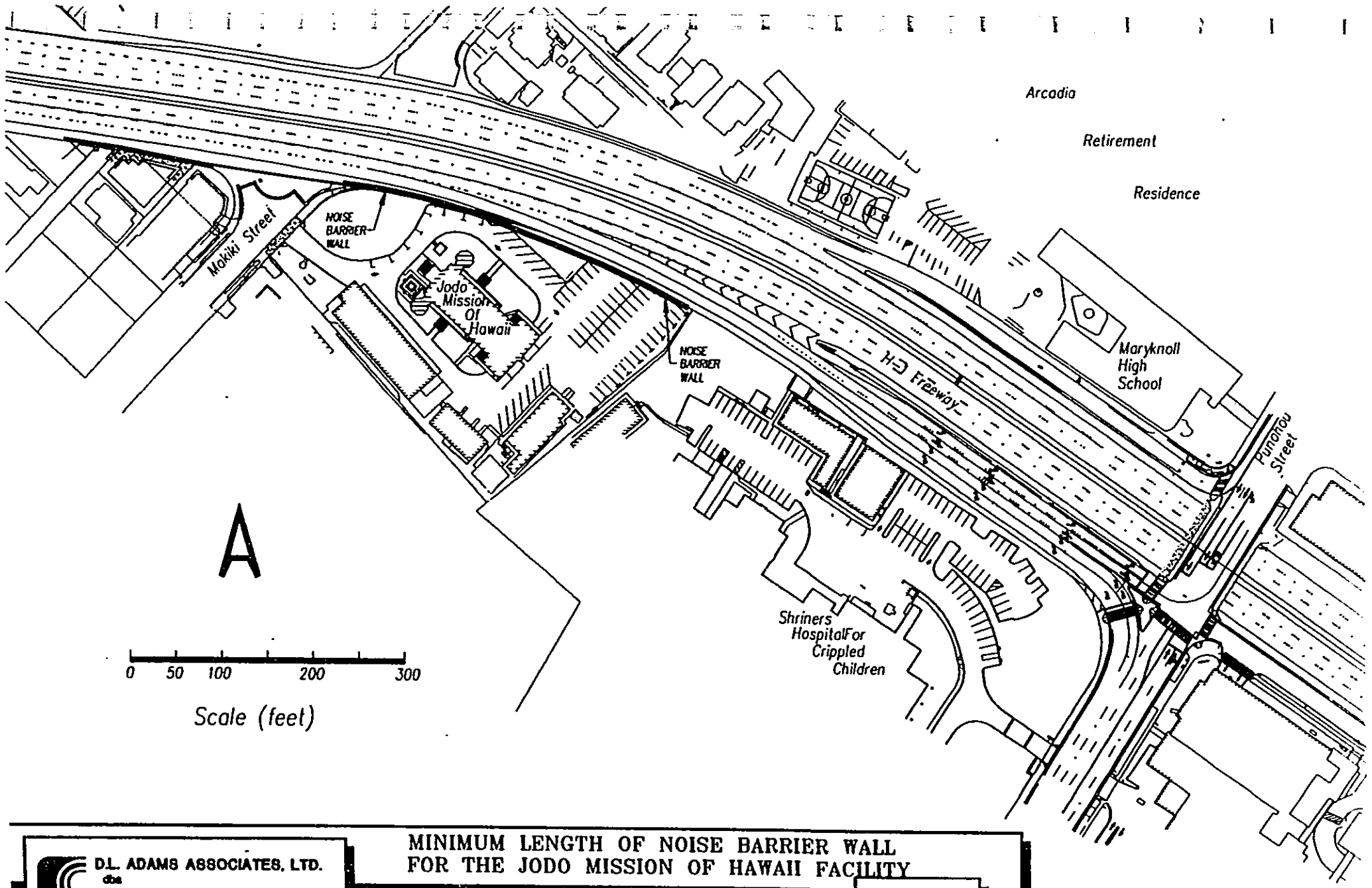
PROPOSED 6-FOOT HIGH CMU WALL

Punahou Off-Ramp

Figure No. 5

Date	Project No.	Drawn By
October, 1998	98-55	PTN



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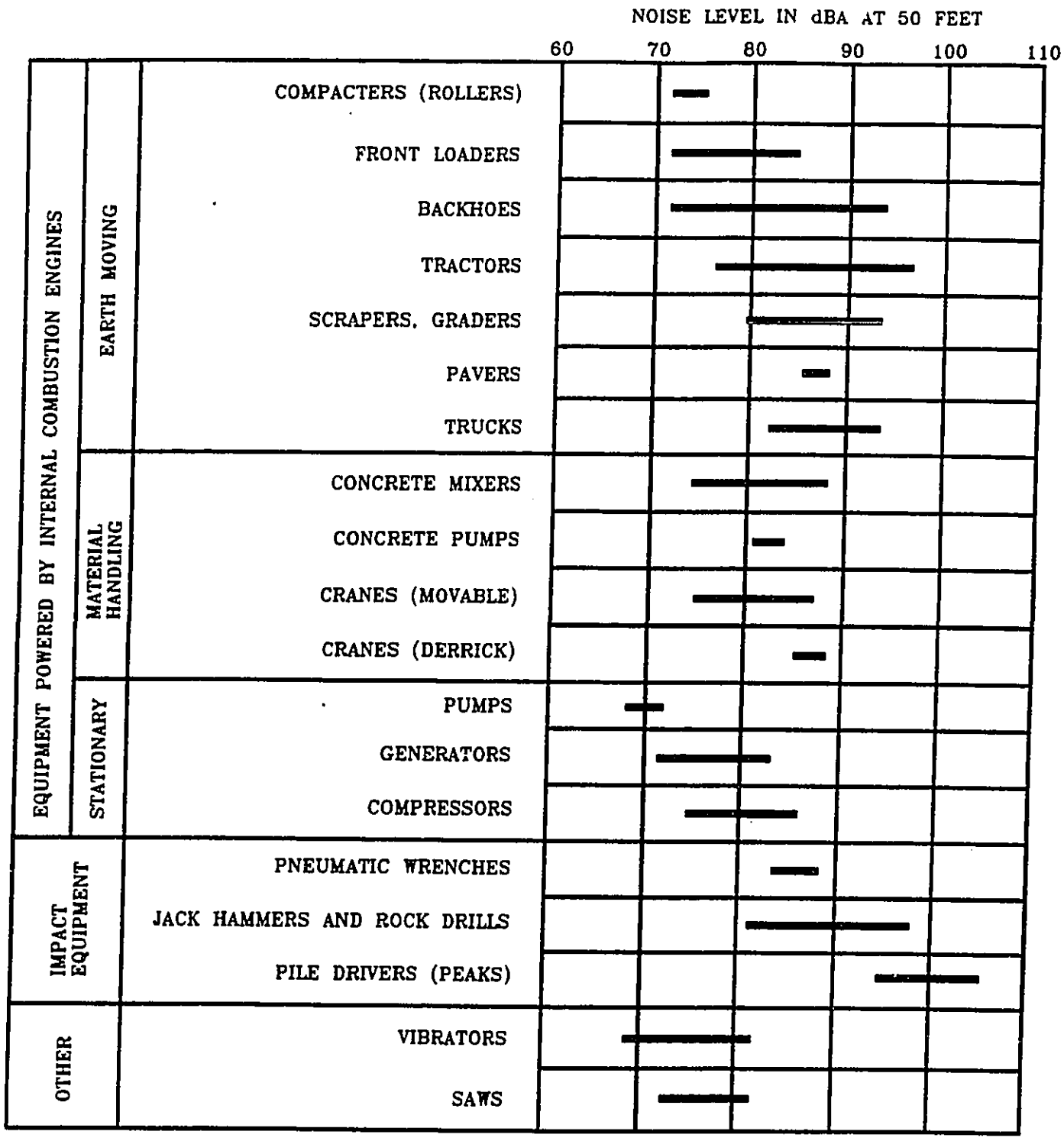
MINIMUM LENGTH OF NOISE BARRIER WALL
FOR THE JODO MISSION OF HAWAII FACILITY

Punahou Off-Ramp

Figure No. 6

Date	Project No.	Drawn By
October, 1998	98-55	PTN



NOTE: BASED ON LIMITED AVAILABLE DATA SAMPLES

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DARBY & ASSOCIATES
ACOUSTICAL CONSULTANTS
PALI PALMS PLAZA
970 N. KALAHEO AVENUE, SUITE A-311
KAILUA, HAWAII 96734
808/254-3318 FAX 808/254-5295

CONSTRUCTION EQUIPMENT NOISE LEVELS

Punahou Off-Ramp

Figure No. 7

Date	Project No.	Drawn By
October, 1998	98-55	PTN

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:

$$SPL = 20 \log (P/Pref) \text{ dB}$$

where P is the sound pressure fluctuation (above or below atmospheric pressure) and Pref 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 5 dB change corresponds to a noticeable change in loudness. A 10 dB increase or decrease in sound level corresponds to an approximate doubling or halving of loudness, respectively.

A-Weighted Sound Level

The human ear is more sensitive to sound in the frequency range of 250 Hertz (Hz) and higher, than in frequencies below 250 Hz. Due to this type of frequency response, a frequency weighting system, was developed to emulate the frequency response of the human ear. This system expresses sound levels in units of A-weighted decibels (dBA). A-weighted sound levels de-emphasizes the low frequency portion of the spectrum of a signal. The A-weighted level of a sound is a good measure of the loudness of that sound. Different sounds having the same A-weighted sound level are perceived as being about equally loud. Typical values of the A-weighted sound level of various noise sources are shown in Figure A-1.

Appendix A
Acoustical Terminology (Continued)

Statistical Sound Levels

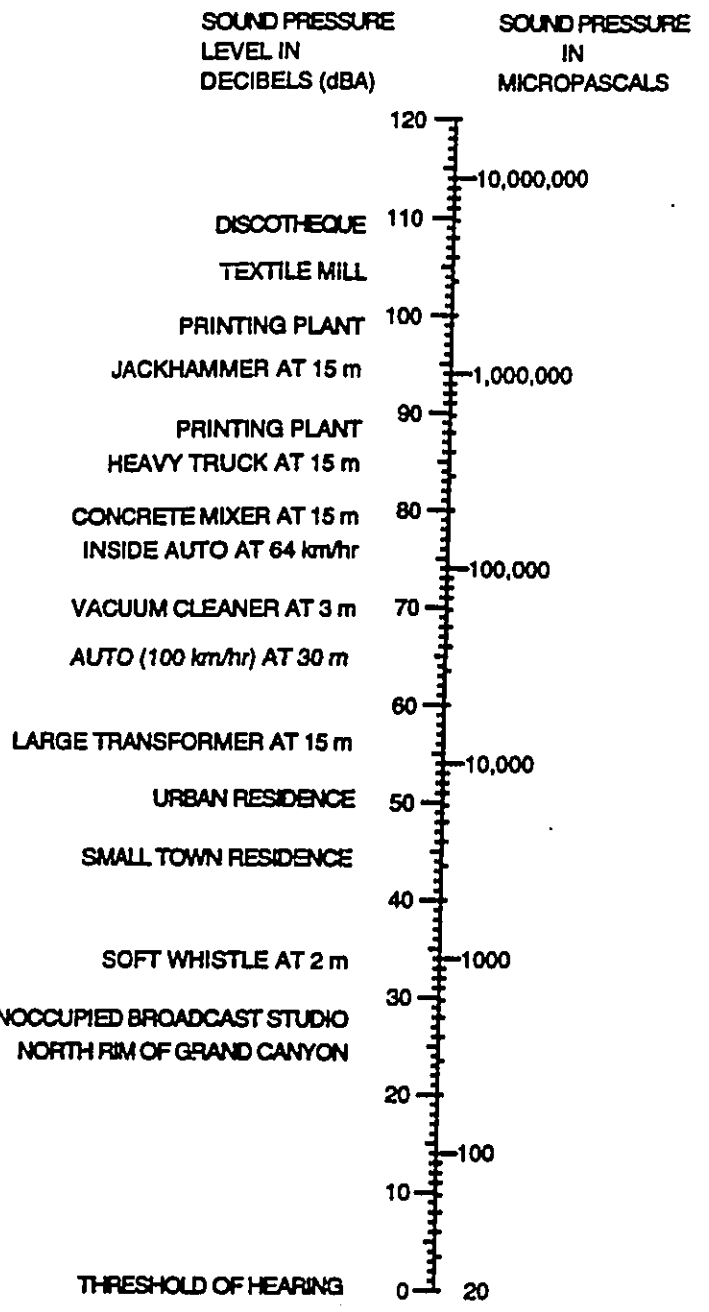
The sound levels of long-term noise producing activities, such as traffic movement, aircraft operations, etc., can vary considerably with time. In order to obtain a single number rating of such a noise source, a statistically-based method of expressing sound or noise levels developed. It is known as the Exceedence Level, L_n. The Exceedence Level, L_n, represents the sound level which is exceeded for n% of the measurement time period. For example, $L_{10} = 60$ dBA indicates that for the duration at the measurement period, the sound level exceeded 60 dBA 10% of the time. Commonly used Exceedence Levels include L_1, L_{10}, L_{50}, and L_{90}, which are widely used to assess community and environmental noise. Figure A-2 illustrates the relationship between selected statistical noise levels.

Equivalent Sound Level

The Equivalent Sound Level, L_{eq}, represents a constant level of sound having the same total acoustic energy as that contained in the actual time-varying sound being measured over a specific time period. L_{eq} is commonly used to describe community noise, traffic noise, and hearing damage potential. It has units of dBA and is illustrated in Figure A-2.

Day-Night Equivalent Sound Level

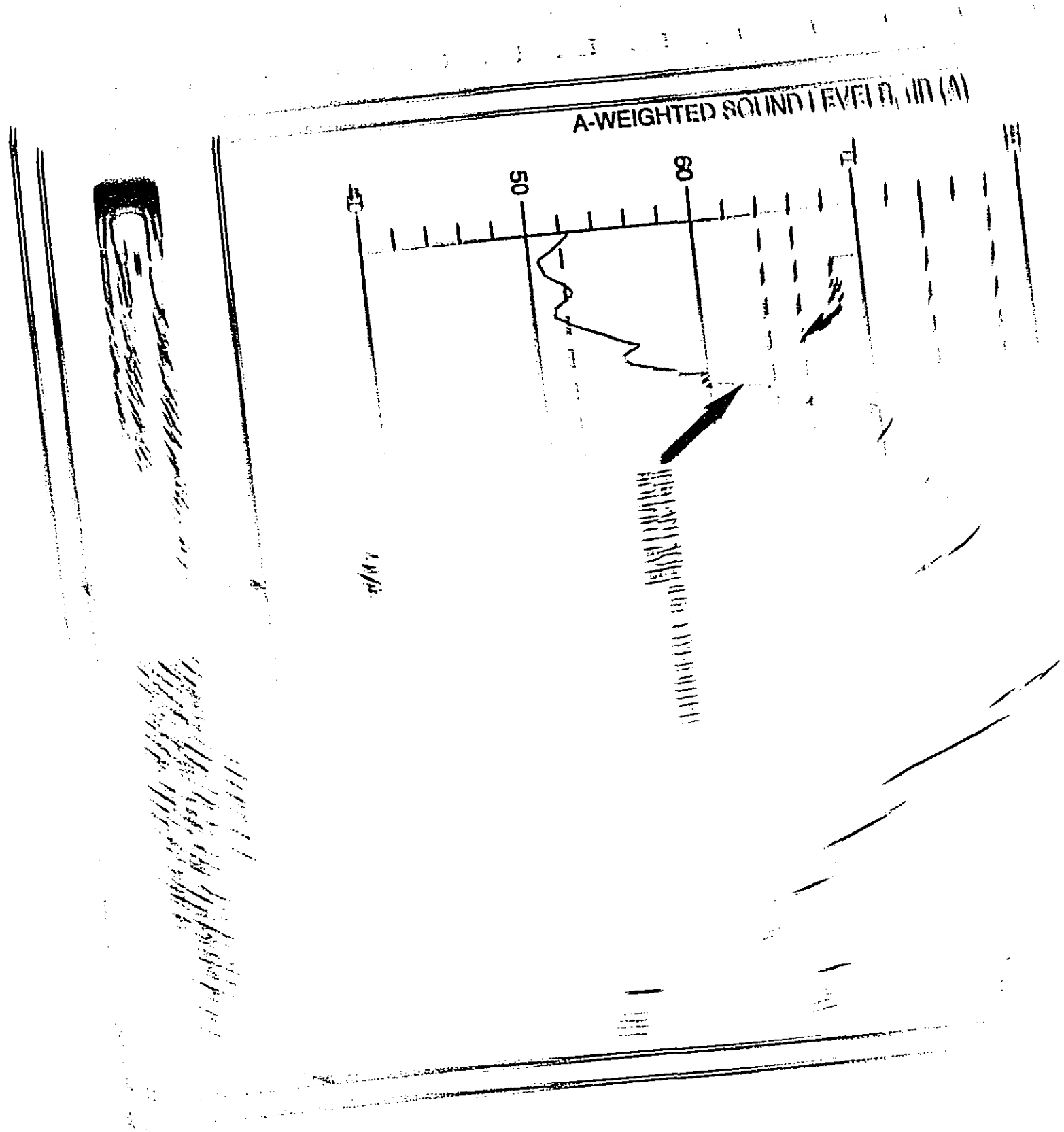
The Day-Night Equivalent Sound Level, L_{dn}, is the Equivalent Sound Level, L_{eq}, measured over a 24-hour period. However, a 10 dB penalty is added to the noise levels recorded between 10 pm and 7 am to account for people's higher sensitivity to noise at night when the background noise level is typically lower. The L_{dn} is a commonly used noise descriptor in assessing land use compatibility, and is widely used by federal and local agencies and standards organizations. Qualitative descriptions, as well as local examples of L_{dn}, are shown in Figure A-3.



D. L. ADAMS ASSOCIATES, LTD.
dba
DARBY & ASSOCIATES
ACOUSTICAL CONSULTANTS

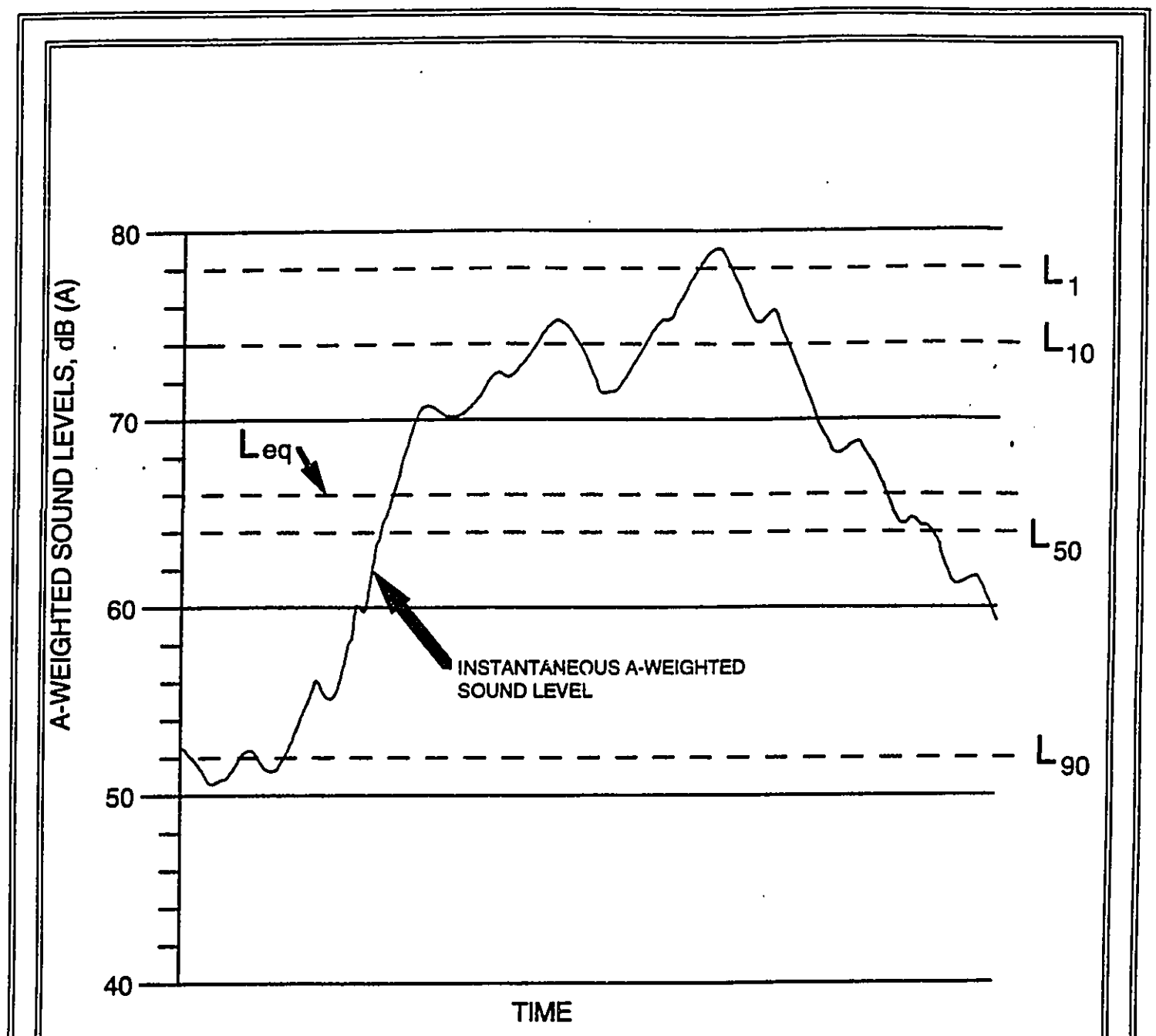
FIGURE A-1

THE RELATION BETWEEN SOUND PRESSURE, P, AND SOUND PRESSURE LEVEL, SPL. ALSO SHOWN ARE TYPICAL VALUES OF A-WEIGHTED SOUND LEVELS OF VARIOUS NOISE SOURCES.


A-WEIGHTED SOUND LEVEL, dB (A)
50
80

CORRECTION

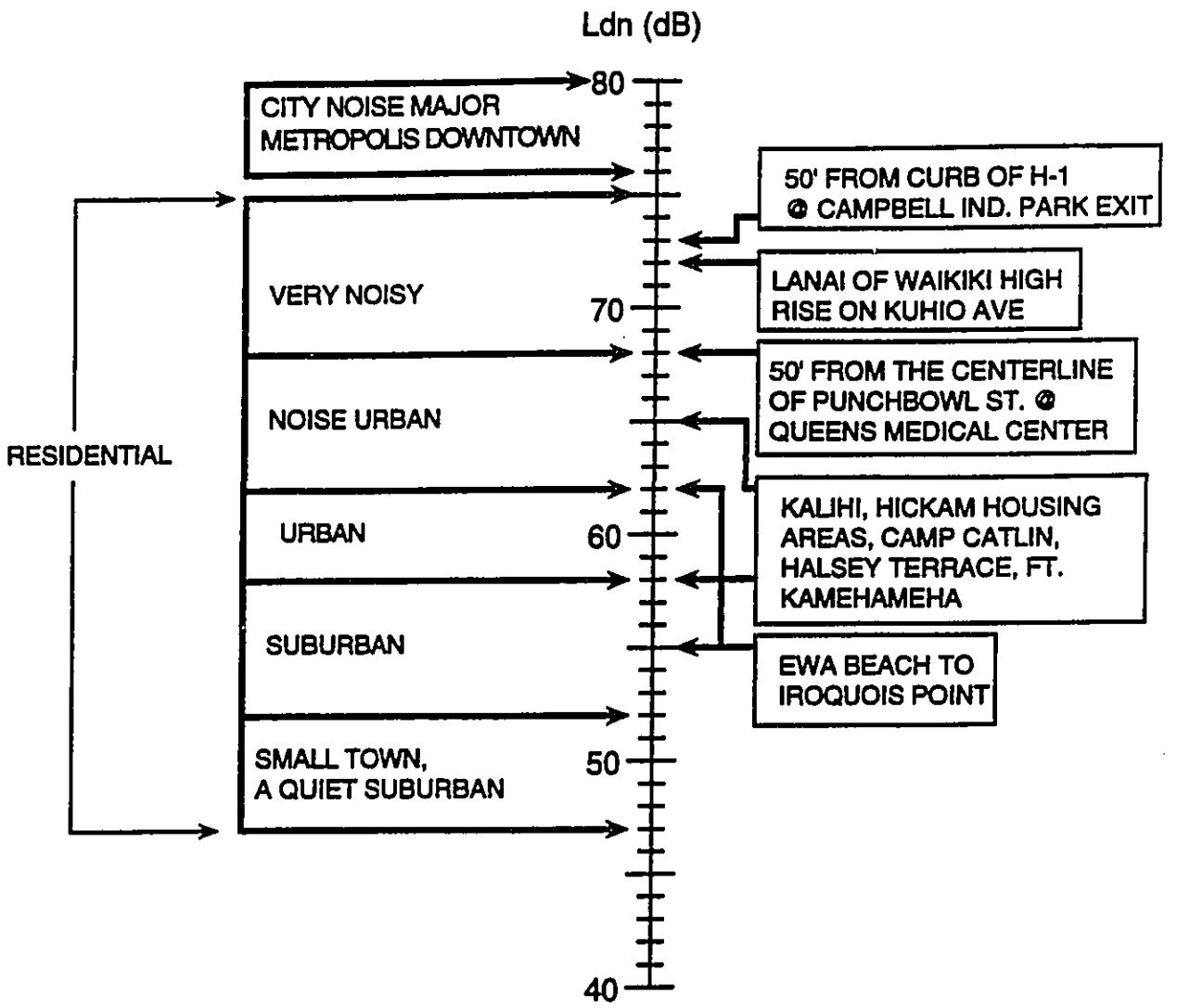
THE PRECEDING DOCUMENT(S) HAS BEEN REPHOTOGRAPHED TO ASSURE LEGIBILITY
SEE FRAME(S)
IMMEDIATELY FOLLOWING



D. L. ADAMS ASSOCIATES, LTD.
dba
DARBY & ASSOCIATES
ACOUSTICAL CONSULTANTS

FIGURE A-2

COMPARISON OF AN INSTANTANEOUS SOUND LEVEL AND THE CORRESPONDING STATISTICAL SOUND LEVELS



D. L. ADAMS ASSOCIATES, LTD.
dba
DARBY & ASSOCIATES
ACOUSTICAL CONSULTANTS

FIGURE A-3

QUALITATIVE DESCRIPTION OF THE DAY-NIGHT EQUIVALENT SOUND LEVELS (Ldn) AND EXAMPLE Ldn's AT SELECTED LOCATIONS ON OAHU

APPENDIX E

Correspondence

United States Department of the Interior

FISH AND WILDLIFE SERVICE

PACIFIC ISLANDS ECOREGION
300 ALA MOANA BOULEVARD, ROOM 3108
BOX 50088
HONOLULU, HAWAII 96850
PHONE: (808) 541-3441 FAX: (808) 541-3470

RECT NOV 25 1997

In Reply Refer To: CMC

NOV 24 1997

Collete Sakoda
R.M.Towill Corporation
420 Waiakamilo road, Ste. 411
Honolulu, HI 96817

Re: H-1 Eastbound Punahou Off-Ramp Improvements, State of Hawaii, Department of Transportation, Highways Division.

Dear Ms. Sakoda:

The U.S. Fish and Wildlife Service (Service) has reviewed the information provided in your letter dated November 13, 1997. The project proposed by the State of Hawaii, Department of Transportation, Highways Division is to expand the Punahou Off-Ramp for eastbound traffic exiting H-1.

The Service has reviewed the provided information as well as other information contained in our files, including maps prepared by The Nature Conservancy's Hawaii Natural Heritage Program. To the best of our knowledge, there are no federally endangered, threatened, or candidate species or wetlands directly within the referenced project site. The Service does not anticipate any adverse impacts to Federal trust resources to result from this project.

The Service appreciates the opportunity to provide comments on the proposed project. If you have questions or comments, please contact Fish and Wildlife Biologist Christina Crooker at (808) 541-3441.

Sincerely,

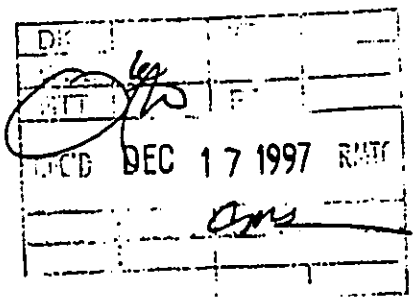
Karen W Rosa

for/ Brooks Harper
Field Supervisor
Ecological Services

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

P.O. BOX 621
HONOLULU, HAWAII 96809

December 12, 1997



LD-NAV
REF.:PUNAHOU.RCM

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

Dear Ms. Sakoda:

SUBJECT: Review : Summary
Project : H-1 Eastbound Punahou Off-Ramp Improvements
Applicant: State of Hawaii Department of Transportation, Highways Division
Location : Honolulu, Island of Oahu, Hawaii
TMK : 1st/ 2-4-07: Por. 01 and 2-4-09: Por. 06

Thank you for the opportunity to review and comment on the Summary for the H-1 Eastbound Punahou Off-Ramp Improvement Project.

By letter dated November 13, 1997, (copy attached), our State Historic Preservation Division has commented that "it appears that the project should have 'no effect' on any known historic resources."

The Department of Land and Natural Resources has no other comments to offer on the subject matter at this time.

Should you have any questions, please contact Nicholas Vaccaro of our Land Division's Support Services Branch at 587-0438.

HAWAII: Earth's best!

Aloha,

MICHAEL D. WILSON

c: At Large Land Board Member
Oahu District Land Office

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

NOV 17 1997

MICHAEL D. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES

GILBERT COLOMA-AGARAN

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

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

November 13, 1997

Mr. Jim Niermann
R.M. Towill Corporation
420 Waiakamilo Road, Suite 411
Honolulu, Hawaii 96817-4941

LOG NO: 20464
DOC NO: 9711co03
Architecture

Dear Mr. Niermann:

SUBJECT: **Punahou Off Ramp Expansion**
TMK 2-4, Honolulu, Oahu

Thank you for the inquiry dated November 5, 1997, regarding the Punahou Off Ramp expansion. The Jodo Mission of Hawaii (TMK 2-4-09:06) and the Central Union Church (TMK 2-8-11:02) are not listed on either the Hawaii or National Register of Historic Places. However, we believe that both of these structures meet the criteria and may be eligible for both the Hawaii or National Register of Historic Places. It appears that the project should have 'no effect' on any known historic resources.

Thank you for your inquiry. If you have any questions, please contact Carol Ogata at 587-0004.

Aloha,

DON HIBBARD, Administrator
State Historic Preservation Division

CO:jk

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 523-4414 • FAX: (808) 527-6743

JEREMY HARRIS
MAYOR

JAN NAOE SULLIVAN
DIRECTOR

LORETTA K.C. CHEE
DEPUTY DIRECTOR

97-08463(AC/SHC)
'97 EA Comments Zone 2

December 17, 1997

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

Dear Ms. Sakoda:

H-1 Eastbound Punahou Off-Ramp Improvements
Tax Map Keys: 2-4-07: por. 01 and 2-4-09: por. 06

In response to your letter dated November 13, 1997, we have reviewed the above-referenced project and find that:

1. The proposed project is not within the Special Management Area (SMA), and therefore not subject to the provisions of Chapter 25, Revised Ordinances of Honolulu. A Special Management Area Use Permit (SMP) is not required prior to construction.

2. We note that the H-1 Freeway at Punahou Off-Ramp is within the Punchbowl Special District. However, the proposed project is not in the Special District. As such, a Special District Permit will not be required prior to issuance of any building permit.

We have no further comments at this time. Thank you for the opportunity to review the proposal. Should you have any questions, please contact the Environmental Review Branch at 523-4077.

Very truly yours,

JAN NAOE SULLIVAN
Director of Land Utilization

JNS:am

g:ppd\9708463.shc

APPENDIX F

Comments and Responses to Draft Environmental Assessment

30-Day Comment Period

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

REPLY TO ATTENTION OF

December 3, 1997

Planning and Operations Division

1997

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

Dear Ms. Sakoda:

Thank you for the opportunity to review and comment on the H-1 Eastbound Punahou Off-Ramp Improvements, Honolulu, Oahu (TMKs 2-4-7: por. 1 and 2-4-9: por. 6). The following comments are provided in accordance with Corps of Engineers authorities to provide flood hazard information and to issue Department of the Army (DA) permits.

a. Based on the information provided, the project will not involve fills or discharges into known wetlands or jurisdictional waters; therefore, a DA permit will not be required. For further information, please contact our Regulatory Section at 438-9258 for further information and refer to file number 980000035.

b. According to the enclosed Federal Emergency Management Agency's Flood Insurance Rate Map, panel number 150001 0120C (dated September 4, 1987), the project site is located in Zone X (unshaded; areas determined to be outside of the 500-year floodplain).

Sincerely,

Paul Mizue, P.E.
Acting Chief of Planning
and Operations Division

Enclosure

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

REPLY TO ATTENTION OF

March 4, 1998

MAR 5 1998

Civil Works Branch

Mr. Kevin Ito, Project Engineer
State of Hawaii
Department of Transportation
Highways Division
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Ito:

Thank you for the opportunity to review and comment on the Draft Environmental Assessment for the Interstate Route H1 Punahou Street Off-Ramp Improvements Project, Honolulu, Oahu (Tax May Keys 2-4-7: por. 1 and 2-4-9: por. 6). We do not have any additional comments to offer beyond those provided in our previous letter dated December 3, 1997.

Sincerely,

Paul Mizue, P.E.
Chief, Civil Works Branch

Copy Furnished:

Mrs. Colette Sakoda, Project Manager
R. M. Towill Corporation
420 Waiakamilo Road, Room 411
Honolulu, Hawaii 96817-4941

HWY-DS
2.9549

May 29, 1998

Mr. Paul Mizue, Chief
Civil Works Branch
Pacific Ocean Division
U.S. Army Corps of Engineers
Building 230
Fort Shafter, Hawaii 96858-5440

Dear Mr. Mizue:

Subject: Your Letter Dated March 4, 1998 Regarding the Draft Environmental Assessment, Interstate Route H-1 Punahou Street Off-Ramp Improvements, Project No. IM-H1-1(232)

Thank you for reviewing the Draft Environmental Assessment for the proposed Punahou Off-Ramp Expansion project.

We acknowledge that a Department of the Army permit is not required for the proposed project. In addition, we note that the flood hazard information provided on page 29 of the Draft EA is correct.

If you have any questions, please contact Kevin Ito at 587-2122.

Very truly yours,

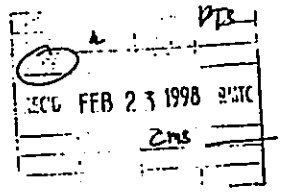
Pericles Manthos

PERICLES MANTHOS
Administrator
Highways Division

United States Department of the Interior

U.S. GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
677 Ala Moana Boulevard, Suite 415
Honolulu, Hawaii 96813

February 19, 1998



Mr. Kevin Ito, Project Engineer
Department of Transportation, Highways Division
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Ito:

Subject: Draft Environmental Assessment
Interstate Route H-1
Punahou Street Off-Ramp Improvements

The staff of the U.S. Geological Survey, Water Resources Division, Hawaii District, has reviewed the Draft Environmental Assessment, and we have no comments to offer at this time.

Thank you for allowing us to review the report. We are returning it for your future use.

Sincerely,

William Meyer
District Chief

Enc.

cc: Mrs. Colette Sakoda, R.M. Towill Corporation

HWY-DS
2.9549

May 29, 1998

Mr. William Meyer
District Chief
U.S. Department of the Interior
Geological Survey
677 Ala Moana Boulevard, Room 415
Honolulu, Hawaii 96813-5412

Dear Mr. Meyer:

Subject: Your Letter Dated February 19, 1998 Regarding the Draft Environmental Assessment Interstate Route H-1 Punahou Street Off-Ramp Improvements, Project No. IM-H1-1(232)

Thank you for reviewing the Draft Environmental Assessment for the proposed Punahou Off-Ramp Expansion project.

We acknowledge that you have no comments to offer at this time. If you have any questions, please contact Kevin Ito at 587-2122.

Very truly yours,

PERICLES MANTHOS
Administrator
Highways Division

United States
Department of
Agriculture

Natural
Resources
Conservation
Service

P.O. Box 50004
Honolulu, HI
96850

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

March 26, 1998

Mr. Jim Niermann, Planning
R.M. Towill Corporation
420 Waiakamilo Road, #411
Honolulu, Hawaii 96817-4941

Dear Mr. Niermann:

Subject: Draft Environmental Assessment (DEA) - Interstate Route H1, Punahou Street Off-Ramp Improvements, Honolulu,HI

We have reviewed the following items and have no comments at this time.

Thank you for the opportunity to review this document.

Sincerely,

KENNETH M. KANESHIRO
State Conservationist

HWY-DS
2.9549

May 29, 1998

Mr. Kenneth M. Kaneshiro
State Conservationist
Natural Resources Conservation Service
USDA-NRCS
P. O. Box 50004
Honolulu, Hawaii 96850

Dear Mr. Kaneshiro:

Subject: Your Letter Dated March 26, 1998 Regarding the Draft Environmental Assessment, Interstate Route H-1 Punahou Street Off-Ramp Improvements Project No. IM-H1-1(232)

Thank you for reviewing the Draft Environmental Assessment for the proposed Punahou Off-Ramp Expansion project.

We acknowledge that you have no comments to offer at this time. If you have any questions, please contact Mr. Kevin Ito at 587-2122.

Very truly yours,

PERICLES MANTHOS
Administrator
Highways Division

(P)1158.8

MAR 19 '98

Mr. Kevin Ito, Project Engineer
Department of Transportation
Highways Division
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Ito:

Subject: Public Review Copy of Draft Environmental Assessment (EA) for Interstate Route H-1 Punahou Street Off-Ramp Improvements

Thank you for the opportunity to review the subject environmental assessment provided by R. M. Towill Corporation's letter dated February 17, 1998. We have no comments to offer.

If there are any questions, please have your staff contact Mr. Ronald Ching of the Planning Branch at 586-0490.

Sincerely,

GORDON MATSUOKA
Public Works Administrator

RC:jy
c: Ms. C. M. Sakoda, R. M. Towill Corporation

HWY-DS
2.9549

May 29, 1998

Mr. Gordon Matsuoka
Public Works Adminstrator
Department of Accounting and
General Services
Kalanimoku Building
1151 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Matsuoka:

Subject: Your Letter Received March 19, 1998 Regarding the Draft Environmental Assessment Interstate Route H-1 Punahou Street Off-Ramp Improvements, Project No. IM-H1-1(232)

Thank you for reviewing the Draft Environmental Assessment for the proposed Punahou Off-Ramp Expansion project.

We acknowledge that you have no comments to offer at this time. If you have any questions, please contact Kevin Ito at 587-2122.

Very truly yours,

PERICLES MANTHOS
Administrator
Highways Division

BENJAMIN J. CAYETANO
GOVERNOR

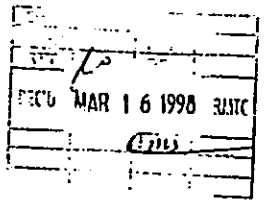
MAJOR GENERAL EDWARD V. RICHARDSON
DIRECTOR OF CIVIL DEFENSE

ROY C. PRICE, SR.
VICE DIRECTOR OF CIVIL DEFENSE

PHONE (808) 733-4300
FAX (808) 733-4287

STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE DIRECTOR OF CIVIL DEFENSE
3949 DIAMOND HEAD ROAD
HONOLULU, HAWAII 96816-4495

March 12, 1998



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

FROM: Roy C. Price, Sr.
Vice Director of Civil Defense

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT, H-1 EASTBOUND PUNAHOU OFF-RAMP

Thank you for the opportunity to comment on the Draft Environmental Assessment for the Interstate Route H-1 Punahou Street Off-Ramp Improvements, Honolulu, Oahu, Hawaii.

State Civil Defense respectfully declines from making any comments on this Environmental Assessment. Please be aware that State Civil Defense has an outdoor warning siren almost directly across the highway from this site.

If you have any further questions, please call Mr. Norman Ogasawara of my staff at 733-4300.

c: Mr. Kevin Ito, Project Engineer
Highways Division, Dept. of Transportation

HWY-DS
2.9549

May 29, 1998

Mr. Roy C. Price, Sr.
Vice Director of Civil Defense
Department of Defense
3949 Diamond Head Road
Honolulu, Hawaii 96816-4495

Dear Mr. Price:

Subject: Your Letter Received March 19, 1998 Regarding the Draft Environmental Assessment Interstate Route H-1 Punahou Street Off-Ramp Improvements, Project No. IM-H1-1(232)

Thank you for reviewing the Draft Environmental Assessment for the proposed Punahou Off-Ramp Expansion project.

We note that State Civil Defense has an outdoor warning siren across the highway from the project site. We acknowledge that you have no further comments regarding this project.

If you have any questions, please contact Kevin Ito at 587-2122.

Very truly yours,

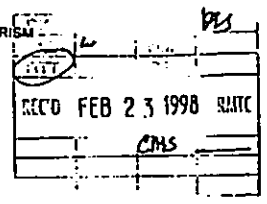
PERICLES MANTHOS
Administrator
Highways Division

BENJAMIN J. CAYETANO
GOVERNOR

ESTHER UEDA
EXECUTIVE OFFICER

STATE OF HAWAII
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM
LAND USE COMMISSION
P.O. Box 2359
Honolulu, HI 96804-2359
Telephone: 808-587-3822
Fax: 808-587-3827

February 20, 1998



Mr. Kevin Ito, Project Engineer
Department of Transportation, Highways Division
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Ito:

Subject: Interstate Route H-1, Punahou Street Off-Ramp Improvements - Draft Environmental Assessment

We have reviewed the subject draft environmental assessment as transmitted with the letter dated February 17, 1998 from R.H. Towill Corporation, and confirm that the proposed project site, identified as TMKs: 2-4-09: por. 6 and 2-4-07: por. 1, is within the State Land Use Urban District.

We have no further comments to offer at this time.

Thank you for the opportunity to provide comments on the subject draft environmental assessment.

If you have any questions in regards to this matter, please feel free to contact me or Leo Asuncion of my staff at 587-3822.

Sincerely,

ESTHER UEDA
Executive Officer

EU:th

cc: OEQC
Ms. Colette Sakoda

HWY-DS
2.9549

May 29, 1998

Ms. Esther Ueda
Executive Officer
Department of Business, Economic
Development and Tourism
Land Use Commission
State Office Tower
235 South Beretania Street, 4th Floor
Honolulu, Hawaii 96813

Dear Ms. Ueda:

Subject: Your Letter Dated February 20, 1998 Regarding the Draft Environmental Assessment Interstate Route H-1 Punahou Street Off-Ramp Improvements, Project No. IM-H1-1(232)

Thank you for reviewing the Draft Environmental Assessment for the proposed Punahou Off-Ramp Expansion project.

We note that the proposed project site, identified as TMKs: 2-4-09: por. 6 and 2-4-07: por. 1, is within the State Land Use Urban District. We acknowledge that you have no further comments regarding this project.

If you have any questions, please contact Kevin Ito at 587-2122.

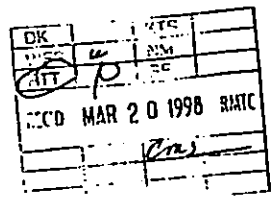
Very truly yours,

PERICLES MANTHOS
Administrator
Highways Division

STATE OF HAWAII
OFFICE OF PLANNING
P. O. Box 2359
Honolulu, Hawaii 96804

Ref. No. P-7266

March 11, 1998



MEMORANDUM

TO: Kevin Ito, Project Engineer
Highways Division
Department of Transportation

FROM: Rick Egged
Director, Office of Planning

SUBJECT: Draft Environmental Assessment for the Interstate H-1 Punahou Street Off-Ramp

This project involves the expansion of the Punahou Off-Ramp for eastbound traffic exiting H-1. We support this project and its efforts to promote safe and efficient transportation systems. In addition, we appreciate your attempts to maintain venues for pedestrian and bicycle traffic to the fullest possible extent.

We will be very interested in the best management practices to control storm water runoff that will be used during construction. You may find some of our recommended mitigation measures in the "Management Measures for Urban Areas" section of our report entitled "Hawaii's Coastal Nonpoint Pollution Control Plan."

If you have questions, please contact Claire Cappelle of our Coastal Zone Management Program at 587-2880.

cc: Mrs. Colette Sakoda, R.M. Towill Corporation

HWY-DS
2.2643

February 8, 1999

Mr. Rick Egged, Director
Office of Planning
Department of Business, Economic
Development and Tourism
P.O. Box 2359
Honolulu, Hawaii 96804

Dear Mr. Egged:

Subject: Draft Environmental Assessment (DEA), Interstate Route H-1 Punahou Street Off-Ramp Improvements, Project No. IM-H1-1(232)

This is in regard to your memo dated March 11, 1998, for the proposed Punahou Off-Ramp Expansion project.

We acknowledge your support of the project and further note your interest in the best management practices that will be used during construction to control storm water runoff.

Under the terms of our construction contract, the project contractor is required to provide temporary erosion control measures, as specified by the State's engineer, to prevent water pollution. Erosion control measures may include the use of berms, dikes, fiber mats, silt fence, netting, gravel, mulches, grass, and slope drains. Specific measures will be tailored to conform with site conditions and construction activities.

If you have any questions, please contact Kevin Ito, Technical Design Section, Design Branch at 692-7548.

Very truly yours,

for PERICLES MANTHOS
Administrator
Highways Division

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF HEALTH
P O BOX 3378
HONOLULU HAWAII 96801

LAWRENCE MIKE
DIRECTOR OF HEALTH

HWY-DS
2.9549

March 19, 1998

97-257A/epo

Mr. Kevin Ito, Project Engineer
Highways Division
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Ito:

Subject: Draft Environmental Assessment (DEA)
Interstate Route H-1, Punahou Street Off-Ramp
Improvements
Honolulu, Hawaii
TMK: 2-4-07: Por. 1, 2-4-09: por. 6

Thank you for allowing us to review and comment on the subject project.

We would like to repeat our strong desire to have the fugitive dust and noise emissions controlled to the greatest extent possible so that these emissions will not become a concern to the occupants of the Shriners' Hospital for Crippled Children and the Jodo Mission, both of which are downwind of the project.

If you have any questions regarding fugitive dust control or noise control, please do not hesitate to call Mr. Wilfred Nagamine, Program Manager, Clean Air Branch or Mr. Jerry Haruno, Program Manager, Noise Radiation & Indoor Air Quality Branch, respectively.

Sincerely,

BRUCE S. ANDERSON, Ph.D.
Deputy Director for Environmental Health

c: CAB
NR&IAQB
✓R. M. Towill Corporation

May 29, 1998

Bruce S. Anderson, Ph.D.
Deputy Director
Environmental Health Administration
Department of Health
Kinau Hale
1250 Punchbowl Street
Honolulu, Hawaii 96813

Dear Dr. Anderson:

Subject: Your Letter Dated March 19, 1998 Regarding the Draft Environmental Assessment Interstate Route H-1 Punahou Street Off-Ramp Improvements, Project No. IM-H1-1(232)

Thank you for reviewing the Draft Environmental Assessment for the proposed Punahou Off-Ramp Expansion project.

We acknowledge your comment regarding the control of fugitive dust and noise emissions. As described on page 25 of the Draft EA, action will be taken by the project contractor to control fugitive dust and exhaust emissions associated with construction.

If you have any questions, please contact Kevin Ito at 587-2122.

Very truly yours,

PERICLES MANTHOS
Administrator
Highways Division

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
PHONE (808) 523-4414 • FAX (808) 523-4730

JEREMY HARRIS
MAYOR

JAN NAOE SULLIVAN
DIRECTOR

LORETTA K.C. CHEE
DEPUTY DIRECTOR

RECD JUN 17 1998 RLTC

98-01411(SHC)
'98 EA Comments Zone 2

June 16, 1998

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

Dear Ms. Sakoda:

Draft Environmental Assessment (EA) For
Interstate Route H-1 Punahou Street Off-Ramp Improvements
Tax Map Keys: 2-4-07: 01 and 2-4-09: 06

This is in response to your letter dated February 17, 1998 requesting comments on the above-referenced Draft EA. Based on our review, we have determined that the project is not within the Special Management Area (SMA).

Thank you for the opportunity to review this document. Should you have any questions, please contact Art Challacombe of our staff at 523-4107.

Very truly yours,

JAN NAOE SULLIVAN
Director of Land Utilization

JNS:am

cc: Department of Transportation (Kevin Ito)

HWY-DS
2 2544

February 6, 1999

Ms. Jan Naoe Sullivan, Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Ms. Sullivan.

Subject: Your Letter Dated June 16, 1998, Regarding the Draft Environmental Assessment Interstate Route H-1 Punahou Street Off-Ramp Improvements, Project No. IM-H1-1(232)

Thank you for reviewing the Draft Environmental Assessment for the proposed Punahou Off-Ramp Expansion project.

We acknowledge your determination that the subject project is not within the Special Management Area. If you have any questions, please contact Kevin Ito at 692-7548.

Very truly yours,

PERICLES MANTHOS
Administrator
Highways Division

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 8TH FLOOR • HONOLULU, HAWAII 96813-3017
PHONE: (808) 523-4432 • FAX: (808) 523-4730

JEREMY HARRIS
MAYOR

PATRICK T. ONISHI
CHIEF PLANNING OFFICER

CHRYSTN H. KANAIKE
DEPUTY CHIEF PLANNING OFFICER

MAR 26 1998

RH 2/98-0336

March 23, 1998

Mr. Kevin Ito, Project Engineer
Department of Transportation
Highways Division
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Ito:

Interstate Route H-1 Punahou Street
Off-Ramp Improvements, Draft Environmental Assessment

We have no comments on the subject Draft EA.

Should you have any questions, please contact Randy Hara of my staff at 523-4483.

Yours very truly,

PATRICK T. ONISHI
Chief Planning Officer

PTO:lh

c: Mrs. Colette Sakoda, Project Manager
R. M. Towill Corporation

HWY-DS
2.9549

May 29, 1998

Mr. Patrick T. Onishi
Chief Planning Officer
Planning Department
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813-3017

Dear Mr. Onishi:

Subject: Your Letter Dated March 23, 1998 Regarding the Draft Environmental Assessment Interstate Route H-1 Punahou Street Off-Ramp Improvements, Project No. IM-H1-1(232)

Thank you for reviewing the Draft Environmental Assessment for the proposed Punahou Off-Ramp Expansion project.

We acknowledge that you have no comments to offer at this time. If you have any questions, please contact Kevin Ito at 587-2122.

Very truly yours,

PERICLES MANTHOS
Administrator
Highways Division

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 11TH FLOOR • HONOLULU, HAWAII 96813
PHONE (808) 523-4341 • FAX (808) 527-5857

JEREMY HARRIS
MAYOR

JONATHAN K. SHIMADA, PhD
DIRECTOR AND CHIEF ENGINEER
ROLANDO LIBBY, JR
DEPUTY DIRECTOR

March 10, 1998

ENV 98-065

DK			
WES			
ATT		RF	
REC'D MAR 1 2 1998 RMTC			

Mr. Kevin Ito, Project Engineer
Department of Transportation
Highway Division
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Ito:

Subject: Draft Environmental Assessment (DEA)
Interstate Route H1 Punahou Street Off-Ramp Improvements
TMK: 2-4-07: Por. 1 and 2-4-09: Por. 6

We have reviewed the subject DEA and have no comments to offer at this time. Should you have any questions, please contact Mr. Alex Ho, Environmental Engineer, at 523-4150.

Very truly yours,

For JONATHAN K. SHIMADA, PhD
Director and Chief Engineer

cc: R.M. Towill Corporation (Colette Sakoda)

HWY-DS
2.9549

May 29, 1998

Jonathan K. Shimada, Ph.D.
Director and Chief Engineer
Department of Public Works
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813-3017

Dear Dr. Shimada:

Subject: Your Letter Dated March 10, 1998 Regarding the Draft Environmental Assessment Interstate Route H-1 Punahou Street Off-Ramp Improvements, Project No. IM-H1-1(232)

Thank you for reviewing the Draft Environmental Assessment for the proposed Punahou Off-Ramp Expansion project.

We acknowledge that you have no comments to offer at this time. If you have any questions, please contact Kevin Ito at 587-2122.

Very truly yours,

PERICLES MANTHOS
Administrator
Highways Division

POLICE DEPARTMENT

CITY AND COUNTY OF HONOLULU

801 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96813 - AREA CODE (808) 529-3111

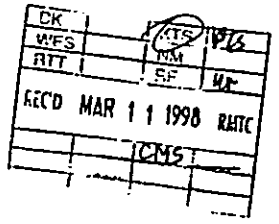
JEREMY HARRIS
MAYOR

LEE D. DONOHUE
ACTING CHIEF

WILLIAM B. CLARK
DEPUTY CHIEF

OUR REFERENCE CS-DL

March 5, 1998



Mr. Kevin Ito, Project Engineer
Highways Division
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Ito:

Thank you for the opportunity to review and comment on the Draft Environmental Assessment for the Interstate Route H-1 Punahou Street Off-Ramp Improvements.

Our usual concerns relative to dust and noise have been addressed in this document. Therefore, the impact on police calls for service should be minimal during the construction phase of this project.

Further, since the stated goals of the project are to reduce projected traffic congestion on the off-ramp and reduce the queuing on the freeway, we anticipate a positive impact on calls for police services when the project is completed.

Sincerely,

LEE D. DONOHUE
Acting Chief of Police

By
JAMES FEMIA, Assistant Chief
Administrative Bureau

cc: Mrs. Colette Sakoda
R.M. Towill Corporation

HWY-DS
2.9549

May 29, 1998

Mr. Lee D. Donohue, Chief
Police Department
City and County of Honolulu
801 South Beretania Street
Honolulu, Hawaii 96813

Dear Chief Donohue:

Subject: Your Letter Dated March 5, 1998 Regarding the Draft Environmental Assessment Interstate Route H-1 Punahou Street Off-Ramp Improvements, Project No. IM-H1-1(232)

Thank you for reviewing the Draft Environmental Assessment for the proposed Punahou Off-Ramp Expansion project.

We acknowledge that your general concerns relating to dust and noise have been addressed in this document. We also note that you anticipate a positive impact on calls for police service when the project is completed due to improved traffic flow resulting from the expansion.

If you have any questions, please contact Kevin Ito at 587-2122.

Very truly yours,

PERICLES MANTHOS
Administrator
Highways Division

FIRE DEPARTMENT

CITY AND COUNTY OF HONOLULU

3375 KOAPAKA STREET, SUITE H425
HONOLULU, HAWAII 96819-1869

JEREMY HARRIS
MAYOR

ANTHONY J. LOPEZ, JR.
FIRE CHIEF

ATTILIO K. LEONARDI
FIRE DEPUTY CHIEF

February 27, 1998

MAR 4 1998

Mr. Jim Niermann
R. M. Towill Corporation
420 Waiakamilo Road, #411
Honolulu, Hawaii 96817-4941

Dear Mr. Niermann:

Subject: Public Review Copy of Draft Environmental Assessment (EA) for
Interstate Route H1 Punahou Street Off-Ramp Improvements
HFD Internal No. OL 98-091

We have reviewed the submitted information relating to the proposed property and foresee no adverse impact if the amendment were approved.

Construction shall comply with all applicable county codes.

If you need additional information, please contact Battalion Chief Charles Wassman of our Fire Prevention Bureau at 831-7778.

Very truly yours,

ANTHONY J. LOPEZ, JR.
Fire Chief

AJL/CW:bh

HWY-DS
2.9549

May 29, 1998

Mr. Anthony J. Lopez, Jr.
Fire Chief
Fire Department
City and County of Honolulu
3375 Koapaka Street, Suite H425
Honolulu, Hawaii 96819-1869

Dear Mr. Lopez:

Subject: Your Letter Dated February 27, 1998 Regarding the Draft Environmental Assessment, Interstate Route H-1 Punahou Street Off-Ramp Improvements Project No. IM-H1-1(232)

Thank you for reviewing the Draft Environmental Assessment for the proposed Punahou Off-Ramp Expansion project.

We acknowledge that you foresee no adverse impact resulting from the proposed expansion. We further note that construction activities will comply with all applicable country codes.

If you have any questions, please contact Mr. Kevin Ito at 587-2122.

Very truly yours,

PERICLES MANTHOS
Administrator
Highways Division

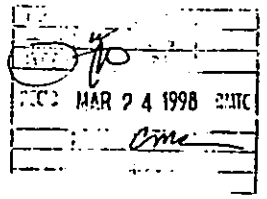
DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 10TH FLOOR • HONOLULU, HAWAII 96813
PHONE (808) 523-4182 • FAX (808) 523-4054

JEREMY HARRIS
MAYOR

WILLIAM D. BALFOUR, JR.
DIRECTOR

MICHAEL T. AMII
DEPUTY DIRECTOR

March 19, 1998



Mr. Kevin Ito, Project Engineer
Highways Division
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Ito:

Subject: Draft Environmental Assessment (DEA) for Construction of Off-Ramp Improvements at Interstate Route H-1 Punahou Street, Honolulu

We have reviewed your DEA for a proposed H-1 Punahou Street off-ramp and offer the following comments:

Our main interest is the Makiki District Park and Cartwright Neighborhood Park which are nearest the project site. Neither park is expected to be impacted from the proposed off-ramp.

Please call our planner, Mr. Jay Lembeck, of our Advance Planning Branch, at 523-4272 if you have any questions.

Sincerely,

W. D. Balfour Jr.

WILLIAM D. BALFOUR, JR.
Director

WDB:ei

cc: Mrs. Colette Sakoda, R.M. Towill Corporation

HWY-DS
2.9549

May 29, 1998

Mr. William D. Balfour, Jr., Director
Department of Parks and Recreation
City and County of Honolulu
650 South King Street, 10th Floor
Honolulu, Hawaii 96813

Dear Mr. Balfour:

Subject: Your Letter Dated March 19, 1998 Regarding the Draft Environmental Assessment Interstate Route H-1 Punahou Street Off-Ramp Improvements, Project No. IM-H1-1(232)

Thank you for reviewing the Draft Environmental Assessment for the proposed Punahou Off-Ramp Expansion project.

We acknowledge your interest in the Makiki District Park and Cartwright Neighborhood Park near the project site, and note that neither park is expected to be impacted by the proposed off-ramp expansion.

If you have any questions, please contact Kevin Ito at 587-2122.

Very truly yours,

Pericles Manthos

PERICLES MANTHOS
Administrator
Highways Division

COPY

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96843
PHONE (808) 527-6160
FAX (808) 533-2714

April 13, 1998

Mr. Kevin Ito, Project Engineer
Department of Transportation, Highways Division
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813-5087

APR 2 1998

Dear Mr. Ito:

Subject: Your Transmittal of March 26, 1998 of the Draft Environmental Assessment for the Interstate Route H-1, Punahou Street Off-Ramp Improvements, Honolulu, Oahu, TMK: 2-4-07: Portion 01 and 2-4-09: Portion 06

Thank you for the opportunity to review and comment on the Draft Environmental Assessment for the proposed off-ramp improvements.

We have no objections to the proposed project. The construction plans should be submitted for our review and approval.

If you have any questions, please contact Barry Usagawa at 527-5235.

Very truly yours,

BROOKS H. M. YUEN
Acting Manager and Chief Engineer

cc: Colette Sakoda, R.M. Towill

HWY-DS
2.9549

May 29, 1998

Mr. Brooks H. M. Yuen
Acting Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843

Dear Mr. Yuen:

Subject: Your Letter Dated April 13, 1998 Regarding the Draft Environmental Assessment Interstate Route H-1 Punahou Street Off-Ramp Improvements, Project No. IM-H1-1(232)

Thank you for reviewing the Draft Environmental Assessment for the proposed Punahou Off-Ramp Expansion project.

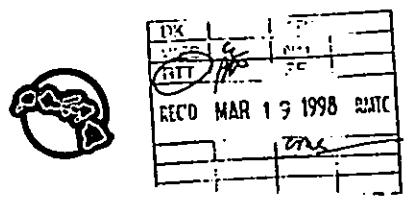
We acknowledge that you have no objections to the proposed project. Construction plans, when complete, will be made available for your review.

If you have any questions, please contact Kevin Ito at 587-2122.

Very truly yours,

PERICLES MANTHOS
Administrator
Highways Division

Hawaiian Electric Company, Inc. • P.O. Box 2750 • Honolulu, HI 96840-0001



March 17, 1998

Mr. Kevin Ito, Project Engineer
Department of Transportation, Highways Division
State of Hawaii
869 Punchbowl Street
Honolulu, HI 96813-5097

Dear: Mr. Ito

Subject: **Punahou Street Off-Ramp Improvements**

Thank you for the opportunity to comment on your February 1998 Draft EA for the Punahou Street Off-Ramp Improvements, as proposed by the Department of Transportation. We have reviewed the subject document and have no comments at this time.

HECO shall reserve further comments pertaining to the protection of existing powerlines bordering the project area until construction plans are finalized. Again, thank you for the opportunity to comment on this draft environmental assessment.

Sincerely,

Donn T. Fukuda
Principal Environmental Scientist

cc: Mrs. Colette Sakoda, Project Manager
R.M. Towill Corporation
420 Waikamilo Rd., Suite 411
Honolulu, HI 96817-4941

HWY-DS
2.9549

May 29, 1998

Mr. Donn T. Fukuda
Principal Environmental Scientist
Hawaiian Electric Company, Inc.
P.O. Box 2750
Honolulu, Hawaii 96840-0001

Dear Mr. Fukuda:

Subject: Your Letter Dated March 17, 1998 Regarding the Draft Environmental Assessment Interstate Route H-1 Punahou Street Off-Ramp Improvements, Project No. IM-H1-1(232)

Thank you for reviewing the Draft Environmental Assessment for the proposed Punahou Off-Ramp Expansion project.

We acknowledge that you have no comments at this time. We note that you reserve further comments pertaining to the protection of existing powerlines in the project vicinity until the construction plans are finalized.

If you have any questions, please contact Kevin Ito at 587-2122.

Very truly yours,

PERICLES MANTHOS
Administrator
Highways Division

BENJAMIN J. CAYETANO
GOVERNOR

GARY GILL
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186

March 25, 1998

RECD MAR 26 1998 DLNR

Kazu Hayashida, Director
Department of Transportation
869 Punchbowl St.
Honolulu, HI 96813

Attn: Kevin Ito

Dear Mr. Hayashida:

Subject: Draft Environmental Assessment (EA) for H-1 Punahou Off Ramp Improvements

Please include the following in the final EA:

1. Funding: The total project cost is not given. Please disclose all state or county funds involved, including federal funds flowing through the state or county.

2. Timeframe: What are the anticipated start and end dates of this project?

3. Contacts: Document all community contacts, including the neighborhood meetings, and list concerns raised at these meetings. Include copies of any correspondence.

4. Landscaping: Will any trees be removed for construction? If so will they be replanted near the site or elsewhere? Discuss any proposed landscaping for this project.

5. Visual Impacts: Section 4.1.2, *Noise Impacts*, states that noise may be mitigated by construction of roadside acoustical barrier walls. Please discuss the visual impacts of acoustical barrier walls and illustrate these impacts by superimposing a rendering of them onto photographs taken from public vantage points.

If you have any questions, call Nancy Heinrich at 586-4185.

Sincerely,

GARY GILL
Director

c: Colette Sakoda, RM Towill

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

HWY-DS
2.3403

April 27, 1999

TO: GARY GILL, INTERIM DIRECTOR
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

FROM: KAZU HAYASHIDA
DIRECTOR OF TRANSPORTATION

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (DEA) FOR INTERSTATE ROUTE H-1 PUNAHOU STREET OFF-RAMP IMPROVEMENTS, PROJECT NO. IM-H1-1(232)

Thank you for your letter dated March 25, 1999, regarding the DEA for the proposed Punahou Off-Ramp Expansion project.

We offer the following in response to your comments:

1. Funding: *Please disclose all state or county funds involved, including federal funds flowing through the state or county.*
The total project cost, including land acquisition, is currently estimated at $7.5 million dollars. Approximately ninety percent of the project cost will be funded by the Federal Highways Administration and ten percent by the State through the Department of Transportation. No county funds will be used in this project. This information will be included in the Final EA.

2. Time frame: *What are the anticipated start and end dates of this project?*
At present, construction is anticipated to begin in April 2000. The project will take approximately six months to complete. The estimated end date for the project is September 2000. This schedule will be published in the Final EA.

3. Community Contacts: *Document all community contacts, including the neighborhood meetings, and list concerns raised at these meetings. Include copies of any correspondence.*
Between September 1997 and January 1998, a series of community meetings was conducted involving local residents, neighborhood boards, condominium managers, and representatives from other organizations in the area (See page 32 of the DEA). The meetings were announced by flyers distributed and posted at all neighborhood condominiums, by phone contact with group representatives, and by mailed notices.

Few concerns and no opposition to the proposed expansion was expressed at these meetings. No letters were received from area residents expressing concern. The following issues were raised in the meetings:

- Mr. Jeffries of Kapiolani Medical Center asked that access to the emergency facility not be impeded during project construction.
- Mr. Corcoran of Maryknoll High School asked if the project includes improvements to the west-bound freeway on-ramp on Punahou Street. According to SDOT there will not be any work done on the west-bound on-ramp.
- Mr. Corcoran also raised the issue of impacts that the project might have on mauka-bound traffic on Punahou Street. The response was that there will be no impact. The project design is specific to the off-ramp and makai-bound traffic.
- Ms. Nakamura of Maryknoll High School raised the issue of noise impacts to the school. Ms. Nakamura mentioned that the school had already planned and budgeted for the installation of air conditioning in the classrooms. SDOT stated that they will include Maryknoll High School in the noise analysis.
- Representative Sam Aiona recommended that construction not interfere with the timing of the Punahou School carnival to avoid traffic impacts on the community during that time.

4. Landscaping: *Will any trees be removed for construction? If so will they be replanted near the site or elsewhere? Discuss any proposed landscaping for this project.*
Over the course of the project, the preliminary landscape design may undergo some alteration with additional input from Shriners Hospital, Jodo Mission, and from the landscape architect assisting with the design. Currently, the plan involves the following:

On the Shriners Hospital property, four trees (one plumeria, one mango and two pines) will be removed and six trees (one coconut, two showers and three poincianas) will be relocated to make room for the expansion. The six trees to be relocated will be integrated into the front landscape of the Shriners Hospital. Additionally, a mock orange hedge growing along the existing off-ramp will be removed. A new hedge of salmon hibiscus will be planted along the border of the expanded off-ramp. No other trees or landscaping will be affected on the Shriners property.

On the Jodo Mission property, six trees (five plumeria and one lemon tree) will be removed to accommodate the expansion. Additionally, a mock orange hedge running along the existing property boundary will be removed. In the preliminary landscape plan, 12 new allspice trees will be planted around the parking lot and adjacent to the mission building, and three additional trees of undetermined species will be added to the front landscape.

This information will be published in the Final EA.

5. Visual Impacts: *Section 4.1.2, Noise Impacts, states that noise may be mitigated by construction of roadside acoustical barrier walls. Please discuss the visual impacts of acoustical barrier walls. . .etc.*
A revised acoustical study prepared by Darby and Associates determined that an acoustical barrier wall of sufficient height and length to reduce traffic noise levels by the required 5 dB would be both aesthetically unpleasing and impractical to build. The report recommended an alternate method for mitigating traffic noise - installation of air conditioning in affected buildings. The acoustical barrier wall is no longer being considered for this project. The State is currently developing an agreement on noise mitigation measures with representatives from Jodo Mission.

We believe the issues raised by the community were adequately addressed within the DEA without the need to itemize each point of community contact, particularly in the absence of any opposition to the proposed project.

Finally, proposed modifications to the landscape have been designed to preserve the aesthetic quality of the existing setting while functioning to reduce the visual and noise impacts of the highway traffic. The landscape plan is thus considered to be consistent with a finding of no significant impact. Furthermore, since these modifications occur outside of the Punchbowl Special District, a detailed landscape inventory was not considered necessary for the EA.

If you have any questions, please contact Kevin Ito at 692-7548.

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPIOLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813-5249
PHONE (808) 594-1888
FAX (808) 594-1865

March 24, 1998

Doc. EIS No. 118

Mr. Kevin Ito, Project Engineer
Department of Transportation, Highways Division
State of Hawaii
869 Punchbowl Street
Honolulu, Hawai'i 96815-5097

Re: Public Review Copy of Draft Environmental Assessment (EA) for Interstate Route H1 Punahou Street Off-Ramp Improvements

Dear Mr. Ito:

Thank you, for the opportunity to review the above-mentioned EA for Interstate Route H1 Punahou Street Off-Ramp Improvements. The Office of Hawaiian Affairs has not comments or concerns at this time.

Should you need to contact OHA concerning this EA please contact Colin Kippen, Land and Natural Resources Division Officer or Lynn Lee at 594-1936.

Sincerely,

Randall Ogata
Administrator

Colin Kippen
Land and Natural Resources Division Officer

RO:LL
cc: A. Frenchy DeSoto, Chair
Board of Trustees

Colette Sakoda
R.M. Towill Corporation

HWY-DS
2.9549

May 29, 1998

Mr. Randall Ogata
Administrator
Office of Hawaiian Affairs
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawaii 96813-5249

Dear Mr. Ogata:

Subject: Your Letter Dated March 24, 1998 Regarding the Draft Environmental Assessment Interstate Route H-1 Punahou Street Off-Ramp Improvements, Project No. IM-H1-1(232)

Thank you for reviewing the Draft Environmental Assessment for the proposed Punahou Off-Ramp Expansion project.

We acknowledge that you have no comments to offer at this time. If you have any questions, please contact Kevin Ito at 587-2122.

Very truly yours,

PERICLES MANTHOS
Administrator
Highways Division

WILLIAM J. CAYETANO
GOVERNOR

HERMAN M. AIZAWA, Ph.D.
SUPERINTENDENT

STATE OF HAWAII
DEPARTMENT OF EDUCATION
P O BOX 2360
HONOLULU HAWAII 96804

OFFICE OF THE SUPERINTENDENT

February 27, 1998

MEMO TO: Mr. Kevin Ito, Project Engineer
Highways Division, DOT

F R O M: Herman M. Aizawa, Ph.D., Superintendent
Department of Education

SUBJECT: Punahou Street
Off-Ramp Improvements Draft EA

The Department of Education has no comment on the proposed off-ramp improvements.

Thank you for the opportunity to respond.

HMA:SB:hy

cc: A. Suga, OBS
M. Shishido, HDO
C. Sakoda, R. M. Towill Corporation

HWY-DS
2.9549

May 29, 1998

Herman M. Aizawa, Ph.D.
Superintendent
Department of Education
Queen Liliuokalani Building
1390 Miller Street
Honolulu, Hawaii 96813

Dear Dr. Aizawa:

Subject: Your Letter of February 27, 1998 Regarding the Draft Environmental Assessment Interstate Route H-1 Punahou Street Off-Ramp Improvements, Project No. IM-H1-1(232)

Thank you for reviewing the Draft Environmental Assessment for the proposed Punahou Off-Ramp Expansion project.

We acknowledge that you have no comments on the proposed project. If you have any questions, please contact Kevin Ito at 587-2122.

Very truly yours,

PERICLES MANTHOS
Administrator
Highways Division

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS

March 2, 1998

To: Mr. Kevin Ito, Project Engineer
Department of Transportation, Highways Division

From: Kali Watson, Chairman
Hawaiian Homes Commission

Subject: Interstate Route H-1 Punahou Street Off-Ramp Improvements, Draft Environment Assessment, TMK 2-4-7:01 por. & 2-4-9:06 por. Makiki, Oahu, Dated February 1998

Thank you for the opportunity to review the subject application. The Department of Hawaiian Home Lands has no comment to offer.

If you have any questions, please call Daniel Ornellas at 586-3836.

HWY-DS
2.9549

May 29, 1998

Mr. Kali Watson, Chairman
Hawaiian Homes Commission
Department of Hawaiian Home Lands
Old Federal Building
335 Merchant Street, 3rd Floor
Honolulu, Hawaii 96813

Dear Mr. Watson:

Subject: Your Letter of March 2, 1998 Regarding the Draft Environmental Assessment Interstate Route H-1 Punahou Street Off-Ramp Improvements, Project No. IM-H1-1(232)

Thank you for reviewing the Draft Environmental Assessment for the proposed Punahou Off-Ramp Expansion project.

We acknowledge that you have no comments on the proposed project. If you have any questions, please contact Kevin Ito at 587-2122.

Very truly yours,

PERICLES MANTHOS
Administrator
Highways Division

CHAR SAKAMOTO ISHII LUM & CHING
ATTORNEYS AT LAW

March 20, 1998

Mr. Kevin Ito
State of Hawaii
Department of Transportation
Highways Division
869 Punchbowl Street
Honolulu, Hawaii 96813

Re: Interstate Route H-1, Punahou St. Off-Ramp Improvement Draft Environmental Assessment

Dear Mr. Ito:

I have attended the Jodo Mission of Hawaii for my entire life and I am currently the attorney for the Mission.

The membership of Jodo Mission of Hawaii is predominantly elderly. For many of this membership, Jodo Mission of Hawaii serves as the focal point for their religion and their social life. When H-1 was constructed, it brought the freeway within a few yards of the church. The noise and odors of the heavy traffic using the Punahou offramp immediately adjacent to the church has forced the membership to choose between being able to hear church services or shutting all the windows and suffering the heat. The dilemma is particularly vexing during the most heavily attended services of Bon season which occurs in the summer.

The State's proposal to handle increased traffic in the area by bringing the freeway and traffic intended for the densely populated areas of Makiki and Punahou, and such commercial centers as Waikiki, the Convention Center, and Ala Moana even closer to the church has greatly distressed the membership of Jodo Mission. Assurances that the expansion of H-1 would only marginally increase the noise at ground level is no comfort to the membership that cannot hear church services now and can barely cope with the dust and pollution that is generated by current usage of the offramp. Under these circumstances, even a marginal increase would be intolerable.

The members of the Jodo Mission of Hawaii certainly appreciate the need for the expansion of the Punahou offramp. However, they are unable to bear the burden such an expansion would impose on them in the form of increased noise and pollution upon their place of worship. For many of us, the columbarium within the church holds all of the ancestors we have known. For the

CHAR SAKAMOTO ISHII LUM & CHING

elderly, this place should be a sanctuary for peaceful contemplation of loved ones who have passed away. They should not be forced to risk their health because of increased air pollution or contend with an increase in the constant drone of traffic noise to accomplish the simple task of paying their respects or engaging in the practice of their religious beliefs.

The members of the Jodo Mission of Hawaii would greatly appreciate the State's help in minimizing the deleterious effects of the freeway expansion on their place of worship by considering installation of air conditioning to alleviate the problems of noise and pollution which will be aggravated by the expansion of the Punahou offramp.

Very truly yours,

CHAR SAKAMOTO ISHII LUM & CHING

Michael K. Tanigawa

A LAW CORPORATION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO:
HWY-DS
2.3404

April 14, 1999

Mr. Michael K. Tanigawa
Char, Sakamoto, Ishii, Lum and Ching
Attorneys-at-Law
Davies Pacific Center, Suite 850
841 Bishop Street
Honolulu, Hawaii 96813

Dear Mr. Tanigawa:

Subject: Draft Environmental Assessment (DEA) for Interstate Route H-1
Punahou Street Off-Ramp Improvements, Project No. IM-H1-1(232)

Thank you for your letter dated March 20, 1998, regarding the DEA for the proposed Punahou Off-Ramp Expansion project. We understand the concerns of the Jodo Mission membership regarding noise and air quality impacts associated with the project and share your interest in finding solutions to these issues

In response, an additional acoustical study has been conducted by Darby and Associates to augment an earlier noise analysis prepared for the DEA. The purpose of the study is to assess various mitigation measures for reducing traffic noise impacts at the Jodo Mission.

The State considers the Jodo Mission Temple to be an extremely noise sensitive structure, and based on the results of the acoustical study, air conditioning will be provided for noise abatement. The Jodo Mission will be responsible for all costs to maintain and operate the air conditioning system.

If you have any questions, please contact Kevin Ito at 692-7548.

Very truly yours,

PERICLES MANTHOS
Administrator
Highways Division

ASHFORD & WRISTON
ATTORNEYS AT LAW

March 25, 1998

Post-it® Fax Note 7671 | Date 3-27-98 | # of pages ▶ 3
To Odette Sakada | From Kevin Ito
Co./Dept. RM Towill | Co. DOT
Phone # | Phone #
Fax # 942-1437 | Fax #

Department of Transportation
Highways Division
Technical Design Services Office
State of Hawaii
869 Punchbowl Street, Room 304
Honolulu, HI 96813-5097

Attn: Mr. Kevin Ito, Project Manager and Engineer

Re: Interstate Route H-1 - Punahou Street Off-Ramp Improvements
Comments on Draft Environmental Assessment Dated February 1989

Gentlemen:

As local counsel for Shriners Hospitals for Children we are furnishing to you our comments concerning the Draft Environmental Assessment dated February 1998 for the proposed Punahou Street Off-Ramp widening. The Draft Environmental Assessment mentions various problems which have been addressed in discussions between the State and representatives of the Hospitals. The solutions to these problems have also been discussed, but are not all clearly reflected in the Draft Environmental Assessment. Accordingly, the Hospitals consider it appropriate to provide comments which reflect our mutual recognition of these problems and the solutions we have discussed. The Draft Environmental Assessment does not need to be amended to incorporate them so long as it is clearly understood that such solutions are to be regarded as implicit in the Draft Environmental Assessment's discussion.

1. Air Quality, Noise and Landscaping.(§§1.4;4.1.1;4.1.2;3.1.6;4.2.6.2) The Hospitals are concerned with any significant deterioration in air quality and any significant increase in noise levels. The Draft Environmental Assessment suggests that there should be no significant deterioration in air quality other than for fugitive dust during construction and that any significant increase in noise level is also likely to be a problem only during construction. With the possible exception of the impact on the Orthotics Facility discussed below, we believe that is correct. The State and the Hospitals have agreed that, while the State will need to remove the chainlink fence and mock orange hedge, along with other landscaping, in connection with the taking of, and construction of improvements on, the Hospitals' property, the State will replace the fence and landscaping as approved by the Hospitals. The replaced

HONOLULU OFFICE
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Post Office Box 131
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(808) 674-0993
KAILUA-KONA OFFICE
Kaiulani Tower, Suite 248
75-5722 Kuakini Hwy
Kailua-Kona, HI 96740
Telephone
(808) 329-7705
Facsimile
(808) 329-7529

landscaping should assist in preserving long term air quality and assist in long term noise attenuation. The State should be aware that the building nearest the off-ramp is being planned for use as an Orthotics Facility and, by virtue of its location, is very prone to impact from noise. To the Hospitals' knowledge no calculations have been made concerning the impact to that facility and that impact should be studied. The Draft Environmental Assessment indicates that during construction the contractor will be required to implement dust control and noise suppression measures. We assume that the State will assure that the contractor's hours of work and dust control and noise attenuation efforts will take into account the adverse impact of dust and noise on the Hospitals' operations and will cause the contractor to operate in such a manner as will assure the minimum adverse impact possible. We suggest that the specific measures which may be required to deal with the noise impact to the Orthotics Facility and the specific measures which may be required to be implemented for dust and noise control during construction should be worked out in consultation between the State's engineers and a consulting engineer to be retained by the Hospitals. We suggest that the cost of a consulting engineer for the Hospitals in connection with these and other measures required in connection with the off-ramp improvements should be borne by the State.

2. Demolition of Incinerator, Construction of Cooling Towers.(§1.4) The Draft Environmental Assessment notes the necessity to demolish the Incinerator and to "relocate" the cooling towers to the existing parking lot on the east side of the main hospital building. As we have discussed, in connection with the demolition of the incinerator the State will remove the existing gas line and cap it at its entrance onto the Hospitals' property. Also, as we have discussed, the State will actually not relocate the old towers, but construct new cooling towers at State expense and will preserve the old towers until the new ones are available to the Hospitals for use. The State recognizes that the hospital requires the uninterrupted availability of air conditioning. We suggest that the exact location of the new cooling towers also be worked out in consultation between the State's engineers and a consulting engineer to be retained by the Hospitals. The State has recognized the need for the Hospitals to have the same number of parking stalls it possesses at present. Accordingly, the State has agreed to construct sufficient new stalls to replace any parking lost to the new cooling towers or other State actions, such new stalls to be created through expansion of an existing parking lot in a location approved by the Hospitals. The State has also agreed to repair any damage caused to the property of the Hospitals by the State's activities, including its use of hospital property for a staging area. This obligation of repair includes replacement of landscaping and repair, resurfacing, marking and striping of driveways and parking areas.

3. Storm Waters and Drainage (§§4.1.4;4.1.6) The Draft Environmental Assessment notes that the Makiki Stream crosses the property in an underground

CORRECTION

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

ASHFORD & WRISTON

ATTORNEYS AT LAW

March 25, 1998

Post-it® Fax Note	7671	Date 3-27-98	# of pages ▶ 3
To Colette Sakata		From Kevin Ito	
Co./Dept. RM Towill		Co. DOT	
Phone #		Phone #	
Fax # 942-1937		Fax #	

Department of Transportation
Highways Division
Technical Design Services Office
State of Hawaii
869 Punchbowl Street, Room 304
Honolulu, HI 96813-5097

Attn: Mr. Kevin Ito, Project Manager and Engineer

Re: Interstate Route H-1 - Punahou Street Off-Ramp Improvements
Comments on Draft Environmental Assessment Dated February 1989

Gentlemen:

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KAPOLEI OFFICE — Pacific Guardian Center, Makai Tower, Suite 2120, 733 Bishop Street, Honolulu HI 96813 — Telephone (808) 539-0400, Facsimile (808) 539-0402
MAUI OFFICE — Maui Marketplace, Suite 310, 1000 Kamehameha Highway, Wailuku HI 96793 — Telephone (808) 242-4535, Facsimile (808) 242-4536
KAILUA-KONA OFFICE — Kaiulani Tower, Suite 208, 75-5722 Kuakini Hwy, Kailua-Kona HI 96740 — Telephone (808) 329-7706, Facsimile (808) 329-7529

landscaping should assist in preserving long term air quality and assist in long term noise attenuation. The State should be aware that the building nearest the off-ramp is being planned for use as an Orthotics Facility and, by virtue of its location, is very prone to impact from noise. To the Hospitals' knowledge no calculations have been made concerning the impact to that facility and that impact should be studied. The Draft Environmental Assessment indicates that during construction the contractor will be required to implement dust control and noise suppression measures. We assume that the State will assure that the contractor's hours of work and dust control and noise attenuation efforts will take into account the adverse impact of dust and noise on the Hospitals' operations and will cause the contractor to operate in such a manner as will assure the minimum adverse impact possible. We suggest that the specific measures which may be required to deal with the noise impact to the Orthotics Facility and the specific measures which may be required to be implemented for dust and noise control during construction should be worked out in consultation between the State's engineers and a consulting engineer to be retained by the Hospitals. We suggest that the cost of a consulting engineer for the Hospitals in connection with these and other measures required in connection with the off-ramp improvements should be borne by the State.

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3. Storm Waters and Drainage.(§§4.1.4;4.1.6) The Draft Environmental Assessment notes that the Makiki Stream crosses the property in an underground

culvert and suggests that there should be no adverse impact on the property arising from the construction or improvements. The Hospitals understands that the State will require its engineers to take whatever steps are necessary to assure that the Hospitals' property is not exposed to damage by flood or storm waters in the course of construction or thereafter as a consequence of the off-ramp widening. We suggest that this is also an area for discussion and agreement among the State's engineers and the Hospitals' consulting engineer.

4. Traffic.(§§1.5;4.2.1;4.2.4) The Draft Environmental Assessment recognizes and addresses most traffic impacts which the Hospitals can envision. The one potential impact not specifically addressed is the possible effect that the improvements and increased flow of traffic on Punahou Street might have on the entrance to and exit from the hospital. Solutions to this potential problem should be considered and we suggest that this is another issue which can best be addressed by the State's engineers and the Hospitals' consulting engineer.

5. Visual Impact.(§4.2.6.1) We assume the State agrees that avoidance of adverse visual impact to the Hospitals' property during and after construction by the State of the off-ramp improvements is implicit in the State's undertakings in the Draft Environmental Assessment.

Please contact the undersigned if you have any questions or comments concerning the foregoing.

Very truly yours,

G. James Wriston, Jr.

A. James Wriston, Jr.

cc: Mrs. Collette Sakoda, Project Manager, R. M. Towill Corporation
Edward C. Castagna, Jr., Esq., Senior Associate Counsel
Mr. James B. Brasel, Administrator

0195908.01

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097
April 14, 1998

IN REPLY REFER TO
HWY-DS
2.3405

Mr. A. James Wriston, Jr.
Ashford and Wriston
Attorneys-at-Law
P.O. Box 131
Honolulu, Hawaii 96810

Dear Mr. Wriston:

Subject: Draft Environmental Assessment (DEA) for Interstate Route H-1 Punahou Street Off-Ramp Improvements, Project No. IM-H1-1(232)

Thank you for your letter dated March 25. 1998, regarding the DEA for the proposed Punahou Off-Ramp Expansion project.

As is noted in your comments, past discussions between the Shriners Hospitals and the State have identified and recommended solutions to problems resulting from the proposed expansion project. While the DEA does not detail the agreements reached in those discussions, we concur with your understanding that the agreed upon solutions are implicit in the DEA.

With respect to the specific items in your letter, the State stands behind its previous agreements with the Shriners Hospitals. Responses to individual items are discussed below.

Item 1- Air Quality, Noise, and Landscaping
To assist in preserving long-term air quality and assist in long-term noise attenuation, the State agrees to replace all fencing and boundary landscaping removed during construction.

Regarding noise impacts to future developments at Shriners Hospital, specifically to the proposed orthotics facility, the State has completed a study of noise impacts to the planned facility. Based on construction plans provided by Shriners Hospital, the Study determined that traffic noise levels inside the future orthotics facility will be less than the State's recommended interior noise levels of 52 dBA. Abatement measures will therefore not be needed.

Item 2 - Demolition of the Incinerator and Construction of Cooling Towers
The State agrees to the following:

- In connection with the demolition of the hospital incinerator, the State shall remove the incinerator gas line and cap it at its entrance onto the Hospital property.
- To maintain uninterrupted availability of air conditioning to the hospital, the State shall preserve the existing cooling towers until new cooling towers are constructed and functioning. The new cooling towers shall be constructed at the State's expense.
- The State shall construct new parking stalls to replace parking lost to the new cooling towers. The new stalls shall be created through expansion of the existing parking lot, as shown on the project plans.
- The State shall repair any damage to Hospital property caused by project activities.

Item 3 - Storm Waters and Drainage
The State's contractor will develop best management practices to protect the Hospital's property from damage by storm waters during construction. The proposed project will result in no adverse impacts to Makiki Stream. Construction activities and off-ramp modifications in proximity to Makiki Stream will not adversely impact Shriners Hospital property.

Item 4 - Traffic
The State recognizes the need for further discussion to determine how best to address potential impacts to the Hospital's entrance/exit way due to the proposed improvements. An additional traffic study will be conducted to determine any impacts and solutions. Results of the study will be included in the Final EA.

Item 5 - Visual Impacts
The State agrees that avoidance of adverse visual impacts to Shriners Hospitals property is implicit in the State's undertakings described in the DEA for the Punahou Street Off-Ramp Improvements.

With respect to costs for a consulting engineer, the State maintains that the construction plans were prepared by highly qualified, licensed, professional engineers. The State is confident that project design will meet all state, federal, and local requirements. Thus, any consultant engineering services deemed necessary by the Shriners Hospital for the proposed improvements shall be retained at the hospital's expense.

If you have any questions, please contact Kevin Ito at 692-7548.

Very truly yours,

PERICLES MANTHOS
Administrator
Highways Division

The Senate

The Nineteenth Legislature

of the

State of Hawaii

STATE CAPITOL

HONOLULU, HAWAII 96813

March 25, 1998

VIA FACSIMILE 587-2342
and REGULAR U.S. MAIL

Mr. Kevin Ito, Project Engineer
Department of Transportation
Highways Division
State of Hawaii
869 Punchbowl Street
Honolulu, HI 96813-5097

VIA FACSIMILE 842-1937
and REGULAR U. S. MAIL

Mrs. Colette Sakoda, Project Manager
R. M. Towill Corporation
420 Waiakamilo Road, Suite 411
Honolulu, HI 96817-4941

SUBJECT: Comments on Draft Environmental Assessment (EA)
For Interstate H-1 Punahou Street Off-Ramp Improvements

Dear Mr. Ito and Mrs. Sakoda:

Attached are our comments on the Draft Environmental Assessment (EA) for the Interstate H-1 Punahou Street Off-Ramp Improvements. As elected representatives of districts which will be impacted by the expansion of the eastbound H-1 Punahou off-ramp, we appreciate the opportunity to submit these comments for your consideration in the preparation of a Final Environmental Assessment.

Based on discussions and comments from area residents, business and community organizations, we believe that a number of critical issues pertaining to noise and air pollution remain to be adequately addressed.

We believe that our joint efforts can resolve most of them, and hope that the final environmental impact statement for the Interstate H-1 Punahou Street Off-Ramp Improvements will develop thoughtful and beneficial solutions.

Sincerely,

CAROL FUKUNAGA
Senator, 12th District

BRIAN TANIGUCHI
Senator, 11th District

Attachment

LEGISLATIVE COMMENTS ON THE
DRAFT ENVIRONMENTAL ASSESSMENT (EA)
FOR INTERSTATE ROUTE H-1 PUNAHOU STREET OFF-RAMP IMPROVEMENTS

The Route H-1 Punahou Street Off-Ramp project has raised a number of noise and related issues expressed by neighboring landowners. In particular, the Jodo Mission of Hawaii, located at 1429 Makiki Street, property TMK 2-4-09-6, is extremely concerned about the proposed encroachment of the off-ramp into its property. The encroachment of the off-ramp on the Jodo Mission's temple building will dramatically increase noise and air pollution problems, which will impact the main temple area and subject all users of the facility to those problems.

Noise Level Standards

As indicated in the Draft Environmental Assessment (EA), the recommended maximum noise level standard of 67 dBA, for churches and hospitals, is applicable to the Jodo Mission and Shriner's Children Hospital. The EA states that "At the Jodo Mission, this level is now exceeded by approximately 4 to 6 dBA. Similar conditions exist at locations mauka of the proposed project site, including Maryknoll High School and Arcadia Retirement Residence." (emphasis added)

The EA further states that "traffic noise impacts that 'approach or exceed' the Federal Highway Administration's noise abatement criteria suggest a need for mitigative action." In a survey of eight test sites, including the Jodo Mission, the EA states that four of the eight test sites "currently 'approach or exceed' FHWA noise abatement criteria and five sites are forecast to do so for both the future 'build' and 'no build' conditions. That is, even without the project, traffic noise levels will trigger HDOT noise abatement criteria through the year 2020." (emphasis added)

The EA also indicates that "exterior-interior noise level reductions characteristic of naturally ventilated buildings generally range from 9 to 12 dB. Based on a reduction of 12 dB, the existing interior noise levels at the Jodo Mission and Maryknoll High School exceed 52 dBA which is the interior noise level for schools and churches cited in the Noise Abatement Criteria."

It is anticipated that the various phases of construction will generate significant noise which could impact nearby noise sensitive areas. Short-term noise impacts would involve excavating, grading, and paving of the off-ramp.

To alleviate the noise conditions, the EA list of possible measures includes constructing roadside acoustical barrier walls, and providing air-conditioning for impacted dwellings. We understand that efforts have been made by the design team to minimize the impact of the encroachment to preserve the bon dance and other outdoor ceremonial service areas of the Jodo Mission. However, we believe that the acoustical barrier walls will not meet the full noise impact nor the long-term situation which would exist at the Jodo Mission when the expanded off-ramp is located immediately adjacent to the temple building. We believe that the better solution would be to provide air conditioning for the entire temple building, as is being done with the Honolulu International Airport Noise Attenuation Iroquois Point Elementary School project.

Air Pollution

The Interstate Route H-1 Punahou Street Off-Ramp is a major intersection which maintains a heavy volume of traffic and resultant pollution from motor vehicles. As indicated in the EA, "If the proposed project is given the necessary approvals to proceed, it is inevitable that some short- and long-term impacts on air quality will occur either directly or indirectly as a consequence of the project construction phase. Short-term impacts from fugitive dust will likely occur during the project construction phase." It further points out that air quality at the project site is relatively good at present, "Except possibly for areas near traffic-congested intersections."

The Jodo Mission serves approximately 850 families of which a large number of them are aged and have hearing and respiratory problems. Heightened activity on the off-ramp, during and following construction, would likely aggravate the health conditions of the Mission's members, and solutions beneficial to their well-being, as well as to other residents in the area, need to be fully explored.

We believe that solutions for negative noise and air pollution impacts identified in the Jodo Mission, Shriner's Hospital, Kapiolani Health Center, Arcadia and Maryknoll High School areas in the Draft Environmental Assessment have not been adequately addressed. We are encouraged that several community respondents have taken the time to identify these impacts and to urge their resolution.

We offer our assistance in facilitating community participation to insure that the negative impacts which have been identified during this public comment process can be resolved as rapidly as possible.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

MAY 10 1999

IN REPLY REFER TO:
HWY-DS
2.3401

The Honorable Carol Fukunaga, Co-Chair
Senate Committee on Ways and Means
Nineteenth State Legislature
State Capitol, Room 210
Honolulu, Hawaii 96813

The Honorable Brian Taniguchi, Co-Chair
Senate Committee on Economic Development
Nineteenth State Legislature
State Capitol, Room 219
Honolulu, Hawaii 96813

Dear Senators Fukunaga and Taniguchi:

Subject: Draft Environmental Assessment (DEA) for Interstate Route H-1 Punahou Street Off-Ramp Improvements, Project No. IM-H1-1(232)

Thank you for your letter dated March 25, 1998, regarding the Draft Environmental Assessment for the proposed Punahou Off-Ramp Expansion project. We understand your concerns regarding noise and air quality impacts associated with the project and share your interest in addressing these issues

In response to your comments we offer the following information:

1. Noise Level Standards
   In response to noise impact concerns, an additional acoustical study has been conducted by Darby and Associates, acoustical consultants, to augment an earlier noise analysis prepared for the DEA. The updated study determined that an acoustical barrier wall of sufficient height and length to reduce traffic noise levels by the minimum 5 dB required to meet HDOT standards would be both aesthetically unpleasing and impractical to build. Therefore, the acoustical barrier wall is no longer being considered for this project.

   As an alternative method for mitigating traffic noise, the report recommends the installation of air conditioning in impacted buildings. Compared to naturally ventilated buildings, air conditioning is estimated to provide a traffic noise level reduction of 15 dB in building interiors.

The State considers the Jodo Mission Temple to be an extremely noise sensitive structure. Based on the results of the acoustical study, the State will provide air conditioning for noise abatement within the temple building. The State's responsibility will be limited to the initial furnishing and installation of a fully functional air conditioning system. All costs to keep the system functional, including but not limited to, maintenance and operation, repair, and replacement will be the sole responsibility of the Jodo Mission.

Regarding noise impacts to building interiors at Shriners Hospital, specifically to the proposed orthotics facility, the State has completed a study of noise impacts to the planned facility. Based on construction plans provided by Shriners Hospital, the study determined that traffic noise levels inside the future orthotics facility will be less than the State's recommended interior noise level of 52 dBA. Abatement measures will therefore not be needed.

With regards to Maryknoll High School and Arcadia Retirement Residence, existing noise levels at those locations currently exceed abatement criteria. The proposed ramp widening will cause an increase in noise levels of only 1 dB. Because noise levels are already exceeded under existing conditions, and only a minor increase will result from the proposed improvements to the makai off-ramp, noise abatement will not be undertaken for Maryknoll High School and Arcadia Retirement Residence during this project. Noise abatement for those locations would be considered when improvements are made to the Punahou on-ramp on the mauka side of H-1, or during freeway widening.

2. Air Pollution

As indicated in Section 4.1.1 of the DEA, potential impacts to air quality from the proposed project are primarily attributable to construction activities and are therefore temporary in nature. These impacts will cease when construction is completed. Furthermore, mitigation measures to minimize dust and exhaust emissions from construction activities will be employed by project contractors in compliance with State of Hawaii, Department of Health air pollution control regulations (DOH Rules Title 11, Chapter 59 and 60). Every effort will be made to reduce short-term air quality impacts resulting from construction activities.

With regards to long-term impacts to air quality resulting from traffic increases, analysis performed by B. D. Neal and Associates for the DEA is summarized in Section 1.4 and Section 4.1.1. As noted in your letter, air quality in the project vicinity is relatively good at present. Occasional exceeding of State standards for air quality, however, do occur during peak traffic conditions. Likewise, future scenarios modeled with and without the proposed expansion produced estimated worst-case carbon monoxide (CO) concentrations in excess of State standards. Projected estimates of maximum CO concentrations during peak morning hours with the proposed expansion actually predict a slight improvement in air quality compared to existing conditions (refer to Table 1-1 of the DEA)

Based on this analysis, we believe that the expanded off-ramp's contribution to projected increases in traffic-related air pollution is minimal.

If you have any questions, please contact Kevin Ito at 692-7548.

Very truly yours,

KAZU HAYASHIDA
Director of Transportation

THE HOLY TEMPLE OF THE PURE LAND BUDDHISM
JODO MISSION OF HAWAII
1429 MAKIKI ST. • HONOLULU, HI 96814 • PHONE (808) 949-2885 • FAX (808) 941-4818

March 20, 1998

State of Hawaii, Dept. of Transportation
Highways Division, Attn: Mr. Kevin Ito
869 Punchbowl Street
Honolulu, HI 96813

Subject: Interstate Route H-1, Punahou St. Off-Ramp Improvement
Draft Environmental Assessment

1. Introduction: The Jodo Mission of Hawaii property TMK 2-4-09-6 prior to the construction of the H-1 freeway extended quite extensively into the current H-1 freeway. Back then this temple served over 2,000 families with our current entry on Makiki street and easy access from both Beretania Street and Wilder Avenue. Currently we are now at the end of the cul-de-sac on Makiki St serving approximately 850 families of which a great number of them are aged and have hearing and respiratory problems. We are almost certain that the H-1 construction pre-dated the National Environtal Protection Act which we are not certain what impact it would have then.

2. We had number of discussions with you and several documents relating to the scope of this project especially in the area of our yard area and noise. We appreciate the efforts of the design team to minimize the encroachment of the yard area to preserve our religious bon dance and other outdoor ceremonial service area. We also appreciate the cooperation for the redesigning of the parking stalls in maintaining the same number of stalls and the preservation of our landscaping.

3. We have continuously expressed our concern with the encroachment of the off-ramp almost right against our temple building creating the noise and air pollution problems. We have especially addressed the noise problem where the draft environmental assessment cites a "possibly a roadside acoustical barrier walls and air conditioning" will be provided.

a. Our temple is a permanent concrete structure measuring approximately 45 feet wide and 120 feet in length with two stories and a full basement.

1). The first floor is the administrative area with several administrative offices, machine room, lounge, etc. This first floor is approximately 8 feet above ground level.

2). Our worshipping area is on the second floor approximately 30 feet above ground level with very high ceiling. This second floor includes the altar, 42 pews seating 10 persons on each pew and a columbarium back of the altar for 730 niches.

3). Immediately below the columbarium on the ground level is our secondary worshipping, meeting and activities area.

4). There is a full basement approximately eight feet below ground level with a library, store rooms and additional guest rooms.

5). The usage of these areas by number of persons and the times were provided to you on March 18, 1998. Verbal telephonic addition to this usage information was provided to you on March 19, 1998 stating that there are 10 - 20 persons daily visiting the columbarium paying their respects to their deceased. These visits normally averages 15 minutes per visit per person similar to one visiting one's grave site.

b. As explained above, the temple structure is high above the ground level with the roof line approximately 50 feet high. The noise and air pollutions have a very detrimental affect on our daily operation and membership. We doubt the roadside acoustics barrier of twelve feet mentioned by members of the design team will alleviate the air and especially the noise problem.

c. Relocation to a reasonable centrally located area or just relocating the present structure back safe from the noise and air pollution maybe other options but surely would be cost prohibitive.

d. Air conditioning the entire temple building seems to be the most effective and reasonable option on the long term and especially for the short term where high costs for air and noise pollution protection must be provided during the construction phase.

5. We again thank you for your cooperation and hopefully we can reach an amiacable agreement.

Sincerely,

David Miyamoto
President

Teruto Soma
Ad Hoc Committee Chmn

Copy to: Sen. Norman Mizoguchi, State Capitol, fax #586 6819
Sen. Carol Fukunaga, State Capitol, fax #586 6899
Sen. Brian Taniguchi, State Capitol, fax #586 6461
Rep. Ed Case, State Capitol, fax #586 8479
Mr. Michael Tanigawa, CHAR HAMAMOTO ISHII LUM & CHING
fax #522 5144

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO:
HWY-DS
2.3402

April 14, 1999

Mr. David Miyamoto, President
Mr. Teruto Soma, Chairman
Jodo Mission of Hawaii
1429 Makiki Street
Honolulu, Hawaii 96814

Dear Messrs. Miyamoto and Soma:

Subject: Draft Environmental Assessment (DEA) for Interstate Route H-1 Punahou Street Off-Ramp Improvements, Project No. IM-H1-1(232)

Thank you for your letter dated March 20, 1998, regarding the DEA for the proposed Punahou Off-Ramp Expansion project. We understand the concerns of the Jodo Mission membership regarding noise and air quality impacts associated with the project and share your interest in finding solutions to these issues.

In response, an additional acoustical study has been conducted by Darby and Associates to augment an earlier noise analysis prepared for the DEA. The purpose of the study is to assess various mitigation measures for reducing traffic noise impacts at the Jodo Mission.

The updated acoustical study has initially determined that an acoustical barrier wall of sufficient height and length to reduce traffic noise levels by the minimum 5 dB required to meet HDOT standards would be both aesthetically unpleasing and impractical to build. Therefore, the acoustical barrier wall is no longer being considered for this project.

As an alternative method for mitigating traffic noise, the report recommends the installation of air conditioning in impacted buildings. Compared to naturally ventilated buildings, air conditioning is estimated to provide a traffic noise level reduction of 15 dB in building interiors. Based on the findings of the new acoustical analysis, and due to the fact that the Jodo Mission Temple is extremely noise sensitive and that a severe traffic noise impact exists, the State will provide air conditioning for the temple building. Although the State will provide air conditioning as a means of noise abatement, the Jodo Mission will be responsible for all costs to operate and maintain the system.

If you have any questions, please contact Kevin Ito at 692-7548.

Very truly yours,

PERICLES MANTHOS
Administrator
Highways Division